

DOG MEADOW  
TIMBER SALE PROJECT



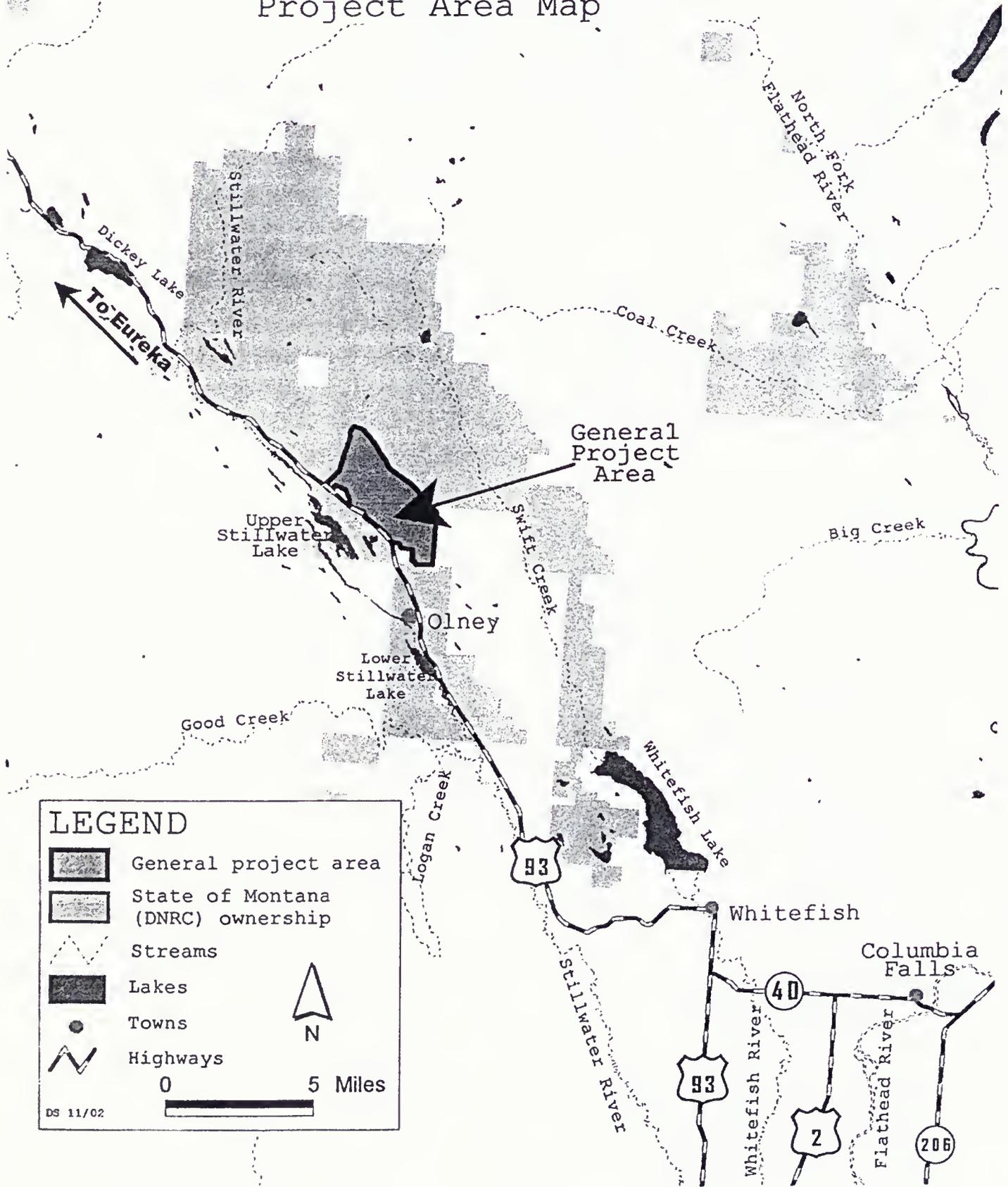
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Environmental Assessment  
January 2003

# Dog Meadow Timber Sale Project Area Map



**LEGEND**

- General project area
- State of Montana (DNRC) ownership
- Streams
- Lakes
- Towns
- Highways

0 5 Miles

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FINDING  
PROPOSED DOG MEADOW TIMBER SALE PROJECT  
STILLWATER STATE FOREST

An interdisciplinary team (ID Team) has completed the Environmental Assessment (EA) for the proposed Dog Meadow Timber Sale Project.

After a thorough review of the EA, project file, public correspondence, Department policies and standards, and the State Forest Land Management Plan (SFLMP), I have made the following 3 decisions:

1. **ALTERNATIVE SELECTED - Action Alternative B**

Two alternatives are presented and were fully analyzed in the EA:

- No-Action Alternative A, includes existing activities, but does not include a timber sale.
- Action Alternative B proposes harvesting approximately 8.5 million board feet (MMBF) of timber over an estimated 939 acres; builds roughly .3 mile of short, temporary jump-up and extension roads, which will be reclaimed after harvesting activities are completed; and interplants western larch, rust-resistant western white pine, and a small number of ponderosa pine in the areas that will be harvested.

I have selected Action Alternative B with the requirement that mitigations and specifications identified in the EA will be implemented as prescribed.

Alternative B has been selected for the following reasons:

- Action Alternative B meets the Purpose of Action and the specific project objectives listed on pages I-1 and I-2 of the EA.
- The analyses of identified issues did not reveal information to persuade the Department to choose the No-Action Alternative prior to this decision.
- Action Alternative B includes adjustments, modifications, mitigations, and activities to address concerns expressed by the public, including, but not limited to:
  - 1) The project was designed to minimize impacts to commercial revenue-generating activities, primarily winter recreational-use operations, within the project area by limiting winter hauling to 1 year on roads permitted for commercial winter recreational use.
  - 2) Harvesting will concentrate in areas dominated by tree species most susceptible to insect and disease problems (subalpine fir, grand fir, Douglas fir, lodgepole pine, and severely mistletoe-infected western larch).
  - 3) Stands classified as old growth were avoided.
  - 4) Concerns over clearcutting were addressed by implementing design features to reduce the size and impact of openings, and provide buffers between roads and harvest units.
  - 5) Natural spatial distributions and spatial patterns were considered on a landscape scale for placement of harvest units.

- 6) Stand covertypes and tree age classes, in reference to historic conditions, were considered at a landscape scale. Treatments were designed to move the forest toward historic conditions.
  - 7) Harvest units were designed to reduce fragmentation of large continuous timber stands and considered connectivity for wildlife species.
  - 8) Existing roads were surveyed to identify surface-drainage problems that could be improved or eliminated. Those identified will be addressed as part of the proposed project.
  - 9) Best Management Practices (BMPs) will be implemented.
  - 10) Streamside Management Zones (SMZs) will be protected.
- DNRC is required to administer these lands to produce the largest measure of reasonable and legitimate long-term return for beneficiaries (*Montana Codes Annotated 77-1-202*). DNRC meets this obligation by managing intensively for healthy and biologically diverse forests.
  - The proposed timber sale project contributes to harvest levels mandated by State Statute (*Montana Codes Annotated 77-5-222*).

2. **SIGNIFICANCE OF IMPACTS - No impacts are determined to be significant.**

I find that none of the project impacts are regarded as severe, enduring, geographically widespread, or frequent. Further, I find that the quantity and quality of various resources, including any that may be considered unique or fragile, will not be adversely affected to a significant degree. I find no precedent for future actions that would cause significant impacts, and I find no conflict with local, State, or Federal laws, requirements, or formal plans. In summary, I find that the identified adverse impacts will be avoided, controlled, or mitigated by the design of the project to an extent that they are not significant.

- **Vegetation** - None of the timber-stands harvested by Action Alternative B are classified as old growth. Although a potential exists for blowdown in old-growth stands adjacent to harvest units, the harvest units may also provide an opportunity for a fuel break in the event of a wildfire. Treatments harvest trees that were infested with bark beetles; retain trees that are more resistant to insect and disease attacks; retain species that are less susceptible to root and stem rots; and, regenerate a tree-species composition that is more diverse. Most of the stands entered have been entered previously. The proposed harvest will convert 546 acres of overrepresented covertypes (mixed-conifer, subalpine fir, and lodgepole pine) to an underrepresented coertype (western larch/Douglas fir). An estimated 614 acres of 40-to-99-year, 100-to-old stand, and old-stand age classes will convert to the 0-to-39-year age class. Where available, approximately 2 to 5 snags per acre will be retained. Four known populations of sensitive plants have been documented on State trust land near where harvesting activities are proposed. The meadows, wetlands, and fens where these plants are located were buffered with retention trees and vegetation to reduce direct impacts or limit increases in water level.
- **Noxious Weeds** - Heavy equipment used for sale activities will be washed thoroughly before being brought on site; disturbed areas will be seeded with a native grass seed mix concurrently with disturbance. Site-

specific herbicide spraying will occur prior to harvesting activity on all haul roads. Monitoring will take place to provide for early detection and treatment of noxious weed infestations.

- **Hydrology** - Proposed activities are expected to increase water yield in the Dog Creek watershed by 2.9 percent, from 4.9 to 7.8, which is not sufficient to create unstable stream channels and is well below the allowable threshold level of 12 percent. Equivalent clearcut acres (ECA) will increase by 701 from 1,037 to 1,738, which is well below the allowable ECA of 2,838. Several stream crossings on Dog Creek will be replaced and will contribute sediment during construction. However, operational timing, use of sediment fences, and other mitigation measures will substantially limit the amount of sediment. These improvements will result in a long-term reduction in sediment delivery at these sites.
- **Wildlife** - Approximately 939 acres of forest canopy will be opened to varying degrees. However, patch sizes will increase, and connectivity will be retained through buffer areas; those species that use edge and open habitats will benefit, and those species associated with old stands will have reduced habitat. No harvesting will occur within the nest or primary use area for the Upper Stillwater Lake nesting eagle pair. Although harvest activities will occur across Highway 93 from Dog Lake (identified as foraging habitat), this eagle pair is conditioned to disturbance by living adjacent to an active railroad and a lake that receives extensive recreational use. As such, I do not believe harvesting will limit their available forage. There will be temporary disturbance that may impact grizzly bears. However, long-term open and total-road density will not increase, and considerable hiding cover will remain. No substantive change in wolf use is expected. Activities are not proposed within areas of high hare use or potential lynx denning habitat. Most harvesting avoids habitats typically preferred by fisher. Only 4 acres of pileated woodpecker nesting habitat will be impacted by harvest treatments, although recruitment of future nesting trees will be reduced. Continued widespread use of the forest by pileated woodpeckers is expected. Some thermal and hiding cover will be reduced for big game, but the magnitude of these changes is expected to have negligible impacts to big game survival.
- **Economics** - The proposed project will generate approximately \$1,212,600 in net income for the associated trust beneficiaries and \$1,675,000 in total State net income. The level of harvesting represents support for 94 jobs for 1 year with an average estimated income of \$3,016,500.
- **Soils** - Action Alternative B will impact less than 15 percent of the harvested areas with these impacts, minimized by use of existing skid trails and soil-moisture restrictions on timing of operations. Prescribed mitigation measures will also provide sufficient downed woody debris for nutrient needs and erosion control. Impacts to soil resources are within DNRC standards in the SFLMP.

- **Precedent Setting and Cumulative Impacts** - The project area is located on State-owned lands that are "principally valuable for the timber that is on them or for growing timber or for watershed protection" (Montana Codes Annotated 77-1-402). Since the EA does not identify future State actions that are new or unusual, the proposed timber sale project is not setting precedence for a future action with significant impacts.

Taken individually and cumulatively, the impacts of the proposed timber sale are not significant. The proposed activities are common practices and none are being conducted on important fragile or unique sites.

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

3. **SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)? - No**

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

- The EA adequately addressed the issues identified during project development and displayed the information needed to make the decisions.
- Evaluation of the potential impacts of the proposed Dog Meadow Timber Sale Project indicates that no significant impacts will occur.
- The ID Team provided adequate opportunities for public review and comment. Public concerns were incorporated into the project design and analysis of impacts.

Robert L. Sandman



Unit Manager

Stillwater/Swan State Forests

January 30, 2003

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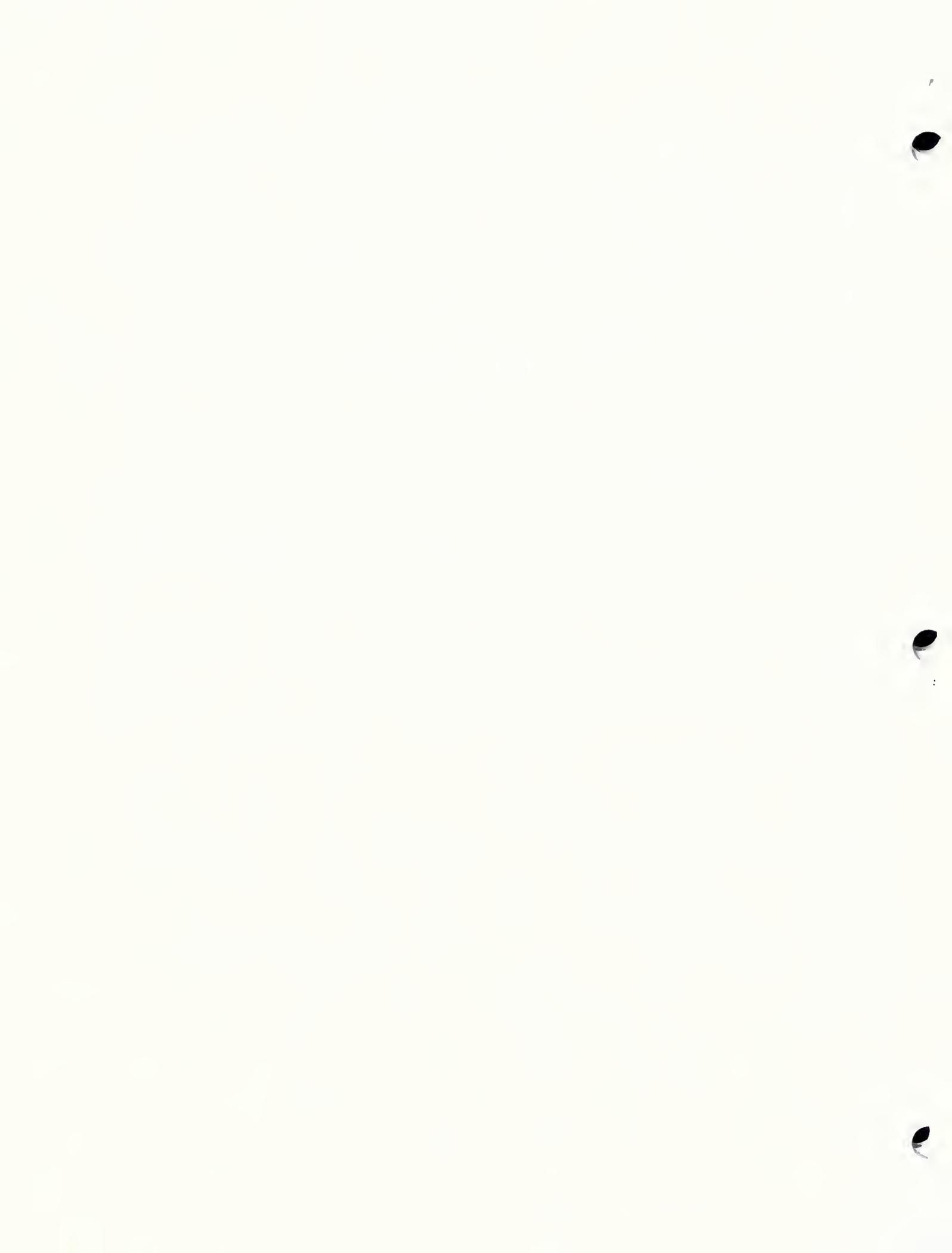
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### ACRONYMS (Front of back cover)



**ENVIRONMENTAL  
ASSESSMENT**

**CHAPTER I**

**PURPOSE AND NEED**



# DOG/MEADOW TIMBER SALE PROJECT ENVIRONMENTAL ASSESSMENT

## CHAPTER I PURPOSE AND NEED

### INTRODUCTION TO PROPOSED ACTION

The Department of Natural Resources and Conservation (DNRC), Stillwater Unit, is proposing the Dog/Meadow Timber Sale Project. The project proposes to harvest timber and improve road drainage and stream crossings.

The gross project area encompasses approximately 5,000 acres. The project area, north of Olney, is adjacent to Highway 93 and runs east to the toe of Stryker Ridge. All or portions of Sections 7, 17, 18, 19, 20, 21, 28, 29, 30, 32, and 33, T33N, R23W, and Sections 12, 13, and 24, T33N, R24W, are included in the project area (see *PROJECT AREA MAP* on the back of the front cover). The school trusts involved in the proposed actions include Public Schools (C.S.), Agricultural College (Morrill Grant) (A.C.B.), Public Building (P.B.), and State Reform School (S.R.S).

Two alternatives, an action and a no-action, are being analyzed. If the action alternative were selected, an estimated 8.5 million board feet (MMBF) of timber would be harvested from approximately 939 acres of the analysis area. Harvesting would be accomplished using a variety of silvicultural treatments. The type of treatment selected for each stand would depend upon the existing condition and the desired future condition for that particular stand. Existing roads and short spur roads that would be built for temporary use would access the proposed harvest units. The

temporary spur roads would be built to minimum standards and reclaimed after harvesting activities are completed. Adding ditch and surface-drainage structures, graveling segments of road, and installing culverts where needed would improve existing roads in the project area. All stream crossings on access roads would be examined to ensure that they comply with Best Management Practices (BMPs); improvements would be made as needed.

### PURPOSE OF THE PROPOSED ACTION

The lands involved in the proposed project are held in trust by the State of Montana for the support of specific beneficiary institutions, such as public schools, State colleges and universities, and other specific State institutions, such as the School for the Deaf and Blind (*Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11*). The Board of Land Commissioners (Land Board) and DNRC are legally required to administer these trust lands to produce the largest measure of reasonable and legitimate long-term return for these beneficiary institutions (*Section 77--1-202, Montana Codes Annotated [MCA]*). On May 30, 1996, DNRC released the Record of Decision for the State Forest Land Management Plan (SFLMP). The Land Board approved the implementation of the SFLMP on June 17, 1996. The SFLMP outlines DRNC's management philosophy for forested State trust lands and provides specific Resource

Management Standards for 10 resource categories.

DNRC manages the forested State trust lands according to the philosophy and standards in the SFLMP, which states:

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

#### PROPOSED OBJECTIVES

To meet the goals of the management philosophy adopted through a programmatic review of the SFLMP, DNRC has set specific objectives for the Dog/Meadow Timber Sale Project:

- Harvest 6 to 10 MMBF of sawtimber to generate revenue for the appropriate school trusts. As mandated by State Statute 77-5-222 MCA, the proposed harvest would also contribute toward maintaining DNRC's sustained-yield requirements.
- Provide funding for completion of site improvements needed to promote long-term water quality and maintain existing road systems. Existing roads and stream crossings in the project area would be improved to ensure that adequate road drainage, water quality, and safety standards set forth by current BMPs are met. Specific design criteria may need to be engineered to address any known sources of sediment in the Dog Creek and Meadow Creek watersheds.
- Implement management activities that would bring the forest toward desirable appropriate conditions. Timber harvesting would be used to

promote biodiversity on State-owned lands by managing for appropriate stand structures and species compositions. Ecological characteristics, such as landtype, habitat type, disturbance regime, and unique attributes, would be used to determine appropriate stand structures and compositions. Harvesting would maintain or improve the long-term productivity of timber stands by increasing stand vigor, reducing incidence of, and potential for, insect infestations and disease infections, regenerating portions of the stands where overall timber-stand growth is decreasing, and reducing the risk for high-intensity, stand-replacement wildfires.

#### RELATIONSHIP TO THE SFLMP

The SFLMP is a programmatic plan that provides field personnel with consistent policy, direction, and guidance for the management of State forested lands. It contains the general philosophies and management standards that provide the framework for project-level decisions.

The SFLMP guided the planning of the proposed Dog/Meadow Timber Sale Project. Its philosophy and appropriate Resource Management Standards have been incorporated into the design of the proposed actions. The Dog/Meadow Timber Sale Project Environmental Assessment (EA) is not intended as a programmatic or area plan and is limited to addressing specific proposed actions in reference to issues that were identified through public involvement and Interdisciplinary Team (ID Team) input.

#### EA PROCESS

##### EA DEVELOPMENT

This EA was prepared in compliance with the Montana Environmental Policy Act (MEPA) of 1971. The intent of MEPA is to foster better

decisions and wise actions by ensuring that relevant environmental information is available to public officials and citizens before decisions are made and actions are taken. MEPA requires the State government to consider environmental impacts in its decisionmaking process. MEPA also requires the State government to inform the public and other interested parties of proposed projects, the resulting environmental impacts, and alternative actions that could achieve the project's objectives.

#### **PUBLIC SCOPING**

The initial stage of an EA is the public scoping process, which is used to:

- inform the public that a State agency is proposing an action and
- invite members of the public who are interested in a proposal to identify issues of concern and, possibly, suggest alternatives to components of the proposal.

Three mailings and a field trip with an individual have taken place; two mailings were followed by thirty-day public comment periods. The mailings are detailed as follows:

- **Initial Proposal and Comment Period**

DNRC solicited public participation in the Dog/Meadow Timber Sale Project by advertising in the Whitefish Pilot and Daily Interlake newspapers on April 26, 2001. Additional public comments were solicited in a newsletter describing the Initial Proposal, which was mailed to neighboring landowners, individuals, agencies, industry representatives, and other organizations that had expressed interest in the management activities of Stillwater State Forest.

The comment period for the Initial Proposal was open for 30 days. Five letters and 2 phone calls

were received.

- **Project-Update Newsletter and Comment Period**

The newsletter of July 9, 2001 provided people on the mailing list with an update of the Dog/Meadow Timber Sale Project and explained the basic concepts of the proposal and the action alternative. Concerns raised during the public scoping of the Initial Proposal were also included in this newsletter. The types of proposed management activities, their location in the project area, and a proposed project time line were identified.

The comment period for this newsletter was open for 30 days. One response was received.

- **Project-Update Letter**

A February 26, 2002 project-update letter informed people on the mailing list that work on the Dog/Meadow Timber Sale Project would be delayed until completion of DNRC's Moose Fire Salvage and Restoration Project Environmental Impact Statement (EIS).

The ID Team, made up of DNRC specialists (see *LIST OF PREPARERS AND CONTRIBUTORS* at the end of *CHAPTER III*), identified and summarized issues and concerns raised during the public scoping. Based on input from the ID Team and issues and concerns from the public, the decision was made to analyze the effects of a no-action alternative and an action alternative. The issues and concerns identified through both periods of public comment are summarized in this chapter. The original comments received during both comment periods, a memorandum documenting the details of a field trip, and the mailing lists developed for this project are located in the project file at the Stillwater State Forest office in Olney.

## EA DEVELOPMENT AND DECISION PROCESS

Public comments related to issues that could affect the project were incorporated into the document. Upon completion of the analysis, the EA and Finding will be circulated to parties who, through a Request for Information, requested for a copy. To ensure that adequate environmental analyses have been done, DNRC provides a 30-day comment period for public and internal input regarding the EA and Finding.

The decisions presented with the Finding will become recommendations by DNRC to the Land Board. Ultimately, the Land Board will make the final decisions regarding the proposal.

## PROPOSED SCHEDULE OF ACTIVITIES

If the action alternative were selected, it is likely that 2 timber sale contracts will be prepared, one in the winter of 2003 and the other at a later date.

The first contract package would be tentatively scheduled for presentation to the Land Board in the spring of 2003, the second at a later date. If the Land Board approves the packages, the timber sales would be advertised for bid. Harvesting and roadwork under both contract packages would occur over a single 4-year period. After harvesting activities are completed, site preparation, tree planting, and hazard reduction would occur.

## OTHER ENVIRONMENTAL REVIEWS RELATED TO THE PROJECT

To address direct, indirect, and cumulative effects to resources on a landscape level, resource analyses will consider the required potential effects from past, present, and future actions to resources within defined analysis areas. The Taylor South Timber Sale Project Environmental Impact Statement (EIS), completed in 2000, updated

the existing environment in reference to vegetation in the coarse-filter analysis area, accounting for changes that were not reflected in the stand level inventory (SLI). The analysis for the Dog/Meadow Timber Sale Project uses this information to examine conditions in the existing environment.

## OTHER AGENCIES WITH JURISDICTION/ PERMIT REQUIREMENTS

Montana Department of Fish, Wildlife and Parks (DFWP) has jurisdiction over the management of fisheries and wildlife in the project area. DFWP is on the mailing list for the Dog/Meadow Timber Sale Project and has received the initial proposal, newsletter, and letter update.

DNRC has an ongoing contract with DFWP to collect data on Stillwater State Forest and monitor streams for existing fisheries habitat and the presence/absence of bull trout and westslope cutthroat trout.

## PERMITS THAT MAY BE REQUIRED TO IMPLEMENT THE PROPOSED ACTION

A Stream Protection Act Permit (124 Permit) is required from DFWP for activities that may affect the natural shape and form of a stream's channel, banks, or tributaries.

A Short-term Exemption from Montana's Surface Water Quality Standards (3A Authorization), issued by the Montana Department of Environmental Quality (DEQ), may be required if:

- temporary activities would introduce sediment exceeding natural levels into streams, or
- DFWP feels the permit is necessary after reviewing mitigation measures in the 124 Permit.

DNRC is a member of the Montana Airshed Group, which regulates DNRC slash burning. DNRC receives an air-quality permit through participation in the Montana Airshed Group.

## PUBLIC CONCERNS

Through the public-involvement process, the public and DNRC specialists raised issues and concerns about the project's potential impacts on the environment. DNRC used these issues concerns in developing the project design and mitigation measures (see *CHAPTER II - ALTERNATIVES*). These issues and concerns were considered by DNRC when

analyzing the need for developing additional action alternatives. *TABLE I-1 - SUMMARY AND TRACKING OF ISSUES AND CONCERNS FROM PUBLIC COMMENTS* summarizes issues and concerns received during the two 30-day public comment periods and indicates where these concerns and issues are addressed in the EA package.

**TABLE I-1 - SUMMARY AND TRACKING OF ISSUES AND CONCERNS FROM PUBLIC COMMENTS**

RESOURCE AREA	CONCERN OR ISSUE	WHERE ADDRESSED IN EA PACKAGE
Fisheries	Bull trout and westslope cutthroat trout cumulative effects analysis meet the minimum Federal and State legal requirements.	Appendix D - Hydrology Analysis, page 4
Hydrology/ water quality	Timber harvesting in riparian areas.	Chapter II - Alternatives, page II-6; Appendix D - Hydrology Analysis, page 4 and 5; Appendix E - Wildlife Analysis, page 6
	Identification and mitigation of existing nonpoint sediment sources before additional activities proceed that have the potential to create sediment sources.	Chapter II - Alternatives, page II-5; Appendix B - Stipulations and Specifications; Appendix D - Hydrology Analysis
	The analysis of water quality meets the legal requirements of the cumulative-effects analysis mandated by the Clean Water Act, State water-quality standards, and MEPA.	Appendix D - Hydrology Analysis. A cumulative effects analysis was completed in compliance with MEPA. All requirements of the Clean Water Act are being met.
Cultural resources	Surveying for cultural resources in potentially affected areas before ground-disturbing activities occur.	Appendix B - Stipulations and Specifications, page 4
Economics	Potential effects of lost timber-industry jobs and revenues to local communities if other long-term revenue-generating opportunities are considered in lieu of timber harvesting.	Appendix F - Economic Analysis
	Winter timber harvesting and associated road use affecting permitted commercial winter recreation in the project area.	Chapter II - Alternatives, page II - 3
	Opportunity costs and rates of return if sale costs were invested in other ways.	Appendix F-Economic Analysis

RESOURCE AREA	CONCERN OR ISSUE	WHERE ADDRESSED IN EA PACKAGE
Economics (cont.)	The economic feasibility of the roadwork, logging, and slash treatments associated with this project.	Appendix F - Economics Analysis
Soils	Unstable soils in the project area with the potential for mass movement.	Appendix G - Soils Analysis, page 1
	Quantifying soil compaction and erosion that occurred in the project area due to past actions or erosion that may occur due to planned actions.	Appendix G - Soils Analysis
	The potential effects of proposed activities on soil productivity and stability.	Appendix G - Soils Analysis
Wildlife	The effects of the proposed actions on habitat-security areas for large mammals (grizzly bears and Canada lynx) and old-growth-dependent species (pileated woodpeckers, goshawks, pine martens, and fishers).	Appendix E - Wildlife Analysis
	The effects of forest fragmentation and changes in connectivity on wildlife and vegetation resulting from proposed and previous management and road-building activities.	Chapter II - Alternatives, page II-5; Appendix E - Wildlife Analysis, pages E-3, E-4, and E-5
	The restoration of fragmented habitat blocks and corridors.	Chapter II - Alternatives, page II-5; Appendix E - Wildlife Analysis, page E-4
	Species-specific habitat losses (both locally and forestwide).	Appendix E - Wildlife Analysis
Threatened, sensitive, and endangered species	The analysis should demonstrate that species present in the analysis area also adequately populate the surrounding area.	Appendix E - Wildlife Analysis
	The influence of the proposal on populations and habitats of threatened and endangered species (particularly Canada lynx and grizzly bears) and disturbances to sensitive species.	Appendix E - Wildlife Analysis
Vegetation	The impacts associated with clearcutting.	Chapter II - Alternatives, page II-5; Appendix C - Vegetation Analysis; Appendix E - Wildlife Analysis
	The blowdown of trees within and near the harvest units.	Appendix C - Vegetation Analysis, page C-11
	The successful regeneration of harvest units.	Chapter II - Alternatives, page II-3 and Table II-1 on page II-6; Appendix C - Vegetation Analysis, pages C-6, C-7, and C-8

RESOURCE AREA	CONCERN OR ISSUE	WHERE ADDRESSED IN EA PACKAGE
Vegetation (cont.)	The spatial distribution of existing and planned harvest units, and the variation from historic spatial-distribution patterns.	Chapter II - Alternatives, page II-5; Appendix E - Wildlife Analysis, pages E-3 and E-4; Project File 601, item 3.
	The documentation of how historic occurrence patterns used to make management decisions were determined.	Chapter II - Alternatives, page II-4; Appendix C - Vegetation Analysis, pages C-1, C-3, and C-6; Appendix E - Wildlife Analysis, pages E-2, E-3, and E-4
Old growth	Any logging of old-growth areas in the project area should be analyzed for: <ul style="list-style-type: none"> <li>- impacts to the old-growth network;</li> <li>- justification for not including these areas in the network;</li> <li>- fragmentation of and impacts to the quality of old-growth-associated wildlife and threatened, sensitive, and endangered species; and</li> <li>- impacts to major components of old growth as defined by Green et al.</li> </ul>	Chapter II - Alternatives, page II-3; Appendix C - Vegetation Analysis, page C-9; Appendix E - Wildlife Analysis
Roads/ transportation	Increasing the quantity and density of roads in the project area.	Chapter II - Alternatives, page II-5
	Existing sediment delivery to streams from roads.	Chapter II - Alternatives, pages II-2 and II-4; Appendix B - Stipulations and Specifications; Appendix D - Hydrology Analysis
	Postharvest reclamation and restoration of roads to preharvest conditions.	Chapter II - Alternatives, page II-4; Appendix D - Hydrology, page D-4
Monitoring	More intensive monitoring of forest-management activities on State trust land.	Chapter II - Alternatives, page II-7; Appendix B - Stipulations and Specifications
Air quality	No public comment was received specifically naming air quality as a concern. Under the proposed action, activities that will create smoke and dust, such as prescribed burning and log hauling, will be mitigated for.	Appendix B - Stipulations and Specifications



**ENVIRONMENTAL  
ASSESSMENT**

**CHAPTER II**

**ALTERNATIVES**



# DOG/MEADOW TIMBER SALE PROJECT ENVIRONMENTAL ASSESSMENT

## CHAPTER II ALTERNATIVES

### INTRODUCTION

Chapter II describes alternatives for the Dog Meadow Timber Sale Project and summarizes the predicted effects of implementing each alternative. A summary of the alternative-development process that occurred on this project is included. *TABLE II-2 - SUMMARY OF ENVIRONMENTAL EFFECTS* summarizes predicted effects from the detailed environmental analyses in *CHAPTER III - ENVIRONMENTAL EFFECTS* or the *RESOURCE APPENDICES*.

### DEVELOPMENT OF ALTERNATIVES

The Dog/Meadow Timber Sale Project area was proposed for a timber sale project in the fall of 1999. The area was identified for timber harvesting at this time primarily because 2 existing stand conditions are prominent in the area:

- Several relatively large patches of 40-to-99-year-old overstocked stands are present. These areas have low growth rates and the frequency of mortality and decay is substantial. Tree mortality in these areas has created heavy fuel loading and areas that are at high risk for high-intensity, stand-replacement wildfires.
- Also present are areas of densely-stocked and mature mixed-conifer stands of shade-tolerant species. Many of these areas were entered with timber harvests several decades ago. The harvests removed many of the dominant western larch, Douglas-fir, western white

pine, and western red cedar trees. The shade-tolerant species that currently dominate these areas are highly susceptible to stem rots and loss of value as wood products. Due to jackpots of down fuels and the high-stocking density of species that act as ladder fuels into the upper canopy, many of these stands are at high risk for high-intensity, stand-replacement wildfires.

After identifying the project area, this project was included in the Northwestern Land Office (NWLO) 3-year listing of upcoming timber sale proposals. The listing was sent to interested parties. The ID Team began work on the project in the spring/summer of 2000. The role of an ID team is to summarize issues and concerns, develop and define management options, and, in reference to issues, analyze predicted and potential impacts of a proposal on the human and natural environment.

Throughout 2000, 2001, and 2002, ID Team members and other DNRC personnel were involved in field reconnaissance and data collection in the project area. Information was collected on:

- existing roads to determine needs to improve surface drainage, ditch relief, stream crossings, and safety features;
- timber-stand characteristics, old-growth characteristics, noxious weeds, and sensitive plants;
- the type, size, and location of

- root disease concentrations;
- specific and general watershed characteristics; and
- wildlife habitat.

Field data was used to define the project and analyze the alternatives and their potential effects. Using this information within the framework of the SFLMP and associated Resource Management Standards, an initial proposal was developed. The initial proposal began the public scoping period.

Public scoping consisted of newspaper advertisements, newsletters, and a project update letter. During two 30-day comment periods, 6 letters and 2 phone calls were received. Issues and concerns received during the two 30-day comment periods are summarized in *TABLE I-1 - SUMMARY OF ISSUES AND CONCERNS FROM PUBLIC COMMENTS*.

Within the context of public comments, continuing field reconnaissance, and specific resource concerns, the ID team considered the need or benefit of developing additional alternatives. The ID Team determined that the issues directly related to proposed actions could be addressed through minor changes in the project design and/or mitigation. Based on determination of the ID Team, issues and concerns did not drive further alternative development. The ID Team developed an action proposal, Action Alternative B, within the framework of the SFLMP and its associated Resource Management Standards.

#### ALTERNATIVE DESCRIPTIONS

This section describes No-Action Alternative A and Action Alternative B. The decisionmaker may select a modification or combination of the alternatives.

- *Description of No-Action Alternative A*

No-Action Alternative A may be used as a baseline for comparing

the effects that Action Alternative B would have on the environment. No-Action Alternative A is considered a possible alternative for selection.

Under No-Action Alternative A, no timber harvesting, improvements to existing roads or stream crossings on access roads, or timber-management revenue generation for the appropriate school trusts would occur in the Dog/Meadow Timber Sale Project area at this time. Winter recreation would continue to occur under commercial permits. Salvage logging, firewood gathering, recreational use, fire suppression, noxious-weed control, additional requests for permits and easements, and other ongoing management requests may occur. Road maintenance may occur when funding is available and equipment is in the area. Nonpoint-source sediment-delivery from roads in violation of BMPs may occur. Seasonal road closures may be installed to protect water quality and investments in road maintenance. Natural events, such as plant succession, tree mortality due to insect infestations and disease infections, windthrow, down fuel accumulation, in-growth of ladder fuels, and wildfires, would continue to occur. Future proposed management activities, including timber harvesting, would go through the appropriate level of environmental analyses before implementation.

- *Description of Action Alternative B*

The ID Team developed strategies for harvesting timber within the framework of the SFLMP. Opportunities for harvesting timber are identified based on current and desired timber-stand conditions. Proposed treatments were developed that would, in the long-term, move timber-stand conditions toward desired age

classes, species compositions, structures, and stocking densities. Proposed treatments would also maintain long-term site productivity, thereby ensuring the long-term capability of trust lands to produce revenue for the trust.

Action Alternative B proposes to harvest approximately 8.5 MMBF of sawlog and stud material over an estimated 939 acres. Acre and volume estimates may change due to streamside management zones (SMZs), fisher buffers, wetlands, and other adjustments taken into consideration during the layout of the project.

Action Alternative B is designed to minimize impacts to commercial revenue-generating activities on DNRC-managed State lands. Commercial winter recreational use has been permitted for more than 10 years under a DNRC Land Use License in the Dog-Meadow Timber Sale Project area. The Land Use License currently includes use of the McCabe and Skunk Meadow roads, which are proposed routes for hauling timber under Action Alternative B. To minimize economic impacts to permitted commercial recreation in the Dog/Meadow Timber Sale Project area, the following mitigation measures were applied in the design of Action Alternative B:

- Winter hauling on segments of McCabe and Skunk Meadow roads would be limited to 1 season.
- Proposed harvesting in areas requiring use of the McCabe and Skunk Meadow roads would not be included in the first year of timber sale activities. This would provide the licensee an additional year to find an alternate area for use during periods of log hauling.
- Vegetative screens or buffers would be maintained between harvest units and open roads to

minimize visual impacts to recreational users.

Proposed unit locations and existing roads are shown in *FIGURE II-1 - PROPOSED DOG/MEADOW ACTION ALTERNATIVE MAP*.

Under Action Alternative B, timber harvesting in the Dog/Meadow Timber Sale Project area would occur in:

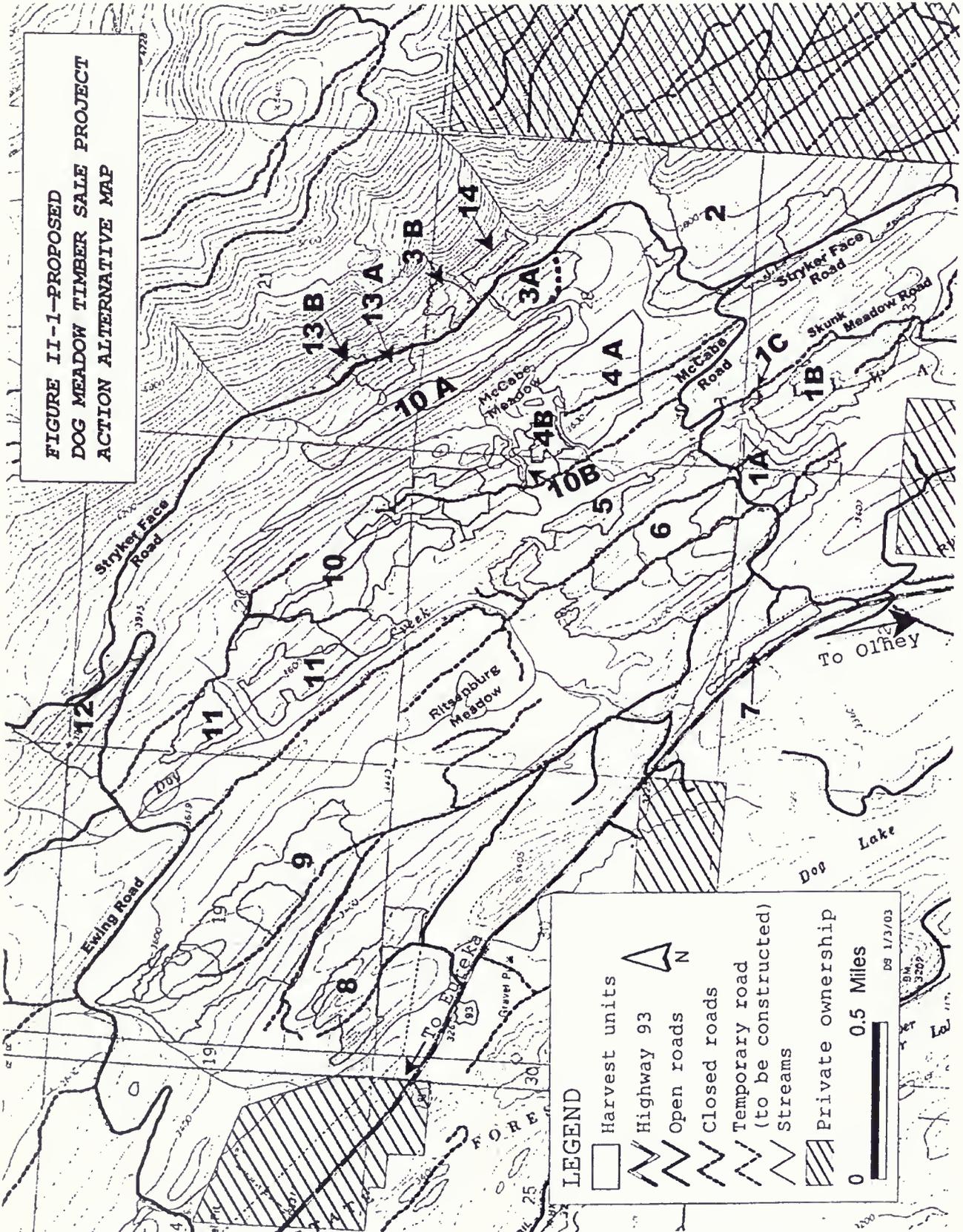
- large patches of 40-to-99-year-old overstocked stands and
- densely stocked, mature, mixed-conifer stands with species compositions dominated by shade-tolerant species.

The proposed silvicultural treatments are designed to concentrate on areas dominated by the tree species most susceptible to insect and disease problems (subalpine fir, grand fir, Douglas-fir, lodgepole pine) or in areas with preexisting insect and disease problems (mountain pine beetle infestations in lodgepole pine or severe mistletoe infections in western larch). Action Alternative B is designed to avoid harvesting in areas meeting the old-growth criteria for the number and size of large trees as defined by *Green et al.*

To bring stands toward desired conditions, Action Alternative B would utilize various harvesting methods to emulate naturally occurring disturbance processes of varying sizes and intensities. Regeneration of areas not fully stocked after harvesting would focus on establishing vigorous stands of western larch, rust-resistant western white pine, and Douglas-fir. Following timber harvesting, other areas would remain fully stocked.

The stipulations and specifications designed to protect resources during harvesting and road-improvement activities are forms of mitigation measures that

FIGURE II-1-PROPOSED  
DOG MEADOW TIMBER SALE PROJECT  
ACTION ALTERNATIVE MAP



would be applied to Action Alternative B (*APPENDIX B - STIPULATIONS AND SPECIFICATIONS*). These stipulations and specifications, incorporated into the Timber Sale or Site-Preparation contracts, are enforced during contract administration. Mitigation measures that were designed to reduce impacts on a particular resource are also discussed in Chapter III and each particular resource appendix.

Public comment was received concerning use of clearcut silvicultural prescriptions on the project. To reduce the size and impact of openings created within the proposed harvest units, the following mitigations were included in the project design:

- Harvest units would have irregular edges, emulating natural disturbances.
- The clearcut prescription was combined with other treatments to allow for the retention of individual trees and pockets of trees to reduce the size of created openings.
- Units adjacent to open roads would be buffered by the retention of additional trees/vegetation along the road.

Public comment was received that proposed that natural spatial distribution and occurrence patterns be considered when management decisions are made. A landscape-level patch analysis was completed in reference to age class and coertype (project file 601, item 3). Coertypes and age classes, in reference to historic conditions, were considered at a landscape level (see *APPENDIX C-VEGETATION ANALYSIS*). Connectivity, in reference to wildlife habitat, was considered in the wildlife analysis for this project (see *APPENDIX E-WILDLIFE ANALYSIS*). The locations of

harvest units were designed to reduce fragmentation of large continuous timber stands of a particular age class or coertype. Locating harvest units adjacent to units that had been recently harvested and increasing average size of these harvest units to better emulate natural disturbance patterns was incorporated into the design.

Existing open and closed roads would be used to access harvest units. This would reduce impacts to soil, water quality, and wildlife habitat and reduce the sale's development costs. Approximately 0.3 mile of short temporary spur roads are proposed for improved yarding access. The temporary roads would be reclaimed to reduce road maintenance costs, protect specific resources, and prevent unauthorized motorized use after harvesting activities are completed. Surveys of existing roads have been conducted in the Dog Meadow Timber Sale Project area to identify erosion and surface-drainage problems that could be improved or eliminated to prevent sediment delivery to streams. In a road-development proposal, sediment-delivery reduction and the implementation of BMPs would be accomplished through a road-improvement package. Improvements would include:

- culvert replacements and upgrades,
- minor road relocation, and
- installation of road and ditch drainage features, such as drain dips, open-top culverts, ditch-relieving culverts, graveling and grading road surfaces, armoring existing culverts, and using slash filters and sediment fences near stream crossings and culverts.

The purchaser of the timber sale would fund the road and BMP improvements.

## PROPOSED SILVICULTURAL TREATMENTS

If Action Alternative B were chosen, several of harvest treatments (silvicultural prescriptions) would be required to meet the described management objectives. Under Action Alternative B, multiple silvicultural prescriptions are proposed for implementation within a single harvest unit. A variation of silvicultural prescriptions within a proposed harvest unit would emulate the effects of mixed-severity and stand-replacement fires across the landscape. Where existing stands would allow, multistoried forest structures would be retained to perpetuate structural diversity.

The preferred tree species for retention (in order of preference) would be western white pine, western larch, Douglas-fir, and western red cedar. Although none were encountered during field reconnaissance of the stands proposed for treatment, any healthy ponderosa pine would be retained.

Reserve trees would remain individually or in clumps within the harvest units where prescriptions specify. Reserve trees would include seedtrees, existing snags, vigorous trees of various age classes, and large seral trees that have a high potential to become future cavity-nesting sites. To provide for structural and species diversity, small clumps of younger trees would also be retained as reserve trees.

In some buffer areas adjacent to streams and wetlands, the potential for limited harvesting would occur in compliance with the Montana SMZ law. Depending on an area's timber and hydrologic characteristics, harvesting in SMZs and buffer areas would be determined on a case-by-case basis. Some SMZs along perennial streams in the project area have been designated as fisher buffers where timber harvesting would not occur. These 165- and 83-

foot fisher buffers are designed to function as wildlife linkage corridors across the project area.

The proposed silvicultural treatments would leave approximately 8 to 10 tons per acre of coarse woody debris (greater diameter than 3 inches) in harvest units following site preparation and hazard reduction.

Where available, approximately 2 large snags and 2 large live trees for snag recruits per acre would be retained in a clumpy distribution in harvest units. Silvicultural treatments that would be applied to each harvest unit are specified in TABLE II-1 - PROPOSED SILVICULTURAL TREATMENTS BY UNIT. Following are descriptions of the silvicultural prescriptions proposed under Action Alternative B:

- Modified Seedtree with Reserves - Six to eight large western larch, Douglas-fir, and western white pine seedtrees per acre would, individually and in clumps, provide a seed source, snags and snag recruits. Reserve-tree selection is described above.
- Modified Seedtree/Shelterwood with Reserves - Six to eight large western larch, Douglas-fir, and western white pine seedtrees per acre would, individually and in clumps, provide a seed source, future snags, and cavity-nesting sites. Approximately 15 to 30 trees per acre would be retained in shelterwood areas.
- Commercial Thin - Forty to sixty percent of the existing overstory would be harvested to reduce the stocking density and improve growth rates and vigor. The residual stand would consist of the most vigorous and largest diameter trees currently on site. Seral species (western larch, western white pine, and Douglas-fir) would be the favored leave trees in the stand.

- Group-Select with Reserves - Small openings up to 5 acres in size would be created in the existing stand to promote regeneration and/or release established regeneration. Seedtrees would be retained within group-select openings. Improvement cutting would be done between openings to reduce stocking density, increase the shade-intolerant species mix, and remove trees that are at high risk for timber-product value loss and mortality.
- Combination Clearcut with Reserves/Commercial Thin/Group Select with Reserves - This treatment would vary across a harvest unit, depending upon the existing stand conditions. Varying the prescription across the unit would help break up the openings and create irregular shapes that emulate the variation of natural disturbances across the landscape. Areas consisting of densely stocked lodgepole pine stands would be prescribed as Clearcut with Reserves harvests. Portions of the unit treated with the Group Select with Reserves prescription (described above) would create smaller openings with larger quantities of seedtrees and reserve trees present than would be present in areas treated as Clearcut with Reserves. Commercial Thinning (described above) would be prescribed in portions of the unit with adequate amounts of seral species and/or vigorous, large diameter trees.

#### MONITORING

DNRC's timber sale administrators would monitor and administer harvesting and road construction/maintenance activities for compliance with BMPs, the State SMZ Law, any 124 and 3A permits, and the SFLMP. The sale administrator would also monitor harvesting operations to ensure that the prescribed stand treatment was occurring within each harvest unit.

Following harvesting activities in the Dog/Meadow Project area, the following monitoring would take place:

- DNRC personnel would likely audit the project area for compliance with the SFLMP;
- DNRC specialists and a State-wide BMP audit team may audit the harvest units and haul roads in the project area for BMP compliance;
- the harvest units would be entered into DNRC's electronic calendar recall system to schedule and track needed slash disposal, site preparation, planting, noxious weed treatment, regeneration stocking surveys, and precommercial thinnings; and
- postharvest stand characteristics in the harvest units would be recorded and updated in the SLI database. Annual reconnaissance reports done by Stillwater Unit foresters would continue to be compiled for the Dog/Meadow Project area.

TABLE II-1 PROPOSED SILVICULTURAL TREATMENTS BY UNIT NUMBER FOR ACTION ALTERNATIVE B  
 (note: Acreages and MBF may change based on continuing field work and unit layout).

UNIT NUMBER	ACRES	TREATMENT	YARDING METHOD	HARVEST VOLUME (MBF)	SITE PREPARATION AND HAZARD REDUCTION	METHOD OF REGENERATION IN AREAS BEING REGENERATED
1A	23	Group select with reserves	Tractor	211	Mechanical pile and scarify; jackpot burn	Interplant with western larch and western white pine. Rely on the natural regeneration of other tree species.
1B	52	Group select with reserves	Tractor	260	Mechanical pile and scarify; jackpot burn	Interplant with western larch and western white pine. Rely on the natural regeneration of other tree species.
1C	1	Seedtree with reserves	Tractor	8	Mechanical pile and scarify; jackpot burn	Interplant with western larch and western white pine. Rely on the natural regeneration of other tree species.
2	160	Commercial thin/seedtree with reserves/shelterwood cut	Tractor	1,800	Mechanical pile and scarify; jackpot burn	Primarily natural regeneration. Light interplant of western larch and western white pine in areas not fully stocked.
3A	22	Commercial thin/group select with reserves	Tractor	190	Mechanical pile and scarify; jackpot burn	Primarily natural regeneration. Light interplant of western larch and western white pine in areas not fully stocked.
3B	9	Clearcut with reserves	Tractor	44	Mechanical pile and scarify; jackpot burn	Fully plant western larch and western white pine. Rely on natural regeneration of other tree species.
4A	50	Clearcut with reserves/group select with reserves	Tractor	297	Mechanical pile and scarify; jackpot burn	Fully plant western larch and western white pine in unstocked areas. Interplant and rely on natural regeneration elsewhere.
4B	7	Commercial thin/group select with reserves	Tractor	30	Mechanical pile and scarify; jackpot burn	Primarily rely on natural regeneration. Interplant western larch and western white pine in areas not fully stocked.

UNIT NUMBER	ACRES	TREATMENT	YARDING METHOD	HARVEST VOLUME (MBF)	SITE PREPARATION AND HAZARD REDUCTION	METHOD OF REGENERATION IN AREAS BEING REGENERATED
5	14	Commercial thin	Tractor	68	Mechanical pile	Fully stocked after harvesting.
6	143	Group select/seedtree with reserves	Tractor	1,004	Mechanical pile and scarify; jackpot burn	Interplant western larch and western white pine. Natural regeneration of other tree species.
7	10	Seedtree with reserves	Tractor	86	Mechanical pile and scarify; jackpot burn	Interplant western larch and western white pine. Natural regeneration of other tree species.
8	38	Seedtree with reserves/shelterwood	Tractor	455	Mechanical pile and scarify; jackpot burn	Interplant western larch, ponderosa pine, and western white pine. Natural regeneration of other tree species.
9	113	Group select/seedtree with reserves	Tractor	1,845	Mechanical pile and scarify; jackpot burn	Interplant western larch and western white pine. Natural regeneration of other tree species.
10	147	Clearcut with reserves/commercial thin/group select with reserves	Tractor/ soft track	798	Mechanical pile and scarify; jackpot burn	Fully plant unstocked areas with western larch and western white pine. Natural regeneration of other tree species.
10A	37	Clearcut with reserve trees/commercial thin	Tractor	235	Mechanical pile and scarify; jackpot burn	Fully plant unstocked areas with western larch and western white pine. Natural regeneration of other tree species.
10B	8	Clearcut with reserves	Tractor	39	Mechanical pile and scarify; jackpot burn	Fully plant with western larch and western white pine. Natural regeneration of other tree species.

UNIT NUMBER	ACRES	TREATMENT	YARDING METHOD	HARVEST VOLUME (MBF)	SITE PREPARATION AND HAZARD REDUCTION	METHOD OF REGENERATION IN AREAS BEING REGENERATED
11	50	Group select with reserves/seedtree with reserves	Tractor	616	Mechanical pile and scarify; jackpot burn	Interplant western larch and western white pine. Natural regeneration of other tree species.
12	35	Seedtree with reserves	Skyline	341	Mechanical pile and scarify; jackpot burn	Interplant western larch and western white pine. Natural regeneration of other tree species.
13A	10	Commercial thin	Skyline	66	Lop and scatter	Fully stocked after harvesting.
13B	3	Clearcut with reserves	Tractor	17.5	Mechanical pile and scarify; jackpot burn	Fully plant western larch and western white pine. Natural regeneration of other tree species.
14	7	Seedtree with reserves	Tractor	106	Mechanical pile and scarify; jackpot burn	Interplant western larch and western white pine. Natural regeneration of other tree species.
	939			8,516.5		
Total estimated volume: 8.5 MMBF						
Total estimated acreage: 939 acres						

TABLE II-2-SUMMARY OF ENVIRONMENTAL EFFECTS

RESOURCE	DIRECT EFFECTS	INDIRECT EFFECTS	CUMULATIVE EFFECTS
Vegetation	<i>No-Action Alternative A</i>		
Insect and disease/forest health	Current rates of infestation, mortality, and loss of sawlog value would continue.	Over time, the overall decadence and mortality levels, loss of sawlog value, particularly in the true firs, down woody material, and fire hazard would increase.	Any trend toward increases in tree mortality, fuel loadings, insect infestations, and disease infections would be in addition to other stands on Stillwater State Forest with similar conditions where no major disturbance was occurring.
<i>Action Alternative B</i>			
	Trees that are highly susceptible to stem rots would be harvested, recovering value before it is lost; stocking levels would be reduced, subsequently reducing stress on retained trees. Through planting, the amount of western larch and rust-resistant western white pine would be increased. Ladder fuels and risk of crown fire would be reduced. Harvesting would reduce concentrations of trees infected with western larch dwarf mistletoe.	Levels and risk of mortality from insects and diseases would be reduced. Some minor increases in root rot infections in Douglas-fir may occur. Species mixes regenerated from proposed treatments would be more resistant to insect and disease attacks. Stand vigor and growth rates would increase. Fire hazards would be reduced.	Any trend toward decreases in tree mortality and fuel loadings, increases in timber-stand vigor and a species mix that includes young western larch, rust-resistant western white pine and lodgepole pine would be in addition to areas on Stillwater State Forest that have had recent silvicultural treatments or fire disturbances.

RESOURCE	DIRECT EFFECTS	INDIRECT EFFECTS	CUMULATIVE EFFECTS
<p>Vegetation (Cont.)</p> <p>Changes in age classes and covertypes</p>	<p>No changes are expected.</p>	<p><i>No-Action Alternative A</i></p> <p>Over time, western larch/Douglas-fir and western white pine covertypes would decrease and the mixed-conifer covertypes would increase. Over time, with continued fire suppression, age-class distribution would become somewhat homogeneous, trending toward older age classes.</p>	<p>The trend toward shade-tolerant species, a reduction of western white pine, and an increase in older age classes would be in addition to the general trend in the analysis area.</p>
	<p>Approximately 546 acres would be converted to western larch/Douglas-fir covertypes. An estimated 614 acres would be converted to a seedling/sapling age class, with some older trees retained in the overstory.</p>	<p><i>Action Alternative B</i></p> <p>Over time, with follow-up treatments, the species mix of western white pine and western larch in the project area would increase in addition to the direct effects. A mosaic of stand structures and openings would be distributed throughout the project area that would emulate both stand-replacement and mixed-severity fire disturbances.</p>	<p>Other forest-management activities now taking place on the forest are also converting the mixed-conifer stands to western larch/Douglas-fir covertypes. An estimated increase of 3 percent of area occupied by the western larch/Douglas-fir covertype is expected. In combination with other timber sales currently occurring on Stillwater State Forest, there is an approximate 1.7 percent increase in the area occupied by the 0-to-39-year age class.</p>

RESOURCE	DIRECT EFFECTS	INDIRECT EFFECTS	CUMULATIVE EFFECTS
Vegetation	<i>No-Action Alternative A</i>		
Old growth	No effect.	Some activities, such as roadside salvage and firewood harvesting, would occur, especially along open roads. Over time, the character of the stands would change with an increase in decadence, snags, and fire hazards.	No effect.
	<i>Action Alternative B</i>		
	No old-growth stands would be entered. No effects expected.	Harvesting would occur adjacent to old-growth stands, creating a structurally abrupt edge. Some increase of risk of blowdown along the edge of some of these stands adjacent to harvest units would occur. Harvest units adjacent to stands may provide opportunity for a fire break should a wildfire threaten.	No effect.
Sensitive plants	<i>No-Action Alternative A</i>		
No effect.	Fire hazard would increase, which would increase the threat of a large-scale intense wildfire in the area and could substantially alter the habitat for the 2 plant species present in the project area. No funds would be collected towards noxious-weed management on Stillwater State Forest. Noxious weeds would continue to be a threat to these sensitive species.	A trend of no action would reduce and could eventually eliminate funding for the weed-management program on Stillwater State Forest.	

RESOURCE	DIRECT EFFECTS	INDIRECT EFFECTS	CUMULATIVE EFFECTS
Vegetation (Cont.) Sensitive plants (cont.)	No effect.	<p><i>Action Alternative B</i></p> <p>There would be a risk of an increase in the water level within the wetlands in the project area due to canopy removal. All wetlands and streams have vegetative buffers, which should limit increases to minor amounts. The proposal would collect fees for forest improvement, some of which would be used to monitor and control weeds that may threaten sensitive plant populations.</p>	The forest-management program provides funding for surveying for sensitive plant species and searching known data sources. A large portion of Stillwater State Forest has been surveyed as part of forest-management analysis. Over time, the entire ownership could be surveyed for sensitive species.
Noxious weeds	No effect.	<p><i>No Action Alternative A</i></p> <p>The project area is used extensively for dispersed recreation. Weed seed would continue to be spread by recreational users; some new areas would most likely be disturbed, providing areas for weeds to become established. No funding would be collected for noxious-weed-management purposes.</p>	If, over time, the timber management program was greatly reduced, other sources of funding for weed management would need to be increased or the weed population on the forest could increase dramatically.
Additional motor vehicle traffic and exposed mineral soil would occur. Weed treatment, washing equipment before it moves onto State ownership, and grass seeding disturbed areas are some of the mitigation measures designed into the project.	Herbicide treatments and seeding disturbed areas could, over time, reduce the weed population in the project area, allowing for the establishment of native plant species on these sites.	<p><i>Action Alternative B</i></p> <p>The weed management program on Stillwater State Forest has, in cooperation with the County weed-control efforts, become more active in recent years. With funding, the program, over time, could reduce the overall area on the forest that is occupied by noxious weeds.</p>	

RESOURCE	DIRECT EFFECTS	INDIRECT EFFECTS	CUMULATIVE EFFECTS
<i>Hydrology</i>	<i>No-Action Alternative A</i>		
Sediment delivery	No effect.	The natural processes of erosion and/or revegetation/stabilization would continue. Sediment delivery into streams from crossings that need upgrades would be an increased risk. These sites would not be repaired until funding became available.	Existing sources of sediment delivery would continue to recover or degrade, dependent on natural and preexisting conditions. Sediment loads in streams would remain at or near present levels.
	<i>Action Alternative B</i>		
Some sediment would enter streams during the installation, replacement, and upgrading of stream crossings. Erosion-control measures would limit the sediment delivery to minor amounts. Proposed timber-harvesting activities would have a very low risk of sediment delivery to streams.	Overtime, there would be a reduction in sediment delivery on sites where upgrades to surface drainage, crossings, and erosion control took place.		Over time, the amount of cumulative sediment delivery to the outlet of Dog Creek would likely decrease due to the installation of more effective surface-drainage and erosion-control features on the existing road system.
Water yield	<i>No-Action Alternative A</i>		
No effect.	No effect.	No effect.	No effect.
	<i>Action Alternative B</i>		
The annual water yield in the Dog Creek watershed would increase over the current level by 2.9 percent.	Over time, after regeneration and growth within the harvest units has occurred, water yield would decrease.		The water yield would increase from the current level of 4.9 percent to 7.8 percent. The watershed would still be well below the established threshold of a 12-percent allowable water-yield increase in Dog Creek.

RESOURCE	DIRECT EFFECTS	INDIRECT EFFECTS	CUMULATIVE EFFECTS
Wildlife—Threatened and endangered species (cont.)	<i>No-Action Alternative A</i>		
	No effects.	No effects.	No effects.
Bald eagle (cont.)	<i>Action Alternative B</i>		
	Some minor disturbance to foraging bald eagles may occur.	Activities could limit use of Dog Lake for bald eagle foraging for a season.	Disturbance would occur in addition to traffic on Highway 93, a very active railroad track, and recreational use. Road management would improve the protection of the nesting sites.
Grizzly bear	<i>No-Action Alternative A</i>		
	No effect.	Foraging opportunities may decline over time.	Hiding cover would increase and, potentially, forage production would decrease with continuing succession.
	<i>Action Alternative B</i>		
	Increased activity in the area may affect bear use of the area. Hiding cover would be reduced over approximately 939 acres. Security core, currently at 12 percent of the Lazy Creek Subunit and 50 percent of the Stillwater Subunit, will not be altered. Open-road density in the Lazy Creek and Stryker BMU subunits are at 1996 baseline levels; therefore, operations on restricted roads would be conducted so that the status of the road would not be changed.	A reduction in hiding cover would negatively affect bear security. Forty percent or more of the area within the BMU subunits would still maintain hiding cover following the proposed actions.	Reductions in hiding cover would be additive to the reductions from past and current timber harvests. Considerable hiding cover currently exists within these subunits. Foraging opportunities would increase.

RESOURCE	DIRECT EFFECTS	INDIRECT EFFECTS	CUMULATIVE EFFECTS
<i>Wildlife—Threatened and Endangered Species (don't.)</i>			
Canada lynx	No effect.	<i>No Action Alternative A</i> Denning habitat quality would increase. Foraging habitat, over time, would be reduced.	Improvement in denning habitat and a reduction in foraging habitat over time is anticipated.
	Foraging habitat would be increased.	<i>Action Alternative B</i> Connectivity and foraging habitat would be retained.	Cumulative effects would be minor.
	No effect.	<i>No Action Alternative A</i> Big game forage would decrease.	No effect.
	Harvesting activities may cause disturbance and change use patterns of the area by wolves.	<i>Action Alternative B</i> Forage for big game would increase while summer thermal cover would decrease. A slight increase in prey for wolves may occur.	Cumulative effects would be minor.
<i>Wildlife—Sensitive Species</i>			
Fisher	No effect.	<i>No Action Alternative A</i> A minor increase in fisher denning and travel habitat may occur with additional tree growth and crown closure of forest canopy.	No effect.
	Harvesting would occur in 172 acres of potential fisher denning habitat.	<i>Action Alternative B</i> No effects.	A reduction in potential denning habitat would be in addition to 167 acres in the Good/Long/Boyle Timber Sale Project and 597 acres with the Taylor South Timber Sale Project.

RESOURCE	DIRECT EFFECTS	INDIRECT EFFECTS	CUMULATIVE EFFECTS
<i>Wildlife—Sensitive Species (cont.)</i>			
Pileated woodpecker	No effect.	<i>No Action, Alternative A</i> A reduction in suitable nesting trees is likely over time. Habitat quality for pileated woodpeckers would gradually increase and then decline.	No effect.
	Some temporary displacement in active harvest units may occur.	<i>Action, Alternative B</i> Much of the area within proposed harvest units would be too open to be considered pileated woodpecker habitat. The species mix perpetuated by the proposed treatments would increase the potential large western larch nest trees in the area over the long term.	Loss of pileated woodpecker habitat from the proposed harvesting would be additive to habitat loss associated with past harvesting in the analysis area.
<i>Wildlife—Big Game Security and Winter Range</i>			
Big game security and winter range	No effects.	<i>No Action, Alternative A</i> No effects.	The effects would be additive to the general trend of conversion to mature forest, reducing forage production for moose and elk.
	Some displacement would occur in the active harvest units and loss of canopy cover would occur over approximately 246 acres of winter range. In the near term, security would be reduced from loss of hiding cover.	<i>Action, Alternative B</i> A reduction of thermal cover in winter range area that was harvested (11 percent of the identified winter range). Big game movement through the area would not be prevented. Over the long term, as regeneration takes place in harvest units, hiding and security cover would increase over current conditions.	Reductions in thermal cover and snow intercept would be additive to other areas where recent harvesting activities have occurred. In reference to security, negligible impacts to big game survival are anticipated.

RESOURCE	DIRECT EFFECTS	INDIRECT EFFECTS	CUMULATIVE EFFECTS
<p><i>Economics</i></p> <p>Generation of trust revenue/local employment opportunities</p>	<p>The trusts would receive no revenue generated from timber harvesting. No forest improvement (FI) fees would be collected.</p>	<p><i>No-Action-Alternative A</i></p> <p>No students would be supported and no workers would be employed.</p>	<p>Long-term deferral of harvesting from this forest would impact harvest patterns, changing both the region where trees are harvested and the volumes taken. This would impact other areas of the State.</p>
	<p>Approximately \$1,212,600 would be generated in trust revenue.</p>	<p><i>Action-Alternative B</i></p> <p>Revenue earned from this project would provide schooling for 1 year for approximately 201 kindergarten through grade 12 students. Employment for an estimated 94 individuals would also be provided.</p>	<p>This timber sale would be part of DNRC's State-wide sustained-yield annual harvest of timber from State trust lands. The net revenue of this sale would add to the trust fund.</p>
<p><i>Soils</i></p>	<p>No effect.</p>	<p><i>No-Action-Alternative A</i></p> <p>No effect.</p>	<p>No effect.</p>
	<p>Summer logging would directly impact soils on 200 acres. Winter logging would directly impact soils on 42 acres.</p>	<p><i>Action-Alternative B</i></p> <p>Within harvest units, 4 to 11 percent of the area would be in an impacted condition following proposed harvesting activities.</p>	<p>The harvest would enter previously harvested stands of timber. Existing skid trails would be used when appropriate. The risk of cumulative impacts to soil productivity is low.</p>



**ENVIRONMENTAL  
ASSESSMENT**

**CHAPTER III**

**EXISTING ENVIRONMENT  
AND ENVIRONMENTAL  
CONSEQUENCES**



DOG/MEADOW TIMBER SALE PROJECT  
ENVIRONMENTAL ASSESSMENT

CHAPTER III  
EXISTING ENVIRONMENT AND  
ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

Chapter III is a summary of resource conditions as they relate to the proposed Dog/Meadow Timber Sale Project. The current, or existing, condition can be viewed as a baseline condition to compare changes resulting from the selection of either alternative. How each alternative may affect the environment is also described. For more complete assessments and analyses related to the resources, for both scientific and judicial reviews, refer to the appropriate appendices of this EA.

PROJECT AREA DESCRIPTION

The proposed action would take place on the western face of Stryker Ridge, approximately 20 miles north of Whitefish, Montana. The project area, on the lower slopes of the ridge, ranges from 3,400 to 4,400 feet in elevation. The soils in the area are primarily silty glacial till. The moist and cool area has a relatively short growing season. The vegetation indicates high to very high timber productivity potential. Some timber harvesting has occurred in the area over the past 80 years; many different mixes of tree species and age classes can be found in the timber stands. Most of the area was accessed with a road system that consists of several primary roads, which remain open for motorized use, and many lateral roads, which are restricted from motorized access for most of the year. Some private ownership borders the project area along the western edge near the Highway 93 corridor.

# VEGETATION

## INTRODUCTION

This section provides a summary description of the conditions of the forest in the analysis area. Also addressed are the potential effects of the proposed alternatives related to the following concerns:

- Harvest units would regenerate adequately following harvesting.
- Trees may blow down in and adjacent to existing harvest units.
- Old-growth stands would, potentially, be affected on Stillwater State Forest.

This summary also addresses some general concerns about the harvest, such as how harvesting would affect:

- the health of the forest,
- the spread of noxious weeds,
- wildfire hazards,
- the historic occurrence patterns, and
- whether biodiversity would be maintained in the project area.

## ANALYSIS METHODS

An analysis was done on a large scale to assess how age classes, covertypes, and old-growth timber stands would be affected. How snags, coarse woody debris, and the occurrence and distribution of noxious weeds would be affected under each alternative was also analyzed. The data used to derive the existing condition was a combination of DNRC's SLI, traveling the area extensively, and taking plots within the areas proposed for harvesting. Where recent harvests are completed, the Stillwater SLI is updated on a yearly basis. Projects of forest management that have been started, but not completed, are considered in the cumulative effects analysis.

## ANALYSIS AREA

The large-scale analysis area includes Stillwater State Forest and scattered sections in northern

Lincoln County (approximately 99,264 forested acres); this is referred to as the *analysis area* in this document. The analysis of site-specific effects will be limited to areas where actions are proposed, which is referred to in this document as the *proposed harvest units* or the *project area*. Adjacent lands will be analyzed where applicable. Some comparisons will be made with the historic data representing the Upper Flathead Valley, which was collected in the 1930s (climatic section 333c, Losensky 1997b).

## EXISTING CONDITIONS

### DISTRIBUTION OF AGE CLASSES AND COVERTYPES

Stillwater State Forest's age classes and distributions of covertypes across the landscape are used to examine its condition at a large scale. Historic conditions and conditions DNRC believes the forest should trend toward will be compared. The comparison will be based on the current percent of tree species mix, the history of fires and fire suppression, tree mortality attributed to white pine blister rust, the history of harvesting, and the condition of the forest at the sites proposed for harvesting.

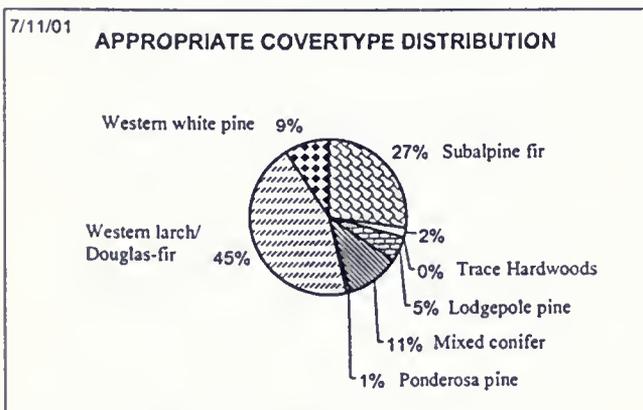
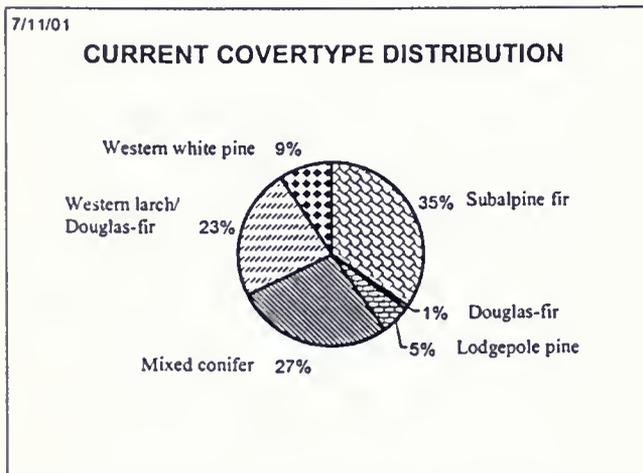
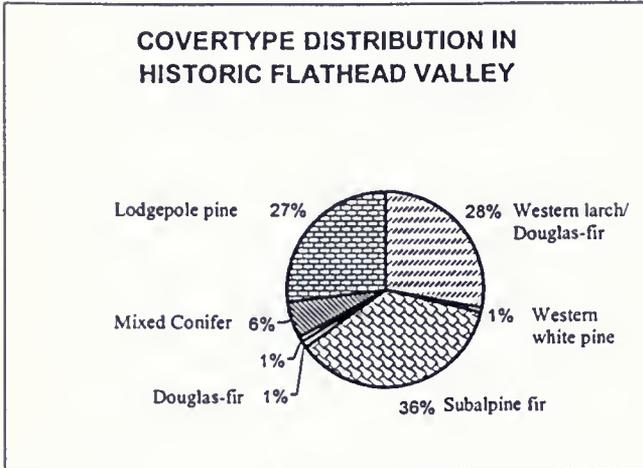
Graphs in *FIGURE III-1 - HISTORIC, CURRENT, AND APPROPRIATE DISTRIBUTION COVERTYPE DISTRIBUTION IN ANALYSIS AREA* displays the current distribution of covertypes in contrast to the historic covertype distribution in the Flathead Valley and the appropriate covertype distribution.

The comparisons show that the current subalpine fir and mixed-conifer covertypes are more common than the historic past or desired future covertype distributions.

Increases in the subalpine fir and mixed-conifer covertypes may be consequences of fire suppression and

# VEGETATION

**FIGURE III-1 — HISTORIC, CURRENT, AND APPROPRIATE DISTRIBUTION COVERTYPE DISTRIBUTION IN ANALYSIS AREA**



past timber harvesting. Suppressing fires allowed these shade-tolerant species to grow in the understory. Past timber harvests changed coertype distribution by selectively removing some of the

shade-intolerant western larch, Douglas-fir, and western white pine from the timber stands.

In the analysis area, compared to the Historic Data from the Flathead Valley, Stillwater State Forest ownership has approximately 25 percent less area in the seedling/sapling age class (0-to-39-year age class) and 11 percent more area in the old-stand age class.

### OLD-GROWTH DISTRIBUTION

For this analysis, old growth is defined as stands that meet the minimum criteria (number of trees per acre that have a minimum diameter at breast height (dbh) and a minimum age) for a given site (old-growth group from habitat type). These minimums can be found in Green et al (*Old Growth Forest Types of the Northern Region*). The SLI indicates that the estimated timber stands that meet the old-growth definition total approximately 8,070 acres, or 12.3 percent of the analysis area.

The 2 coertypes most represented in old-growth stands in the analysis area are western larch/Douglas-fir (40 percent) and subalpine fir (26 percent).

### INSECTS AND DISEASES/FOREST HEALTH CONDITIONS

The most prevalent insect- and disease-related tree mortality recently found on Stillwater State Forest was attributed to the Douglas-fir bark beetles and fir engravers. The attacks by Douglas-fir bark beetles have caused mortality to individual and clumps of Douglas-fir trees throughout the analysis area. The attacks by fir engravers have caused the death of a relatively high number of grand fir and subalpine fir in the lower portion of the Swift Creek drainage in the past year.

The occurrence of root rot is fairly common in the project area, but the

## VEGETATION

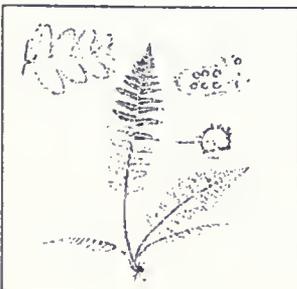
overall impact of root rot appears low. However, the project area has a high percentage of Douglas-fir, subalpine fir, and grand fir, which are highly susceptible to root rot. The Indian paint fungus stem rot in subalpine fir and grand fir is fairly prevalent in the project area. Concentrations of downed dead trees can be found throughout the project area. Most of the large concentrations are lodgepole pine that have been attacked by mountain pine beetles several years ago. Concentrations of downed dead trees, combined with densely stocked smaller trees, have created risks of high intensity wildfires occurring.

### NOXIOUS WEEDS

Concentrations of spotted knapweed, oxeye daisy, orange hawkweed, Saint-John's-wort, dalmation toadflax, and several species of thistle can be found in the project area. Spotted knapweed, the most widely distributed noxious weed on Stillwater State Forest, is found in areas where ground disturbance has occurred, such as landings and skid trails, and in areas of high use, such as powerlines and roadsides. Isolated occurrences of tansy ragwort were found in the project area and sprayed with herbicide in 2002.

### SENSITIVE PLANTS

In the project area, 2 populations each of poor sedge and Buckler fern were found during surveys. These species, associated with wet meadows and fens, appeared to be healthy and reproducing.



Buckler fern



Poor sedge

## ALTERNATIVE EFFECTS

### > Distribution of Age Classes and Covertypes

#### DIRECT EFFECTS

- *Direct Effects of No-Action Alternative A on Age Classes and Covertypes*

This alternative would not directly affect the distribution of age classes or covertypes in the project area.

- *Direct Effects of Action Alternative B on Age Classes and Covertypes*

This alternative would convert approximately 546 acres of the mixed-conifer, subalpine fir, and lodgepole pine covertypes to a western larch/Douglas-fir covertype. An estimated 614 acres would be converted from stands of pole-sized timber (40 to 99 years old) and mature sawtimber (100+ years old) to stands of seedlings/saplings (0 to 39 years old).

#### INDIRECT EFFECTS

- *Indirect Effects of No-Action Alternative A on Age Classes and Covertypes*

Over time, the western white pine covertype would likely decrease as western white pine mortality continues, and the mixed-conifer covertypes (shade tolerant) would likely increase. The combination of lack of forest management and continued fire suppression would increase the distribution of older age classes.

- *Indirect Effects of Action Alternative B on Age Classes and Covertypes*

As tree planting, precommercial thinning, or other follow-up treatments occur in the proposed harvest units, the percentage of western larch, Douglas-fir, and western white pine species would likely increase in addition to the direct effects. The proposed harvest treatments, in combination with the existing

## VEGETATION

condition, would maintain timber stands in the project area with a mosaic of multiple stories and ages.

### **CUMULATIVE EFFECTS**

- ***Cumulative Effects of No-Action Alternative A on Age Classes and Covertypes***

Under this alternative, continued fire suppression and the ongoing mortality of western white pine from white pine blister rust would add to the trend of an increase of shade-tolerant tree species in the analysis area and a decrease in the amount of western white pine. Timber stands in the analysis area would continue to age, which would slightly offset the total area being converted to younger age classes through other timber-management projects in the analysis area.

- ***Cumulative Effects of Action Alternative B on Age Classes and Covertypes***

Stillwater State Forest's other timber sale projects and associated planting and precommercial thinning activities will also increase the amount of western larch, western white pine, and Douglas-fir in the analysis area. In addition to the area that would be converted to seedling/sapling stands under the proposed action alternative, other current timber sale projects in the analysis area would increase seedling/saplings stands in the area by approximately 1.7 percent and slightly decrease the area in older age classes.

> **Old Growth**

### **DIRECT EFFECTS**

- ***Direct Effects of No-Action Alternative A and Action Alternative B on Old Growth***

No direct effects to old growth would be expected under either

alternative. Action Alternative B was designed to not harvest timber or build roads in old-growth stands.

- ***Indirect Effects of No-Action Alternative A and Action Alternative B on Old Growth***

Under both alternatives, stands currently meeting DNRC's old-growth definition would become more decadent with heavier stocking levels and an increased loading of down woody debris and wildfire hazards. Shade-tolerant species would increase in stands and, potentially, more snags would eventually occupy the stands.

Additionally, Action Alternative B would harvest timber next to old-growth stands and structurally create a more abrupt stand edge. Potentially, the risk of blowdown along the proposed unit boundaries would increase. Harvest areas next to old-growth stands would possibly act as fuel breaks that could slow or stop wildfires before these fires could burn the old growth.

- ***Cumulative Effects of No-Action Alternative A and Action Alternative B on Old Growth***

Approximately 188 forested acres that meet the old-growth definition may be entered with other timber sale projects that have been initiated in the analysis area. Because of ongoing litigation, these areas are not currently being harvested. If this litigation is resolved, these areas would be harvested as part of their initial project. Following harvesting, these areas would not likely be considered old growth.

## VEGETATION

### > Insects and Diseases (Forest Health Conditions)

#### DIRECT AND INDIRECT EFFECTS

- ***Direct and Indirect Effects of No-Action Alternative A on Insects and Diseases / Forest Health Conditions***

Tree mortality from some insects and diseases that are currently active in the project area would likely continue. This would increase decadence and lower overall vigor in the timber stand. Loss of sawlog volume (value) in the area would increase as the species mature that are susceptible to root and stem rots. As stand densities and accumulations of down woody debris continue, wildfire hazards would increase. No additional rust-resistant western white pine would be introduced into the area.

- ***Direct and Indirect Effects of Action Alternative B on Insects and Diseases / Forest Health Conditions***

Mortality from some insects and diseases in the project area would likely continue, but the amount would appreciably decrease as the older, decadent trees are harvested and, eventually, replaced with young vigorous trees. Much of the sawlog volume that is most susceptible to loss of value from stem rot infection would be harvested. Some mortality from root rot may occur shortly after harvesting due to a build-up of the disease, but the species mix that would be retained and regenerated by the proposed harvest would be far less susceptible to root rot. Over the long term, a reduction in the number of trees with root and stem rot infections would be expected. During the first season after harvesting, the hazard of wildfire may increase due to the high amount of

logging slash. With the completion of the proposed hazard reduction (usually within 18 months of harvesting), fire hazards would be reduced substantially for a long time.

#### CUMULATIVE EFFECTS

- ***Cumulative effects No-Action Alternative A and Action Alternative B to Insect and Disease / Forest Health Conditions***

Other forest-management treatments, similar to treatments proposed in this project, are being proposed and initiated in the analysis area. These treatments would promote the regeneration and retention of a diverse mix of tree species that are more vigorous and less susceptible to attacks by insects and diseases.

### > Noxious Weeds

#### DIRECT AND INDIRECT EFFECTS

- ***Direct and Indirect Effects of No-Action Alternative A on Noxious Weeds***

Under No-Action Alternative A, no new areas of disturbance, which would be at high risk for weed infestation, would be created through timber-management activities. Recreationalists using the project area would continue to introduce and spread weed seeds. Some effort would be made to manage weeds, but no revenue would be collected to fund the noxious weed program.

- ***Direct and Indirect Effects of Action Alternative B on Noxious Weeds***

Under Action Alternative B, additional mineral soils would be exposed by logging equipment within the proposed harvest units and on access roads. Constructing and maintaining roads, skidding logs, and clearing landings would create conditions that are conducive to new weed infestations.

## VEGETATION

Mitigation measures would require that equipment be washed before it is brought on site, substantial areas of exposed mineral soil be seeded, and herbicides be applied at specified sites. Action Alternative B would collect money for forest improvement, which would help fund the Stillwater Unit weed-management program. This program monitors noxious weeds annually and applies herbicides at specific sites.

### CUMULATIVE EFFECTS

- *Cumulative Effects of No-Action Alternative A and Action Alternative B on Noxious Weed Populations*

The open roads in the analysis area have traffic from dispersed recreation, timber-management activities, and other uses on a regular basis. This traffic, along with road-maintenance and timber-harvesting activities, increases exposure to weed establishment. Utility line corridors and illegal motorized use also increase exposure to weed establishment. Over time, the weed-management program at Stillwater Unit, including cooperation with the Flathead and Lincoln County weed departments, has improved. If funding remains available, some of the large populations of weeds in the analysis area would be treated, greatly reducing the current weed populations.

### ➤ Sensitive Plants

#### DIRECT AND INDIRECT EFFECTS

- *Direct and Indirect Effects of No-Action Alternative A on Sensitive Plants*

This alternative would not directly affect water levels or increase the risk of exotic plant species being introduced in meadows and fens where sensitive plants are known to

occur. Over time, if forest fuels were allowed to build up and increase fire hazards, the risk of a very large stand-replacement fire in the area would increase. The result of such a fire could increase runoff and water levels in the fens and meadow complexes near the burn. Under this alternative, no funds would be collected for weed-population monitoring or management. Without adequate funding the weed-management program on Stillwater Unit would, over time, be reduced, which would increase the risk of exotic plants successfully invading the habitat of the sensitive plant species in the project area.

- *Direct and Indirect Effects of Action Alternative B on Sensitive Plants*

Action Alternative B would reduce the canopy on approximately 939 acres to varying degrees. This could, potentially, cause some increased water levels at low points of the topography. The meadows, wetlands, and fens would be buffered by additional vegetation that would be retained along the edges; in some cases, harvest units would be located away from the habitat feature. This retained vegetation would absorb much of the water from surrounding areas and should limit increases in water levels in sensitive plant habitat to very minor amounts. Action Alternative B would collect fees that could be used, in part, to fund measures to monitor and control weeds. This would allow land managers to react to the future establishment of an exotic plant species within the sensitive plant habitat in the project area.

## VEGETATION

### CUMULATIVE EFFECTS

- *Cumulative Effects of No-Action Alternative A and Action Alternative B on Sensitive Plants*

Management actions on Stillwater Unit are being initiated with mitigation measures to prevent the spread of weeds more than in the past; the spread of weeds from these actions should be reduced from past levels. In contrast, the amount of dispersed recreation on Stillwater State Forest has increase substantially, which also increases the chances of weed introduction. The Forest Weed Management Program provides a way to monitor the overall weed population, identify major problem areas, and treat those

areas to control weed populations. These control treatments could prevent future outbreaks of exotic species in sensitive plant habitat. Projects to harvest timber that have been initiated on Stillwater Unit will analyze the potential effects to water yield and include mitigation measures to reduce the increases to water yield that might affect sensitive plant habitat.



*Example of 40-to-99-year-old stand that would be entered with proposed harvest. Notice the ingrowth of shade-tolerant species underneath the lodgepole pine overstory.*

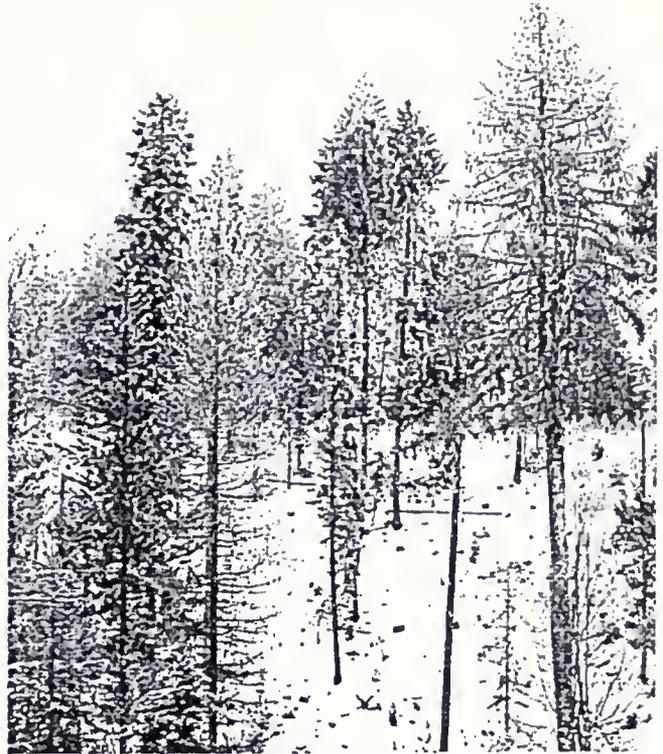


*An example of a mixed-conifer stand proposed for harvesting.*

## VEGETATION



*Example of 40-to-99-year-old stand that would be entered with proposed harvesting. Notice western larch component in overstory. Much of the western larch overstory would be retained with a commercial-thin harvest treatment.*



*An example of a prescribed group-select seedtree-with-reserves harvest treatment after harvesting.*



*Example of 40-to-99-year-old stand that would be entered with proposed harvest. Notice the heavy stocking density and concentrations of down woody material.*



*Example of mixed-conifer stand similar to stands proposed for harvesting.*

## HYDROLOGY

### INTRODUCTION

This analysis is designed to disclose the existing condition of the hydrologic resources, display the anticipated effects that may result from each alternative, and address the following issues and concerns:

- Timber-harvesting activities may increase the amount of sediment flowing into the streams.
- The removal of vegetation near streams reduces its sediment-filtering capacity and channel stability.
- Harvesting may reduce future amounts of large woody material in streams; the material is used as natural sediment traps and energy dissipaters to reduce the velocity and erosiveness of streamflows.
- Removing tree canopies would decrease rain and snow interception and alter the distribution of snowpack and snowmelt, which would lead to water yield increases. This may result in more streambank erosion and sediment deposits.

### ANALYSIS METHODS

A DNRC hydrologist evaluated roads and stream crossings to determine the location of sediment sources and identify in-channel sources of sediment. The increase in water yield for the Dog Creek watershed was also determined using the equivalent-clearcut-acre (ECA) method. This method equates the area harvested and percent of crown removed with an equal amount of clearcut area. This method also calculates the recovery of these increases as new trees grow on the site and move toward preharvest water use.

### ANALYSIS AREA

The analysis area for sediment delivery is the Dog Meadow Timber Sale Project area and the proposed

haul routes. Dog Creek, a 9,459-acre watershed that includes Dog Lake, is a perennial third-order tributary to Stillwater River. The sediment delivery analysis will cover all stream segments within the watershed and all roads and upland sites that may contribute sediment to Dog Creek.

The analysis area for water yield is the 9,459-acre, third-order Dog Creek watershed. Dog Lake covers 99 acres and is fed and drained by Dog Creek. The Dog Creek watershed also contains dozens of wetlands and beaver dam complexes. These all serve to dampen the effect of water yield by releasing water more slowly and evenly than incoming flows.

### EXISTING CONDITIONS

The Montana Surface Water Quality Standards classifies the Stillwater River drainage, including Dog Creek, as B-1, which does not allow increases in sediment above naturally occurring levels and allows only minimal increases over natural turbidity.

Bull trout or migratory cutthroat trout do not inhabit streams in the project area. Eastern brook trout, an exotic species, are present in the streams.

The SMZ Law defines Dog Creek as a Class 1 stream; Dog Creek and many of its tributaries flow for more than 6 months of the year. Many of these tributaries also support fish. Some of the smaller first-order tributaries may be Class 2 or 3, depending on the site-specific conditions.

Stream channels in the Dog Creek watershed are mostly in good condition. Though some sediment deposits exist, no areas of in-channel erosion were found during reconnaissance. Stream crossings in the project area and on the haul route are in good condition generally and are not contributing sediment to streams. Some stream

## HYDROLOGY

crossings require additional BMP work, and others need to be replaced. Surface drainage needs to be upgraded. Despite this, reconnaissance identified no point sources of fine-sediment delivery.

Past timber harvesting and associated road construction, combined with vegetative recovery, have led to a 4.9 percent increase in water yield over an unharvested condition in this watershed. The allowable water yield increase is 12 percent.

### ALTERNATIVE EFFECTS

#### DIRECT AND INDIRECT EFFECTS

- *Direct and Indirect Effects of No-Action Alternative A on Hydrology*

This alternative would have no direct effects to sediment delivery or water quality beyond those currently occurring. An increased risk of sediment delivery to streams from crossings that do not meet BMPs would continue until other funding becomes available to repair them.

- *Direct and Indirect Effects of Action Alternative B on Hydrology*

This alternative would:

- replace several stream crossings in the Dog Creek watershed and along the proposed haul route;
- construct .3 mile of temporary road in Section 28, including the installation of a culvert on a perennial stream; and
- improve drainage from the road surface.

All pertinent laws, rules, and BMPs, including erosion-control measures, would be applied to all roadwork and harvesting activities to minimize the risk of sediment delivery to draws and streams. The 0.3 mile of proposed temporary roads would be reclaimed immediately after harvesting activities are completed. The reclaimed road would pose an

increased risk of sediment delivery until the bare soil revegetates. On the temporary road in Section 28, little or no disturbance to the creek banks and bed would occur while installing a temporary stream crossing in the perennial stream. In the long term, the risk of sediment delivery to streams would be reduced from current conditions.

Action Alternative B would increase the annual water yield in this watershed by 2.9 percent over the current level. This level of increase would not be sufficient to create unstable channels.

#### CUMULATIVE EFFECTS

- *Cumulative Effects of No-Action Alternative A on Hydrology*

All existing sources of sediment would continue to recover or degrade as dictated by natural and preexisting conditions until a source of funding is available to repair them. Sediment loads would remain at or near present levels. Harvest units of the past would continue to revegetate and move closer to premanagement levels of water use and snowpack distribution.

- *Cumulative Effects of Action Alternative B on Hydrology*

The sediment generated from replacing an existing culvert would increase the total sediment load in Dog Creek while the culvert is being replaced. The installation and improvement of erosion-control features on existing roads would also affect the cumulative sediment delivery in Dog Creek by exposing bare soil, though applying BMPs during this work would make increased sediment loads unlikely. As these sites stabilize and revegetate, the sediment levels would return to the level of preactivity. Over the long term, cumulative sediment delivery to Dog Creek would likely

## HYDROLOGY

decrease with the installation of the more effective surface-drainage and erosion-control features on the existing road system. The water yield increase expected from this alternative leaves the watershed well below the established threshold of concern. None of the cumulative

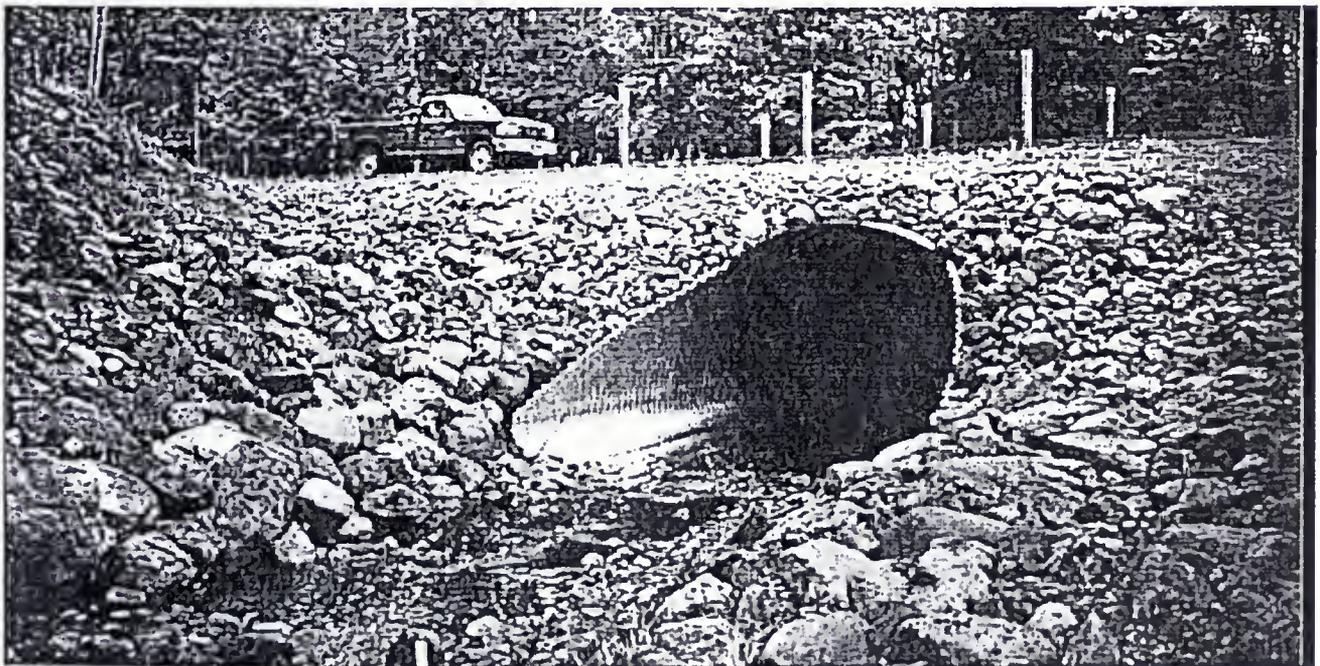
impacts described above are expected to adversely affect downstream uses such as domestic water supply, coldwater fisheries, and recreation. Therefore, no impacts to water quality are expected as a result of this alternative.



*Placing a culvert*



*Placing rock (rock armoring) at a culvert inlet/outlet to stabilize the soil and minimize sediment introduction*



*Culvert installation could cause a short-term increase in sediment to the streams, but in the long term would help reduce the amount of sediment entering streams from existing road-crossing structures.*

# WILDLIFE

## INTRODUCTION

This analysis is designed to address public concerns and analysis elements considered necessary by the ID Team in reference to threatened, sensitive, and endangered wildlife species and wildlife species of concern. Additional coarse-filter wildlife analysis and description is presented in APPENDIX E - WILDLIFE ANALYSIS.

## ANALYSIS METHODS

Field visits, scientific literature, SLI data, aerial photographs, Montana Natural Heritage Program data, and consultations with other professionals provided information for this wildlife analysis.

## ANALYSIS AREA

The analysis area varies for each particular species, depending on the habitat needs of that species.

## EXISTING CONDITION

**Bald Eagle** - Classified as threatened. This project is proposed in and around the Upper Stillwater Lake Bald Eagle Territory.

**Canada Lynx** - Classified as threatened. Lynx foraging and denning habitats exist within the proposed project area.

**Gray Wolf** - Classified as endangered. The project area includes habitat suitable to wolves; wolf packs are present near the project area. Wolves likely use the vicinity of the proposed project area for hunting, breeding, and other life requirements.

**Grizzly Bear** - Classified as threatened. The project area includes spring habitat and is used by grizzly bears. The proposed project would harvest either during the denning season (November 15 through March 5) from open roads or using closed roads for during short-duration, high-intensity periods.

**Fisher** - Listed by DNRC as a "sensitive" species. In the proposed project area, an estimated 1,060 acres provide potential denning habitat. Additionally, travel corridors retained along riparian areas connect forested stands throughout the proposed project area.

**Pileated Woodpecker** - Listed by DNRC as a "sensitive" species. Approximately 242 acres of potential nesting habitat for pileated woodpeckers exists within the proposed project area.

**Big Game** - Moose winter throughout the project area, while elk winter along the western portion of the project area. Stands within the proposed project area provide security habitat for elk and deer during the general hunting season.

## ALTERNATIVE EFFECTS

### DIRECT EFFECTS

#### • *Direct Effects of No-Action Alternative A on Wildlife*

No substantial changes in human disturbance would be expected with this alternative; therefore, no direct effects would be expected to bald eagles, Canada lynx, grizzly bears, gray wolves, fishers, pileated woodpeckers, or big game (moose, elk, white-tailed deer, mule deer).

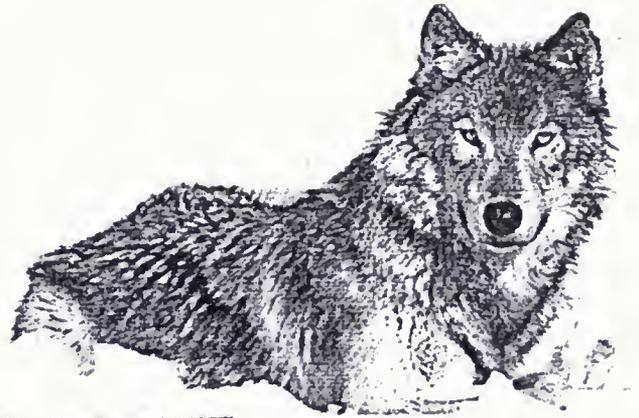
#### • *Direct Effects of Action Alternative B on Wildlife*

Negligible to minor effects to Canada lynx, gray wolves, fishers, and pileated woodpeckers would be expected. Minor disturbances to foraging bald eagles might occur. No effects to eagle reproduction would be expected. Hiding cover for grizzly bears would be reduced over 939 acres. Grizzly bear use of the project area would be altered during activities. Some displacement of big game would be expected; however, no long-term

WILDLIFE



Bald eagle



Gray Wolf



Grizzly bear



Canada lynx



Fisher



Pileated woodpecker



Moose



White-tailed deer

## WILDLIFE

changes in big game security would be anticipated.

### **INDIRECT EFFECTS**

#### **• Indirect Effects of No-Action Alternative A on Wildlife**

No additional effects to nesting eagles, gray wolves, or grizzly bears would be expected from this alternative.

This alternative would allow for the greatest development and abundance of existing and potential future lynx and fisher denning habitats, and pileated woodpecker nesting and foraging habitats. As stands become dominated by shade-tolerant tree species, habitat sustainability and quality for pileated woodpeckers would gradually increase through time, then would decline as any remaining shade-intolerant species were removed by mortality..

This alternative would not reduce big game hiding or thermal cover in the project area. Through time, thermal cover would increase, forage production would probably decline, and elk security would remain relatively unchanged.

#### **• Indirect Effects of Action Alternative B on Wildlife**

The proposed action alternative would not reduce alternative bald eagle nest sites, foraging opportunities, or the ability of the territory to support a pair of nesting bald eagles; therefore, the indirect effects to bald eagles are expected to be minor.

Reductions in the quality of grizzly bear hiding cover are anticipated. The proposed project area occurs in spring grizzly bear habitat. In addition to the previously described reduction in hiding cover, the proposed treatments would also alter some of the spring habitat components

likely causing grizzly bears to avoid the treated areas during the spring. Therefore, grizzly bear use during the spring, and possibly other seasons, is expected to decline. Forage production is anticipated to increase. No long-term increases in open- or total-road densities are proposed, which would minimize disturbance to grizzly bears.

Potential Canada lynx denning habitat would not be removed, and no impacts to lynx prey or movement would be expected. Foraging habitats would be generated through the proposed harvest. Landscape connectivity would be retained through riparian buffers.

Likely increases in forage production may result in a light increase in big game use, which, in turn, may benefit gray wolves.

The proposed project would reduce potential fisher denning habitat on 172 acres. Potential fisher habitat would be retained within riparian buffers. Otherwise, effects to fisher are expected to be minor because the proposed project largely avoids typical fisher habitats.

Suitable habitat for pileated woodpeckers would be reduced due to the removal of 4 acres of potential nesting habitat. The canopy would be expected to be too open over the 939 acres proposed for harvesting to be considered pileated woodpecker habitat.

Harvesting is expected to reduce thermal cover for big game. The proposed activity should increase forage production. Elk security is expected to decline in the short term, but increase in the long term. Reclosing roads after harvesting would benefit elk security.

## WILDLIFE

### CUMULATIVE EFFECTS

#### • *Cumulative Effects of No-Action Alternative A on Wildlife*

Currently, no other activities are under consideration within the bald eagle home range.

Road access to the grizzly bear subunits would not change, nor would security cover, hiding cover, and spring habitat quality.

Recruitment of new denning habitat for Canada lynx is possible as stands age; however, reductions in foraging habitat are also anticipated as stands age.

Disturbance to gray wolves would not be expected to change. As previously harvested areas regenerate, a slight decrease in big game forage would reduce prey availability.

Fisher denning and resting habitats would be retained. Landscape connectivity through riparian buffers would persist. Disturbance levels would not be expected to change.

Pileated woodpecker foraging and nesting habitats would improve through time.

Big game thermal cover and snow intercept would not be altered. Reduced forage production is anticipated. No change in elk security would be expected.

#### • *Cumulative Effects of Action Alternative B on Wildlife*

Proposed activities would not reduce the potential nesting or perching habitats for bald eagles. Eagles using the Upper Stillwater territory are expected to benefit from the road restrictions associated with another current timber sale.

Long-term road access in the grizzly bear subunits would not change; timber harvesting would use a combination of harvesting

along open roads, winter logging, and intense road use for short durations to minimize impacts to grizzly bears. No changes in security cover are anticipated. Reductions in hiding cover would be additive to ongoing and past timber sales.

No further reductions in Canada lynx foraging and denning habitats are expected. Foraging habitats created by past timber sales would decline in quality through time as they age. Lynx use should not be impacted.

Slight shifts in big game use are anticipated. Landscape connectivity for gray wolves would be maintained. No substantive change in gray wolf use of Stillwater State Forest is expected.

The reduction of fisher denning habitat by 172 acres would be additive to the loss of 167 acres during the Good/Long/Boyle Timber Sale Project and 597 acres during the Taylor South Timber Sale Project. Landscape connectivity through riparian buffers would persist. Human disturbance levels would not be expected to change in the long term.

The opening of the canopy on 939 acres would be additive to pileated woodpecker habitat loss associated with past harvesting.

Thermal cover for elk would be reduced. Increased forage production in harvest units and other harvested areas would benefit wintering elk. The proposed harvesting would reduce elk security by removing some hiding cover along open roads. This would be additive to past harvests. Hunter access would be unchanged.

# ECONOMICS

## INTRODUCTION

This analysis summarizes the economic impacts of the timber sale and focuses on market activities that directly or indirectly benefit the Montana education system and the local economy. The Enabling Act of 1889 and the State of Montana Constitution require that income be generated from State forestlands for the school trust fund and to provide funding for public buildings.

## ANALYSIS AREA

The analysis centers on Flathead County in northwestern Montana, where the Dog/Meadow Timber Sale Project is located. Most of the economic impacts related to this timber sale project are likely to occur in Flathead County because of its well-developed wood-product industry.

## FLATHEAD COUNTY

Flathead County, located in the northwest corner of Montana, is the fourth most populous county in the State. The population in Flathead County increased by 15,253 residents between 1990 and 2000, a growth rate of 2.3 percent. The average age in Flathead County is 37.2 years, a slightly younger population than the State average of 37.8 years.

The Montana Office of Public Instruction indicates that over 13,000 kindergarten through grade 12 school children were enrolled in Flathead County public schools in the 2000/2001 school year. Since 1991, the enrollment in high schools has increased more than 23 percent.

The woods product industry is the largest producer in the County, accounting for approximately 21 percent of the County's gross product.

Total employment in Flathead County shows that nearly 30,200 workers earned \$697 million in wages in 1999; an average annual wage of \$23,152. This average annual wage is about the

same as the Statewide annual wage. The average annual wage of workers in the forestry industry is \$49,490, almost 2.14 times as much as the average wage earner in Flathead County. Lumber workers earn an average of \$34,574 per year, or nearly 50 percent more than the average wage earner. Forestry and lumber workers account for 1,955 jobs, or about 6 percent of the jobs in Flathead County. Forestry and lumber, combined, produce approximately 9.8 percent of the area's wage and salary income.

## ALTERNATIVE EFFECTS

### DIRECT AND INDIRECT EFFECTS

#### • *Direct and Indirect Effects of No-Action Alternative A on Economics*

No people would be employed or earn income from this timber sale project under this alternative. No money would be earned from this timber sale in support of schools or public buildings.

#### • *Direct and Indirect Effects of Action Alternative B on Economics*

The estimates in this analysis compare the action alternative to the no-action alternative. These estimates of the employment, income, or wages associated with this sale are not intended to be absolute.

If the estimated harvest volume of 60,221 tons of timber sells for an estimated stumpage of \$27.82 per ton, the total revenue earned for the stumpage would be \$1,675,000. Of this, the revenue for the school trust would be \$1,212,600. This would be enough money to educate 201 students in grades kindergarten through 12 for 1 year. This estimate is based on a student cost per year of \$6,038, as provided by the Montana Office of Public Instruction.

This timber sale project would provide approximately 94 jobs to

## ECONOMICS

workers that would earn a total of \$3,016,500. The estimated amount of income tax paid on this money by the workers would be \$131,700.

### CUMULATIVE EFFECTS

#### • *Cumulative Effects of No-Action Alternative A on Economics*

DNRC's State-wide goal is to harvest 42.164 MMBF each year. If timber from this project is not sold, this volume could come from timber sale projects elsewhere, which may not benefit this region of the State.

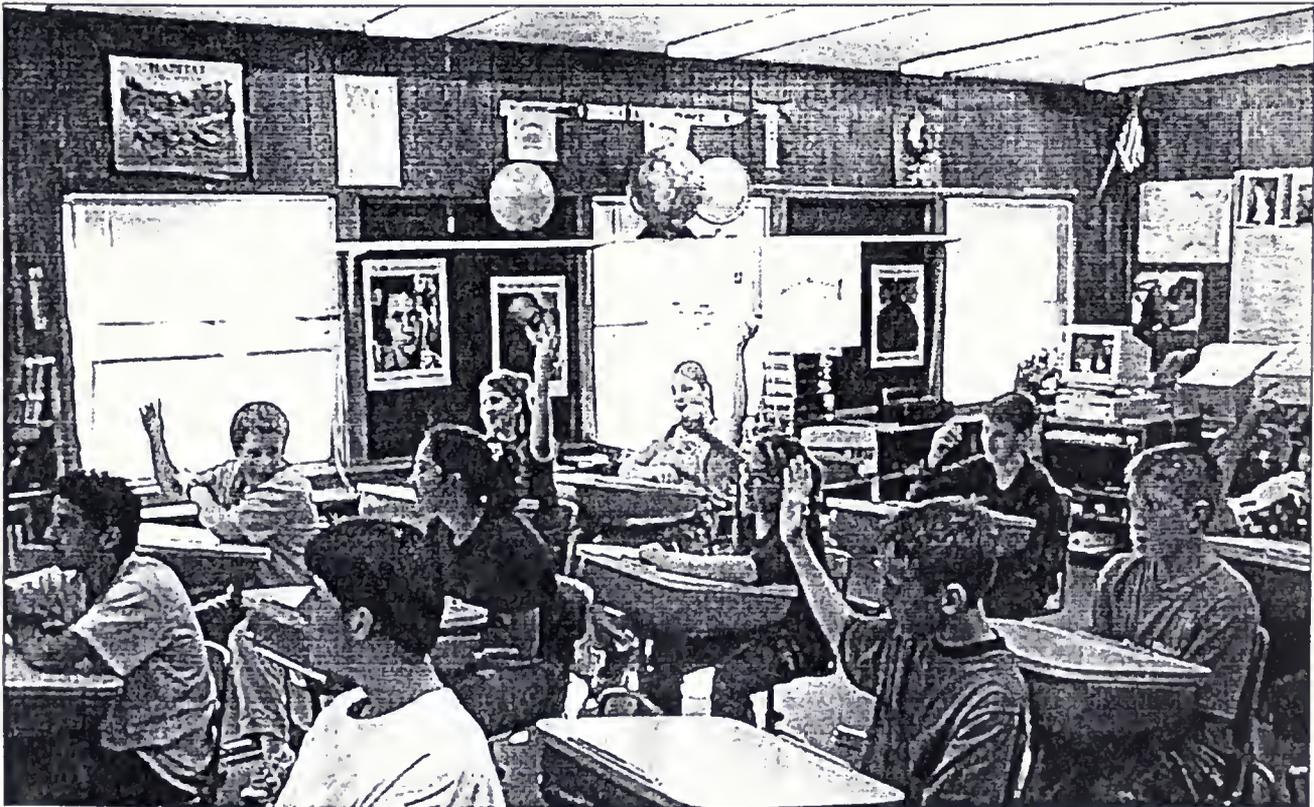
If harvesting in this forest is deferred for a long time, harvest patterns would be impacted, changing the region where the volume was harvested and this region.

#### *Cumulative Effects of Action Alternative B on Economics*

This sale would be part of the annual harvest of timber from trust lands. The net revenue from this sale would add to the trust fund. The annual contribution to the trust fund has varied widely over the years, as shown in TABLE III-1 - DNRC'S ANNUAL TIMBER HARVEST REVENUE FOR YEARS 1997 THROUGH 2001). The contribution to the trust fund is also affected by the annual costs experienced by DNRC for program management.

TABLE III-1 - DNRC'S ANNUAL TIMBER HARVEST REVENUE FOR YEARS 1997 THROUGH 2001.

YEAR	HARVEST REVENUE (\$)
2001	8,524,150
2000	12,710,311
1999	6,998,847
1998	8,393,485
1997	7,327,641



Dog/Meadow Timber Sale Project would earn \$1,212,600 for the school trust, which is enough money to educate 201 students in grades kindergarten through 12 for 1 year

# SOILS

## INTRODUCTION

The Dog Creek watershed is a valley formed by glaciers and rivers. The dominant soil types found in the project area are deep glacial tills. Upper slopes and ridges are weathered bedrock that have been scoured by glaciers. **EXISTING CONDITIONS**

The Flathead National Forest (FNF) Soil Survey did not identify any areas of soils that are at high risk for mass movement in the project area. Several areas are wetland soil types not suitable for timber management and would require special measures for road construction. The Dog Creek watershed soil types and their associated management implications are found in APPENDIX G - SOILS ANALYSIS in TABLE G-3 - SOIL MAP UNIT DESCRIPTIONS FOR THE DOG/MEADOW PROJECT AREA.

In the Dog Creek watershed, DNRC has conducted timber harvesting since the 1920s. Timber sale records dating back to the 1960s indicate that 2,062 acres have been harvested on State land, using a combination of ground-based and cable-yarding methods. Ground-based yarding can affect soil productivity through displacement and compaction of productive surface layers of soil, mainly on heavily used trails. Based on field review of the area, an estimated 10 to 15 percent of the area may be impacted by existing trails. Trails are still apparent, but most are well vegetated and past impacts are beginning to ameliorate from frost and vegetation.

## ANALYSIS AREA

The Dog Creek watershed encompasses the entire Dog Meadow Timber Sale Project area. The analysis area for evaluating soil productivity will include DNRC-managed State lands within this project area.

## ANALYSIS METHODS

The productivity of the soils will be analyzed by evaluating the level of soil disturbance currently in the proposed project area. The criteria for analysis will also include risk factors of soil stability.

## ALTERNATIVE EFFECTS

### DIRECT AND INDIRECT EFFECTS

#### • *Direct and Indirect Effects of No-Action Alternative A on Soils*

No-Action Alternative A would not directly or indirectly affect soil productivity. No harvesting activities would take place.

#### • *Direct and Indirect Effects of Action Alternative B on Soils*

Action alternative B would directly impact approximately 137 acres of ground if yarded in the summer, and approximately 42 acres if yarded in the winter. Direct impacts would include compaction and displacement resulting from the use of ground-based equipment to skid logs on approximately 898 acres, and cable yarding on approximately 41 acres. Ground-based site preparation and road construction would also generate direct impacts to the soil resource. These activities would leave up to 15 percent of the proposed harvest units in an impacted condition if done in the summer, and up to 4 percent if done in the winter. DNRC expects to maintain long-term soil productivity based upon the implementation of mitigation measures to control the area and degree of detrimental soil impacts to less than 15 percent of the proposed harvest area. A combination of skidding mitigation measures would include:

- restricting the season of use,
- utilizing a minimum skid-trail spacing,
- installing erosion control where

## SOILS

- needed,
- retaining woody debris, and
  - following all applicable BMPs.

### **CUMULATIVE EFFECTS**

#### **• *Cumulative Effects of No-Action Alternative A on Soils***

This alternative would not cumulatively affect soil productivity. No soil would be disturbed and no past harvest units would be reentered.

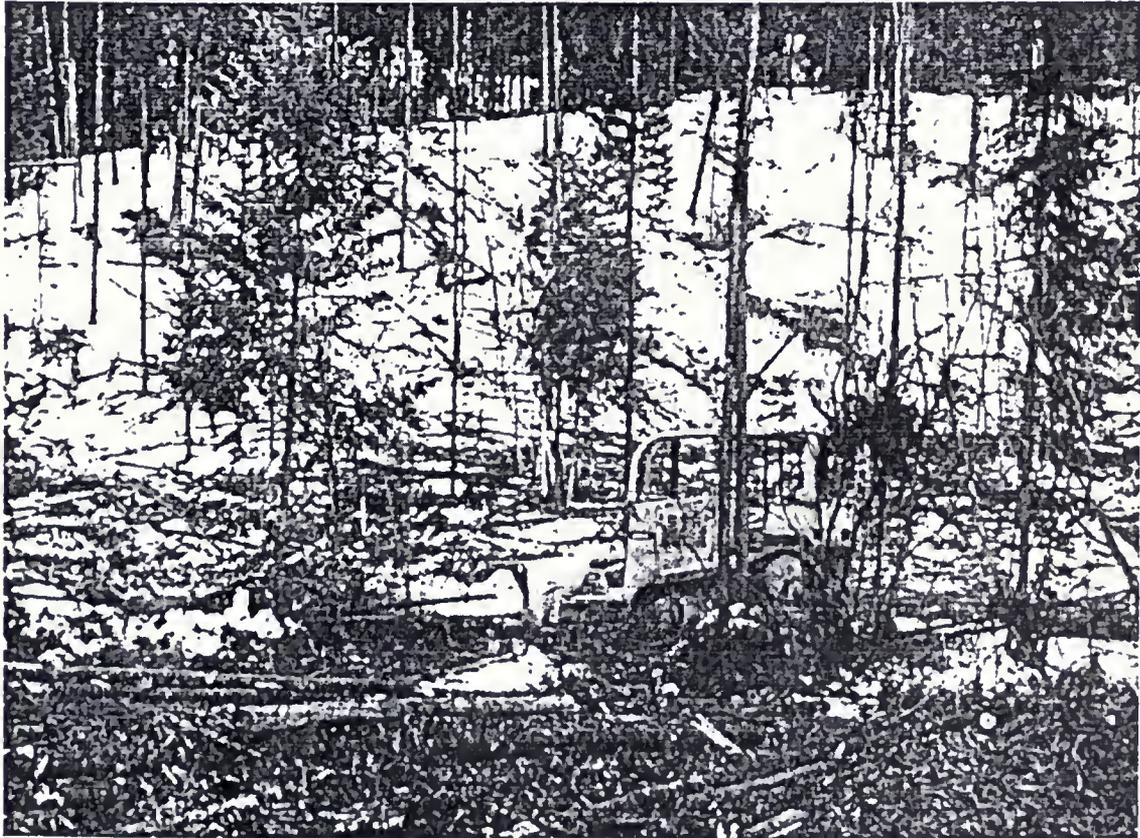
#### **• *Cumulative Effects of Action Alternative B on Soils***

Action Alternative B would enter some stands that had been previously harvested. Cumulative effects to soils may occur from repeated entries into a forest stand, where additional ground is impacted by equipment operations. DNRC would maintain long-term soil productivity and minimize cumulative effects by implementing

any or all of the following mitigation measures:

- Existing skid trails from past harvesting activities would be used if they are properly located and spaced.
- Additional skid trails would be used only where existing trails are unacceptable.
- The potential direct and indirect effects would be mitigated with soil-moisture restrictions.
- A portion of coarse woody debris and fine litter would be retained for nutrient cycling.

In stands that have not been previously harvested, cumulative effects to soil productivity from multiple entries would be the same as those listed in the direct and indirect effects section.



*Ground-based yarding equipment causes some soil compaction and displacement*



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DOG/MEADOW TIMBER SALE PROJECT  
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# **APPENDIX A**

# **REFERENCES**



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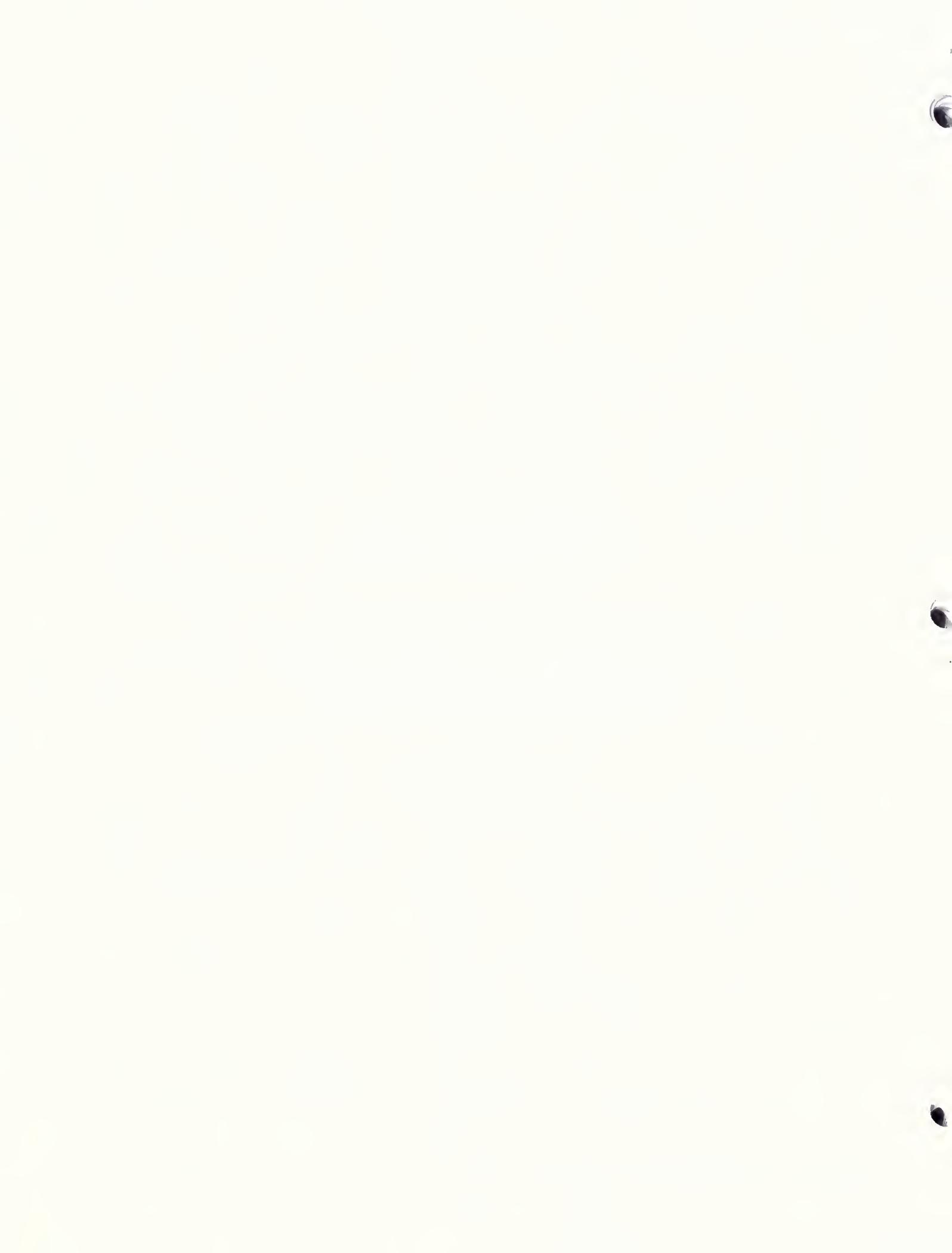
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## **APPENDIX B**

# **STIPULATIONS AND SPECIFICATIONS**



DOG/MEADOW TIMBER SALE PROJECT  
ENVIRONMENTAL ASSESSMENT

APPENDIX B  
STIPULATIONS AND  
SPECIFICATIONS

Stipulations and specifications for the action alternatives were identified or designed to prevent or reduce potential effects to resources considered in this analysis. In part, stipulations and specifications are a direct result of issue identification and resource concerns. This section is organized by resource.

Stipulations and specifications that apply to operations required by, and occurring during, the contract period would be contained within the Timber Sale Contract. As such, they are binding and enforceable. Project administrators would enforce stipulations and specifications relating to activities such as hazard reduction, site preparation, and planting that may occur during or after the contract period.

The following stipulations and specifications would be incorporated into the selected action alternative to mitigate potential effects on resources.

**WATERSHED AND FISHERIES**

- Erosion-control measures planned include:
  - grade breaks on roads,
  - surface-water-diverting mechanisms on roads,
  - slash-filter windrows, and
  - grass seeding.

Details for these control measures will be included in Appendix B of the Timber Sale Agreement.

- Culvert sizing for all road projects will be for a 50-year-flood event, as recommended by the DNRC hydrologist.
- Stream crossings where culvert removals and installations are planned will have the following requirements, as needed, to protect water-quality and meet BMPs:
  - Filter-fabric fences will be in place downstream prior to and during culvert installation.
  - Diversion channels will be constructed and lined with plastic to divert streamflow prior to any in-channel operations.
- Contract requirements for removal and installation of any stream-crossing structures include:
  - Crossings would be limited and occur only at authorized sites.
  - All soil disturbed during installation or removal of bridges would be seeded with quick-cover mix within 24 hours of disturbance.
- Brush would be removed from existing road prisms to allow effective road maintenance. Road maintenance would reduce sediment delivery.
- The contractor would be responsible for the immediate cleanup of any spills (fuel, oil, dirt, etc.) that may affect water quality.

- Leaking equipment would not be permitted to operate at stream-crossing construction sites.
- The BMP audit process will continue. This sale will likely be reviewed in an internal audit and may be picked at random as a State-wide audit site. SMZs would be evaluated as a part of the audit process.

#### WILDLIFE

##### > Bald Eagles

No harvesting or yarding activity will occur in the bald eagle primary-use area or across documented flight paths.

##### > Grizzly Bears

The following items are incorporated into this proposal:

- Grass seeding plans to revegetate roads and landings include seeding with plant species less palatable to grizzly bears to discourage or minimize the potential for bear/human conflicts.
- No logging camps would be allowed in the sale area.
- Garbage hauling would be required daily.
- The Forest Officer would, if necessary, immediately suspend any or all activities directly related to the proposed action to prevent imminent confrontation or conflict between grizzly bears, or other threatened or endangered species, and humans.
- While working under contract, contractors would be prohibited from carrying firearms onto restricted roads.
- All restricted roads would be closed by a gate, if present, or by a sign and sawhorse placed in the middle of the road while logging operations are inactive

(weekends, nights, etc.).

- Following harvesting operations, temporary roads would be obliterated by recontouring, slashing, or otherwise obscuring the road prism for at least 200 feet. The remaining road prism behind the obliteration would be ripped and water barred. The obliteration should be at a level to prevent motorized use.

##### > Wolves

A contract provision will require DNRC to contact USFWS to develop and implement mitigations to protect any wolf den or rendezvous site within the gross sale area that may be discovered during implementation of this proposal.

#### VEGETATION

##### SNAG RETENTION

- Where available, 2 to 5 snags or 2 to 5 trees (snag recruits), 21 inches dbh or greater, per acre.
- Larger trees that are at least 200 feet from an open road would be favored.
- Western larch, Douglas-fir, and black cottonwood would be favored.
- Clumpy distribution, versus even distribution, would be favored.

##### AESTHETICS

- The number and size of landings would be limited; the location would be away from main roads, when possible.
- Disturbed sites along road right-of-ways would be grass seeded.

##### AIR QUALITY

- To prevent individual or cumulative effects during burning operations, burning would be done in compliance with the Montana Airshed Group reporting regulations and any burning restrictions imposed in Airshed 2. This would provide for burning

during acceptable ventilation and dispersion conditions.

- To reduce effects from burning operations:
  - Excavator, landing, and roadwork debris would be piled clean to allow ignition to occur during fall and spring when ventilation is good and surrounding fuels are wet. The Forest Officer may require that piles be covered to reduce dispersed (unentrained) smoke. Covered piles are drier, ignite easier, burn hotter, and extinguish sooner.
  - The number of burn piles would be minimized by leaving large woody debris on site.
- Dust abatement may be applied on some road segments, depending on the seasonal conditions and level of public traffic.

## SOILS

### > *Soil Compaction and Displacement*

- Logging equipment would not operate off forest roads unless soils are adequately dry, frozen to a depth that would support machine operations, or snow covered to a depth that would prevent compaction, rutting, or displacement.
- Existing skid trails and landings would be used if their design is consistent with prescribed treatments and meets current BMP guidelines.
- Conventional wheeled and tracked skidders would not be operated on sustained slopes steeper than 40 percent, or could be operated on slopes up to 45 percent on a site-specific basis if operations do not cause excessive disturbance. Short steep slopes (less than 300 feet) of 40 to 50 percent would be winchline skidded, soft-track yarded, or timber-feller harvested with wood shuttled to

gentler slopes.

- The logging foreman and sale administrator would agree to a general skidding plan prior to equipment operations.
  - The density of skid trails in a harvest area would not exceed 20 percent of the total area in a cutting unit.
- ### > Soil Erosion
- Winchline skidding would be required for short (less than 300 feet) steep slopes over 45 percent, on equipment restriction zones (ERZ), and as required by the Forest Officer.
  - To reduce surface erosion, roads used by the purchaser would be reshaped and the ditches redefined following use to reduce surface erosion.
  - Drain dips and gravel would be installed on roads, as needed, to improve road drainage and reduce maintenance needs and erosion.
  - Some sections of roads would be repaired to upgrade the roads to design standards that reduce erosion potential and maintenance needs.
  - Certified weed-free grass seed and fertilizer would be applied in a timely manner on all newly constructed road surfaces, cut-and-fill slopes, and any existing disturbed cut-and-fill slopes and landings immediately adjacent to open roads to stabilize soils and reduce/prevent the establishment of noxious weeds. This would include:
    - seeding all road cuts and fills concurrently with construction;
    - applying "quick cover" seed mix at culvert installation sites within 1 day of when work is completed; and

- seeding all road surfaces and reseeded culvert installation sites when the final blading is completed for each specified road segment.
- As directed by the Forest Officer, water bars, logging-slash barriers, and, in some cases, temporary culverts would be installed on skid trails where there is a potential for erosion, based on ground and weather conditions. These erosion-control features would be periodically inspected and maintained throughout the contract period or extensions thereof.

#### NOXIOUS WEED MANAGEMENT

- Surface blading may be required to remove weeds before the seed-set stage on roads affected by the proposal.
- All tracked and wheeled equipment are required to be clean of noxious weeds prior to beginning

project operations. The contract-administrating officer would inspect equipment periodically during project implementation.

- Prompt revegetation of disturbed roadside sites would be required. Roads used and closed as part of this proposal would be reshaped and grass seeded.
- Infestations of noxious weeds would be treated on a site-specific basis (mainly along roads), with a priority on the newer species and infestations of noxious weeds.

#### ARCHAEOLOGY

- A review of this project was conducted by a DNRC archaeologist. No additional archeological investigative work was recommended for this project.
- A contract clause provides for suspending operations if cultural resources are discovered; operations may only resume as directed by the Forest Officer.

**APPENDIX C**

**VEGETATION  
ANALYSIS**



DOG/MEADOW TIMBER SALE PROJECT  
ENVIRONMENTAL ASSESSMENT

APPENDIX C  
VEGETATION ANALYSIS

### INTRODUCTION

This section provides a detailed description of the conditions of the forest in the analysis area and addresses the potential effects of the proposed alternatives related to the following issues:

- Adequate regeneration of the harvest units
- The likelihood of blowdown occurring in and adjacent to existing harvest units
- The potential effects to old growth on Stillwater State Forest

Also, this section addresses general concerns with timber harvesting, such as potential effects to the health of the forest, the spread of noxious weeds, wildfire hazards, the maintenance of biodiversity, the effects of clearcutting, and historic occurrence patterns.

### ANALYSIS METHOD

A coarse-filter analysis was conducted on the analysis area in reference to effects to age class, covertype, and old-growth timber stands. Each alternative was analyzed for the effects to snags, coarse woody debris, and noxious weed occurrence and distribution. The data used to define the existing condition of the project area came from several sources, including DNRC's SLI, extensive traverses, and plots. The Stillwater SLI is updated annually in areas where recent harvesting has been completed. The estimated effects of

forest-management projects that have been implemented, but not completed, on current vegetation conditions are considered in the cumulative-effects analysis.

### ANALYSIS AREA

The coarse-filter analysis area is the contiguous Stillwater State Forest and scattered sections in northern Lincoln County, approximately 99,264 forested acres. The analysis of site-specific effects is limited to areas where actions are proposed (referred to as the proposed harvest units or the project area); consideration for adjacent lands is analyzed where applicable. Some comparisons are made with historic data representing the Upper Flathead Valley that was collected in the 1930s (climatic section 333c, Losensky 1997b).

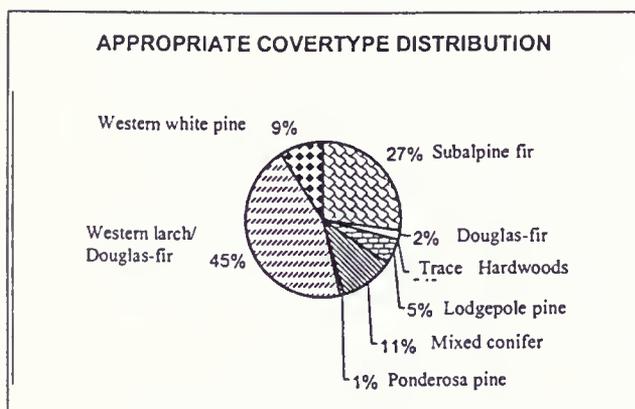
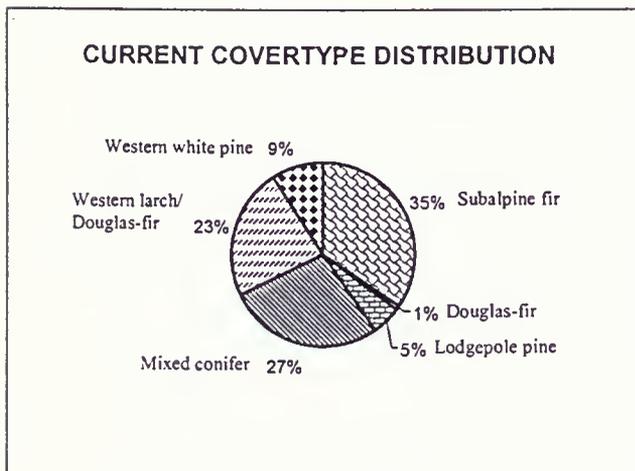
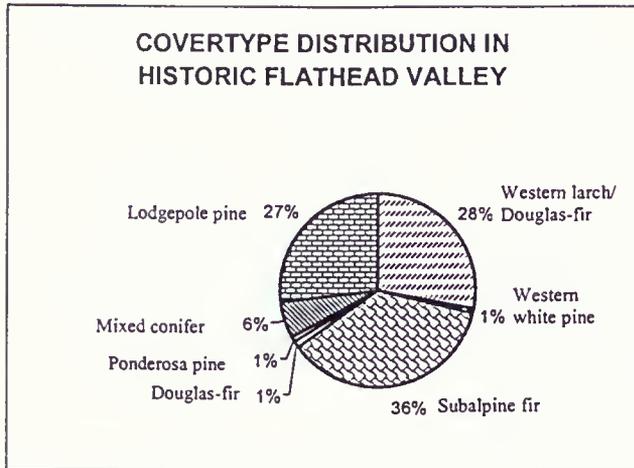
### EXISTING CONDITIONS

#### COVERTYPE

The current covertype distribution on the landscape in the coarse-filter analysis area is displayed in *FIGURE 1*. For comparison, the covertype distribution from the Historic Upper Flathead Valley is displayed. Covertypes are assigned based on the existing percent of species mixes from a set protocol using SLI. Also displayed is an appropriate covertype distribution. This depicts the covertype distribution DNRC determined should be trended towards based on the current percent of species mix, fire and fire suppression history, white

pine blister rust mortality, harvest history, and local site conditions.

FIGURE C-1



Data indicates that the largest discrepancies between the current covertypes distribution and historic data are that there is currently less lodgepole pine and more mixed-conifer covertypes. Currently, the

largest discrepancies between appropriate covertypes and current covertypes appear to be that there are more mixed-conifer and subalpine fir (24 percent) covertypes and less western larch/Douglas-fir covertypes (22 percent). Increases in the subalpine fir and mixed-conifer covertypes may be a consequence of an increase in shade-tolerant species from fire suppression and past harvesting that selectively removed some of the shade-intolerant species. Current covertypes distribution is displayed in TABLE C-1 - CURRENT COVERTYPE DISTRIBUTION WITHIN PROPOSED HARVEST UNITS.

TABLE C-1 - CURRENT COVERTYPE DISTRIBUTION WITHIN PROPOSED HARVEST UNITS

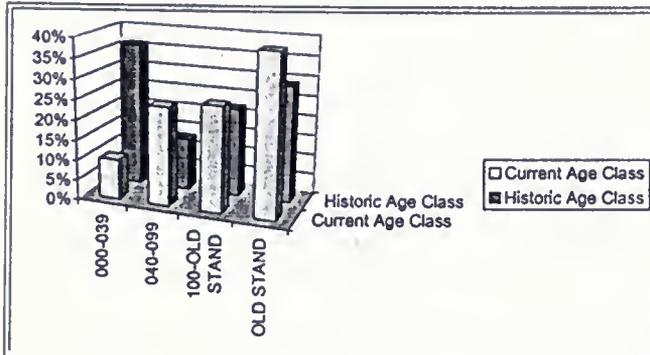
COVERTYPE	UNIT DISTRIBUTION (PERCENT)
Subalpine fir	4
Douglas-fir	2
Hardwoods	Trace
Lodgepole pine	19
Mixed conifer	34
Western larch/Douglas-fir	1
Western white pine	40

AGE-CLASS DISTRIBUTION

FIGURE C-2-COMPARISON OF CURRENT AGE-CLASS DISTRIBUTION IN THE ANALYSIS AREA AND AGE-CLASS DISTRIBUTION FROM HISTORIC UPPER FLATHEAD VALLEY DATA provides a comparison of the current age-class distribution in the analysis area and from Historic Upper Flathead Valley data.

State ownership in the analysis area has approximately 25 percent less area in the seedling/sapling age class (0 to 39 years) and 11 percent more area in the old-stand age class than Historic Data over the larger climatic section. TABLE C-2 - CURRENT AGE-CLASS DISTRIBUTION IN THE PROPOSED HARVEST UNITS is displayed below.

**FIGURE C-2 - COMPARISON OF CURRENT AGE-CLASS DISTRIBUTION IN THE ANALYSIS AREA AND AGE-CLASS DISTRIBUTION FROM HISTORIC UPPER FLATHEAD VALLEY DATA**



(Note: Old stands for age-class comparison are stands with a dominant overstory of 150 years or older or in the case of lodgepole 140 years or

**TABLE C-2 - CURRENT AGE-CLASS DISTRIBUTION IN THE PROPOSED HARVEST UNITS**

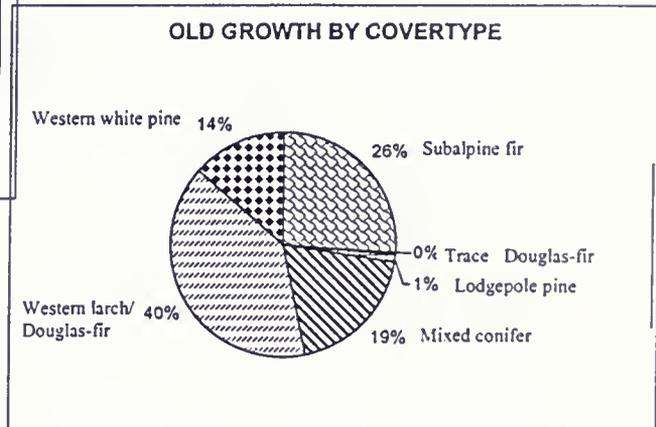
AGE CLASS	ACRES	PERCENT
0 to 39 years	8	1
40 to 99 years	316	33
100 years to old stand	332	34
Old stand	282	30
Totals	939	100

**OLD-GROWTH DISTRIBUTION**

Old growth, for this analysis, is defined as stands that meet the minimum criteria (number of trees per acre that have a minimum dbh and a minimum age) for a given site (old-growth group from habitat type). These criteria can be found in the Green, et al, *Old Growth Forest Types of the Northern Region, R-1 SES 4/92, USDA Forest Service, Northern Region, Missoula, MT.* The SLI indicates that timber stands that are estimated to meet the old-growth definition total approximately 8,070.4 acres, or 12.3 percent of the analysis area. For comparison, in the FNF Forest Plan Amendment 21, the amount of old growth on FNF historically was estimated to be between 15 and 60 percent (FNF Plan Amendment #21, 1998). The percentage is highly

variable by forest type. This historic estimate is based on various information sources, including historic data, aerial photography comparison, and computer modeling. **FIGURE C-3 - CURRENT COVERTYPE DISTRIBUTION WITHIN OLD-GROWTH STANDS IN THE ANALYSIS AREA** is displayed below.

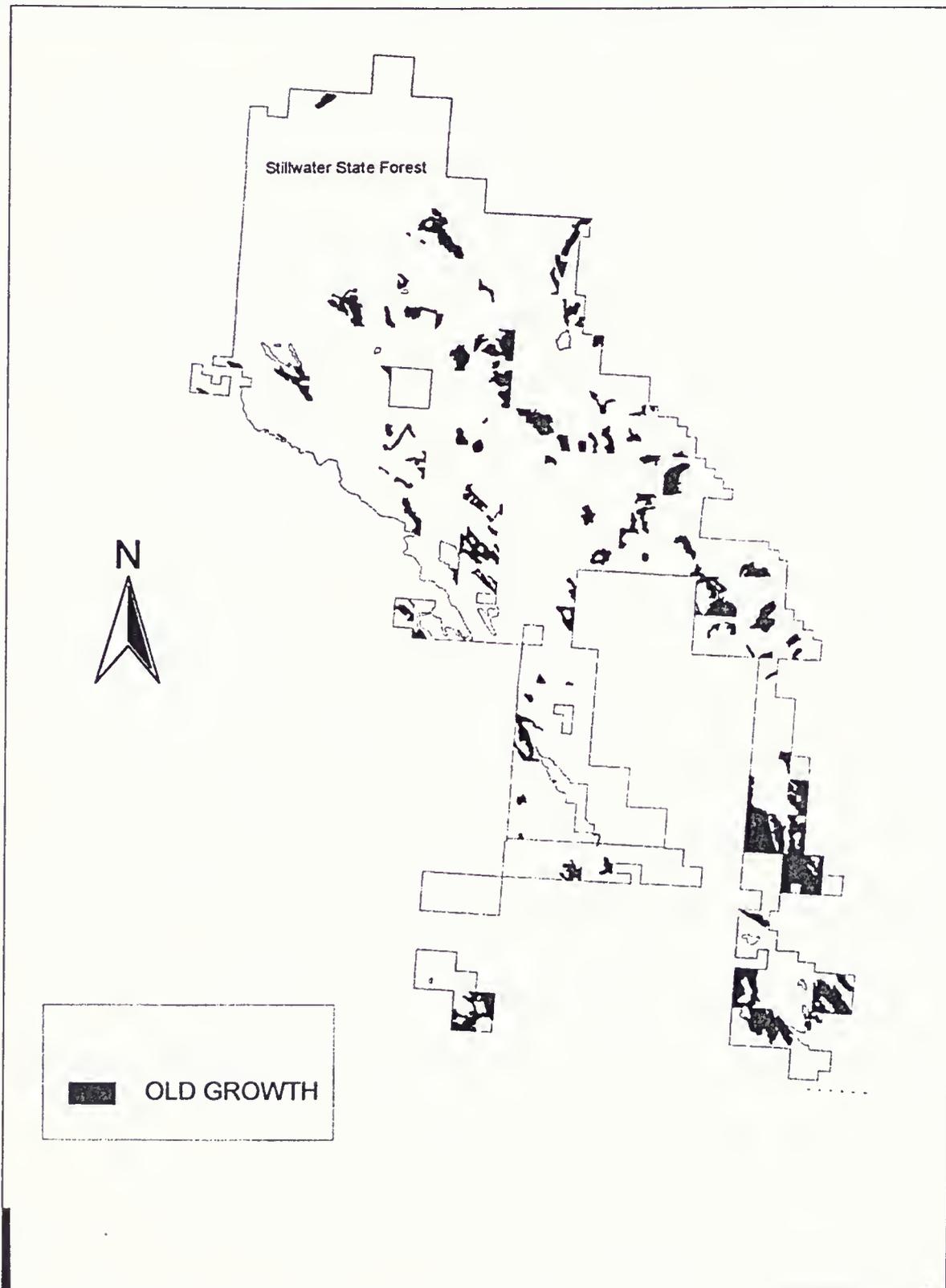
**FIGURE C-3 - CURRENT COVERTYPE DISTRIBUTION WITHIN OLD-GROWTH STANDS IN THE ANALYSIS AREA**



Subalpine fir and western larch/ Douglas-fir are the 2 dominant old-growth covertypes in the analysis area. The Dog/Meadow Timber Sale Project was designed to not harvest in old-growth stands. The old stands that are proposed for harvest entry with the Dog/Meadow Timber Sale Project have, for the most part, been entered previously with timber harvesting and do not currently meet minimum criteria for old-growth definition. The mature overstory component in these timber stands is distributed in a scattered, clumpy distribution with less than the minimum number of large old trees per acre than are required to be considered old growth in this analysis.

**FIGURE C-4 - OLD-GROWTH STAND LOCATIONS ACROSS THE ANALYSIS AREA** is displayed on the following map.

FIGURE C-4 - OLD-GROWTH STAND LOCATIONS ACROSS THE ANALYSIS AREA



Note: The analysis area has no old-growth stands in scattered sections northwest of the contiguous Stillwater State Forest.

## INSECT AND DISEASE/FOREST HEALTH CONDITIONS

Insect and disease conditions in timber stands on Stillwater State Forest are monitored annually. The annual Forest Health Protection aerial detection survey flight provides DNRC data on mortality on State ownership and adjacent forest ownerships. In addition, Stillwater Unit conducts an annual aerial survey to detect mortality from forest insect infestations and disease infections. The last Stillwater Unit survey was conducted in June of 2002. Ground surveys are done in areas where tree mortality is detected; the cause and scope of the infestation is evaluated. The most prevalent tree mortality found recently on the forest was attributed to Douglas-fir bark beetle (*Dendroctonus pseudotsuga* *Hoopk*) and fir engraver (*Scolytus Ventalis* *Leconte*) attacks. The Douglas-fir mortality is distributed in clumps and individual trees throughout the analysis area, with the largest concentrations in the lower Swift Creek area and on the rocky portions of Stryker Ridge. The lower Swift Creek area experienced substantial mortality in the grand fir from the fir engraver during 2001 and 2002. Some western larch dwarf mistletoe (*Arceuthobium laricis*) is patchily distributed over the project area.

Indian paint stem decay (*Echinodontium tinctorium*) in the subalpine fir and grand fir is fairly prevalent in the project area.

A contracted pathologist conducted a root-disease survey and authored a map and management report for the Dog/Meadow Timber Sale Project area. The report can be located in the project file (*Root Disease Survey, Mapping And Management Report For The Dog/Meadow Project Area, Stillwater State Forest, Montana, Ferguson 2001*). Most of the mortality from *Armillaria* root rot

(*Armillaria ostoyae*) observed during the survey was in grand fir and subalpine fir. Douglas-fir showing symptoms of root rot infections were fairly common in the area. Some samples of annosus root rot (*Heterobasidium annosum*) were also collected from infected trees in the project area during the survey. Schweinitzii root rot (*Phaeolus Schweinitzii*) is also present. The report concluded that the overall impact of root disease in the project area appears low in the known areas of past disease.

Stocking densities in many of the stands in the project area are high, reducing tree vigor and growth rates and increasing susceptibility to additional insect and disease attacks.

The project area contains an estimated less than 2 snags per acre that are greater than 15 inches in diameter, which is a condition probably associated with the species mix and harvest entries in the distant past.

Concentrations of down trees can be found throughout the project area. Most of the down trees are a product of lodgepole pine mortality created several years ago by mountain pine beetle (*Dendroctonus ponderosae*) attacks. The combination of heavy fuel loads and dense stocking creates risks of high intensity wildfire occurrences.

The existing vegetative types in the project area are a result of various site factors, disturbance regimes, and past forest-management activities.

### SITE FACTORS

- Elevation - The proposed harvest units lay between 4,400 and 3,400 feet.
- Aspects, position on landscape - Proposed activities are primarily at the base of Stryker Ridge on west, south, and flat aspects.
- Soils - The project area is

composed primarily of silty glacial till soils (see APPENDIX G - SOILS ANALYSIS).

- Moisture availability - The mean annual precipitation is approximately 28 inches.
- Growing season - The project area consists of a relatively short growing season, 5 to 7 months.

These site factors helped develop the habitat-type classifications used to describe successional development and timber productivity, among other things (Pfister et al, 1977). Most of the areas within the proposed harvest units are western red cedar/queencup beadrily habitat types. These habitat types indicate a high to very high potential for timber productivity. Fire return intervals in cedar/hemlock stands in northern Idaho have been estimated by Arno and Davis (1980), who have reported fire-free intervals from 50 to greater than 200 years. Fire severities vary greatly, from minor ground fires of moist sites to stand-replacement fires (Fischer, Bradley 1987).

Currently, blowdown occurs periodically in small clumps and individual trees throughout the project area. Blowdown events occur most often in the spring when conditions are generally wet and windy.

Trees have regenerated well with a diverse species mix of native trees and vegetation in most of the project area that was previously harvested with regeneration as an objective. A sort of the 0-to-39-year age class in the SLI shows over 75 percent of the area is medium to well stocked. The most common barriers to tree regeneration in the area are a lack of good seed source (particularly with western larch and western white pine), brush competition, and competition from pinegrass and beargrass.

#### **INFLUENCES FROM PAST DNRC HARVESTING ACTIVITIES**

Historical records indicate that a small amount of selective timber harvesting was initiated at lower elevations in the gross sale area in the 1920s. These harvests targeted some of the large seral dominants in the stands, such as western larch and western white pine, but did not cover large areas. The area was entered in the 1930s for harvesting cedar poles; these pole harvests continued through the 1940s and 50s. Partial cutting was initiated during the 1940s and 50s, removing some of the large western larch, western white pine, and Douglas-fir, primarily from areas in the lower elevations. This resulted in stand compositions heavy in shade-tolerant species (subalpine fir, grand fir, and western red cedar). In the late 1960s, even-aged harvesting methods, primarily seedtree and clearcut harvests, occurred. Some mixed-conifer stands were entered in the 1980s with an improvement harvest that removed most of the lodgepole pine and other scattered individual trees that were showing poor vigor. This improvement cutting and some of the even-aged harvesting was focused on treating lodgepole pine stands that were heavily infested with mountain pine beetle. The species mixes in the seedling/sapling stands that have regenerated from the even-aged treatments are predominantly lodgepole pine, western larch, and Douglas-fir.

#### **NOXIOUS WEEDS**

A survey of the road system that accesses the project area and many of the existing harvest units in and around the project area was completed. One small population of tansy ragwort (*Senecio jacobaea L*) was found and sprayed with an herbicide in 2002. The road rights-of-way had both patchy and continuous concentrations of spotted knapweed (*Centaurea maculosa*) and oxeye daisy (*Chrysanthemum*

leucanthemum). Small isolated concentrations of orange hawkweed (*Hieracium aurantiacum*), Saint-John's-wort (*Hypericum perforatum*), dalmation toadflax (*Linaria dalmatica*), sulphur cinquefoil (*Potentilla recta* L), and several species of thistle (*Cirsium* spp.) were also located. Within existing harvest units were invasions of spotted knapweed, oxeye daisy, and thistle that tended to follow areas where the greatest disturbance, such as landings, skid trails, and areas that received heavier scarification, had occurred. Generally, the weed infestation was more extensive in the recently (occurring in the last 15 years) harvested areas; once units have successfully regenerated with seedling- to sapling-sized trees, the area of infestation appears to decrease, with only small, scattered patches of weeds remaining. Orange hawkweed appears to be increasing in the area and is able to tolerate some shade.

#### **SENSITIVE PLANTS**

A sensitive plant survey was conducted in the project area in the summer of 2000 by contracted botanists. Two substantial populations of poor sedge (*Carex paupercula*) were found in the lower elevations of the project area associated with a wet meadow and a fen. Seed production was in evidence. Two populations of Buckler fern (*Dryopteris cristata*) were found in the project area. These plants also occupy wet sites such as the edge of swamps and fens. The Buckler fern populations appeared to be healthy with mature, fertile fronds.

## **ALTERNATIVE EFFECTS**

### **COVERTYPE DISTRIBUTION**

#### **Direct Effects**

- ***Direct Effects of No-Action Alternative A on Covertypes***

No-Action Alternative A would not directly affect covertypes in the analysis area.

- ***Direct Effects of Action Alternative B on Covertypes***

The proposed treatments would convert approximately 546 acres (60 percent) of the area where treatment is proposed from mixed-conifer, subalpine fir, and lodgepole pine covertypes to a western larch/Douglas-fir coertype. Areas where natural lodgepole pine regeneration becomes established at heavy stocking levels might retain the lodgepole pine coertype. Rust-resistant western white pine would be planted over much of the proposed harvest area and, depending on the regeneration success of other tree species, some of the area may convert to a western white pine coertype.

#### **Indirect Effects**

- ***Indirect effects of No-Action Alternative A on Covertypes***

Over time, as ingrowth of shade-tolerant species continues with the ongoing mortality of western white pine, the western white pine coertype would likely decrease in the area and the mixed-conifer coertype would likely increase.

- ***Indirect Effects of Action Alternative B on Covertypes***

As follow-up treatments such as precommercial thinning occur in proposed harvest units, the species mix percentages of western larch, Douglas-fir, and western white pine would likely increase in addition to the direct effects.

## Cumulative Effects

### • *Cumulative Effects of No-Action Alternative A on Covertypes*

Given continued fire suppression and ongoing mortality of western white pine from white pine blister rust, No-Action Alternative A would add to the trend of an increase of shade-tolerant tree species in the analysis area and a decrease in the amount of western white pine.

### • *Cumulative Effects of Action Alternative B on Covertypes*

In addition to the changes in coertype from the proposed action are other timber sale projects that have been initiated, but not completed; therefore, their effects are not represented in the SLI. These projects would probably increase the amount of the western larch/Douglas-fir coertype by 3 percent over the analysis area and, subsequently, reduce the amount of area in the mixed-conifer and supalpine fir coertypes by 3 percent. The Stillwater State Forests precommercial thinning program thins 200 to 500 acres of sapling stands a year. The thinnings often favor the retention of western larch and western white pine coertypes and, in some cases, the Douglas fir coertype. The cumulative effect is a trend toward seral coertypes in areas where recent forest-management activities have taken place.

## AGE-CLASS DISTRIBUTION

### Direct Effects

#### • *Direct Effects of No-Action Alternative A on Age-Class Distribution*

No direct effects on age classes within timber stands in the analysis area would occur with No-Action Alternative A.

#### • *Direct Effects of Action Alternative B on Age-Class Distribution*

Action Alternative B proposes harvest treatments that would create openings within stands, though, in most cases, some mature trees would be retained; the stands within the openings would likely be converted to a 0-to-39-year age class. Overall, an estimated 614 acres of 40-to-99-year, 100-to-old-stand, and old-stand age classes would be converted to the 0-to-39-year age class. Approximately 67 percent of the harvested area would be converted to the 0-to-39-year age class.

### Indirect Effects

#### • *Indirect Effects of No-Action Alternative A on Age-Class Distribution*

Over time, with natural forest succession and continued fire suppression, the age-class distribution between stands would become somewhat homogeneous, trending toward older age classes.

#### • *Indirect Effects of Action Alternative B on Age-Class Distribution*

With the proposed harvest treatments, the project area would contain a mosaic of stand structures, including single-storied, two-storied, and multistoried conditions. The openings created would be typical of mixed-severity fires and large portions of the area would be typical of stand-replacing fires.

### Cumulative Effects

#### • *Cumulative Effects of No-Action Alternative A and Action Alternative B on Age Class*

In addition to the changes in age-class distribution from the proposed action, other timber sale projects have been initiated, but have not been completed, so their effects are not represented in the SLI. These projects are estimated to increase the amount of area in the 0-to-39-year age class by

approximately 1.7 percent and slightly decrease the area in older stand classes.

#### OLD GROWTH

##### Direct Effects

- *Direct Effects of No-Action Alternative A on Old Growth*

No-Action Alternative A would have no direct effects on the amount, distribution, or character of old-growth stands in the analysis area.

- *Direct Effects of Action Alternative B on Old Growth*

Action Alternative B was developed to not enter old-growth stands with harvesting or road construction. Therefore, no direct effects to old growth are expected with the implementation of this alternative.

##### Indirect Effects

- *Indirect Effects of No-Action Alternative A on Old Growth*

Fire suppression, firewood cutting, and roadside salvage harvesting would still occur with No-Action Alternative A. Over time, with no harvesting, old-growth timber stands would likely become more decadent, more heavily stocked, and contain increased down woody loads and wildfire hazards. An increase in shade-tolerant species would occur within the stands; potentially, more snags would occupy the stands where they are too far from open roads to be harvested for firewood.

- *Indirect Effects of Action Alternative B on Old Growth*

Action Alternative B would not harvest within old-growth stands; thus, the indirect effects would be very similar to No-Action Alternative A. Additionally, this alternative would harvest in stands adjacent to old-growth

stands, structurally creating a more abrupt edge to the stand boundary. The risk of blowdown along proposed harvest unit boundaries would, potentially, increase. Harvest units adjacent to old-growth stands would be less susceptible to high intensity crown fires and may provide an opportunity for a fuel break in the event of a wildfire.

##### Cumulative Effects

- *Cumulative Effects of No-Action Alternative A and Action Alternative B on Old Growth*

The timber sales in the analysis area that have been initiated, but are not yet reflected in the SLI, are not harvesting timber in old-growth stands. Approximately 188 acres of these stands meet the current old-growth definition, but were withdrawn from harvests until ongoing litigation is resolved. If this litigation is resolved, these areas may be harvested as part of their initial projects. After harvesting, these 188 acres would not likely be considered old growth, although the current prescribed treatments would retain some of the larger older trees, snags, and coarse woody debris. If no action was applied for an extended period over the entire analysis area, the number of old-growth stands would increase as younger stands age and develop old-growth characteristics.

#### INSECTS AND DISEASES (FOREST HEALTH CONDITIONS)

##### Direct Effects

- *Direct Effects of No-Action Alternative A and Action Alternative B on Insects and Diseases/Forest Health Conditions*

Small pockets of mortality caused by the Douglas-fir bark beetle are expected to occur in clumps of mature Douglas-fir within the project area. Some subalpine fir and grand fir will become infected with stem rots, Indian paint fungus in particular. Western

larch mistletoe infections would continue to increase and intensify in western larch throughout the project area. The mortality from insects and diseases that are currently occurring in the project area will continue.

- ***Direct Effects of No-Action Alternative A on Insects and Diseases/Forest Health Conditions***

No-Action Alternative A would directly affect insect and disease conditions by the continuing loss of sawlog volume due to stem rots and the current level of mortality and infections from stem rots, root rots, and white pine blister rust, and bark beetle infestations. Fire hazards would continue to increase in the project area.

- ***Direct Effects of Action Alternative B on Insects and Diseases/Forest Health Conditions***

The value of many mature true firs within the harvest units that are already infected by, or highly susceptible to, stem rot infection would be recovered. Mistletoe-infected western larch would be preferentially removed, reducing the incidence and severity of western larch dwarf mistletoe. Rust-resistant western white pine would be planted, increasing the amount of rust-resistant western white pine in the project area. The wildfire risk of ignition may be increased during the first season after harvesting due to the availability of cured logging slash. All treatments would reduce ladder fuels and stocking density in the proposed harvest units, thus, reducing crown-fire hazard. Few large trees that are good candidates for wildlife trees would be harvested. Most of the large western larch and black cottonwood would be retained. Where available, approximately 2 to 5 snags per acre would be retained in a clumpy distribution.

#### Indirect Effects

- ***Indirect Effects of No-Action Alternative A on Insects and Diseases/Forest Health Conditions***

Over time, the overall decadence within timber stands would increase and, subsequently, a reduction of vigor and an increase in mortality would occur. No rust-resistant western white pine would be planted and, with continued mortality in western white pine, the representation of western white pine in the area would decrease. As the percent of true firs in the area increases due to lack of disturbances that open the canopy, the incidence of root rot and stem rots would likely increase. With no harvesting or follow-up treatments, western larch dwarf mistletoe would spread from infected mature trees to adjacent young western larch saplings, increasing the overall incidence of this parasitic plant in the project area. For a time, stands would become more densely stocked and ladder fuels would increase. Increased mortality would increase the amounts and size of down woody concentrations. These 2 conditions would increase the risk of fire starts in the area becoming intense stand-replacement fires.

- ***Indirect Effects of Action Alternative B on Insects and Diseases/Forest Health Conditions***

Over time, the removal of infected, low-vigor, highly susceptible trees proposed in Action Alternative B would reduce the levels and risk of insect and disease mortality occurring on sites in the project area. Over time, some loss of retained subalpine fir, grand fir, and Douglas-fir due to root rot would be expected. On sites with existing root rot infestations, where a portion of the mature

Douglas-fir and true fir would be harvested, the inoculum potential would initially increase due to colonization of stumps by existing root rot fungi (Redfern and Filip, 1991). The increase of western larch and rust-resistant western white pine regeneration in the area should reduce the impacts of root disease. The risk of blowdown adjacent to proposed harvest unit boundaries would be increased by the reduction of canopy. Mitigation measures to reduce the amount of blowdown would include retaining clumps of trees in high-risk areas and retaining additional trees in areas exposed to high winds, such as ridgetops. Individual trees that have shallow lateral root systems, such as Engelmann spruce, would not be retained in openings away from timber walls that could provide shelter from the wind. Following hazard-reduction treatments, the harvest unit conditions would be more conducive to fire-suppression efforts, with a lower risk of high intensity, stand-replacement fires occurring.

#### Cumulative Effects

- *Cumulative Effects of No-Action Alternative A and Action Alternative B on Insects and Diseases/Forest Health Conditions*

The Stillwater Unit forest-management program bases the priority of timber-harvest locations largely on timber-stand conditions in reference to insect and disease conditions, retention of biodiversity, loss of value, and fire-hazard reduction. Therefore, treatments similar to those proposed on this project have been initiated and completed in the analysis area. These treatments harvested trees that were infested with bark beetles; retained trees that are more resistant to insect and disease attacks; retained species that are less susceptible to root rot and stem rots; and regenerated a tree-

species composition that is diverse and, therefore, more resistant to insect and disease mortality. These types of treatments will likely continue to be proposed and implemented in the analysis area.

#### NOXIOUS WEEDS

##### Direct and Indirect Effects

- *Direct And Indirect Effects of No-Action Alternative A on Noxious Weeds*

Current infestations of noxious weeds are being addressed with an ongoing program of site-specific herbicide spraying along roads and in small areas of infestation. The spraying is done by a certified applicator at Stillwater Unit and Flathead County weed-control personnel. The funding for weed control comes largely from the FI fee collected on timber sale projects. This alternative would not collect funds to be used for noxious-weed management and could reduce the ability to treat noxious weeds. No-Action Alternative A would not expose additional mineral soil or open up the canopy of existing stands and, therefore, would not increase the risk of additional establishment of weed populations. Currently, the project area is used extensively for dispersed recreation; weed seed is introduced primarily from motor vehicle traffic.

- *Direct And Indirect Effects of Action Alternative B on Noxious Weeds*

Action Alternative B proposes to operate harvesting equipment, logging trucks, and personal and administrative vehicles on existing road systems within the harvest area. Additional mineral soil would be exposed during equipment operation within the proposed harvest units, blading of existing roads, and construction of log landings and temporary roads.

Mitigation measures that would be implemented to reduce the establishment of additional weed populations include:

- Surface blading to remove weeds before the seed-set stage on existing road systems affected by the proposal.
- Monitoring, mapping, and treating existing populations near harvesting activities.
- All tracked and wheeled equipment would be pressure cleaned prior to beginning operations to eliminate weed seeds; the officer administering the contract would inspect equipment periodically during project implementation.
- Disturbed roadside sites would be promptly revegetated; roads used and closed would be reshaped and grass seeded.
- Site-specific herbicide spraying would occur prior to harvesting activities on all haul roads.

Approximately 6.25 miles of road that is currently restricted from motorized traffic would be opened and used. In addition, approximately .5 miles of temporary road would be constructed and reclaimed after proposed treatments were completed. These areas would have additional exposed mineral soil, which are potential seedbeds for weeds. Currently, many of the restricted roads have established populations of noxious weeds. Opening these roads for administrative use only and implementing a site-specific weed spraying and management program would likely, over time, reduce the weed population in the project area.

#### Cumulative Effects

- ***Cumulative Effects of No-Action Alternative A and Action Alternative B on Noxious Weeds***

The analysis area has traffic on open roads from dispersed recreation, timber-management activities, and other uses on a regular basis. This traffic, along with road-maintenance and timber-harvesting activities, increases the areas exposed to weed establishment. In addition, illegal motorized use and the corridors for power and utility lines expose areas to weed establishment. With the organization of Stillwater Unit's weed-management program, the County Weed Department's cooperation, and available funding, some of the large populations of weeds in the analysis area should be treated and greatly reduced; ongoing annual weed management on road systems should reduce the current weed populations.

#### SENSITIVE PLANTS

##### Direct and Indirect Effects

- ***Direct and Indirect Effects of No-Action Alternative A to Sensitive Plants***

Sensitive plants in the project area are located in and around fens or wet meadow complexes. The greatest threats to these species are changes in hydrology and/or the introduction of exotic species that would outcompete these plants. No-Action Alternative A would not directly affect water levels or increase the risk of exotic species introduction. Over time, if fuel buildups and fire hazards were allowed to increase, the risk of a very large stand-replacement fire in the area would increase and the result could increase runoff and water levels in the fens and meadow complexes near the burn. A large stand-replacement fire could also

increase the potential for the introduction of exotic species that could outcompete sensitive plants. This alternative would not collect funds for weed population monitoring or management. Over time, without adequate funding, the weed management program on Stillwater Unit would be reduced and the risk of exotic plants successfully invading the habitat of the sensitive plants in the project area would increase.

- ***Direct and Indirect Effects of Action Alternative B to Sensitive Plants***

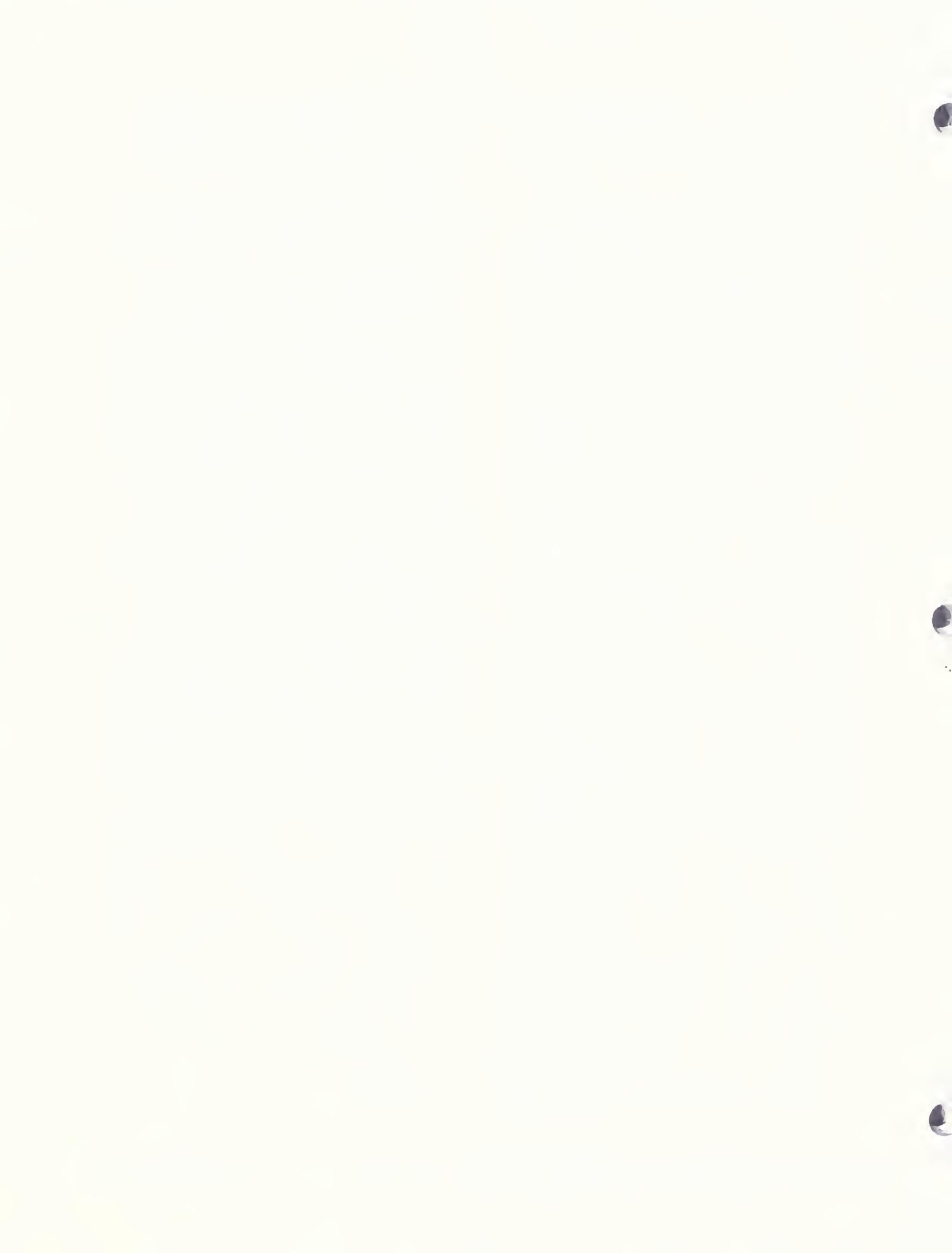
Action Alternative B would reduce the canopy over approximately 939 acres to varying degrees, which, potentially, could cause some increased water levels at low points in the topography. The meadows, wetlands, and fens in the project area will be buffered by retaining tree canopy cover and additional vegetation along the edges or, in some cases, locating harvest units away from the habitat feature. This buffering also protects SMZs and wildlife habitat. The retention of additional vegetation would absorb much of the water from surrounding areas and should limit increases in water levels in sensitive plant habitat to very minor amounts. Action Alternative B would collect fees that could be used, in part, to fund weed-monitoring and weed-

control measures, which would allow land managers to react to the future establishment of exotic species within the sensitive plant habitat in the project area.

#### **Cumulative Effects**

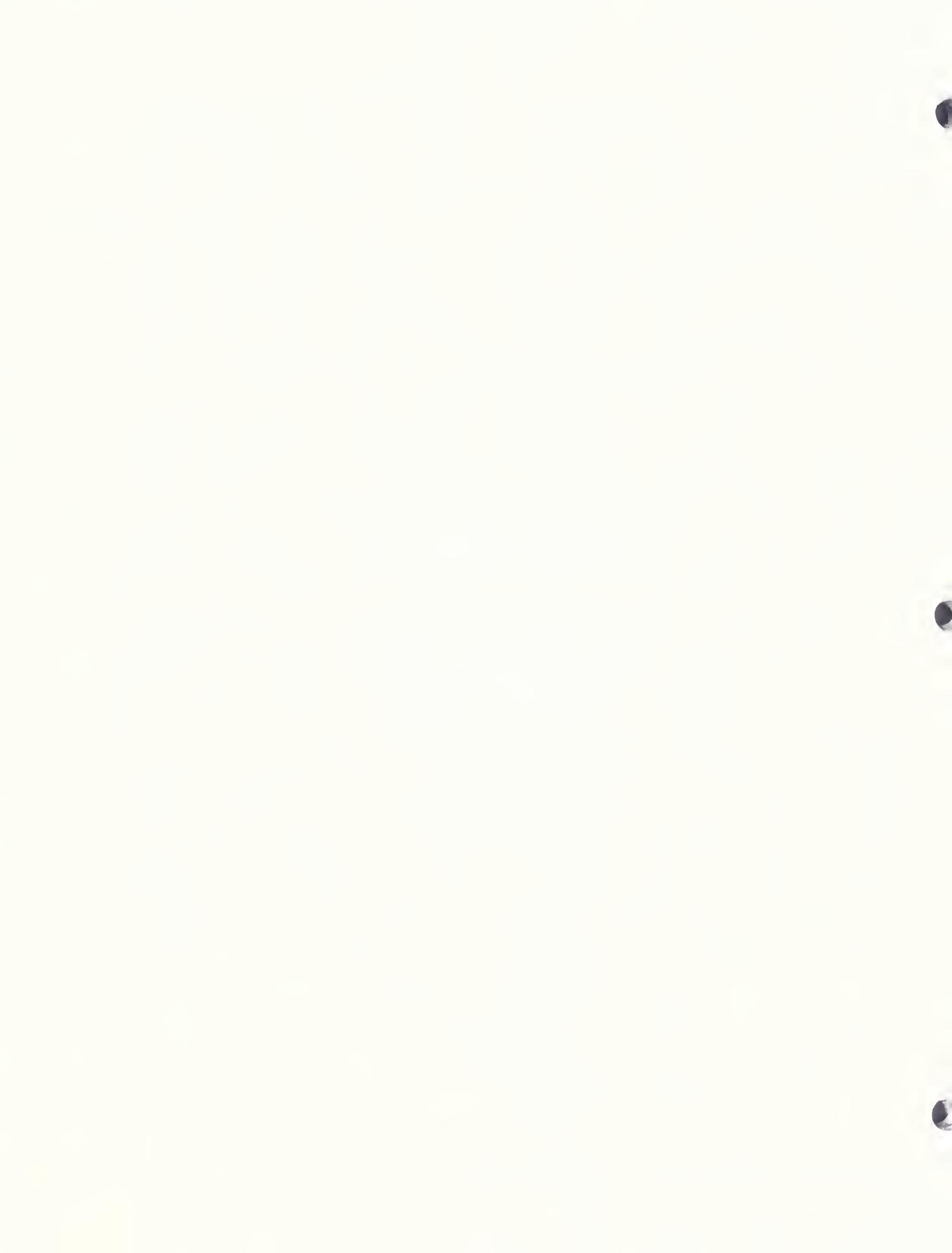
- ***Cumulative Effects of No-Action Alternative A and Action Alternative B to Sensitive Plants***

Management actions on Stillwater Unit are being initiated with mitigation measures to prevent the spread of weeds more often than in the past; these actions should reduce the spread of weeds from past levels. In contrast, the amount of dispersed recreation on Stillwater State Forest has increased substantially, which has also increased the introduction of weeds to the area. Stillwater Unit's weed management program provides a way to monitor the overall population, identify major problem areas, and treat areas to control populations. Control treatments could prevent future outbreaks of exotic species in sensitive plant habitat. Timber-harvesting projects initiated on Stillwater State Forest analyze potential effects to water yield. Mitigation measures are included in the development of the project to reduce increases in water yield that might affect the habitat of sensitive plants.



**APPENDIX D**

**HYDROLOGY  
ANALYSIS**



DOG/MEADOW TIMBER SALE PROJECT  
ENVIRONMENTAL ASSESSMENT

APPENDIX D  
HYDROLOGY ANALYSIS

## INTRODUCTION

This analysis is designed to address the public concerns particular to hydrology, as listed in *TABLE I-1-SUMMARY AND TRACKING OF ISSUES AND CONCERNS FROM PUBLIC COMMENTS* of the EA, and analysis elements considered necessary by the ID Team.

### SEDIMENT DELIVERY

Timber harvesting and related activities, such as road construction, can lead to water-quality impacts by increasing the production and delivery of fine sediment to streams. Construction of roads, skid trails, and landings can generate and transfer substantial amounts of sediment through the removal of vegetation and exposure of bare soil. In addition, removal of vegetation near stream channels reduces the sediment-filtering capacity and may reduce channel stability and the amounts of large woody material. Large woody debris is a very important component of stream dynamics and creating natural sediment traps and energy dissipaters to reduce the velocity and erosiveness of streamflows.

### WATER YIELD

Timber harvesting and associated activities can affect the timing, distribution, and amount of water yield in a harvested watershed. Water yields increase proportionately to the percentage of canopy removal, because removal of live trees reduces the amount of

water transpired, leaving more water available for soil saturation and runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt, which lead to further water-yield increases. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition.

## ANALYSIS METHODS

### SEDIMENT DELIVERY

Methodology for analyzing sediment delivery was completed using a sediment-source inventory. All roads and stream crossings were evaluated to determine the sources of introduced sediment. In addition, in-channel sources of sediment were identified using channel-stability rating methods developed by *Pfankuch*, and through the conversion of stability rating to reach condition by stream type developed by *Rosgen (1990)*. These analyses were conducted in 2000 and 2002 by a DNRC hydrologist.

### WATER YIELD

The water yield increase for the watershed in the project area was determined using the ECA method, as outlined in *Forest Hydrology Part II (1976)*. ECA is a function of total area roaded and harvested, percent of crown removal in harvesting, and amount of vegetative recovery that has occurred in harvest areas. This method equates area harvested and

percent crown removed with an equivalent amount of clearcut area. For example, if 100 acres had 60 percent crown removed, ECA would be approximately 60, or equivalent to a 60-acre clearcut. The relationship between crown removal and ECA is not a 1-to-1 ratio, so the percent ECA is not always the same as the percent canopy removal. As live trees are removed, the water these trees would have evaporated and transpired either saturates the soil or is translated to runoff. This method also calculates the recovery of these increases as new trees revegetate the site and move toward preharvest water use.

In order to evaluate the watershed risk of the potential water-yield increase effectively, a threshold of concern must be established. In order to determine a threshold of concern, acceptable risk level, resource value, and watershed sensitivity are evaluated according to Young (1989). The watershed sensitivity is evaluated using qualitative assessments, as well as using procedures outlined in *Forest Hydrology Part II (1976)*. The stability of a stream channel is an important indicator of where a threshold of concern should be set. As water yields increase as a result of canopy removal, the amount of water flowing in a creek gradually increases. When these increases reach a certain level, the bed and banks may begin to erode. The more stable streams will be able to handle larger increases in water yield before they begin to erode, while less stable streams will experience erosion at more moderate water-yield increases.

## ANALYSIS AREA

### SEDIMENT DELIVERY

The analysis area for sediment delivery is the Dog Meadow Timber Sale Project area and the proposed haul routes. Dog Creek is a 9,459-acre watershed that includes Dog

Lake. Dog Creek is a perennial third-order tributary to Stillwater River. Analysis will cover all stream segments within the watershed and all roads and upland sites that may contribute sediment to Dog Creek.

### WATER YIELD

The analysis area for water yield is the Dog Creek watershed. Dog Creek is a 9,459-acre, third-order watershed. Dog Lake is a 99-acre lake that is fed and drained by Dog Creek. The Dog Creek watershed also contains dozens of wetlands and beaver dam complexes. These wetlands and Dog Lake serve to moderate and stabilize the effect of water yield by releasing water more slowly and evenly than incoming flows.

### EXISTING CONDITIONS

#### REGULATORY FRAMEWORK

##### Montana Surface Water-Quality Standards

According to *Administrative Rules of Montana (ARM) 17.30.608 (1)*, the Stillwater River drainage, including Dog Creek, is classified as B-1. Among other criteria for B-1 waters, no increases are allowed above naturally occurring levels of sediment, and minimal increases over natural turbidity. "Naturally occurring," as defined by *ARM 17.30.602 (17)*, includes conditions or materials present during runoff from developed land where all reasonable land, soil, and water conservation practices (commonly called BMPs) have been applied. Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. These practices include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. Appropriate BMPs may be applied before, during, or after completion of potentially impactful activities.

Designated beneficial water uses within the project area include

domestic water supply, lawn and garden sprinkling, industrial and commercial uses, coldwater fisheries, and recreational use in the stream, wetlands, lake, and surrounding area.

**Water-Quality-Limited Waterbodies**

The Dog Creek watershed is not listed in either the 1996, 2000, or 2002 *LIST OF WATERBODIES IN NEED OF TOTAL MAXIMUM DAILY LOAD (TMDL) DEVELOPMENT* publication produced by DEQ (2003a, 2003b, 2003d).

**Montana SMZ Law**

By the definition in ARM 36.11.312 (3), the majority of the Dog Creek watershed is a class 1 stream. Dog Creek and many of its tributaries flow for more than 6 months each year. Many of these stream reaches also support fish. Some of the smaller first-order tributaries may be classified as class 2 or 3 based on site-specific conditions.

**SEDIMENT DELIVERY**

According to field reconnaissance in the summers of 2000 and 2002, stream channels in the Dog Creek watershed are primarily in good condition. Three reaches were rated in fair condition, and one in fair/poor condition. The reason for the reaches rating fair and fair/poor was deposition. Gravel bars have formed on point bars in these reaches. No areas of in-channel erosion were identified during field reconnaissance. Large woody debris was found in adequate supply. Little evidence of past streamside harvesting was found; where past logging in the riparian area had taken place, no deficiency was apparent of existing or potential downed woody material in the streams.

The existing road system in and leading to the proposed project area was reviewed for potential sources of sediment. Stream crossings in the project area and on the haul route are generally in good

condition and not contributing sediment to streams. Many have been replaced and brought up to applicable BMP standards through other projects. Some crossings need additional BMP work and some need to be replaced. Surface drainage BMPs on the existing road system need to be upgraded to meet applicable standards. In spite of the minor surface drainage and erosion-control measures needed on the existing road system, no sources of direct delivery of fine sediment were identified through field reconnaissance.

**WATER YIELD**

The allowable water-yield increase for the Dog Creek watershed has been set at 12 percent, based on channel-stability evaluations, watershed sensitivity, and acceptable risk. This water-yield increase would be reached when the ECA level in Dog Creek reaches the allowable level of 2,838. Detailed information is available for timber harvesting and associated road construction activities that have taken place in the Dog Creek watershed since the 1960s. These activities, combined with the vegetative recovery that has occurred, have led to an estimated 4.9 percent water-yield increase over an unharvested condition in the Dog Creek watershed. *TABLE D-1-CURRENT WATER YIELD AND ECA INCREASES IN DOG WATERSHED* summarizes the existing conditions for water yield in the Dog Creek watershed.

**TABLE D-1 - CURRENT WATER YIELD AND ECA INCREASES IN DOG WATERSHED**

	DOG CREEK
Percent WYI	4.9
Allowable WYI (percent)	12
Existing ECA	1,037
Allowable ECA	2,838
Remaining ECA	1,801

## **FISHERIES**

No bull trout or migratory cutthroat trout inhabit streams in the project area. Eastern brook trout, an exotic species, are present in streams in the project area.

## **ALTERNATIVE EFFECTS**

### **SEDIMENT DELIVERY**

#### **Direct and Indirect Effects**

- ***Direct and Indirect Effects of No-Action Alternative A on Sediment Delivery***

No-Action Alternative A would have no direct effects to sediment delivery beyond those currently occurring. Existing sources of sediment, both in-channel and out of channel, would continue to recover or degrade based on natural or preexisting conditions.

The indirect effects of No-Action Alternative A would be an increased risk of sediment delivery to streams from crossings that do not meet applicable BMPs. These sites would continue to pose a risk of sediment delivery to streams until other funding became available to repair them.

- ***Direct and Indirect Effects of Action Alternative B on Sediment Delivery***

Action Alternative B would replace several stream crossings in the Dog Creek watershed and along the proposed haul route. The crossings proposed for replacement do not currently meet all applicable BMPs and require a new culvert in order to meet applicable standards. The replacement of existing stream crossings would contribute sediment directly to Dog Creek. This sediment would be minimized through application of standard erosion-control measures. The sediment delivery anticipated from this project would be short term and comply with all applicable permits and State water-quality laws. In addition, several sites would have additional erosion control added to lower the risk of sediment delivery

to a stream or draw. In some cases, the addition of erosion-control measures may increase the risk of sediment delivery in the short term by creating bare soil. However, as these sites revegetate, the long-term risk of sedimentation to a stream would be reduced to levels lower than the existing condition.

Action Alternative B would also construct 0.2 miles of temporary road in Section 28 of the proposed project area. This temporary road would require installation of a temporary stream crossing on a perennial stream in the Dog Creek watershed. This stream has, approximately, a 5-foot bankfull channel and flows through a series of wetlands before reaching Dog Creek. Installation of this crossing would involve placing a bundle of well-casing pipes in the channel; the pipe bundle would be wrapped in filter fabric. All materials would be removed following the completion of harvesting activities. This installation would create sediment delivery to the creek during the course of construction and hauling. Sediment delivery is expected to be very minimal since little or no bank and bed disturbance would occur from placement of the well casings. Sediment generated from traffic would be minimized by the application of erosion-control measures. Reclamation of the temporary road and crossing would occur immediately following completion of activities in the proposed units. The reclaimed road would present an increased risk of sediment delivery until bare soil is revegetated.

Action Alternative B would have a very low risk of sediment delivery to streams as a result of the proposed timber-harvesting activities. Some harvesting activities may occur within designated SMZs. This harvesting activity would follow all

requirements of the SMZ Law and have a low risk of affecting recruitment of large woody material to Dog Creek or its tributaries. The SMZ law, rules, and all applicable BMPs would be applied to all harvesting activities, which would minimize the risk of sediment delivery to draws and streams.

#### Cumulative Effects

- ***Cumulative Effects of No-Action Alternative A on Sediment Delivery***

The cumulative effects of No-Action Alternative A on sediment delivery would be very similar to those described in the existing condition portion of this analysis. All existing sources of sediment would continue to recover or degrade as dictated by natural and preexisting conditions until a source of funding became available to repair them. Sediment loads would remain at or near present levels.

- ***Cumulative Effects of Action Alternative B on Sediment Delivery***

Cumulative effects to sediment delivery under the action alternative would be primarily related to roadwork and stream-crossing replacements. The sediment generated from replacement of existing culverts would increase the total sediment load in Dog Creek for the duration of the activity. These increases would not exceed any State water-quality laws and would follow all applicable recommendations given in 124 and 318 permit applications. In the long term, the cumulative effects to sediment delivery would be similar to existing levels. As the sites stabilize and revegetate, sediment levels resulting from culvert replacements would return to preactivity levels. Over the long term, cumulative sediment loads may be reduced due to improved design on the crossings. Improved design would reduce the risk of structure failures, which would reduce the risk of sediment

delivery to the outlet of Dog Creek.

The installation and improvement of erosion-control and surface-drainage features on existing roads would also affect the cumulative sediment delivery in Dog Creek. In the short term, the installation and improvement of surface drainage features would expose bare soil. This would increase the risk of sediment delivery to Dog Creek. An increase in sediment load to Dog Creek is possible as a result of this work. The application of all applicable BMPs during this work would make increased sediment loads unlikely. Over the long term, cumulative sediment delivery to Dog Creek would likely be lower than existing conditions with the installation of more effective surface-drainage and erosion-control features on the existing road system.

Harvesting of trees within selected SMZs would have a low risk of adverse cumulative effects to downed woody material in Dog Creek or its tributaries. Tree retention requirements of the SMZ Law would ensure a future supply of woody material to the creeks.

None of the cumulative impacts described above are expected to adversely affect downstream beneficial uses. All activities would comply with applicable laws, rules, and regulations.

#### WATER YIELD

##### Direct and Indirect Effect

- ***Direct and Indirect Effects of No-Action Alternative A on Water Yield***

No-Action Alternative A would have no direct or indirect effects on water yield. Water quantity would not be changed from present levels.

- ***Direct and Indirect Effects of Action Alternative B on Water Yield***

No-Action Alternative B would increase the annual water yield in the Dog Creek watershed by an estimated 2.9 percent over the current level. This level of water-yield increase would not be sufficient to create unstable channels.

**Cumulative Effects**

- ***Cumulative Effects of No-Action Alternative A on Water Yield***

No-Action Alternative A would have no cumulative effects on water yield. Existing harvest units would continue to revegetate and move closer to premanagement levels of water use and snowpack distribution.

- ***Cumulative Effects of Action Alternative B on Water Yield***

The removal of trees proposed in Action Alternative B would increase the water yield in the Dog Creek watershed from its current level of approximately 4.9 percent over unharvested to an

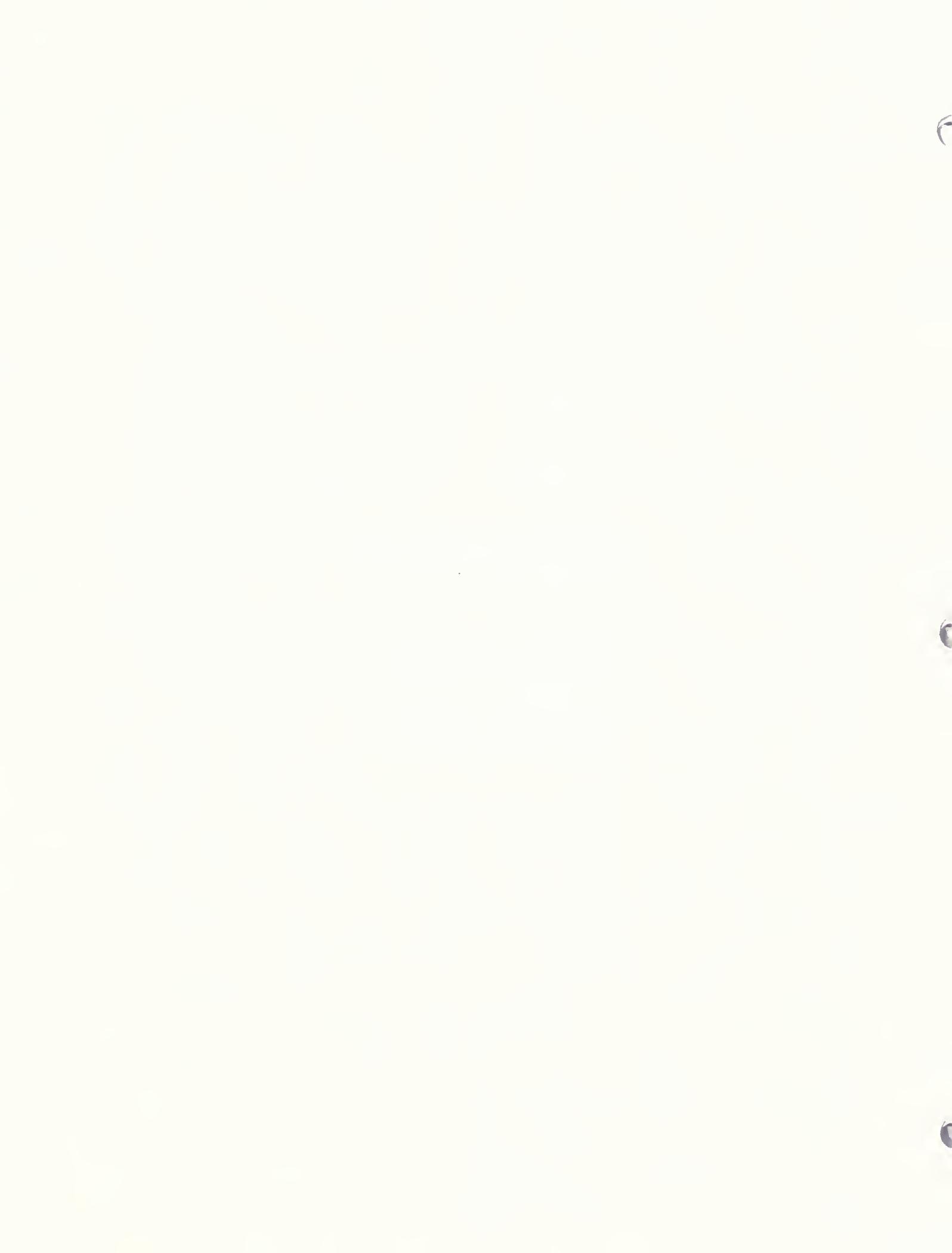
estimated 7.8 percent. This water-yield increase, and its associated ECA level, includes the impacts of all past management activities, existing and proposed roads, proposed timber harvesting, and vegetative hydrologic recovery in the Dog Creek watershed. The water yield increase expected from this alternative leaves the watershed well below the established threshold of concern (See TABLE D-2 - WATER YIELD AND ECA INCREASES IN DOG CREEK). No impacts to water quality are expected as a result of Action Alternative B.

**TABLE D-2 - WATER YIELD AND ECA INCREASES IN DOG CREEK**

	ALTERNATIVE	
	A	B
Allowable WYI (percent)	12%	12%
Percent WYI	4.9	7.8
Acres harvested	0	941
Miles of new road	0	0.5
ECA generated	0	701
Total ECA	1,037	1,738
Remaining ECA	1,801	1,100
Allowable ECA	2,838	2,838

# **APPENDIX E**

## **WILDLIFE ANALYSIS**



DOG/MEADOW TIMBER SALE PROJECT  
ENVIRONMENTAL ASSESSMENT

APPENDIX E  
WILDLIFE ANALYSIS

## INTRODUCTION

This analysis is designed to address the public concerns particular to wildlife, as listed in *TABLE I-1-SUMMARY AND TRACKING OF ISSUES AND CONCERNS FROM PUBLIC COMMENTS* of the EA, and analysis elements considered necessary by the ID Team.

DNRC attempts to promote biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on State lands (DNRC 1996). Appropriate stand structures are based on ecological characteristics (e.g., land type, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which the species evolved, then the full complement of species will persist and biodiversity will be maintained (DNRC 1996). This coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape. DNRC cannot assure that the coarse-filter approach will adequately address the full range of biodiversity; therefore, DNRC also employs a "fine filter" approach for threatened, endangered, and sensitive species. The fine-filter approach focuses on a single species' habitat requirements (DNRC 1996).

## METHODS

To assess the existing condition of the proposed project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, SLI data, aerial photographs, Montana Natural Heritage Program data, and consultations with other professionals provided information for the following discussion and effects analysis.

### EXISTING CONDITIONS

#### COARSE-FILTER ASSESSMENT

##### Overview

The majority of terrestrial vertebrates that were present at the time of European settlement likely still occur on Stillwater State Forest. This includes the large carnivores often displaced by human disturbance, such as grizzly bears (*Ursus arctos*), Canada lynx (*Lynx canadensis*), gray wolves (*Canis lupus*), and wolverines (*Gulo gulo*). Species that rely on special habitat elements, such as white bark pine (*Pinus albicaulis*), western white pine (*Pinus monticola*), or burned areas, may not be present or are in decline due to the decline of these elements across the landscape.

Wildlife habitats on the main block of Stillwater State Forest benefit from the surrounding relatively undisturbed areas managed by FNF. Other adjacent or surrounded private industrial forests have been harvested intensively, benefiting wildlife species that use early

seral stages either exclusively or seasonally.

Human activity, generally recreational, on Stillwater State Forest ranges from high along Lower Whitefish Road and within Upper Whitefish Lake Campground to low or moderate along the high elevation Whitefish Divide and Stryker Ridge of the Whitefish Mountain Range. Dispersed and locally concentrated recreation, combined with timber harvesting, are the primary human activities that, directly and indirectly, affect wildlife.

#### Timber Harvesting

Timber-harvesting activities have occurred on Stillwater State Forest for several decades. Early timber harvesting concentrated mainly on large seral tree species, such as western larch (*Larix occidentalis*) and western white pine. Recent harvesting activities have, through various silvicultural prescriptions, promoted western larch, western white pine, and lodgepole pine (*Pinus contorta*). Snag retention and recruitment have been recently considered in managing timber on Stillwater State Forest.

#### Other Timber Harvest Projects Under Contract

Timber sale projects in progress on Stillwater State Forest include:

- The Taylor-South Timber Sale Project, located in Sections 6, 7, 17, 18, 19, 20, 29, 30, 31, 32, and 33, T32N, R22W, is southeast of the proposed Dog/Meadow Timber Sale Project. This project will harvest 491 acres (based upon contract acreages, which differ from acres reported in the FEIS) of mixed conifers, western larch, and Douglas-fir (*Pseudotsuga menziesii*). The largest impacts to wildlife are reductions in grizzly bear hiding cover and pileated woodpecker habitat. Hiding cover within the Lazy Creek Grizzly Bear Subunit would be reduced by 491 acres.
- The Chicken/Werner Timber Sale Project is directly east of the proposed Dog/Meadow Timber Sale Project area in Sections 19, 20, 29, 30, 32, and 33, T33N, R22W. This project will harvest up to 684 acres, if the optional helicopter units are harvested (based upon contract acres, which differ from acres reported in the FEIS). The largest impacts to wildlife are reductions in Canada lynx denning habitat, grizzly bear hiding cover, and nesting habitats for pileated woodpeckers and boreal owls. Hiding cover within the Lazy Creek Grizzly Bear Subunit would be reduced by 684 acres. There would be no long-term increase in the percent of the subunit with open- or total-road densities higher than 1996 levels. The percentages of the subunit with greater than 2 miles of total road per square mile of land and greater than 1 mile of open road per square mile of land would increase 1 percent during project activities and revert to existing levels following completion of the project.
- The Good/Long/Boyle Timber Sale Project, located in Sections 17, 19, 27, 28, 29, 30, 31, 32, and 33, T32N, R23W, and Section 1, T31N, R24W, is directly south of the proposed Dog/Meadow Timber Sale Project area. Approximately 5 MMBF of timber will be harvested from 1,026 acres (based upon contract acreages, which differ from acres reported in the EA). Approximately 190 acres would be changed directly to the 0-to-39-year age class. Four harvest units are within the Lazy Creek Grizzly Bear Subunit, and hiding cover would be reduced by 597 acres. There would be no long-term increase in the percentage of the subunit with open-road or total-road densities higher than 1996 levels. The percent of the

subunit with greater than 2 miles of total road per square mile of land and greater than 1 mile of open road per square mile of land would both increase 1 percent during project activities and revert to existing levels following completion of the project.

#### Influence of Fire

The influence of fire has been reduced across the northern Rocky Mountains, including most of western Montana. Modern fire-suppression techniques have been effective for at least 50 years. However, relatively cool, moist habitat types make up much of Stillwater State Forest, and mixed-severity and stand-replacing fire regimes are the normal disturbance factor, occurring at intervals of 50 to 250 years. Therefore, the lower-than-characteristic frequency of fire occurrences during the past 50 years on most sites on Stillwater State Forest had a lesser effect than in areas characterized by warm, dry habitats. Nonetheless, fire-associated species, such as the black-backed woodpecker (*Picoides arcticus*), are probably less abundant on Stillwater State Forest currently than would typically have been expected under natural fire regimes. Species preferring the dense coniferous in-growth of shade-tolerant tree species (such as subalpine fir and grand fir) under mature forest canopy likely benefited. Shrub amounts and distribution important for many nongame and big game species have also been influenced by fire-suppression activities during the past half century. However, the effects of the departure from historic shrub conditions are unclear because past logging has created favorable conditions for shrub growth in some instances.

#### Stand-Age and Covertypes Characteristics

Mature and old stands are essential habitat for wildlife species associated with the late seral stages of forest-stand development for all or some life requirements. A partial list of these species includes pileated woodpeckers (*Dryocopus pileatus*), American marten (*Martes americana*), brown creepers (*Certhia americana*), and winter wren (*Troglodytes troglodytes*). The proposed project area currently contains 1,348 acres of mature stands (100 to 149 years old) and 1,323 acres of old stands (more than 150 years old), with overstory canopy closure of at least 40 percent. A majority of these stands are currently mixed-conifer, Douglas-fir/western larch, and western white pine covertypes. Stillwater State Forest has less acres in the seedling/sapling class (0 to 39 years old) than were historically present (Losensky 1997b), and a greater percentage of acres in mature stands. Modern fire suppression has led to an increase in shade-tolerant mixed-conifer stands, while the amount of western larch/Douglas-fir stands has been reduced. The representation of western white pine has also been reduced due to mortality caused by white pine blister rust.

#### Patch Characteristics and Connectivity

Wildlife species that require connectivity of forest habitat types between patches or those species that are dependent upon interior forest conditions can be sensitive to the amount and spatial configuration of appropriate habitats. Therefore, patch size and juxtaposition can influence habitat quality and population dynamics for some species. Some species are adapted to thrive near patch edges, while others are adversely affected by the presence of edge or the presence of other animals that

prosper in edge habitats. Connectivity under historical fire regimes (Losensky 1997b) likely remained relatively high as fire differentially burned various habitats across the landscape. Currently, connectivity across Stillwater State Forest remains relatively high with considerable forested interior habitats and a network of riparian areas. The network of open roads through Stillwater State Forest has reduced some of the landscape-level connectivity. Patch size on Stillwater State Forest is likely similar to the historic conditions (Losensky 1997b) dominated by mixed-severity and stand-replacing fire regimes.

#### **ENVIRONMENTAL EFFECTS TO EXISTING CONDITION**

##### **Direct and Indirect Effects**

##### **• *Direct and Indirect Effects of No-Action Alternative A on Coarse Filter***

Under No-Action Alternative A, forest conditions would continue to move toward denser stands of shade-tolerant tree species with high canopy cover. No immediate changes are anticipated in the patch size, shape, or connectivity. Edge habitats associated with past harvests would gradually be replaced by forested habitats, resulting in a loss of edge habitats, an increase in patch sizes, and an increase in interior forested habitats. Over time, shade-intolerant species in the proposed units would die, and dense shade-tolerant species in the midstory would prevent replacement of shade-intolerant species. A stagnated, dense stand of Douglas-fir, grand fir (*Abies grandis*), subalpine fir (*Abies lasiocarpa*), and Engelmann spruce (*Picea engelmannii*) would likely result. Wildlife favoring dense stands of shade-tolerant tree species would benefit, while those requiring conditions likely found

under natural disturbance regimes would continue to be underrepresented. Habitat for forested interior and old-stand - associated species, such as the American marten, northern goshawk, and pileated woodpecker, would likely improve with this alternative.

##### **• *Direct and Indirect Effects of Action Alternative B on Coarse Filter***

Under Action Alternative B, approximately 939 acres of forest canopy would be opened up to varying degrees. Additionally, shade-intolerant trees would be preferentially retained, while most shade-tolerant mixed conifers would be removed in harvest units. These conditions would lead to more-open stands of mature western larch and western white pine. Based on silvicultural prescriptions, the regeneration of shade-intolerant trees would be expected. Openings from the proposed harvests would be additive to existing openings, increasing mean opening patch size from 18 to 40 acres, while decreasing mean forested patch size from 609 to 199 acres. Regeneration within the patches that are additive to past harvesting would yield larger blocks of relatively homogeneous forested habitats in the long term. Landscape connectivity would be retained through buffers along riparian areas. The proposed harvests would create an additional 26 miles of edge habitats, which would benefit those species using these habitats, while negatively impacting those that require forested interior habitats. Reverting stands to earlier seral stages on approximately 614 acres would bring Stillwater State Forest closer to perceived historical conditions (Losensky 1997b). This change would likely reduce habitats for species

associated with old stands, such as American martens, northern goshawks, and pileated woodpeckers, which benefited from the increasing stand ages due to modern fire suppression.

#### Cumulative Effects

- ***Cumulative Effects of No-Action Alternative A on Coarse Filter***

Under this alternative, the existing habitats within the proposed project area would continue to provide habitat for wildlife species requiring denser stands with a canopy that is more closed. Surrounding stands would retain a mosaic of age classes, representing young stands that have been recently harvested to mature stands. Adjacent harvested stands would continue to emulate stand-replacing fire regimes. Edge habitats between these earlier harvested stands and the State parcel would continue to exist. This alternative would cause neither changes in the amount of fragmentation nor changes in patch size and configuration. Habitats for forested interior and old-stand-associated species would continue to develop across much of Stillwater State Forest.

- ***Cumulative Effects of Action Alternative B on Coarse Filter***

This alternative would open up stands and decrease the amount of interior habitat, while increasing edge habitats within Stillwater State Forest. The proposed harvest units would blend with several recent harvest units adjacent to the proposed units, increasing patch size and offsetting some of the edge habitats developed by the proposed activities. Some wildlife species would benefit from this increase in edge and juxtaposition of different cover types, while, for other species, fragmentation would limit available habitat. Again,

landscape connectivity would be retained through retention buffers preserving riparian plant communities. Although this alternative would remove approximately 939 acres of potential habitat for old-stand-associated species, stands on much of Stillwater State Forest continue to advance toward conditions necessary for these species.

#### Special Habitats

Approximately 8.2 miles of perennial streams are within the proposed project area. In western Montana, 85 percent of all bird species use riparian areas, which comprise 1 percent of the land. Half of those bird species, or 40 to 45 percent of all birds, are restricted to riparian areas for breeding purposes (Mosconi and Hutto, 1982). Also, paper birch (*Betula papyrifera*), willow (*Salix* spp.), and black cottonwood (*Populus trichocarpa*) occur in conjunction with numerous meadow systems in the general vicinity. No avalanche chutes are within the proposed project area; however, rock outcrops and cliffs exist in the project area.

#### Direct and Indirect Effects

- ***Direct and Indirect Effects of No-Action Alternative A on Special Habitats***

The riparian plant communities along approximately 8.2 miles of perennial streams and several miles of intermittent streams within the proposed project area would not be affected by this alternative. Streamside areas would continue to move toward more shade-tolerant conifer species, such as grand fir and Engelmann spruce. Paper birch and black cottonwood would continue to occur in the stream corridors, meadows, and seasonal wetlands (small low areas that seasonally collect water). All of these areas would remain unaffected under this alternative. Therefore, the

wildlife species presently using these riparian areas and other special habitats would not be affected under this alternative.

• ***Direct and Indirect Effects of Action Alternative B on Special Habitats***

On each side of selected perennial streams, 165-foot no-harvest buffers would protect the riparian plant communities; 50-, 83-, or 100-foot buffers would protect other perennial and intermittent streams and adjacent wetlands. Within the proposed project area, approximately 296 acres of the unharvested 165-foot riparian buffers would continue to move toward the more shade-tolerant conifer species (grand fir and Engelmann spruce). Paper birch and black cottonwood would continue to occur within these buffers and the intermittent stream corridors, meadows, and seasonal wetlands. Therefore, the wildlife species associated with these riparian areas would not be affected under this alternative. Likewise, wildlife species using the cliffs, rock outcrops, and other special habitats would also not be affected.

**Cumulative Effects**

Since this project would not affect riparian communities and other special habitats, no cumulative effects would be expected.

**FINE-FILTER ASSESSMENT**

In the fine-filter analysis, individual species that are recognized to be of special concern are evaluated. These species are addressed below and include Federally "threatened" or "endangered" species, species listed as "sensitive" by DNR, and species managed as "big game" by DFWP.

**Threatened and Endangered Species**

Four species indigenous to Montana are classified as "threatened" or "endangered" under the Endangered

Species Act of 1973. The bald eagle, grizzly bear, and Canada lynx are listed as "threatened", while the gray wolf is listed as "endangered".

➤ **Bald Eagle (*Haliaeetus leucocephalus*)**

**Issue**

There is concern that timber harvesting could alter habitat or create disturbance that would be detrimental to bald eagles.

**Existing Environment**

Strategies to protect the bald eagle are outlined in the *Pacific States Bald Eagle Recovery Plan* (United States Fish and Wildlife Service [USFWS] 1986) and the *Montana Bald Eagle Management Plan* (Montana Bald Eagle Working Group 1994). Management direction involves identifying and protecting nesting, feeding, perching, roosting, and wintering/migration areas (USFWS 1986, Montana Bald Eagle Working Group 1994). This project was designed in accordance with the *Montana Bald Eagle Management Plan* and *Habitat Management Guide for Bald Eagles in Northwestern Montana*. The *Stillwater Bald Eagle Nesting Territory Site-Specific Management Guidelines: Upper Stillwater Lake* (Jacobs and Kuennen 1998) was the main source of the site-specific information used.

Bald eagles are diurnal raptors associated with significant waterbodies, such as rivers, lakes, and coastal zones. The bald eagle diet consists primarily of fish and waterfowl, but includes carrion, mammals, and items taken from other birds of prey. In northwestern Montana, bald eagles begin the breeding process with courtship behavior and nest building in early February; the young fledge by approximately mid-August, ending the breeding process. Preferred nest-stand characteristics include

large emergent trees that are within site distances of lakes and rivers and screened from disturbance by vegetation.

#### **Upper Stillwater Lake Bald Eagle Territory**

The Upper Stillwater Lake bald eagle territory (007-020) is located on the north end of Upper Stillwater Lake in northwest Montana (T31N and T32N, R22W).

The aquatic habitat associated with the Upper Stillwater Lake Bald Eagle Territory contains several waterbodies. The principal waterbody is Upper Stillwater Lake (approximately 3 miles long and 0.5 miles wide; 528 acres). Many tributaries, small wetlands, and beaver ponds are within the Upper Stillwater Lake Bald Eagle Territory home range. Also, several bodies of water are located within or near the Upper Stillwater Lake Bald Eagle Territory home range, including Dog, Lower Stillwater, and Duck lakes. These waterbodies may be important components of the Upper Stillwater Lake Bald Eagle Territory.

Aquatic prey for bald eagles are primarily composed of fish and waterfowl species, but also mammals, such as beaver and muskrat. Waterfowl tend to congregate at the inlet and outlet of Stillwater River, which typically remain ice-free when Upper Stillwater Lake is frozen. Fish species that grow large enough for use by bald eagles and occur in the more accessible shallow areas of Upper Stillwater Lake include yellow perch, northern pike, cutthroat trout, rainbow trout, brook trout, bull trout, mountain whitefish, and lake trout.

The terrestrial habitat incorporated by the Upper Stillwater Lake Bald Eagle Territory is a coniferous/

deciduous mixture along the lakeshores and riparian areas, with coniferous forests in the upland areas. Within the present home range, black cottonwood is the deciduous tree of primary importance to bald eagles. Coniferous tree species within the Upper Stillwater Lake Bald Eagle Territory include western larch, western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), grand fir, subalpine fir, Douglas-fir, and ponderosa pine (*Pinus ponderosa*). Large ponderosa pine and western larch trees occur in the Douglas-fir or Douglas-fir/western larch covertypes.

Foraging opportunities within the terrestrial habitats include carrion, ground squirrels, and robbing other raptors' nests. Carrion primarily would be white-tailed deer, mule deer, elk, or moose remains from winterkill, human-caused mortality, or predation activities by wolves, bears, and mountain lions.

Five nests have been associated with this territory since observations were first recorded in 1972. The most recently used nest has an associated nest-site area almost entirely within Stillwater State Forest (Jacobs and Kuennen 1998). This nest-site area produced and fledged 27 fledglings from 1980 to 1998. One additional fledgling was produced since 1998 (A. Jacobs, USFS-FNF, personal communication, October 2002).

The primary-use area is an area where it is assumed 75 percent of the foraging, resting, and associated behaviors occur (Montana Bald Eagle Working Group, 1994). Approximately 60 percent of the delineated primary-use area is within Stillwater State Forest. The delineated home-range area is located on Stillwater State Forest, FNF, and private lands.

Most of the breeding activity of an eagle pair is assumed to occur within the home range. Various levels of timber harvesting, residential development, and recreation are occurring within the prescribed home range of the Upper Stillwater Lake pair. Features within the home range that are important to bald eagle life-history requirements include perching and roosting trees on Upper Stillwater, Dog, and Duck lakes, and approximately 61 acres of DFWP-designated white-tailed deer winter range and its associated carrion in the northwest portion of the home range.

Cumulative effects were analyzed on the bald eagle home range delineated around the nest location.

#### *Direct and Indirect Effects*

- *Direct and Indirect Effects of No-Action Alternative A on Bald Eagles*

No direct or indirect effects to bald eagles would be expected. Stands would continue to age and emergent trees would continue to persist and could serve as perch trees now and in the future. Human disturbance would continue at approximately the same levels.

- *Direct and Indirect Effects of Action Alternative B on Bald Eagles*

Under the proposed Dog/Meadow Timber Sale Project, no harvesting would occur within the nest or primary-use areas. Approximately 120 acres of subalpine fir and mixed-conifer cover types within the delineated home range would be harvested (Unit 8 and portions of Units 7 and 9). These 3 units are approximately 0.8 miles from the primary aquatic habitat, and are more than 1.4 miles from the nest location, so disturbance from harvesting

should be minimal. Within the areas proposed to be harvested, most of the canopy-emergent western larch and Douglas-fir would remain as perch and rest sites for use within the regenerating stands, should these areas receive use. However, several proposed harvest units (Units 1A, 6, and 7) are within 0.3 to 0.5 miles of Dog Lake, which has been identified as a foraging habitat for the Upper Stillwater Lake pair of eagles. Disturbance within these units might limit bald eagle use of Dog Lake for the nesting season in which harvesting takes place. Harvesting in the remaining portions of the proposed project area is not expected to have an immediate or long-term effect on bald eagles.

#### *Cumulative Effects*

- *Cumulative Effects of No-Action Alternative A on Bald Eagles*

Stillwater State Forest and FNF each manage approximately 35 percent of the home range associated with the Upper Stillwater Lake Bald Eagle Territory. Approximately 20 percent of the home range is privately owned, thereby limiting potential development and disturbance. Concurrently, no other plans that would increase human disturbance, development, recreation, timber harvesting, or firewood gathering within the home range are under consideration.

- *Cumulative Effects of Action Alternative B on Bald Eagles*

Timber harvesting from this project would not reduce potential nesting and perching habitats within the home range. A number of proposed units within the home range and in close proximity to foraging areas would be harvested;

however, much of the proposed project would not affect bald eagles. The harvesting of approximately 120 acres within the home-range area would not include the harvesting of ponderosa pine or western larch and should have a negligible cumulative effect on the availability of potential nesting and perching trees. Disturbance near Dog Lake may displace foraging bald eagles for the duration of the proposed project. Concurrently, no other plans are under consideration that would affect eagle use of the territory.

**Mitigation Measure Included:**

Cease all operations and consult with a DNRC biologist for further mitigations should an eagle nest be observed within 1 mile of any project-related activities.

➤ **Grizzly Bear (*Ursus arctos*)**

**Issue**

There is concern that timber harvesting and associated activities could alter habitat or create disturbance that would be detrimental to grizzly bears.

**Existing Environment**

Grizzly bears are wide-ranging mammals that use forested upland habitats. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The proposed project area lies within the Lazy Creek and Stryker Bear Management Subunits of the North Continental Divide Ecosystem (NCDE) Recovery Area (USFWS 1993), and grizzly bears are known to inhabit the project area.

The Lazy Creek Bear Management Subunit is approximately 34,560 acres (54 square miles) managed/ owned by:

- Plum Creek Timber Company (15,013 acres),
- State ownership managed by DNRC (14,520 acres),
- FNF (4,008 acres), and
- other private landowners (1,020 acres).

The Stryker Bear Management Subunit is approximately 40,729 acres (64 square miles) managed/ owned by:

- State ownership managed by DNRC and others (33,054 acres),
- FNF (7,542 acres), and
- other private landowners (133 acres).

There have been several recent grizzly bear sightings within the general vicinity of the project area that have occurred on:

- adjacent portions of Stillwater State Forest,
- adjacent portions of FNF, and
- on Plum Creek Timber Company land west of the project area.

Grizzly bears generally use different habitats relative to season. The Dog Meadow Timber Sale Project area is primarily spring habitat. Summer or autumn habitat values are low within the project area.

Managing human access is a major factor in management for grizzly bear habitat. DNRC is committed to designing projects to result in no net increase in the proportion of each subunit of a bear management unit (State trust lands only) that exceed an open-road density (percent of open road) of 1 mile per square mile and a total road density (percent of total road) of 2 miles per square mile from levels in 1996. Additionally, DNRC is also committed to a no-net decrease in security core areas. Security core areas should be 0.3 miles from open roads or high-use trails. Security core areas are not necessarily roadless, but

existing roads within security cores should be completely free of motorized access during the nondenning period. Security core areas must also have relatively low nonmotorized use. A moving-windows analysis (Ake 1994) was conducted to determine road densities and security core areas within the Lazy Creek and Stryker Grizzly Bear Management Subunits (TABLE E-1 - PRESENT ROAD DENSITY AND LEVELS THROUGH PROJECTS PROPOSED FOR THE IMMEDIATE FUTURE). Total road densities are presently at 1996 thresholds for the Stryker and Lazy Creek subunits.

Security core comprises 12 percent of the State-owned portion of the Lazy Creek Grizzly Bear Management Subunit and 50 percent of the Stryker Grizzly Bear Management Subunit. Baseline from 1996 for the Lazy Creek Grizzly Bear Management Subunit was 12 percent; the Stryker Grizzly Bear Management Subunit was 50 percent.

#### *Direct and Indirect Effects*

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

No direct effects to grizzly bears would be expected. Grizzly bears using the project area for any type of life requirement would be under the lowest risk of mortality or disturbance caused by grizzly bear-human interactions under this alternative. Foraging opportunities may decline due to the lack of diversity in habitat such as forest edge and younger age-class stands. No changes in security core, open- or total-road densities, or hiding cover are anticipated.

- *Direct and Indirect Effects of Action Alternative B on Grizzly Bears*

This project may affect grizzly bears directly through increased road traffic, noise, and human

activity, and indirectly by altering the amount of hiding cover and forage resources. Activities in occupied grizzly bear habitats reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area. These disturbances would only be present during harvesting operations.

The season of disturbance is important in addressing impacts to grizzly bears. Winter harvesting would result in no direct effects to grizzly bears in areas with no known den sites. Secondly, activities that target time periods when the probability of animals using the area is low would result in reduced direct disturbance to grizzly bears in the nondenning period.

Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced by 939 acres (502 acres in the Lazy Creek Grizzly Bear Management Subunit and 432 acres in the Stryker Grizzly Bear Management Subunit) in the proposed harvesting. Hiding cover is especially important along open roads and in areas that receive human disturbance. Pockets of cover, including SMZs, reserve areas, and advanced regeneration would be retained within the units, so these figures represent a liberal estimate of the potential loss of hiding cover in the proposed project area. Forested buffers would be retained between units and open roads to provide screening to increase security. Hiding cover in the harvested units is expected to regenerate in 5 to 10 years.

TABLE E-1 - PRESENT ROAD DENSITY AND LEVELS THROUGH PROJECTS PROPOSED FOR THE IMMEDIATE FUTURE\*

ANALYSIS UNIT	STATUS OF ROAD DENSITY	BASELINE LEVELS (2/96)	EXISTING LEVELS (3/00)	GOOD/LONG/BOYLE	DURING			
					TAYLOR SOUTH	TAYLOR SOUTH AND GOOD/LONG/BOYLE	DOG/MEADOW	DOG/MEADOW, TAYLOR SOUTH, AND GOOD/LONG/BOYLE
Lazy Creek Subunit	Open-road density (less than 1 mile per square mile)	50%	47%	48%	50%	50%	47%	50% <sup>2</sup>
	Total-road density (less than 2 miles per square mile)	74%	72%	73%	72%	73%	72%	73%
DNRC-managed lands within Lazy Creek Subunit	Open-road density (less than 1 mile per square mile)	76%	72%	73%	75%	76%	72%	76% <sup>2</sup>
	Total-road density (less than 2 miles per square mile)	76%	74%	75%	74%	75%	75%	76%
Stryker Subunit	Open-road density (less than 1 mile per square mile)	35%	35%	N/A	N/A	N/A	35%	35% <sup>2</sup>
	Total-road density (less than 2 miles per square mile)	32%	29%	N/A	N/A	N/A	29%	29%
DNRC-managed lands within Stryker Subunit	Open-road density (less than 1 mile per square mile)	40%	40%	N/A	N/A	N/A	40%	40% <sup>2</sup>
	Total-road density (less than 2 miles per square mile)	35%	33%	N/A	N/A	N/A	33%	33%

<sup>1</sup>Based on the most updated road layer available for Stillwater State Forest.

<sup>2</sup>Open-road density in the Lazy Creek and Stryker BMU subunits are at 1996 baseline levels; therefore, operations on restricted roads would be conducted so that the status of the road would not change.

Timber harvesting may reduce the habitat quality within the proposed units. The proposed project area occurs in spring grizzly bear habitat. The effects of timber harvesting on grizzly bears are not conclusive. Small sample sizes and different harvesting practices limited the inference about seasonal grizzly bear use of cutting units. Other factors, such as levels of human disturbance and the amount of hiding cover, may also confound determinations of seasonal grizzly bear habitat use. Therefore, it is difficult to speculate on the effects of this particular project on spring habitat; however, they probably range from neutral to slightly negative. Forage production is anticipated to increase. No long-term increases in open- or total-road densities are proposed, which would minimize grizzly bear disturbance.

Security core would not be entered or altered in this alternative. The amount of DNRC-owned security core would remain at 12 percent of the Lazy Creek Grizzly Bear Management Subunit and 50 percent of the Stryker Grizzly Bear Management Subunit.

No permanent changes to the status of existing roads would occur, and only a 0.3-mile section of road would be constructed; this section of road would be reclaimed after use. Road-density levels would return to their present levels upon completion of the proposed project. Several of the proposed units exist along open roads; hence, harvesting within these units will not alter open-road densities. Other harvest units behind closed gates are small enough to facilitate harvesting during an intensive 30-day period followed by road

closure; this would not cause a change in road status. Winter logging of the remaining larger units behind closed gates (such as Units 10 and 11) would prevent an increase in open-road densities impacting grizzly bears in the area.

#### *Cumulative Effects*

##### *• Cumulative Effects of No-Action Alternative A on Grizzly Bears*

Motorized access to the area, security and hiding cover, and spring habitat would all remain unchanged. In the long term, forest succession would continue and may reduce food sources, but may increase the amount of hiding cover.

##### *• Cumulative Effects of Action Alternative B on Grizzly Bears*

The increased use of road systems during all of the proposed and active projects, including those on private industrial lands, may temporarily increase human disturbance to grizzly bears within the Lazy Creek and Stryker Grizzly Bear Management Subunits. Long-term open- and total-road densities would not increase due to the proposed Dog Meadow Timber Sale Project. FNF manages 12 percent of the subunit on the Whitefish Divide, which receives minimal human disturbance. Reductions in hiding cover would be additive to the reductions due to past DNRC timber sales; however, considerable hiding cover exists within these subunits. Early successional stages of vegetation occurring on harvest units would provide foraging opportunities that do not exist in some mature stands.

#### *Mitigation Measures Included:*

- Retain forested corridors to maintain landscape connectivity.

- Reclose roads and skid trails opened with proposed activities to reduce the potential for unauthorized motor vehicle use.
- Using a combination of topography, group retention, and roadside vegetation buffers, reduce views into harvest units along open roads.
- Harvesting activities would be conducted to limit disturbance in grizzly bear habitat by using the following methods:
  - harvesting during the denning period (November 15 through March 15)
  - harvesting along open roads, or
  - harvesting for short-duration, high-intensity periods on closed roads.

➤ **Gray Wolf (*Canis lupus*)**

**Issue**

There is concern that timber harvesting could alter habitat or create disturbance that would be detrimental to the gray wolf.

**Existing Environment**

The Northern Rocky Mountain Wolf Recovery Plan defines 3 recovery areas for the gray wolf (USFWS 1987). The proposed project area falls within the Northwest Montana Wolf Recovery Area.

The wolf is a wide-ranging species whose habitat contains adequate vulnerable prey and minimal human disturbance. Primary prey species in northwestern Montana are white-tailed deer, elk, moose, and mule deer. The distribution of wolves is strongly associated with the white-tailed deer winter range.

Typically, wolves in Montana den in late April. Wolves choose elevated areas in gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game

wintering areas for dens and rendezvous sites. Within the proposed project area, a number of these important habitats occur, including meadows and openings, some big game winter range, and several water sources. Wolves are most vulnerable to human disturbance at den and rendezvous sites.

Wolves and wolf sign have been documented on adjacent portions of Stillwater State Forest and Plum Creek Timber Company lands to the east of the project area. The newly identified Lazy Creek pack has been using Plum Creek timberlands approximately 7 miles southeast of the proposed project area. Reproduction in the Whitefish pack was documented on the same block of Plum Creek timberland east of the proposed project area during the spring of 2000. The Grave Creek pack has been using portions of Stillwater State Forest and FNF 13 to 15 miles northwest of the proposed project area (T. Meier, USFWS, personal communication, September 2002). Wolves likely use the vicinity of the proposed project area for hunting, breeding, and other life requirements.

Cumulative effects were analyzed on the contiguous Stillwater State Forest.

**Direct and Indirect Effects**

• ***Direct and Indirect Effects of No-Action Alternative A on Gray Wolves***

Disturbance to wolves would not increase. Forest canopy closure would continue to decrease big game forage, while slightly improving thermal cover in the area. In the short term, white-tailed deer habitat would decrease with the reduction in forage production, thereby reducing big game use of the area and, thus, decreasing wolf prey in the area. Wolf use of the proposed project area would

be expected to continue at current levels.

- ***Direct and Indirect Effects of Action Alternative B on Gray Wolves***

Wolves using the area would likely be disturbed by harvesting activities, and are most sensitive at den and rendezvous sites. After harvesting activities, wolf use of the proposed project area for denning and rendezvous sites would likely revert to preharvest levels. In the short term, the proposed harvest units are expected to lead to an increase in big game forage and a decrease in summer thermal cover for white-tailed deer. This may lead to a slight increase in white-tailed deer use, which, again, is an important food source for wolves.

#### Cumulative Effects

- ***Cumulative Effects of No Action Alternative A on Gray Wolves***

Under this alternative, white-tailed deer winter range would not be affected, and substantive change in white-tailed deer population, distribution, or habitat use is not anticipated. Levels of human disturbance are expected to remain similar to present levels. Therefore, the effects to wolves are expected to be negligible.

- ***Cumulative Effects of Action Alternative B on Gray Wolves***

Since the expected effects of this project on wolves would be minor, cumulative effects would also be minor. Some slight shifts of big game use may occur. Reductions in cover may cause slight decreases in use by deer and elk; however, these shifts are likely to be at least partially offset by the increases in forage production in the near-term. Travel

corridors along riparian areas would be retained throughout the project area, maintaining connectivity with surrounding forested habitats. Reductions in cover within the proposed project area will be additive to existing openings from past timber-harvesting activities. The affect of this reduction should still only be minor to wolves due to low human-disturbance levels. Human-disturbance levels are expected to revert to levels similar to current levels after the proposed harvesting is done and roads are again closed. No substantive change in wolf use of Stillwater State Forest is expected; wolves would continue to use Stillwater State Forest and adjacent areas in the long term.

#### Mitigation Measures Included

- Suspend operations and temporarily restrict use of roads within a 1-mile radius of any known active wolf den.
- Suspend operations and consult a DNRC biologist if a suspected rendezvous site is observed within 0.5 mile of any ongoing project activities.
- Retain connective corridors of heavy forest cover, when possible, to maintain travel routes, visual screening, and partial security for elk and deer.
- Reclose roads and skid trails opened with proposed activities to reduce the potential for unauthorized motor vehicle use.
- Use a combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads.

➤ **Canada Lynx (*Lynx canadensis*)**

#### Issue

There is concern that timber harvesting could alter habitat or

create disturbance that would be detrimental to lynx.

**Existing Environment**

Canada lynx are associated with subalpine fir forests generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al, 2000). The proposed project area ranges from approximately 3,200 to 5,800 feet in elevation and is dominated by mixed conifers, Douglas-fir, western larch, and subalpine fir. Primary lynx habitats are subalpine-fir types; however, lynx will use a mix of species compositions (subalpine fir, lodgepole pine, Douglas-fir, grand fir, and western larch). Typical lynx denning habitat consists of mature Engelmann spruce/subalpine fir with abundant coarse woody debris; typical lynx foraging habitat consists of younger coniferous forests with an abundance of snowshoe hare. Historically, high intensity, stand-replacing fires of long fire intervals (40 to 200 years) within continuous forests of lodgepole pine, subalpine fir, and Engelmann spruce maintained a mosaic of ideal snowshoe hare and lynx habitat. The weather station in Olney, 3 miles south of the proposed project area, has recorded an average of 120 inches of snowfall each year, with an average depth of 21 inches. The stand types and ages, elevations, and snow accumulations indicate the northeastern portion of the proposed project area contains appropriate lynx denning habitat (TABLE E-2 - POSSIBLE CANADA LYNX HABITAT WITHIN THE PROPOSED PROJECT AREA BY STAND TYPE AND ELEVATION). Lynx and lynx tracks have been observed near the proposed project area and in adjacent areas on Stillwater State Forest. Snowshoe hares occur throughout the proposed project area.

**TABLE E-2 - POSSIBLE CANADA LYNX HABITAT WITHIN THE PROPOSED PROJECT AREA BY STAND TYPE AND ELEVATION**

STAND TYPE	ACRES ABOVE 5,000 FEET ELEVATION
Douglas-fir/western larch	6
Lodgepole pine	5
Mixed conifer	402
Subalpine fir	115
Grand fir	0
Engelmann spruce	0
Western white pine	64
Total	592

Cumulative effects were analyzed on the State portions of the Stryker and Lazy Creek Grizzly Bear Management Subunits.

**Direct and Indirect Effects**

- **Direct and Indirect Effects of No-Action Alternative 1 on Canada Lynx**

Under this alternative, timber stands would continue to age, die, and be replaced by shade-tolerant tree species. Existing closed roads and skid trails would remain closed; no changes in human-disturbance levels are expected. However, use of the general vicinity by snowmobiles may enable other predators to access some of these upper elevations, increasing competition for available prey. Lynx generally will not travel more than 100 meters (approximately 110 yards) through an open-habitat type; the existing stands of continuous forested habitats facilitate lynx movement.

Denning habitat would continue to age, which would gradually improve the habitat quality for lynx. Dense stands of younger coniferous forests from past timber harvests exist in the proposed project area, providing snowshoe hare habitat. In the long term, foraging

opportunities in these stands will decline as they age, leading to a decline in edge habitats and the amount of younger stands, thereby providing less-favorable habitat conditions for snowshoe hares that are the preferred prey for lynx.

- ***Direct and Indirect Effects of Action Alternative B on Canada Lynx***

Under this action alternative, activities are not proposed within areas of high hare use or potential lynx denning habitat. Again, these younger stands will decline in quality for foraging habitats over time as they mature. The proposed treatments would increase the acreage in earlier-aged stands that would provide snowshoe hare habitat in the future. Forest connectivity around these openings will largely be retained through riparian buffers and other forested habitats.

Lynx may have adapted to move between isolated foraging and denning areas through forest corridors in the southern extent of their range (Koehler and Brittell 1990). The riparian buffers retained as fisher habitat may be used as travel corridors or denning habitat. Large coarse woody debris is more prevalent within the riparian areas, possibly due to the lower fire intensity within these areas.

#### Cumulative Effects

- ***Cumulative Effects of No Action Alternative A on Canada Lynx***

Under this alternative, lynx denning and foraging habitats would not be affected in the near-term. A majority of the lynx denning and foraging habitat in the Stryker and Lazy Creek Grizzly Bear Management Subunits is in the Stryker

Ridge-Herrig Basin and Whitefish Divide areas. No further reductions in foraging or denning habitat are currently under proposal within these subunits. The distribution and quantity of potential lynx denning habitat is not expected to change within these subunits. In the future, as stands age, the quality of existing denning habitats may improve; recruitment of new denning habitats is possible as currently unsuitable stands mature and develop necessary habitat attributes. The Werner Peak Fire created future foraging habitats on 737 acres. Foraging habitats were the by-product of past harvesting on adjacent private timberlands within the Lazy Creek Subunit, but the quality of these as foraging sites is starting to decline as they mature. Otherwise, foraging habitats within the Stryker and Lazy Creek subunits are expected to decline through time as young foraging areas age.

- ***Cumulative Effects of Action Alternative B on Canada Lynx***

Since the expected effects of this project on Canada lynx would be minor, cumulative effects would also be minor. A majority of the lynx denning and foraging habitats in the Stryker and Lazy Creek Grizzly Bear Management Subunits is in the Stryker Ridge-Herrig Basin and Whitefish Divide areas. No further reductions in foraging or denning habitat are currently under proposal within these subunits. The Werner Peak Fire created future foraging habitat on 737 acres. The foraging habitat was the by-product of past harvesting on adjacent private timberlands within the Lazy Creek Grizzly Bear Management Subunit, but the

quality of the foraging sites is starting to decline as they mature. Meanwhile, the Chicken/Werner Timber Sale Project planned to remove 105 acres of potential denning habitat and 353 acres of potential foraging habitat (the FEIS-based acreages are subject to change with project layout), but most of these acres are in the optional helicopter units that are not expected to be harvested. The Taylor South Timber Sale Project planned to reduce potential lynx denning habitat by another 205 acres. The quality and quantity of potential denning habitat across the subunits are expected to slowly improve through time. Meanwhile, foraging habitats within the Stryker and Lazy Creek Grizzly Bear Management Subunits are expected to decline through time as young foraging areas age.

#### Mitigation Measures Included

- Retain forested corridors to maintain landscape connectivity.
- Reduce views into harvest units along open roads using a combination of topography, group retention, and roadside vegetation buffers.

#### Sensitive Species

When conducting forest-management activities, the SFLMP directs DNRC to give special consideration to several sensitive species. These species are sensitive to human activities, have special habitat requirements that might be altered by timber management, or might become listed under the Federal Endangered Species Act if management activities result in continued adverse impacts. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful "fine filter" for ensuring that the primary goal of maintaining healthy and diverse forests is met.

A search of the Montana Natural Heritage Database reconfirmed common loon sightings within of the proposed project area. *TABLE E-3 - LISTED SENSITIVE SPECIES FOR THE NWLO SHOWING THE STATUS OF THESE SPECIES IN RELATION TO THE DOG MEADOW TIMBER SALE PROJECT* shows how each sensitive species was either included in the following analysis or was removed from further analysis because suitable habitat does not occur within the project area or proposed activities would not affect their required habitat components.

**TABLE E-3 - LISTED SENSITIVE SPECIES FOR THE NWLO SHOWING THE STATUS OF THESE SPECIES IN RELATION TO THIS PROPOSED PROJECT**

SPECIES	DETERMINATION - BASIS
Black-backed woodpecker	No further analysis conducted - No recently (less than 5 years) burned areas are in the project area.
Boreal owl	No further analysis conducted - No activities are proposed above 5,200 feet.
Coeur d'Alene salamander	No further analysis conducted - No moist talus or streamside talus habitat occurs in the project area.
Columbian sharp-tailed grouse	No further analysis conducted - No suitable grassland communities occur in the project area.
Common loon	No further analysis conducted - Loons breed on Dog and Upper Stillwater lakes. No activities are proposed within 500 feet of these lakes.
Ferruginous hawk	No further analysis conducted - No suitable grassland communities occur in the project area.
Fisher	Included - Potential fisher denning habitat occurs in the proposed project area.
Flammulated owl	No further analysis conducted - No suitable dry ponderosa pine habitats occur within the project area.
Harlequin duck	No further analysis conducted - No suitable habitat occurs in the project area.
Mountain plover	No further analysis conducted - No suitable grassland communities occur in the project area.
Northern bog lemming	No further analysis conducted - No suitable sphagnum bogs or fens occur in the project area.
Peregrine falcon	No further analysis conducted - A small cliff/rock outcrop complex is within the project area; however, no sightings have been documented in the area, and the cliff complex is likely too small for peregrine falcon use.
Pileated woodpecker	Included - Western larch/Douglas-fir and mixed-conifer habitats occur in the project area.
Townsend's big-eared bat	No further analysis conducted - No caves or mine tunnels occur in the project area.

**Sensitive Species Assessed**

➤ **Fisher (*Martes pennanti*)**

**Issue**

There is concern that timber harvesting could alter habitat or create disturbance that would be detrimental to the fisher.

**Existing Environment**

DNRC has listed the fisher as a sensitive species due to their use of mature and late-successional habitats (DNRC 1996). Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors. Fishers are generalist predators and use a

variety of habitat types, but are disproportionately found in stands with dense canopies. In the Rocky Mountains, fishers appear to prefer late-successional coniferous forests for resting sites and tend to use areas within 150 feet of water more than their availability on the landscape. Such areas typically contain large live trees, snags, and logs, which are used for resting and denning sites and dense canopy cover, which is important for snow intercept (Jones 1991). Modeling the above conditions using SLI data generated an estimate of fisher resting and denning habitat (Heinemeyer and Jones 1994).

The proposed project area ranges

from 3,200 to 5,800 feet in elevation, with several perennial streams. Along the 8 miles of perennial streams in the proposed project area, 296 acres are riparian buffer areas that would be retained as potential fisher habitat. Western larch/Douglas-fir and mixed-conifer habitat types dominate these areas. These areas likely provide resting and denning habitats in addition to travel corridors and landscape connectivity. Potential denning habitat exists on 1,060 acres within the proposed project area.

Trapping is a significant source of fisher mortality. Fishers are easily caught in traps set for martens, bobcats, and coyotes (Powell and Zielinski 1994), and trapping density is generally tied to road density. Currently, open roads total approximately 1 mile within these riparian buffers, so human disturbance and potential trapping mortality are fairly low within the proposed project area.

Cumulative effects were analyzed on the State portions of the Stryker and Lazy Creek Grizzly Bear Management Subunits.

#### *Direct and Indirect Effects*

- *Direct and Indirect Effects of No-Action Alternative A on Fishers*

No effects to fishers would be expected under this alternative. Little change to the stands providing fisher denning and foraging habitats would be expected. Habitats that are conducive to fisher denning and travel may improve due to increased tree growth and canopy closure; however, foraging opportunities may decline due to the lack of diversity in habitat such as edge and younger age-class stands. No changes are anticipated to the 1,060 acres of potential denning habitat within the proposed project area. Human disturbance and

potential trapping mortality would expect to remain similar to current levels.

- *Direct and Indirect Effects of Action Alternative B on Fishers*

Under this action alternative, riparian habitats along the perennial streams in the proposed project area would largely be unaffected. Harvesting would occur in 172 acres of the 1,060 acres of potential fisher denning habitat in Units 2, 11, and 12. Fisher resting habitat might also be slightly reduced due to the proposed overstory removal on the uplands adjacent to the riparian areas and in some of the intermittent tributaries to Dog Creek; but, again, most of the harvesting would avoid habitats typically preferred by fishers.

#### *Cumulative Effects*

- *Cumulative Effects of No-Action Alternative A on Fishers*

Under No-Action Alternative A, fisher denning and resting habitats would be retained. Suitable fisher habitat occurs across much of the Stryker and Lazy Creek subunits. Landscape connectivity within most of the Stryker Subunit and the part of the Lazy Creek Subunit within Stillwater State Forest is largely intact. Road access within the proposed project area and within the subunits would not be changed after implementation of this alternative; therefore, fisher vulnerability to trapping would remain unchanged.

- *Cumulative Effects of Action Alternative B on Fishers*

Under Action Alternative B, 172 acres of potential fisher denning habitat would be harvested within the proposed units. This loss is additive to

the loss of approximately 167 acres of habitat harvested in the Good/Long/Boyle Timber Sale Project and the 597 acres harvested in the Taylor South Timber Sale Project (EA-based acreages that are subject to change with project layout). Potential fisher denning, resting, and foraging habitats would be retained in the riparian buffers. Landscape connectivity within the subunits is largely intact, and human disturbance and potential trapping mortality will remain relatively unchanged since no changes in access within the subunits will be realized.

**Mitigation Measures Included:**

- Reclose roads and skid trails opened with the proposed activities to reduce the potential for unauthorized motor vehicle use.
- Retain vegetated buffers along streams to provide potential fisher denning, resting, and foraging habitats.

➤ **Pileated Woodpecker (*Dryocopus pileatus*)**

**Issue**

There is concern that timber harvesting could alter habitat or create disturbance that would be detrimental to the pileated woodpecker.

**Existing Environment**

The pileated woodpecker is listed by DNRC as a sensitive species because of the important ecological niche it occupies (DNRC 1996). Pileated woodpeckers excavate the largest cavities of any woodpecker. The cavities are frequently used in subsequent years by many other species of birds and mammals. Preferred nest trees are western larch, ponderosa pine, black cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated

woodpeckers primarily eat insects, mainly carpenter ants, which inhabit stumps, snags, and large downed logs. Nesting habitat for pileated woodpeckers consists of mature stands below 5,000 feet in elevation with 100 to 125 square feet per acre of basal area and a relatively closed canopy (Aney and McClelland 1985). The feeding- and nesting-habitat requirements, including large snags or decayed trees for nesting and large downed wood for feeding, closely tie these woodpeckers to mature forests. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979).

Removal of large western larch by past timber-harvesting activity has reduced the quality of habitat for pileated woodpeckers. Large live and dead trees are less common than would occur naturally due to past timber-harvesting activities. Black cottonwood occurs within riparian areas along perennial and intermittent streams. Douglas-fir and grand fir exist in the project area and are primarily used for foraging.

Modeling the above conditions using SLI data generated an estimate of pileated woodpecker habitat. In the proposed project area, potential pileated woodpecker nesting habitat exists on approximately 242 acres. Younger-aged stands might provide feeding or lower quality nesting habitat. During field visits, many feeding sites and 1 to 2 snags per acre were observed in the proposed project area.

Cumulative effects were analyzed on the contiguous Stillwater State Forest.

## Direct and Indirect Effects

- ***Direct and Indirect Effect of No-Action Alternative A on Pileated Woodpeckers***

No direct impacts are anticipated under No-Action Alternative A. Shade-intolerant trees would continue to grow and die over time, providing nesting and foraging habitat. As these trees die, replacement shade-intolerant trees would be underrepresented in the stand unless other disturbances influence the stands, allowing for their regeneration. Therefore, a reduction in suitable nesting trees is likely over time. Pileated woodpeckers typically do not nest in Douglas-fir or grand fir; however, they will forage on the boles of Douglas-fir. Under this alternative, stands once dominated by western larch and Douglas-fir would continue to be converted through succession to Douglas-fir, grand fir, and mixed-conifer stands. Thus, habitat sustainability and quality for pileated woodpeckers would gradually increase through time, and then decline.

- ***Direct and Indirect Effects of Action Alternative B on Pileated Woodpeckers***

Pileated woodpeckers tend to be tolerant of human activities (Bull and Jackson 1995), but might be temporarily displaced by the proposed harvesting and road-building activities. Elements of the forest structure important for nesting pileated woodpeckers would be retained, including snags, coarse woody debris, numerous leave trees, and snag recruits. Of the 242 acres of pileated woodpecker nesting habitat in the proposed project area, only 4 acres are proposed for treatment (in Units 11 and 12). Within these 4 acres, the majority of the midstory and overstory would be

removed. This could reduce pileated nesting use in this limited area. After the proposed harvesting, 939 harvested acres within the proposed project area would be too open to be considered pileated woodpecker habitat. The silvicultural prescriptions would plant western larch and western white pine seedlings in addition to natural regeneration. Recruitment of western larch would benefit pileated woodpeckers in the distant future by providing nesting, roosting, and foraging habitats.

## Cumulative Effects

- ***Cumulative Effects of No-Action Alternative A on Pileated Woodpeckers***

Under this alternative, western larch and western white pine trees would continue to grow and die over time in the proposed project area, providing nesting and foraging habitats. Through time, conversion of stands to shade-tolerant species would reduce nesting substrates for pileated woodpeckers. Stands elsewhere on Stillwater State Forest are frequently managed for mature western larch, snags, and snag-recruit trees, which benefit pileated woodpeckers. Habitats within these recent harvest units, especially the seedtrees retained in some units, could provide nesting substrates in the long term (70+ years).

- ***Cumulative Effects of Action Alternative B on Pileated Woodpeckers***

Under this alternative, reductions in pileated woodpecker habitat are expected. Existing snags, coarse woody debris, and suitable nesting trees would be retained within the proposed project area; however, future recruitment of these attributes may be reduced

by the proposed activities. Within the proposed project area, canopy on 939 acres proposed for harvesting would be too open for appreciable pileated woodpecker use. Recently harvested stands within the proposed project area reduced some of the pileated woodpecker habitat; however the silvicultural prescriptions within these harvested areas would likely improve long-term habitat quality for pileated woodpeckers. Additionally, the quality of habitat on adjacent private timberlands has largely been reduced through recent harvesting; some of the beneficial attributes that have been retained on past State timber sales do not appear to have been managed for on these private lands. The loss of pileated woodpecker habitats from the proposed harvesting would be additive to habitat loss associated with past harvesting both on DNRC lands and adjacent private timberlands; continued widespread use of Stillwater State Forest is expected. After the proposed harvesting, the project area would still be able to support a couple of pairs of pileated woodpeckers.

**Mitigation Measures Included:**

- Favor western larch in retention and regeneration decisions.
- Reclose roads and skid trails opened with the proposed activities to reduce potential loss of existing snags to firewood gathering.

**Big Game**

**Issue - Winter Range**

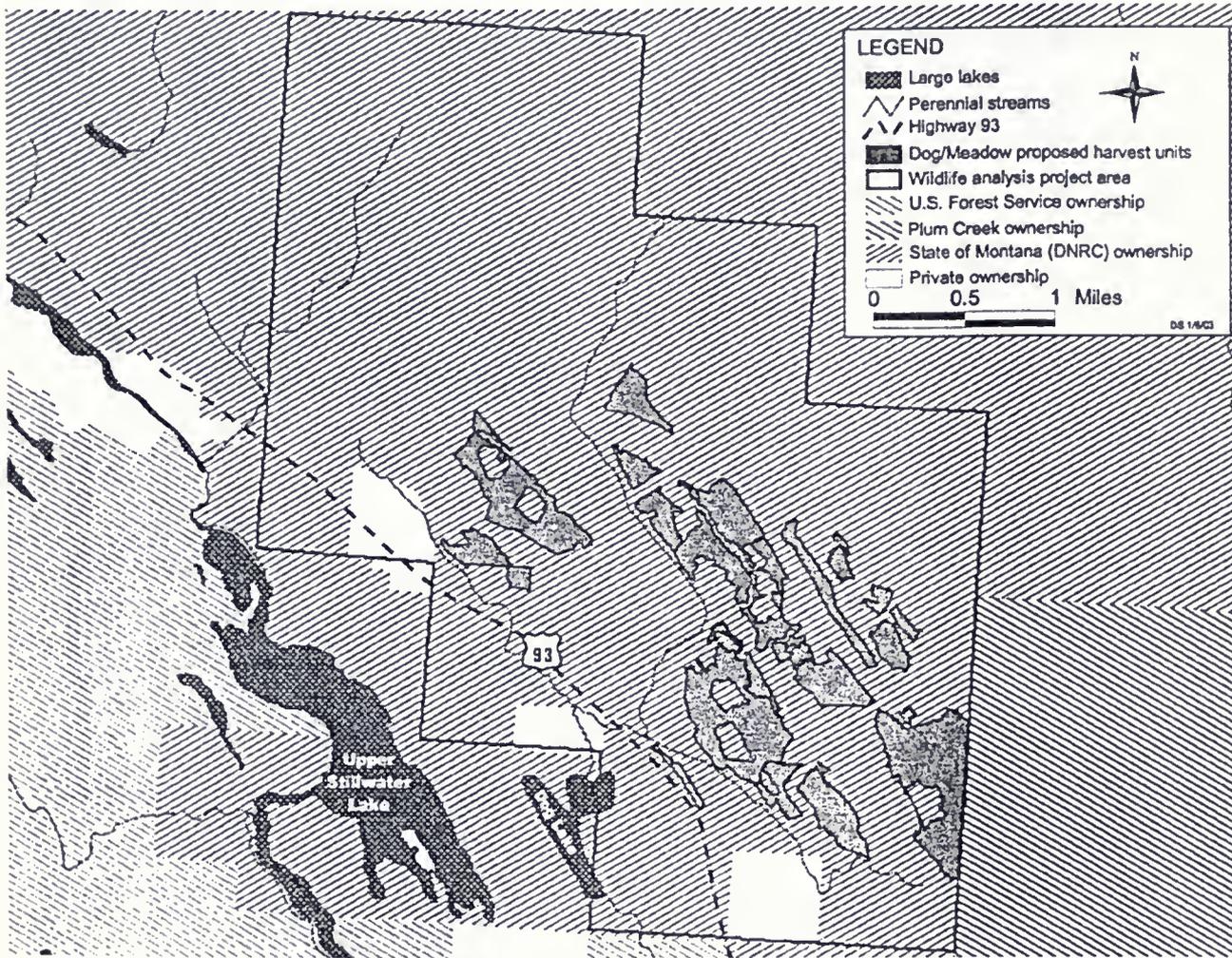
There is concern that timber-harvesting activities associated with this proposed project could reduce cover important for the survival of wintering elk, white-

tailed deer, and mule deer.

**Existing Environment**

Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions. Winter ranges tend to be relatively small areas that support large numbers of big game, which are widely distributed during the remainder of the year. These winter ranges have adequate midstory and overstory to reduce wind velocity and intercept snow, while moderating ambient temperatures. Besides providing a moderated climate, the snow-intercept capacity effectively lowers snow depths, which enables big game movement and access to forage. Snow depths differentially affect big game; deer are most affected, followed by elk (*Cervus elaphus*), then moose (*Alces alces*). The proposed project area does not provide winter range for white-tailed deer (*Odocoileus virginianus*) or mule deer (*Odocoileus hemionus*), but does provide winter habitat for elk and moose. DFWP identified the entire proposed project area as moose winter range and delineated elk winter range along the lower elevations of the project area (see *FIGURE E-1 - ANALYSIS AREA FOR PROPOSED PROJECT AREA SHOWING LOCATIONS OF PROPOSED HARVEST UNITS AND IMPORTANT WATER RESOURCES*). In the contiguous 270,160-acre elk winter range, approximately 2,150 acres fall within the proposed project area and 16,000 acres fall within Stillwater State Forest (see *FIGURE E-2-ELK WINTER RANGE IN RELATION TO THE PROPOSED PROJECT AREA AND STILLWATER STATE FOREST*). Winter snow depths and suitable microclimates influence elk distribution and use within Stillwater State Forest and the proposed project area. The proposed project area is a mosaic of stands of differing ages. Portions of the project area include stands that were harvested during the last 15 years and are not currently providing thermal cover for big

**FIGURE E-1—ANALYSIS AREA FOR PROPOSED PROJECT AREA SHOWING LOCATIONS OF PROPOSED HARVEST UNITS AND IMPORTANT WATER RESOURCES**



game. Other stands are providing the attributes facilitating winter use by elk and moose. Evidence of summer use by moose, white-tailed deer, and elk was noted throughout the proposed project area during field visits.

Cumulative effects were analyzed on the contiguous 16,000-acre portion of the elk winter range occurring within Stillwater State Forest.

#### Direct and Indirect Effects

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

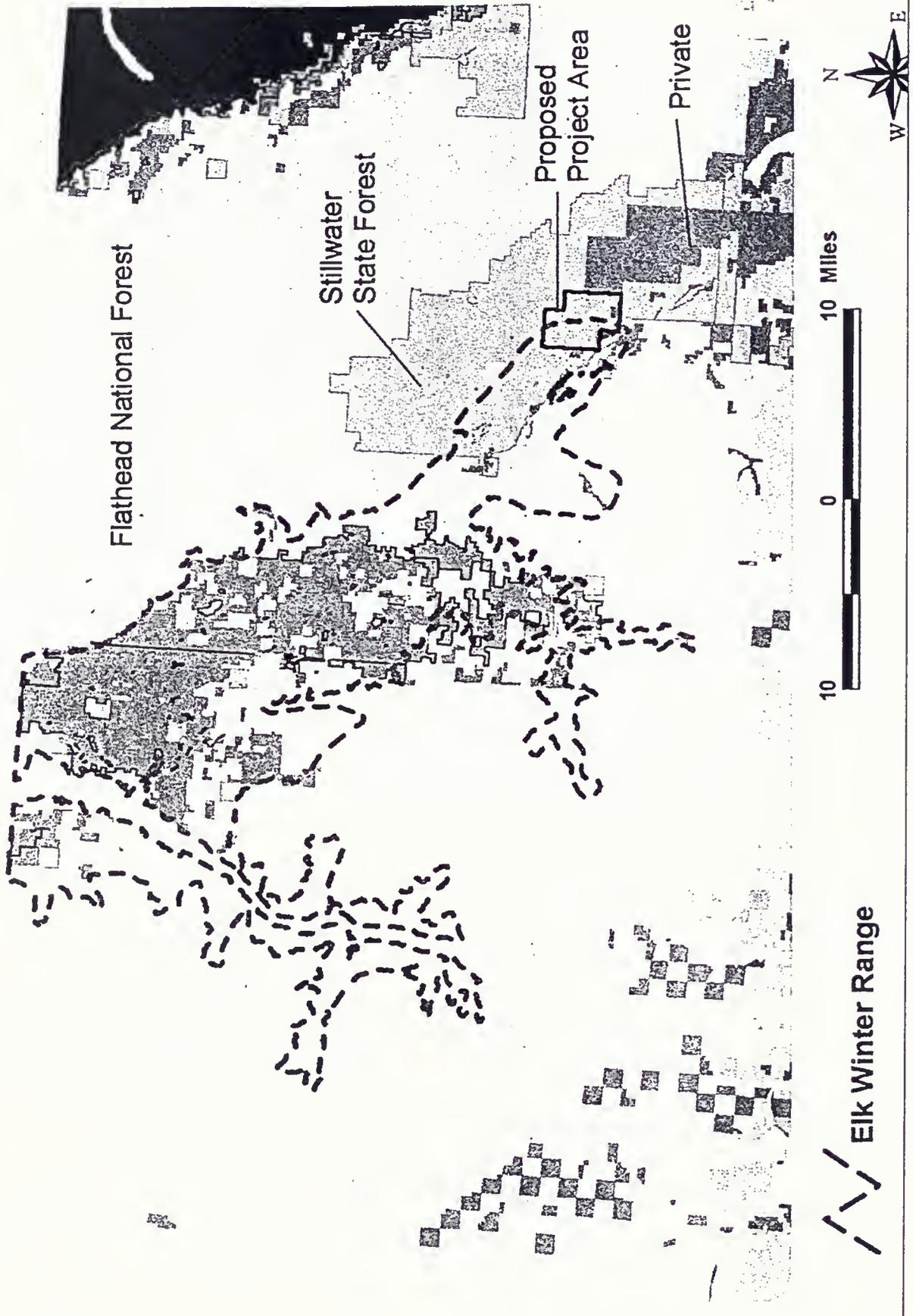
Under this alternative, big game thermal cover in the proposed project area would not be altered in the near term. Existing stands

would continue to provide thermal cover for elk and moose. In the longer-term, continued succession would reduce forage production while increasing thermal cover.

- ***Direct and Indirect Effects of Action Alternative B on Big Game Winter Range***

Some displacement is expected as a result of the proposed harvesting operations. This action alternative would reduce thermal cover for elk and increase potential forage production. Canopy cover would be largely removed from the 246 acres that fall within the elk winter range. (11 percent of the winter range occurring in the proposed project area; 2 percent of the total

FIGURE E-2 ELK WINTER RANGE IN RELATION TO THE PROPOSED PROJECT AREA AND STILLWATER STATE FOREST



16,000-acre winter range). Timber harvests would not prevent big game movement through the area.

#### Cumulative Effects

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

Under this alternative, no changes are anticipated in thermal cover and snow intercept. Stands across Stillwater State Forest are still providing thermal cover and snow intercept for elk and moose. The general trend within Stillwater State Forest is conversion to mature forests, reducing forage production while increasing thermal cover for elk and moose.

- ***Cumulative Effects of Action Alternative B on Big Game Winter Range***

Under this alternative, thermal cover would be largely removed from 246 acres. Harvesting has occurred elsewhere in the winter range on Stillwater State Forest. Big game winter range has been reduced by 505 acres with the Good/Long/Boyle Timber Sale Project, 213 acres with the Taylor South Timber Sale Project, and 684 acres with the Chicken/Werner Timber Sale Project. The proposed reduction in thermal cover would be additive to these other reductions in thermal cover and snow intercept.

#### Mitigation Measures Included:

- Retain patches of dense vegetation in harvest units within elk winter range when possible to provide some thermal cover/snow intercept capacity.
- Reclose roads and skid trails opened with the proposed activities to reduce the potential for disturbance from unauthorized motor vehicle traffic.

#### Issue - Elk Security

There is concern that timber-harvesting activities associated with this proposed project could

have adversely affected elk and other big game security.

#### Existing Environment

Timber harvesting can increase elk vulnerability by changing the size, structure, juxtaposition, and accessibility of areas that provide security during hunting season (Hillis et al. 1991). As visibility and accessibility increase within forested landscapes, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters. Because the female segments of the elk and deer populations are normally regulated carefully during hunting seasons, primary concerns are related to a substantial reduction of the male segment and subsequent decrease in hunter opportunity. The presence of fewer males at the beginning of the hunting season reduces the odds of any given hunter to see or harvest such an animal throughout the remainder of the season.

It is expected that when elk security is substantially compromised effects to deer can also be expected (albeit to a lesser degree than for elk). As with elk, the greatest effects on deer security to occur would be expected to be within the male segment of the populations.

Cumulative effects to elk security were analyzed on the contiguous Stillwater State Forest.

#### Direct and Indirect Effects

- ***Direct and Indirect Effects of No-Action Alternative A on Elk Security***

Under this alternative, no changes in elk security cover are expected. Existing cover would continue to provide intact blocks of security habitat. Timber stands would continue advancing to climax plant species. No alterations in cover would occur that would increase elk vulnerability during the elk hunting season. No changes are

anticipated in disturbance and potential mortality due to hunting.

- ***Direct and Indirect Effects of Action Alternative B on Elk Security***

Under this action alternative, security cover would be reduced in the near-term. As regeneration advances, hiding and security cover would be greater than current conditions. Reclosing the roads used for harvesting would return hunter accessibility to previous levels. The retention of pockets of cover and structure within the proposed units would further contribute to elk and deer security.

#### ***Cumulative Effects***

- ***Cumulative Effects of No-Action Alternative A on Elk Security***

Under this alternative, no changes are anticipated in elk security cover. Over time, habitats within the proposed project area would become denser, offering greater security, which would benefit elk and deer that spend portions of hunting season in the vicinity of the proposed project area. Future harvesting in Stillwater State Forest would not be expected to improve elk security. Recently harvested stands within the proposed project area would likely provide additional security habitat in 10 to 20 years.

- ***Cumulative Effects of Action Alternative B on Elk Security***

Under this alternative, negligible impacts to big game survival are anticipated. A reduction in hiding and security cover caused by the proposed harvest will be additive to the harvesting that has occurred recently within Stillwater State Forest and could occur in the future on Stillwater State Forest and adjacent ownerships. Hiding cover is being reduced by approximately 2,201 acres with the Good/Long/Boyle,

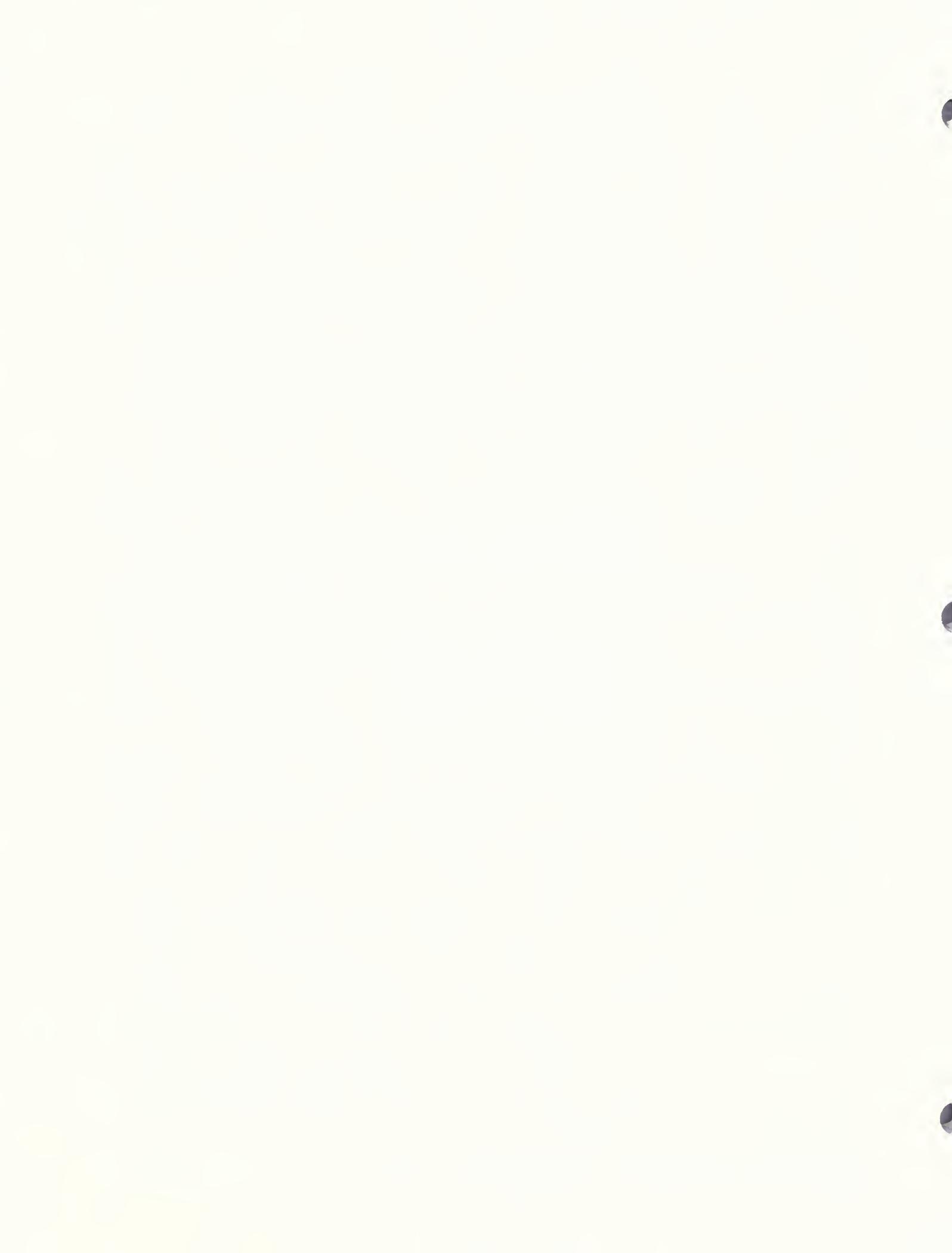
(1,026 acres), Taylor South (491 acres), and Chicken/Werner (684 acres) timber sale projects. Hunter access to Stillwater State Forest is relatively unlimited with many open roads and considerable foot access along trails and closed roads. Closing the roads that were opened during harvesting activities and returning human disturbance to preharvest levels would compensate for some of the reduced elk security caused by the harvesting. Recently harvested stands and the proposed stands on the State parcel would likely provide blocks of security habitat in 10 to 20 years.

#### ***Mitigations for Consideration***

- Retain patches of dense vegetation when possible to provide security cover.
- Reclose roads and skid trails opened with the proposed activities to reduce the potential for disturbance from unauthorized motor vehicle traffic.
- Reduce views into harvest units by using a combination of topography, group retention, and roadside-vegetation buffers.
- Retain corridors connecting forested habitats to aide movement.

# **APPENDIX F**

## **ECONOMIC ANALYSIS**



DOG/MEADOW TIMBER SALE PROJECT  
ENVIRONMENTAL ASSESSMENT

APPENDIX F  
ECONOMIC ANALYSIS

INTRODUCTION

This analysis is designed to address the public concerns particular to economics, as listed in *TABLE I-1-SUMMARY AND TRACKING OF ISSUES AND CONCERNS FROM PUBLIC COMMENTS* of the EA, and analysis elements considered necessary by the ID Team.

This analysis focuses on the proposed actions and economic effects of the 2 alternatives. The analysis is not programmatic by nature and does not provide a detailed analysis of potential long-term economic effects of managing the area exclusively for revenue-generating projects other than timber management. A specific proposal that included only revenue-generating activities other than timber management was not submitted to or created by the ID Team working on this project.

The proposed timber sale project is on State timberlands in Stillwater State Forest. This appendix analyzes the economic impacts of the timber sale and focuses on market activities that directly or indirectly benefit the Montana education system, generate revenue for the school trust fund, and provide funding for public buildings. The Enabling Act of 1889, as well as the State of Montana Constitution, requires that income be generated from State forestlands for the school and public buildings trusts. The analysis will center on Flathead County, where most of the impacts

related to the timber sale project are likely to occur because of the well developed wood-processing industry, including processors at all levels of production.

ANALYSIS AREA

FLATHEAD COUNTY

The proposed Dog Meadow Timber Sale Project is located entirely in Flathead County in northwestern Montana. Flathead County is the fourth most populous county in Montana; only Yellowstone, Missoula, and Cascade counties are larger. The population of Flathead County in 1990 was 59,218. According to the U.S. Census Bureau, the population of Flathead County in April 2000 was 74,471, an increase of 15,253 residents over the last 10 years, implying an annual growth rate of 2.3 percent. The largest community in the County is Kalispell, with a population of over 17,000 within the community, and nearly twice that many in the surrounding area. The second and third largest communities are Whitefish and Columbia Falls with populations of 6,300 and 4,300, respectively. Median age in the County is 37.2 years, making Flathead County's population slightly younger than the Montana average of 37.8.

The Montana Office of Public Instruction indicates that over 13,000 kindergarten through grade 12 school children were enrolled in Flathead County public schools in the 2000/2001 school year. Since

1991, enrollment in high school has increased more than 23 percent, to the 2001 level of 4,369 students. Most of this growth has occurred in the Kalispell High School, where enrollment has increased by more than 500 students over the last 10 years. Elementary school enrollment is at about the same level as in 1991, 9,000 students. In the period between 1991 and 2001, elementary enrollment grew and peaked during the middle 90s, but since then has declined and is currently at 9,000 students. This trend is much the same as school trends for the rest of the country. High school enrollment is likely to drop in the next few years, as the end of the children of the "baby boomers" finish their secondary education. Some of the other County high schools are already experiencing a decline in enrollment.

Flathead County is widely known for its production of "Flathead cherries" and Christmas tree farms; according to the University of Montana Bureau of Business and Economics, these other agricultural activities account for about 8

percent of the County gross product. The wood-products industry is the largest producer in the County, accounting for about 21 percent of the County's gross product. Other areas of economic importance include transportation (16 percent), Federal government (10.1 percent), tourism (10.8 percent), and metal production (11.2 percent). The County gross product figures are substantiated by the personal income, employment, and wage and salary data.

The data in TABLE F-1 - FLATHEAD COUNTY COVERED WAGES AND EMPLOYMENT 1999 - SELECTED INDUSTRIES shows employment and income in different industry categories for Flathead County. Total employment shows that nearly 30,100 workers earned \$697 million in wages, with an average annual wage of \$23,152. The average annual wage is nearly identical to the Statewide average wage of \$23,253.

Industry wages related to forest products and harvesting are paid at rates substantially above the average; only workers in the metal industry have higher annual wages

TABLE F-1 - FLATHEAD COUNTY COVERED WAGES AND EMPLOYMENT 1999 - SELECTED INDUSTRIES

INDUSTRY	AVERAGE ANNUAL EMPLOYMENT	ANNUAL WAGES PAID (\$000s)	AVERAGE WAGE (\$)
Agriculture, forestry, and fish	346	6,750	19,507
Forestry	44	2,176	49,490
Construction	1,855	51,308	27,659
Manufacturing	4,029	133,429	33,117
Lumber	1,911	66,071	34,574
Metals	703	27,522	39,150
Transportation	1,253	35,921	28,668
Trade	8,166	129,864	15,903
Eating and drinking establishments	2,814	26,136	9,288
Finance, insurance, and real estate	1,473	42,639	28,946
Services	8,705	179,250	20,591
Hotels and lodging	1,237	14,840	12,805
Amusement and recreation	741	7,921	10,690
Government	4,151	113,387	27,315
Total all industries*	30,086	696,559	23,152

\*Totals may not add due to nondisclosure of confidential industry data or to rounding.  
Source: Montana Department of Labor and Industry, Research and Analysis Bureau

per capita. The average annual wage in forestry is \$49,490 or nearly 2.14 times as much as the average wage earner in Flathead County. Lumber workers earn on average \$34,574 per year or nearly 50 percent more than the average wage earner. In employment terms, forestry and lumber workers account for 1,955 jobs, or about 6 percent, of the area employment. Other industries supported by tourism actually supply substantially more jobs: eating and drinking establishments, hotels and lodging, and amusement and recreation services employ 4,792 workers, nearly 16 percent of the County's wage and salary employees, or over twice as many as the forestry and lumber industries. However, wages are lower in the tourism-supported industries. The lower wage means that over twice as many workers produce less in terms of annual wage income in the County. Forestry and lumber, combined, produce \$68,247,000 in annual wage income (9.8 percent of all regional wage and salary income) whereas the tourist-related industries (lodging, restaurants, and recreation) yield \$50,000,000 (7.2 percent of all regional wage and salary income) in annual wage and salary income. Income in tourist-related industries and proportional decreases in forest industries would lead to a lower average wage in Flathead County and a lowered ability for individual residents to purchase goods and services.

**ALTERNATIVE EFFECTS**

**DIRECT EFFECTS**

This EA provides for 2 alternatives:

- No-Action Alternative A - No employment, income, or school trust fund effects that result from Action Alternative B would occur.
- Action Alternative B - The estimates provided in the following analysis are for the

purpose of comparing the "action" alternative to the "no-action" alternative and are not intended as an absolute estimate of the employment, income, or wages associated with the sale.

The estimated stumpage volume rate and income, together with an estimate of revenue to the trust, is shown in TABLE F-2 - ESTIMATED REVENUES FROM THE DOG MEADOW TIMBER SALE. The stumpage value was estimated using the most current transaction evidence equation. The transaction evidence appraisal method uses a multivariate regression equation to estimate the bid price based on past sale characteristics and the market data.

**TABLE F-2 - ESTIMATED REVENUES FROM THE DOG/MEADOW TIMBER SALE**

	ACTION ALTERNATIVE B
Harvest volume	60,221 tons
Stumpage price	\$27.82/ton
Stumpage revenue	\$1,675,000
Trust revenue	\$1,212,600
Source: Montana DNRC, Trust Land Management	

TABLE F-3 - ESTIMATED NUMBER OF STUDENTS SUPPORTED BY 1 YEAR'S ESTIMATED SALE REVENUE shows that the trust revenue would provide enough money to pay for the education of 201 students in the kindergarten through grade 12 levels for 1 year; this estimate is based on an annual student cost of \$6,038, as determined from information provided by the Montana Office of Public Instruction.

**TABLE F-3 - ESTIMATED NUMBER OF STUDENTS SUPPORTED BY 1 YEAR'S ESTIMATED SALE REVENUE**

	ACTION ALTERNATIVE B
Estimated school revenue	\$1,212,600
Students supported	201
Source: Montana DNRC, Trust Land Management	

TABLE F-4 - ESTIMATED DOG MEADOW TIMBER SALE DIRECT EMPLOYMENT AND INCOME IMPACTS shows the number of jobs and the wages that would be generated by the timber harvest. These estimates are based on an average wage of \$32,090 and an estimated job generation rate of 10.58 jobs per MMBF of wood harvested. The estimated employment associated with the timber would be 94 jobs. The 94 jobs would generate more than 3 million dollars in income. The estimated amount of income tax that would be paid by millworkers is \$131,700.

**CUMULATIVE EFFECTS**

TABLE F-4 - ESTIMATED DOG/MEADOW TIMBER SALE DIRECT EMPLOYMENT AND INCOME IMPACTS

	ACTION ALTERNATIVE B
Direct employment	94 jobs
Wages and salaries	\$3,016,500
Source: Montana DNRC, Trust Land Management	

This sale would be part of the annual harvest of timber from trust lands. The net revenue from this sale would add to the trust fund. Annual contributions to the trust fund have varied widely over the years, because the actual contribution to the trust is more a function of harvest than of sales. Harvest levels can vary substantially over time; sales tend

to be more consistent. TABLE F-5 - ANNUAL REVENUE FROM TIMBER HARVESTED FROM MONTANA TRUST LANDS shows the annual revenue from harvest for the last 5 years. The net contribution to the trust fund is also affected by the annual costs experienced by DNRC for program management, which varies year to year. DNRC should continue to make net annual contributions to the trust from its forest management program.

TABLE F-5 - ANNUAL REVENUE FROM TIMBER HARVESTED FROM MONTANA TRUST LANDS

YEAR	HARVEST REVENUE (\$)
2001	8,524,150
2000	12,710,311
1999	6,998,847
1998	8,393,485
1997	7,327,641

DNRC has a Statewide sustained-yield annual harvest goal of 42.164 MMBF. If timber from this project is not sold, this volume could come from sales elsewhere; however, the timber may be from other areas and not benefit this region of the State. Long-term deferral of harvesting from this forest would impact harvest patterns, changing both the region where the trees are harvested and the volumes taken. This would impact other areas of the State where these changes occur.

# **APPENDIX G**

## **SOILS ANALYSIS**



DOG/MEADOW TIMBER SALE PROJECT  
ENVIRONMENTAL ASSESSMENT

APPENDIX G  
SOILS ANALYSIS

#### INTRODUCTION

This analysis is designed to address the public concerns particular to soils, as listed in *TABLE I-1-SUMMARY AND TRACKING OF ISSUES AND CONCERNS FROM PUBLIC COMMENTS* of the EA, and analysis elements considered necessary by the ID Team.

The Dog Creek watershed is a valley formed by glaciers and river processes. The dominant soil types found in the project area are deep glacial tills derived from argillite, siltite, and limestone from the Belt Supergroup. Upper slopes and ridges are weathered bedrock scoured by glaciers.

#### ANALYSIS METHODS

Soil productivity will be analyzed by evaluating the current levels of soil disturbance in the proposed project area. Analysis criteria will also include soil-stability risk factors.

#### ANALYSIS AREA

The analysis area for evaluating soil productivity will include DNRC-managed State land within the Dog/Meadow Timber Sale Project area. The Dog Creek watershed encompasses the entire project area.

#### EXISTING CONDITIONS

DNRC has conducted timber harvesting in the Dog Creek watershed since the 1920s. Since timber sales dating back to the 1960s, 2,062 acres have been harvested on State land using a combination of ground-based and

cable-yarding harvest methods. Ground-based yarding can affect soil productivity through displacement and compaction of productive surface layers of soil, mainly on heavily used trails. Based on field review of the area, an estimated 10 to 15 percent of the area may be impacted by existing trails. Trails are still apparent, but most are well vegetated and past impacts are beginning to ameliorate from frost and vegetation.

Soil types in the project area vary from nearly level wetland types along Dog Creek to steep valley sideslopes on ridges. The FNF Soil Survey identified no areas of soils at high risk for mass movements in the project area. Several areas of wetland soil types are not suitable for timber management and would require special measures for road construction. This is in Soil Map Unit 12 and occurs in low areas throughout the watershed. No slope failures were identified during reconnaissance in the proposed project area. The Dog Creek watershed soil types and their associated management implications are found in *TABLE G-3 - SOIL MAP UNIT DESCRIPTIONS FOR THE DOG/MEADOW PROJECT AREA*.

**ALTERNATIVE EFFECTS**

**DIRECT AND INDIRECT EFFECTS**

**• Direct and Indirect Effects of No-Action Alternative A on Soils**

No-Action Alternative A would have no direct or indirect effects on soil productivity. No ground-based activity would take place under this alternative, which would leave the soil in the project area unchanged from the description in the EXISTING CONDITIONS portion of this analysis.

**• Direct and Indirect Effects of Action Alternative B on Soils**

Action Alternative B would have direct impacts on approximately 100 acres of ground if harvesting takes place in the summer, and on approximately 42 acres if harvesting is done in the winter.

Direct impacts would include compaction and displacement resulting from the use of ground-based equipment to skid logs on approximately 898 acres, and cable yarding on approximately 41 acres. Ground-based site preparation and road construction would also generate direct impacts to the soil resource. TABLE G-1 - SUMMARY OF DIRECT EFFECTS OF ALTERNATIVES ON SOILS WITH SUMMER HARVESTING and TABLE G-2 - SUMMARY OF DIRECT EFFECTS OF ALTERNATIVES ON SOILS WITH WINTER HARVESTING summarize the expected impacts to the soil resource as a result of the action alternatives. These activities would leave approximately 15 percent of the proposed harvest units in an impacted condition if harvested in the summer, and up to 4 percent if done in the winter. DNRC expects

**TABLE G-1 - SUMMARY OF DIRECT EFFECTS OF ALTERNATIVES ON SOILS WITH SUMMER HARVESTING**

DESCRIPTION OF PARAMETER	ALTERNATIVE A	ALTERNATIVE B
Acres of harvesting	0	939
Acres of tractor yarding	0	898
Acres of skid trails and landings <sup>1</sup>	0	180
Acres of cable yarding	0	41
Acres of yarding corridors <sup>2</sup>	0	4
Acres of moderate impacts <sup>3</sup>	0	137
Percent of harvest area with impacts	0	15.2
<sup>1</sup> 20 percent of the ground-based area		
<sup>2</sup> 5 to 10 percent of cable-yarding units		
<sup>3</sup> 75 percent of ground-based skid trails and 50 percent of cable corridors		

**TABLE G-2 - SUMMARY OF DIRECT EFFECTS OF ALTERNATIVES ON SOILS WITH WINTER HARVESTING**

DESCRIPTION OF PARAMETER	ALTERNATIVE A	ALTERNATIVE B
Acres of harvesting	0	939
Acres of tractor yarding	0	532
Acres of skid trails and landings <sup>1</sup>	0	106
Acres of cable yarding	0	40.7
Acres of yarding corridors <sup>2</sup>	0	41
Acres of moderate impacts <sup>3</sup>	0	42
Percent of harvest area with impacts	0	4
<sup>1</sup> 20 percent of the ground-based area		
<sup>2</sup> 5 to 10 percent of cable yarding units		
<sup>3</sup> 20 percent of ground-based skid trails and 50 percent of cable corridors		

TABLE G-3 - SOIL MAP UNIT DESCRIPTIONS FOR THE DOG MEADOW PROJECT AREA

SOIL MAP UNIT	DESCRIPTION	SOIL DRAINAGE	ROAD LIMITATIONS	TOPSOIL DISPLACEMENT AND COMPACTION	SEEDLING ESTABLISHMENT	EROSION (BARE SURFACE)	NOTES
12	Organic depressions	Poor	Severe	Severe	Poor	Slight	Wetland soil types; avoid operations.
14-2	Silty lacustrine terraces, 0 to 5 percent	Poor	Wet, poor bearing strength	Severe	Poor	High	Soil has a very limited season of use; consider winter harvesting, use designated skid trails. Roads may require turnpiking, special design, and/or gravel. Lop and scatter slash, excavator pile, or broadcast burn.
23-8	Glaciated mountain slopes, 20 to 40 percent	Well drained	Low	Moderate/high	Moderate-competition	Moderate	Moderately deep, coarse soils reduce water and nutrients. South slopes are droughty. On slopes over 35 percent, lop and scatter slash, excavator pile, or broadcast burn.
23-9	Glaciated mountain slopes, 40 to 60 percent	Well drained	Low	Moderate/high	Moderate-competition	Moderate	Moderately deep, coarse soils reduce water and nutrients. South slopes are very droughty. Cable yard on slopes over 45 percent or soft track on slopes up to 55 percent.
26C-7	Glacial moraines, 0 to 20 percent	Well drained	Low	Moderate (severe if wet)	Good	Low	Deep, productive soil. Topsoil depth important.

to maintain long-term soil productivity, based upon the implementation of mitigation measures, to control the area and degree of detrimental soil impacts to less than 15 percent of the proposed harvest area. A combination of skidding mitigation measures would include:

- restricting the season of use,
- utilizing a minimum skid trail spacing,
- installing erosion control where needed,
- retaining woody debris, and
- following all applicable BMPs.

#### **CUMULATIVE EFFECTS**

##### ***Cumulative Effects of No-Action Alternative A on Soils***

No-Action Alternative A would have no cumulative impacts on soil productivity; no soil would be disturbed and no reentry of past harvest units would occur.

##### ***Cumulative Effects of Action Alternative B on Soils***

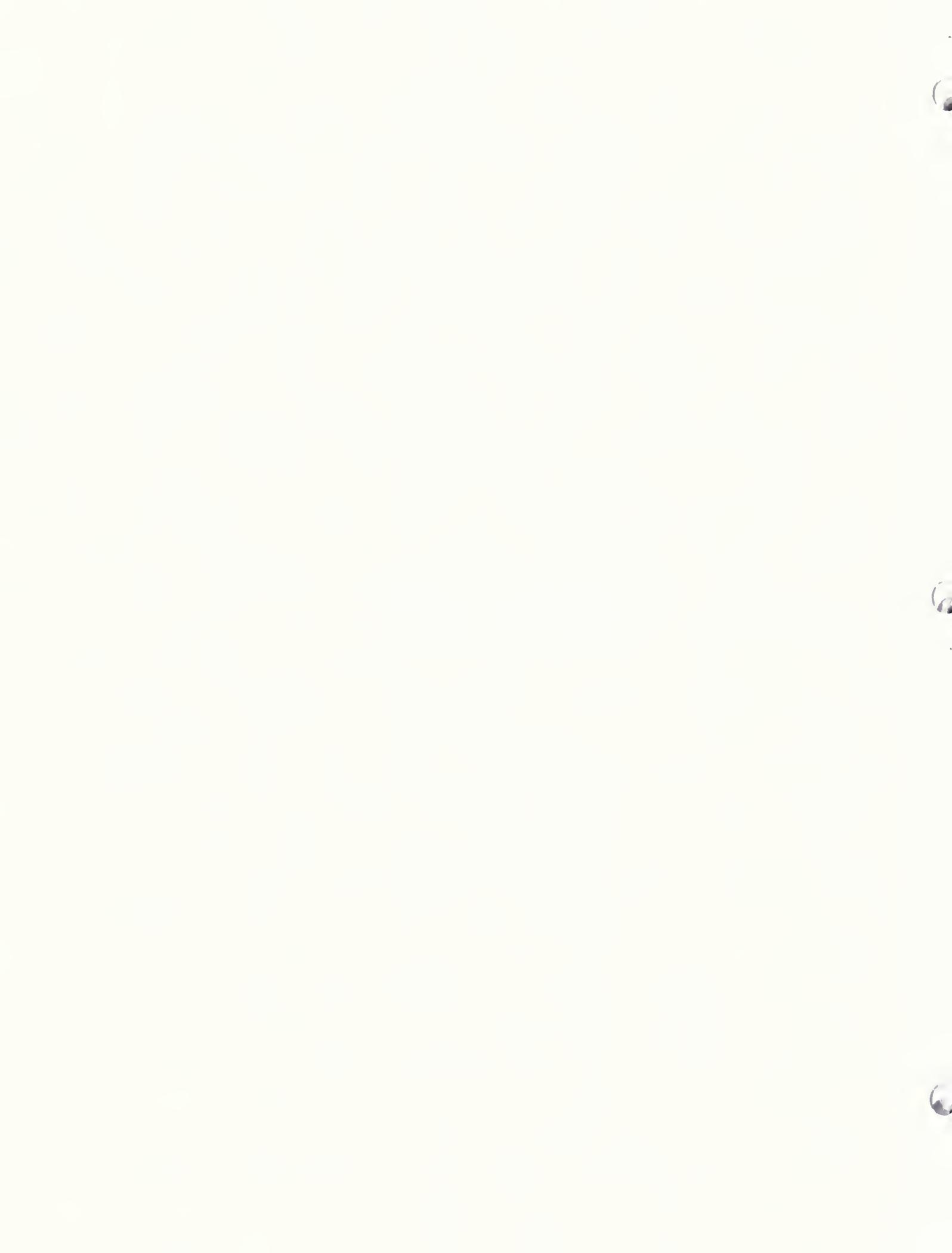
Action Alternative B would enter some stands of previous timber sale operations. Cumulative effects to soils may occur from repeated entries into a forest stand, where additional ground is

impacted by equipment operations. DNRC would maintain long-term soil productivity and minimize cumulative effects by implementing any or all of the following mitigation measures:

- Existing skid trails from past harvesting activities would be used if they are properly located and spaced.
- Additional skid trails would be used only where existing trails are unacceptable.
- The potential direct and indirect effects would be mitigated with soil- moisture restrictions, season of operation, and method of harvesting.
- A portion of coarse woody debris and fine litter for nutrient cycling would be retained.

In previously unharvested stands, cumulative effects to soil productivity from multiple entries would be the same as those listed in the direct and indirect effects sections.

SOIL MAP UNIT	DESCRIPTION	SOIL DRAINAGE	ROAD LIMITATIONS	TOPSOIL DISPLACEMENT AND COMPACTION	SEEDLING ESTABLISHMENT	EROSION (BARE SURFACE)	NOTES
26C-8	Glacial moraines, 20 to 40 percent	Well drained	Moderate/high	Moderate/high	Good	Moderate	Deep, productive soil. Topsoil depth important.
26C-9	Glacial moraines, 40 to 60 percent	Well drained	Moderate/high	Moderate/high	Good	Moderate/high	Deep, productive soil; average season of use. Limit soft-track skidder to slopes that are less than 45 percent.
28-7	Glacial moraines, 0 to 20 percent	Well drained	Low	Moderate	Moderate to droughty	Low	Topsoil depth is very important.
55	Rock outcrop	Well drained	Severe	None	Poor	Low	Landtype is not suited to management
78	Glacial trough wall, 60 to 90 percent	Well drained	Rocky, steep	High displacement	Fair, droughty	Moderate	Steep slopes, rocky soils with common rock outcrops. Cable logging recommended for slopes over 45 percent.



DOG/MEADOW TIMBER SALE PROJECT  
ENVIRONMENTAL ASSESSMENT

GLOSSARY

**Administrative road use**

Road use that is restricted to DNRC personnel and contractors or for purposes such as monitoring, forest improvement, fire control, hazard reduction, etc.

**Airshed**

An area defined by a certain set of air conditions; typically, a mountain valley in which air movement is constrained by natural conditions such as topography.

**Appropriate Conditions**

Describes the set of forest conditions determined by DNRC to best meet the SFLMP objectives. The 4 main components useful for describing an appropriate mix of conditions are covertype proportions, age class distributions, stand structural characteristics, and the spatial relationships of stands (size, shape, location, etc.), all assessed across the landscape.

**Bald eagle primary-use area**

An area where it is assumed that 75 percent of the foraging, resting, and associated behaviors occur.

**Basal area**

A measure of the number of square feet of space occupied by the stem of a tree.

**Best Management Practices (BMPs)**

Guidelines to direct forest activities, such as logging and road construction, for the protection of soils and water quality.

**Biodiversity**

The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

**Board foot**

144 cubic inches of wood that is equivalent to a piece of lumber 1 inch thick by 1 foot wide by 1 foot long.

**Canopy**

The upper level of a forest consisting of branches and leaves of the taller trees.

**Canopy closure**

The percentage of a given area covered by the crowns, or canopies, of trees.

**Cavity**

A hollow excavated in trees by birds or other animals. Cavities are used for roosting and reproduction by many birds and mammals.

**Coarse down woody material**

Dead trees within a forest stand that have fallen and begun decomposing on the forest floor.

**Co-dominant tree**

A tree that extends its crown into the canopy, receiving direct sunlight from above and limited sunlight on its sides. One or more sides are crowded by the crowns of other trees.

### Compaction

Increased soil density caused by force exerted at the soil surface, modifying aeration and nutrient availability.

### Connectivity

The quality, extent, or state of being joined; unity; the opposite of fragmentation.

### Core area

See *Security habitat (grizzly bears)*.

### Cover

See *Hiding cover* and/or *Thermal cover*.

### Covertyp

A classification of timber stands based on the percentage of tree species composition.

### Crown Cover or Crown Closure

The percentage of a given area covered by the crowns of trees

### Crown scorch

The portion of the tree crown that has been scorched.

### Cull

A tree of such poor quality that it has no merchantable value in terms of the product being cut.

### Cutting units

Areas of timber proposed for harvesting.

### Cumulative effect

The impact on the environment that results from the incremental impact of the action when added to other actions. Cumulative impacts can also result from individually minor actions, but collectively they may compound the effect of the actions.

### Direct effect

Effects on the environment that occur at the same time and place as the initial cause or action.

### Ditch relief

A method of draining water from roads using ditches and corrugated metal pipe. The pipe is placed just under the surface of the road.

### Dominant tree

Those trees within a forest stand that extend their crowns above surrounding trees and capture sunlight from above and around the crown.

### Drain dip

A graded depression built into a road to divert water and prevent soil erosion.

### Ecosystem

An interacting system of living organisms and the land and water that make up their environment; the home place of all living things, including humans.

### Environmental effects

The impacts or effects of a project on the natural and human environment.

### Equivalent clearcut acres (ECA)

This method equates area harvested and percent of crown removed with an equivalent amount of clearcut area.

*Allowable ECA* - The estimated number of acres that can be clearcut before stream channel stability is affected.

*Existing ECA* - The number of acres that have been previously harvested, taking into account the degree of hydrologic recovery that has occurred due to revegetation.

*Remaining ECA* - The calculated amount of harvesting that may occur without substantially increasing the risk of causing detrimental effects to the stability of the stream channel.

### Evapotranspiration

A combination of 2 physical processes in the environment: evaporation is the loss of moisture into the atmosphere from the soil and bodies of water (lakes, river, etc.); transpiration is the process where moisture is lost through the surfaces of plants and trees into the atmosphere. Both are the result of heating by the sun, and the combination of the 2 is how moisture

is cycled back into the atmosphere.

#### **Excavator piling**

The piling of logging residue using an excavator.

#### **Fire regimes**

Describes the frequency, type, and severity of wildfires. Examples include: frequent nonlethal underburns; mixed-severity fires; and stand-replacement or lethal burns.

#### **Forage**

All browse and nonwoody plants available to wildlife for grazing.

#### **Forest improvement**

The establishment and growing of trees after a site has been harvested. Associated activities include:

- site preparation, planting, survival checks, regeneration surveys, and stand thinnings;
- road maintenance;
- resource monitoring;
- noxious-weed management; and
- right-of-way acquisition on a State forest.

#### **Fragmentation (forest)**

A reduction of connectivity and an increase in sharp stand edges resulting when large contiguous areas of forest with similar age and structural character are interrupted through disturbance (stand-replacement fire, timber harvesting, etc.)

#### **Habitat**

The place where a plant or animal naturally or normally lives and grows.

#### **Habitat type**

The place or type of site where a plant or animal naturally or normally lives and grows.

#### **Hazard reduction**

The reduction of fire hazard by processing logging residue with methods such as separation, removal, scattering, lopping, crushing,

piling and burning, broadcast burning, burying, and chipping.

#### **Hiding cover**

Vegetation capable of hiding some specified portion of a standing adult mammal from human view at a distance of 200 feet.

#### **Historical forest condition**

The condition of the forest prior to settlement by Europeans.

#### **Homogeneous**

Of uniform structure or composition throughout.

#### **Indirect Effects**

Secondary effects that occur in locations other than the initial action or significantly later in time.

#### **Intermediate trees**

A characteristic of certain tree species that allows them to survive in relatively low light conditions, although they may not thrive.

#### **Interdisciplinary team (ID Team)**

A team of resource specialists brought together to analyze the effects of a project on the environment.

#### **Landscape**

An area of land with interacting ecosystems.

#### **Meter**

A measurement equaling 39.37 inches.

#### **Mitigation measure**

An action or policy designed to reduce or prevent detrimental effects.

#### **Moving-window analysis**

A computer-based method that, in this EA, is used to quantify the area influenced by roads in a study area. Starting with the pixel in the upper left corner of the computerized subunit map, the computer calculates how many miles of road exist within a 1-square-mile "window" around that pixel. It

moves to the next pixel and repeats the process until the road density is calculated in a 1-square-mile area around every pixel in the study area. The number and percentage of pixels in the study area that fall into different road-density classes are then calculated by the computer. Based on research studying the effects of roads on grizzly bears, the effects of open roads are measured by the percentage of pixels in the study area that have at least 1.0 mile of open road in the surrounding 1-square-mile window. The effects of total roads (open, gated, barricaded, bermed, but not brushed, etc.) are measured by the percentage of pixels in the study area that have at least 2 miles of open or restricted roads in the surrounding 1-square-mile window.

#### **Multistoried stands**

Timber stands with 2 or more distinct stories.

#### **Nest site area (bald eagle)**

The area in which human activity or development may stimulate abandonment of the breeding area, affect successful completion of the nesting cycle, or reduce productivity. It is either mapped for a specific nest based on field data, or, if that is impossible, it is defined as the area within a 1/4-mile radius of all nest sites in the breeding area that have been active within 5 years.

#### **No-action alternative**

The option of maintaining the status quo and continuing present management activities; the proposed project would not be implemented.

#### **Nonforested area**

A naturally occurring area where trees do not establish over the long term, such as a bog, natural meadow, avalanche chute, and alpine areas.

#### **Old growth**

For this analysis, old growth is defined as stands that meet the minimum criteria (number of trees per acre that have a minimum dbh and a

minimum age) for a given site (old-growth group from habitat type). These minimums can be found in the Green et al Old Growth Forest Types of the Northern Region (see APPENDIX A - REFERENCES).

#### **Overstory**

The level of the forest canopy including the crowns of dominant, codominant, and intermediate trees.

#### **Patch**

A discrete area of forest connected to other discrete forest areas by relatively narrow corridors; an ecosystem element (such as vegetation) that is relatively homogeneous internally, but differs from what surrounds it.

#### **Potential nesting habitat (bald eagle)**

Sometimes referred to as 'suitable nesting habitat,' areas that have no history of occupancy by breeding bald eagles, but contain the potential to do so.

#### **Project file**

A public record of the analysis process, including all documents that form the basis for the project analysis. The project file for the Dog/Meadow Timber Sale project Ea is located at the Stillwater State Forest office near Olney, Montana.

#### **Redds**

The spawning ground or nest of various fish species.

#### **Regeneration**

The replacement of one forest stand by another as a result of natural seeding, sprouting, planting, or other methods.

#### **Residual stand**

Trees that remain standing following any cutting operation.

#### **Road-construction activities**

In general, the term 'road construction activities' refers to all the activities conducted while building new roads, reconstructing existing roads, and obliterating roads. These activities may include

any or all of the following:

- road construction;
- right-of-way clearing;
- excavation of cut/fill material;
- installation of road-surface and ditch-drainage features;
- installation of culverts at stream crossings;
- burning right-of-way slash;
- hauling and installation of borrow material; and
- blading and shaping road surfaces.

### Road improvements

Construction projects on an existing road to improve ease of travel, safety, drainage, and water quality.

### Saplings

Trees 1 to 4 inches in diameter at breast height.

### Sawtimber trees

Trees with a minimum dbh of 9 inches.

### Scarification

The mechanized gouging and ripping of surface vegetation and litter to expose mineral soil and enhance the establishment of natural regeneration.

### Scoping

The process of determining the extent of the environmental assessment task. Scoping includes public involvement to learn which issues and concerns should be addressed and the depth of assessment that will be required. It also includes a review of other factors such as laws, policies, actions by other landowners, and jurisdictions of other agencies that may affect the extent of assessment needed.

### Security

For wild animals, the freedom from the likelihood of displacement or mortality due to human disturbance or confrontation.

### Security habitat (grizzly bears)

An area of a minimum of 2,500 acres

that is at least .3 miles from trails or roads with motorized travel and high-intensity nonmotorized use during the nondenning period.

### Seedlings

Live trees less than 1 inch dbh.

### Sediment

In bodies of water, solid material, mineral or organic, that is suspended and transported or deposited.

### Sediment yield

The amount of sediment that is carried to streams.

### Seral

Refers to a biotic community that is in a developmental, transitional stage in ecological succession.

### Shade intolerant

Describes the tree species that generally can only reproduce and grow in the open or where the overstory is broken and allows sufficient sunlight to penetrate. Often these are seral species that get replaced by more shade-tolerant species during succession. In Stillwater State Forest, shade-intolerant species generally include ponderosa pine, western larch, Douglas-fir, western white pine, and lodgepole pine.

### Shade tolerant

Describes tree species that can reproduce and grow under the canopy in poor sunlight conditions. These species replace less shade-tolerant species during succession. In Stillwater State Forest, shade-tolerant species generally include subalpine fir, grand fir, Douglas-fir, Engelmann spruce, and western red cedar.

### Siltation

The process of very fine particles of soil (silt) settling. This may occur in streams or from runoff. An example would be the silt build-up left after a puddle evaporates.

### **Silviculture**

The art and science of managing the establishment, composition, and growth of forests to accomplish specific objectives.

### **Site preparation**

A hand or mechanized manipulation of a harvested site to enhance the success of regeneration. Treatments are intended to modify the soil, litter, and vegetation to create microclimate conditions conducive to the establishment and growth of desired tree species.

### **Slash**

Branches, tree tops, and cull trees left on the ground following a harvest.

### **Snag**

A standing dead tree or the remaining portion of a broken-off tree. Snags may provide feeding and/or nesting sites for wildlife.

### **Snow intercept**

The action of trees and other plants in catching falling snow and preventing it from reaching the ground.

### **Spur roads**

Low standard roads, constructed to meet minimum requirements for harvest-related traffic.

### **Stand**

An aggregation of trees occupying a specific area that are sufficiently uniform in composition, age arrangement, and condition so as to be distinguishable from the adjoining forest.

### **Stand density**

Number of trees per acre.

### **Stocking**

The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard, which is an estimate of either the basal area or number of trees per acre required to fully use the growth potential of the land.

### **Stream gradient**

The slope of a stream along its course, usually expressed in percentage, indicating the amount of drop per 100 feet.

### **Stumpage**

The value of standing trees in the forest. Sometimes used to mean the commercial value of standing trees.

### **Substrate scoring**

Rating of streambed particle sizes.

### **Succession**

The natural series of replacement of one plant (and animal) community by another over time in the absence of disturbance.

### **Suppressed**

The condition of a tree characterized by a low-growth rate and low vigor due to competition.

### **Temporary road**

Roads built to the minimal standards necessary to prevent impacts to water quality and provide a safe and efficient route to remove logs from the timber sale area. Following logging operations, reclamation would incorporate the following concepts to discourage future motorized use of the roads:

- Segments near the beginning of the new temporary road systems would be reshaped to their natural contours and reclaimed for approximately 200 feet by grass seeding and strewing slash and debris.
- The reclamation of the remaining road would include a combination of ripping or mechanically loosening the surface soils on the road, removing culverts or bridges that were installed, spreading forest debris along portions of the road, and allowing the surface to revegetate naturally.

### **Texture**

A term used in visual assessments

indicating distinctive or identifying features of the landscape, depending on distance.

#### Thermal cover

For white-tailed deer, thermal cover has 70 percent or more coniferous canopy closure at least 20 feet above the ground, generally requiring trees to be 40 feet or taller.

For elk and mule deer, thermal cover has 50 percent or more coniferous canopy closure at least 20 feet above the ground, generally requiring trees to be 40 feet or taller.

#### Timber-harvesting activities

Refers to all the activities conducted to facilitate timber removal before, during, and after the timber is removed. These activities may include any or all of the following:

- felling standing trees and bucking these trees into logs;
- skidding logs to a landing;
- processing, sorting, and loading logs onto trucks at the landing;
- hauling logs by truck to a mill;
- slashing and sanitizing residual vegetation damaged during logging;
- machine piling logging slash;
- burning logging slash;
- scarifying and preparing the site for planting; and
- planting trees.

#### Transaction evidence equation

Multivariant regression based on past sales and market variables.

#### Understory

The trees and other woody species growing under a, more or less, continuous cover of branches and foliage formed collectively by the overstory of adjacent trees and other woody growth.

#### Uneven-aged stand

Various ages and sizes of trees growing together on a uniform site.

#### Ungulates

Hoofed animals, such as mule deer, white-tailed deer, elk, and moose, that are mostly herbivorous and many are horned or antlered.

#### Vigor

The degree of health and growth of a tree or stand of trees.

#### Watershed

The region or area drained by a river or other body of water.

#### Water yield

The average annual runoff for a particular watershed expressed in acre-feet.

#### Water yield increase

Due to forest canopy removal, an increase in the average annual runoff over natural conditions.

#### Windthrow

A tree pushed over by wind. Windthrows (blowdowns) are common among shallow-rooted species and in areas where cutting or natural disturbances have reduced the density of a stand so that individual trees remain unprotected from the force of the wind.



**DOG/MEADOW TIMBER SALE PROJECT**  
**ENVIRONMENTAL ASSESSMENT**  
**ACRONYMS**

ARM	Administrative Rules of Montana	Land Board	Board of Land Commissioners
BMP	Best Management Practices	MBF	thousand board feet
BMU	Bear Management Unit	MCA	Montana Codes Annotated
dbh	diameter at breast height	MEPA	Montana Environmental Policy Act
DEQ	Department of Environmental Quality	MMBF	million board feet
DFWP	Montana Department of Fish, Wildlife and Parks	NCDE	Northern Continental Divide Ecosystem
DNRC	Department of Natural Resources and Conservation	NWLO	Northwestern Land Office
EA	Environmental Assessment	SFLMP	State Forest Land Management Plan
ECA	equivalent clearcut acres	SLI	stand-level inventory
EIS	Environmental Impact Statement	SMZ	streamside management zone
FI	forest improvement	TMDL	total maximum daily load
FNF	Flathead National Forest	USFS	United States Forest Service
ID Team	Interdisciplinary Team	USFWS	United States Fish and Wildlife Service
124 Permit	Stream Protection Act Permit		
3A Permit	Authorization A - Short-term Exemption from Montana's Surface Water Quality Standards		



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