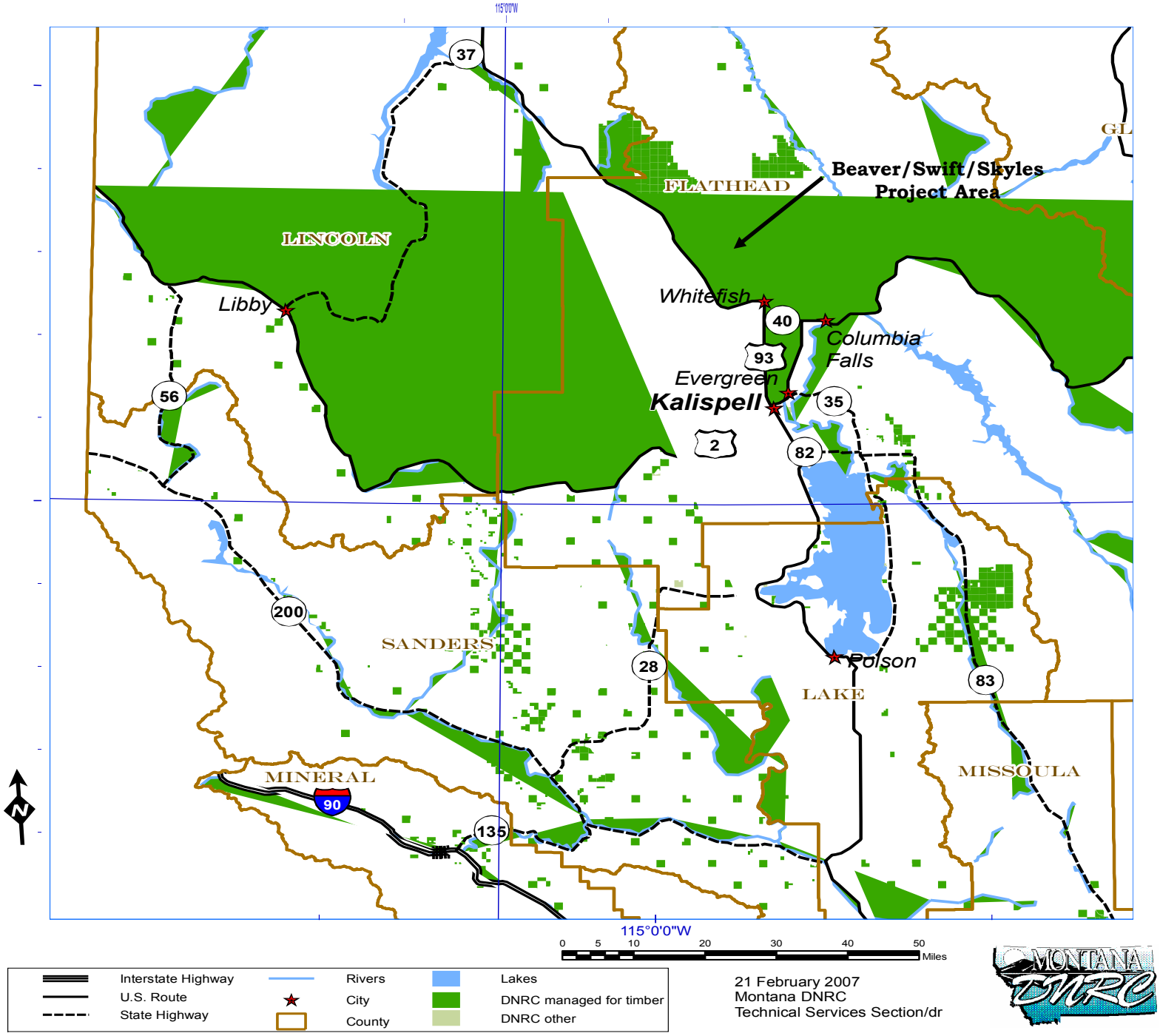
Beaver/Swift/Skyles Timber Sale Project

Environmental Assessment

April 2009

Department of Natural Resources and Conservation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37
FLATHEAD
Beaver/Swift/Skyles
Project Area
GL
LINCOLN
Libby
Whitefish
40
Columbia
Falls
93
Evergreen
Kalispell
35
56
2
82
200
SANDERS
28
Polson
LAKE
83
MISSOULA
MINERAL
90
135
N
115°0'0"W
0 5 10 20 30 40 50
Miles
Interstate Highway
U.S. Route
State Highway
Rivers
City
County
Lakes
DNRC managed for timber
DNRC other
21 February 2007
Montana DNRC
Technical Services Section/dr
MONTANA
DNRC

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CHAPTER I
PURPOSE AND NEED

PROPOSED ACTION

DNRC's Stillwater Unit and Kalispell Unit, are proposing the Beaver/Swift/Skyles Timber Sale Project. The project area is located within 3 geographic areas as shown on the Vicinity Map (inside of front cover) and with the following legal descriptions:

Beaver Area – Sections 7, 8, 16, 17, 18, 19, and 20, Township 31 north, Range 22 west

Swift Area – Sections 29, 32, and 33, Township 32 north, Range 22 west

Skyles Area – Section 33, Township 31 north, Range 22 west

The gross project area encompasses approximately 5,570 acres and the lands involved in this project are held in trust for the Common School, Montana Tech School of Mines, Montana State University Agricultural College, School for the Deaf and Blind, State Normal Schools, Public Buildings, and Montana State University Morrill beneficiaries.

Two alternatives, an action and a no-action, are being analyzed. If the action alternative was selected, 5 MMbf of timber would be harvested from approximately 832 acres. A combination of regeneration and intermediate harvest treatments would be applied. All haul roads would require necessary maintenance and improvements to ensure compliance with BMPs. Approximately 3.5 miles of temporary road would be constructed to access the harvest areas; these roads would be reclaimed to near-natural contours following use.

PURPOSE OF PROPOSED ACTION

The lands involved in the proposed action 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, MCA*).

DNRC began implementing the *SFLMP* on June 17, 1996. On March 13, 2003, DNRC adopted Forest Management Rules) (*Administrative Rules of Montana [ARM] 36.11.401* through *456*). The SFLMP outlines DNRC's management philosophy, and the Forest Management Rules contain specific management requirements. The SFLMP philosophy is:

> *"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."*

OBJECTIVES OF PROPOSED ACTION

In alignment with the management philosophy of the SFLMP and in compliance with the Forest Management Rules, DNRC has set the following specific project objectives:

- Harvest 2 to 5 MMbf of sawtimber to generate revenue for the appropriate school trusts and to contribute to the sustainable yield for the DNRC timber-management program, as mandated by *State Statute 77-5-222, MCA*.
- Regenerate new stands of healthy trees, improve the growth and vigor of retained trees, reduce fire hazards, and maintain and improve the transportation system.
- Promote biodiversity by managing for appropriate stand structures and species compositions.
- Complete site improvements on existing roads to improve drainage, water quality, and safety.
- Promote long-term water quality and soil conservation during logging and road-construction operations by applying BMPs.

ENVIRONMENTAL ASSESSMENT PROCESS

DEVELOPMENT

This EA was prepared in compliance with the *Montana Environmental Policy Act (MEPA) of 1971* (*75-1-101* through *75-1-324, MCA*) and *DNRC Procedural Rules (ARM 36.2.521* through *543*).

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 use interdisciplinary planning and consider environmental effects in its decisionmaking process.

DNRC Procedural Rules are specific legal requirements under which DNRC interprets and implements MEPA. DNRC is required to conform to the *Procedural Rules* prior to reaching a final decision on a proposed action.

PUBLIC SCOPING AND PUBLIC INVOLVEMENT

The public scoping process, which begins during the initial stage of an EA, is used to inform the public that a state agency is proposing an action. The public has the opportunity to express their comments or concerns about the possible effects of the project.

In June 2007, DNRC initiated the public scoping process for this project by placing notices in the *Whitefish Pilot* and sending the Initial Proposal Newsletter with maps to neighboring landowners, and additional individuals, agencies, industry representatives, and other organizations that have expressed interest in Stillwater State Forest's management activities.

The scoping period was open for 31 days. Public input included 25 letters and e-mails, and 1 phone call. Five field tours that included 5 public participants were held during this period.

The issues and concerns identified through public scoping were summarized and a follow-up letter on the scoping results was sent to those groups and individuals that commented; this letter was to ensure we understood the issues that would be carried forward.

During this period of refining issues, several more discussions (meetings) and field tours were conducted.

- One meeting and tour involved an individual interested in ensuring impacts to disc golf would be minimized. DNRC described the purpose of Land Use Licenses for these types of activities, as well as the process to acquire this License.
- Several meetings and field tours were conducted with the Whitefish City Recreation Director and Trail project committee members.
- Several other meetings and field tours involved a group that included a consulting forester. This group's focus is with the implementation of the Whitefish Neighborhood Plan. In April 2008, while the ID Team was in the alternative development phase of the MEPA process, this group submitted a set of comments. These comments included questions and additional mitigation measures or design criteria that could be incorporated into the project; developing an additional alternative was also suggested. The comments were closely considered to determine to what degree the design or mitigation measures had already been incorporated into, or would meet the purpose and need of, the proposed action. The ID Team determined that many of the suggestions had already been incorporated into the project to varying degrees and suggested that development of an additional alternative was not warranted; the decisionmakers for the project concurred. The ID Team sent a response to this group detailing how and where their suggestions had been incorporated into the project design, as well as the reasons some of their suggestions were not adopted.

A second newsletter was sent out in August 2008 to inform the public on the status of the project. Three people had questions about specifics related to the proposed action. One set of comments that requested more than one alternative be developed and analyzed was also received. Since alternative development had been addressed earlier, the ID Team stated they would proceed with a single action alternative.

Several additional meetings were conducted in Whitefish in November and December of 2008 and February of 2009 to address concerns of the potential negative effects the project would have on the Whitefish Lake viewshed and provide information about the project. Mitigation measures designed into the project to address this concern, as well as the analysis tools that were being utilized were presented; question and answer periods were included. One of these meetings was presented to a small group of individuals that included property owners on Whitefish Lake, a representative of the tourist industry, a local member of the Montana House of Representatives, and employees of a local land and lumber company. Upon request, a meeting was presented as an informational workshop for the Whitefish City Council.

ID TEAM

As required by MEPA, DNRC assembled an ID Team to plan this project and analyze the potential environmental effects. This team is comprised of a wildlife biologist, a hydrologist, and several foresters. In the fall of 2006, the team began compiling issues and

gathering information related to the existing environmental conditions.

DECISIONS TO BE MADE

The following decisions are to be made as a result of this EA and will be incorporated into the *FINDING*.

- Do the alternatives presented meet the objectives?
- Would implementing the selected alternative cause significant effects on the human environment?
- Should an Environmental Impact Statement (EIS) be prepared?

OTHER EAs/EISs OR PLANS THAT INFLUENCE THE PROJECT PROPOSAL

Trail Runs Through It EA. DNRC. 2007

Boyle Lake/Railroad Tributary Streamside Management Zone Alternative Practice EA. DNRC. 2008

Whitefish Area Trust Lands Neighborhood Plan. 2004. This document is an addendum to the Flathead County and Whitefish City-County master plans.

OTHER AGENCIES WITH JURISDICTION/PERMIT REQUIREMENTS

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

A (*Short-Term Exemption from Montana's Surface Water Quality Standards (318 Authorization*), issued by the Department of Environmental Quality (DEQ), may be required if temporary activities, such as removing a culvert in a stream, would introduce sediment above natural levels into streams and if Montana Department of Fish, Wildlife and Parks (DFWP) recommends the license.

MONTANA/IDAHO AIRSHED GROUP

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

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

A *Site-specific Alternative Practice (ARM 36.11.310)* to the *SMZ Law (MCA 77-5-303(1))* is required. Mitigations have been designed to yard logs across a dry, snow-covered streambed. This site-specific plan demonstrates reasonable certainty that the proposed alternative practice would conserve the integrity of the SMZ and would not significantly diminish its function.

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

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. Such activities include the installation of a temporary bridge on Spur 16, as well as the removal of a culvert on an abandoned road near King Creek and rehabilitation of the site.

ISSUES STUDIED IN DETAIL AND ELIMINATED FROM FURTHER ANALYSIS

DNRC resource specialists, other agencies, and the public raised issues about the project's potential effects on the environment through the scoping process. Issues pertain to statements that raise concern about the potential impacts the project may have on various resources. The ID Team and decisionmakers determined which issues would be analyzed in detail and which would be eliminated from further analysis.

These issues were considered by DNRC in the development of project alternatives (see *CHAPTER II - ALTERNATIVES*). A summary of the issues studied in detail is presented by resource in *TABLE I-1 - SUMMARY AND TRACKING OF ISSUES STUDIED IN DETAIL*. Following the table is a list of issues that were eliminated from further study and the rationale for elimination.

TABLE I-1 – SUMMARY AND TRACKING OF ISSUES STUDIED IN DETAIL

RESOURCE AREA	ISSUE	WHERE ADDRESSED IN EA PACKAGE
Vegetation	Covertypes and age-class distributions may be affected by timber harvesting related to this and other timber-harvesting projects.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-3 to III-7
	Timber harvesting and road building in old-growth timber stands may affect the amount and distribution of old growth remaining on Stillwater Unit.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-7 to III-11
	Harvesting activities may affect old-growth attributes.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-7 to III-11
	Concern was expressed that the present timber stand species mixes and the level of mortality from insects and diseases present risks in terms of an increase in losses due to wildfire and a continued loss of sawlog value due to rot and firewood gathering.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-11 to III-14
	Soil disturbances and logging equipment could increase the amount and distribution of noxious weeds in the project area.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-16 to III-17
Forest fuels	Forest fuel loadings are at a high level, causing many areas to be susceptible to intense fires.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-15 to III-16
Water quality and water yield	Timber harvesting and road construction has the potential to increase water yield due to the amount of canopy removal, which, in turn, may affect Whitefish Lake.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-19 to III-30

RESOURCE AREA	ISSUE	WHERE ADDRESSED IN EA PACKAGE
Water quality and water yield (continued)	Timber-harvesting and road-construction activities may increase sediment delivery to streams and adversely affect water quality.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-19 to III-30
Fisheries	Timber-harvesting and road-construction activities may affect stream temperatures, stream shading, stream sediments, and recruitable large woody debris in fish-bearing streams.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-19 to III-30
Soils	Timber-harvesting activities may result in reduced soil productivity and increased erosion due to compaction and displacement,	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-36 to III-40
Recreation	The proposed action could disrupt recreation on the Disc Golf Course.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Page III-44
	Timber harvesting and slash cleanup may impact proposals such as the Trail project.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-43 to III-46
Economics	The proposed action may affect revenue generated for several school trust beneficiaries, funding for Forest Improvement (FI) projects, timber-related employment, and revenue generated in the regional economy.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-47 to III-50
Aesthetics	Activities associated with the proposed action may affect the visual quality as seen from several observation locations in the project area and from Whitefish Lake and Whitefish Mountain Resort.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-52 to III-61
Wildlife	Timber harvesting could reduce forested cover, reducing the amount of mature forested habitats available to those species that rely on these habitats and/or decrease the ability of some wildlife species to move through the landscape; this could alter their ability to use the area and or successfully reproduce.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-64 to III-67

RESOURCE AREA	ISSUE	WHERE ADDRESSED IN EA PACKAGE
Wildlife (continued)	Timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependent on these resources, which could alter their survival and/or reproductive ability.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-69 to III-71
	Timber harvesting and associated activities could alter cover, increase access, and reduce secure areas, which could adversely affect grizzly bears by displacing grizzly bears from important habitats and/or increasing the risk of human-caused mortality to bears.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-74 to III-80
	Timber harvesting may reduce the quality and quantity of pileated woodpecker nesting and feeding habitats.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-93 to III-96
	Timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-80 to III-83
	Timber harvesting and associated activities could reduce bald eagle nesting and perching habitats and/or disturb nesting bald eagles.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-83 to III-86
	Timber harvesting and associated activities could displace adult common loons from nest sites and/or disturb nesting loons, reducing loon productivity.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-86 to III-89
	Timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-89 to III-92

RESOURCE AREA	ISSUE	WHERE ADDRESSED IN EA PACKAGE
Wildlife (continued)	Timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests, resulting in increased mortality to pileated woodpecker chicks.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-93 to III-96
	Timber harvesting and associated activities could disturb Townsend's big-eared bats and/or cause abandonment of maternity roosts and/or hibernacula.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-96 to III-99
	Timber harvesting and associated activities could disturb nesting osprey and/or remove active nests, resulting in reduced productivity of osprey in the vicinity.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-99 to III-101
	Timber harvesting and associated activities could remove thermal cover on the big game winter range, which could reduce the carrying capacity of the winter range.	CHAPTER III—EXISTING ENVIRMENT AND ENVIRONMENTAL EFFECTS, Pages III-101 to III-104

ISSUES ELIMINATED FROM FURTHER ANALYSIS

Issue: The area around Murray Lake continues to be a place with litter, off-road vehicle use, and unattended campfires.

Rationale for eliminating the issue from further study: This project has no harvesting activities planned around Murray Lake. This issue is outside of the scope of a timber sale project and requires more widespread public involvement in how the area could be managed recreationally. DNRC has stepped up its involvement in the enforcement of recreational and fire issues with signage, increased patrols with DNRC fire crews, and support of a DFWP game warden whose position is funded by DNRC.

Issue: Log hauling on East Lakeshore Road can be a safety problem.

Rationale for eliminating the issue from further study: East Lakeshore Drive and DelRey Road are county roads; DNRC does not have jurisdiction on these roads. DNRC plans to restrict log hauling from this area to timeframes when the roads would not be snow-covered, as well as hours when commuter traffic is less, which would reduce the risk associated with icy road conditions. Signs signifying that *Log Trucks are Hauling*

would be installed as defined by the Flathead County Road Department.

Issue: Skid trails and low-standard roads may invite motorized use in areas where such use is unauthorized.

Rationale for eliminating the issue from further study: By project design, all new roads would meet DNRCs temporary road standards. These roads are designed to minimum standards to allow for safe hauling and use and to meet BMPs. Most roads would be open only to authorized personnel. Following site preparation, most segments of these roads would be reclaimed to near-natural conditions, which include recontouring those areas on steeper slopes.

Issue: DNRC should not enter into rights-of-way agreements with adjacent private landowners in the King Creek area if that would enable development of those adjacent lands.

Rationale for eliminating the issue from further study: In this proposal, DNRC is asking only for temporary access through private property for forest-management activities. If the adjacent landowners request additional rights-of-way or the State seeks permanent access rights across private property owners, the appropriate level of MEPA would be implemented at that time.

Issue: DNRC should develop a management plan for the area that, in addition to timber management, addresses recreation, development, transportation, etc.

Rationale for eliminating the issue from further study: This project was introduced in the Initial Proposal Newsletter as a timber sale proposal; a larger management plan is considered to be outside of the scope of this project. This MEPA document will address effects to other resources and activities such as recreation, but specific plans for those activities are not a part of this project.

CHAPTER II
ALTERNATIVES

INTRODUCTION

This chapter includes a description of the no-action and action alternatives, the history of alternative development, mitigations developed for the Action Alternative, and a summary of the predicted effects of implementing each alternative. *CHAPTER III – EXISTING ENVIRONMENT AND ENVIRONMENTAL EFFECTS* contains detailed environmental analyses.

ALTERNATIVE DEVELOPMENT

INTRODUCTION

The Beaver/Swift/Skyles Project area was initially listed on the *2005 List of Upcoming Timber Sales* for the Northwestern Land Office. The project area was identified for timber harvesting for various reasons, which include the need to address insect and disease issues and reduce both live and dead fuel loads around the Whitefish Area.

This proposed action has been designed to provide revenue to the various school trusts while maintaining a healthy, productive forest. As noted in *CHAPTER 1- PURPOSE AND NEED*, timber sales are designed under the management philosophy of the *SFLMP*, which includes managing for biodiversity at the landscape level. The landscape includes both Stillwater and Kalispell units. The *Forest Management Rules (ARM 36.11.401* through *36.11.456)* provide direction for conducting the analyses and designing and implementing the project. The project will also be conducted and coordinated as described in the *Whitefish Neighborhood Plan* under *Implementation Strategies*.

The Whitefish Neighborhood Plan acknowledges the responsibilities of DNRC to manage these lands for a sustainable supply of forest products and diverse habitat under the direction of the *SFLMP*, *Forest Management Rules*, and other laws pertaining to state lands. DNRC is incorporating community involvement, addressing fire-hazard concerns, and considering recreational use while developing this project, all of which are consistent with the Whitefish Neighborhood Plan.

The project area, comprised of more than 5,570 acres, is expected to produce a portion of the annual sale of forest products as required by the *State's Sustainable Yield Requirements* (*MCA 77-5-223*). While managing these lands, foresters must be mindful of *MCA 77-5-207*, the *Timber Salvage Program Law*. This law directs DNRC to harvest dead and dying timber before wood decay is substantial and value is lost.

PREPARATION AND DATA COLLECTION

Throughout 2006, 2007, and 2008, ID Team members and other DNRC personnel were involved in field work, analyzing data in the *Stand Level Inventory* (SLI) database, as well as utilizing computerized visual aid demonstrations. Field reconnaissance and data collection efforts were conducted in the project area for numerous resources including:

- existing roads to determine surface drainage, ditch-relief, stream crossing, and safety feature improvement needs;

- road access needs, including assessing feasible road locations and designs;
- timber-stands characteristics, noxious weeds, and sensitive plants;
- insect and disease problems;
- visual resources where photo points and observation points could be located;
- specific and general watershed characteristics;
- the presence of fisheries and various wildlife habitats;
- geology and soil features;
- public use; and
- fire history.

PROCESSES RELATED TO PUBLIC INVOLVEMENT

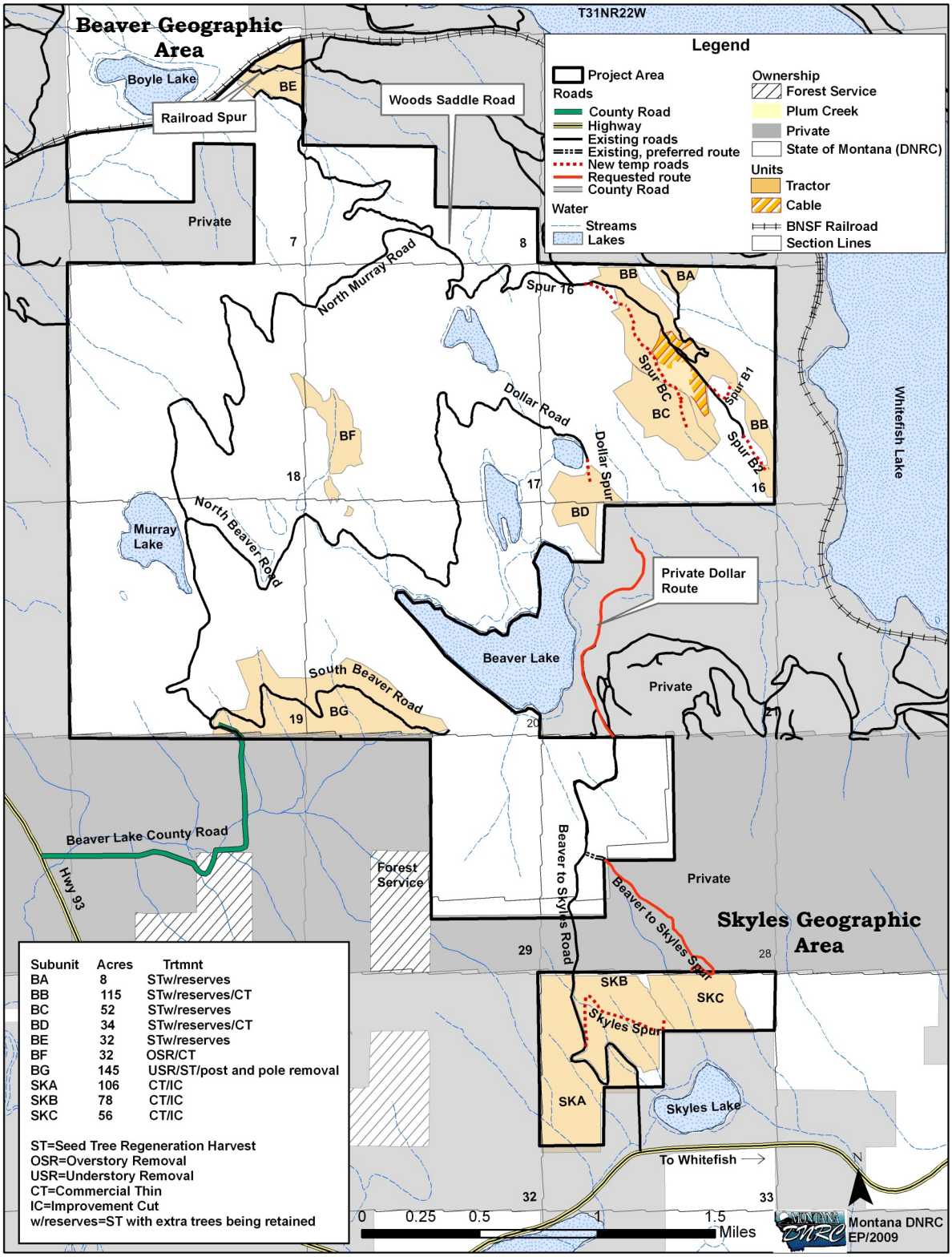
An action alternative was developed using this collected information and utilizing the comments received during the public scoping period, recommendations from a group of interested citizens that included a consulting forester, and ideas exchanged while working with the contracted trail designers of the Trail project.

The group of interested citizens working together presented the project leaders and decisionmakers with lists of questions and recommendations. The project leaders and ID Team members carefully considered the recommendations and used them to further refine the mitigations developed for the project. Recommendations used were those that the project leaders and ID Team determined to be potentially effective at reducing the effects of the proposed action while meeting the objectives listed in *CHAPTER 1 - PURPOSE AND NEED,* as well as the trust mandate.

Following are some recommendations the ID Team incorporated from the citizens group. (See *FIGURE II-1 - BEAVER AND SKLYES AREAS PROPOSED PROJECT MAP* and *FIGURE II-2 - SMITH LAKE AREA PROPOSED PROJECT MAP* for the proposed harvest locations, harvest treatments, and roads.)

- A cut-to-length operation utilizing a log forwarder would be required to minimize road construction. Harvest Area BF would require that a log-forwarder haul logs approximately 0.5 mile on an existing skid trail. This trail could not be easily reconstructed into a truck-haul road because of steep grades, tight turns, and its proximity to a small area with sensitive soils at its junction with North Beaver Road.
- The amount of commercial-thin and regeneration harvesting would be refined, and the amount of cable yarding would be reduced in Harvest Area BB, an area that faces Whitefish Lake. Approximately 55 percent of the area would be regenerated, 40 percent would be commercially thinned, and 5 percent would remain uncut to address visual concerns.
- The amount of harvesting in Harvest Area BB actually requiring cable logging has been reduced to approximately 22 acres in the 115-acre harvest area.
- Boundaries would be irregularly shaped.
- Extra trees would be retained along the existing and new roads to provide for visual screening.
- If feasible, topsoil would be removed and stockpiled on some landings where close-up views are likely. To help native grasses and vegetation establish more quickly, this material would be used to help reclaim the landing after slash piles are burned.

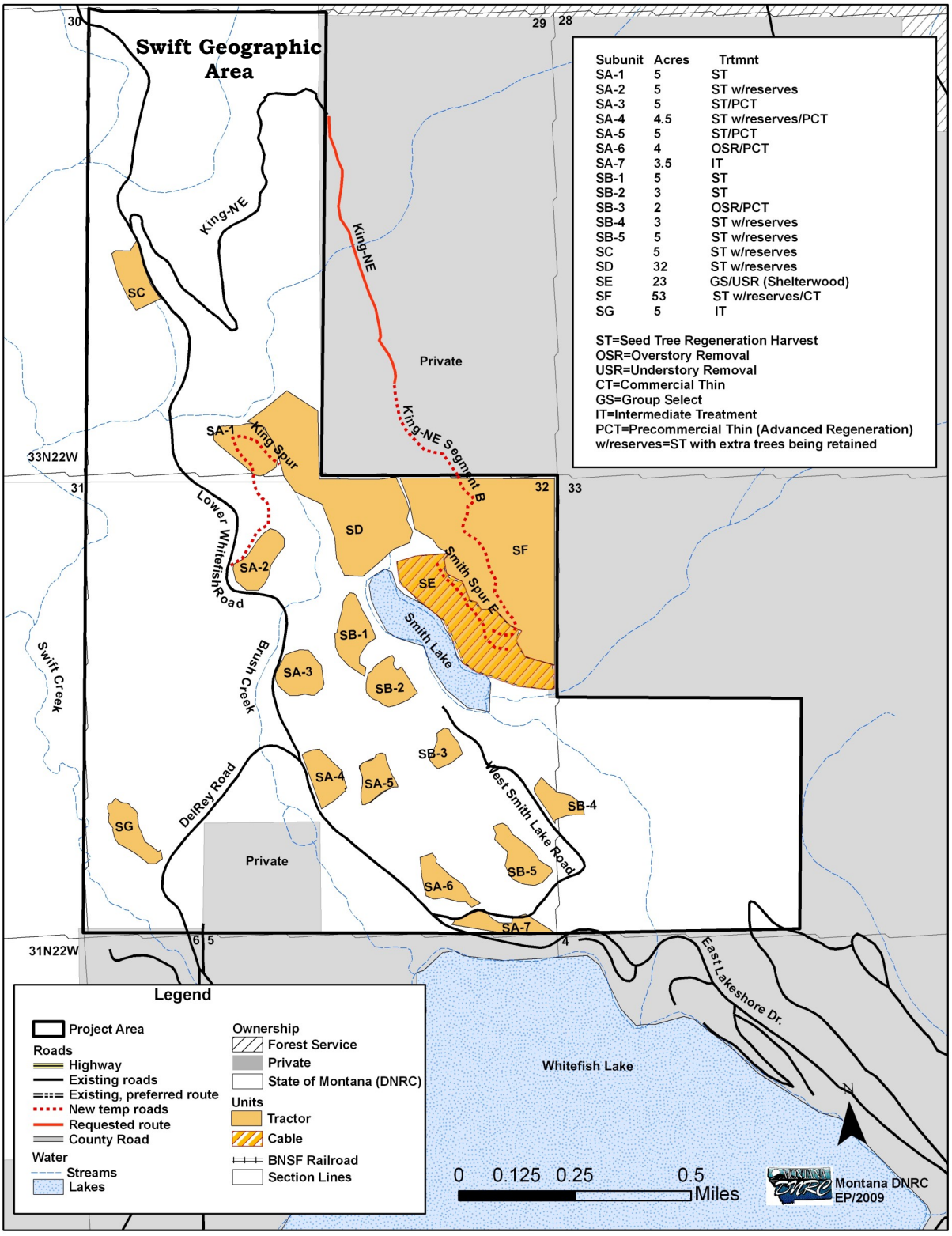
FIGURE II-1 - BEAVER AND SKLYES AREAS PROPOSED PROJECT MAP



Subunit	Acres	Trtmnt
BA	8	STw/reserves
BB	115	STw/reserves/CT
BC	52	STw/reserves
BD	34	STw/reserves/CT
BE	32	STw/reserves
BF	32	OSR/CT
BG	145	USR/ST/post and pole removal
SKA	106	CT/IC
SKB	78	CT/IC
SKC	56	CT/IC

ST=Seed Tree Regeneration Harvest
OSR=Overstory Removal
USR=Understory Removal
CT=Commercial Thin
IC=Improvement Cut
w/reserves=ST with extra trees being retained

FIGURE II-2 - SMITH LAKE AREA PROPOSED PROJECT MAP



- Temporary roads would be built to a minimum standard and most would be reclaimed to near-natural levels.

Project foresters also worked directly with a contracted landscape architect assigned to design the portion of the Trail project in the Skyles area. DNRC and the Trail design team worked out such details as:

- the portions of the spur road that would fit into the trail system;
- the trees that would be retained to give the trail character; and
- an agreement to harvest during winter to reduce impacts that tend to occur while harvesting during the summer period, such as more-defined skid trails.

Suggestions were also made that DNRC incorporate more fuels management into several additional areas in the project area. Some of these areas have been harvested in the past 10 years; therefore, the volume or value is not adequate to cover the expenses of thinning and fuels-reduction treatments. As other avenues or grants become available to fund these types of treatments, DRNC would propose further actions.

Some of the public gave consideration to implementing an option available through *77 -5-20 MCA - Conservation License in Lieu of Timber Sale*. This license allows the applicant to bid for the alternative of not conducting the proposed timber harvest while the sale is out for bid by those interested in purchasing and harvesting the stumpage for sawlogs. Although a letter of intent was submitted, no application followed, and the timeline has been exceeded for an application to be considered according to *ARM 36.11.452 – Timber Conservation License Application Conditions and Forms*.

PROJECT DESIGN CONCEPTS

Several key concepts used in developing this timber sale project in the Beaver, Swift, and Skyles project areas included the prioritization of timber stands for harvesting, transportation planning, and development of mitigations to reduce some resource impacts. The discussion of these concepts follows.

➢ **Stand Prioritization**

Stands were prioritized for treatment based on:

- Insect and disease issues: The Douglas-fir beetle has killed or is killing the larger-diameter Douglas-fir; a combination of larch mistletoe, drought, and wood-boring insects are killing merchantable western larch; and fir engraver (*Scolytus)* insects has killed stands of grand fir.
- Stocking densities: The high number of trees per acre has created overcrowded stand conditions and, over time, the amount of live crown on individual trees has been reduced, making the stands less productive. The harvest prescriptions would focus on leaving trees with live crown ratios greater than 40 percent; therefore, many stands or portions of stands would benefit with increased vigor and productivity due to a reduction in competition for light, moisture, and nutrients.
- Minimizing future impacts to proposed trail locations: The Trail project proposal is located within 3 main areas. Those main areas include Harvest Areas SKA, SKB, SKC, BF, and BG. These areas would be harvested with a high consideration for fuels reduction, aesthetics, and timber-stand improvement; these stands would be

left in such condition that future disturbance to recreation from timber management would be minimal over the next 20 years.

- **Transportation Development**

  The development of a transportation plan for the Beaver/Swift/Skyles Project is a major function of forest management in this area. Transportation planning for this project includes:

  - Assessment of existing road locations and standards: Roads are reviewed to see if they meet BMPs, if the standard is suitable for this proposal and future uses, and what improvements would be required to meet safety concerns and BMPs.
  - Road development to access state land for continued forest management: Areas of the forest are not accessible with ground-based or skyline harvest systems. DNRC would minimize and optimize the amount and locations of roads across the landscape to reach these areas.
  - Access to areas where DNRC does not have easements through private ownership: DNRC is able to access all State ownership in the Beaver/Swift/ Skyles Project area, but the use of private roads would help minimize the impacts that would be expected if the roads were on state land only. To date, permission to use several private roads has not been confirmed.

MITIGATIONS APPLIED DURING PROJECT DESIGN

To accomplish the various elements of the proposed project, certain mitigation measures were designed into the project. Mitigation measures are designed to reduce impacts and protect resources during harvesting and road-improvement activities. Many of the listed mitigations are written into the *Forest Management Rules*, others were adopted through public involvement, as noted above, or have been utilized with desired results by DNRC in similar projects. For a more complete list of mitigations, refer to *STIPULATIONS AND SPECIFICATIONS*. The following is a brief list of mitigations that address some issues involved in this project.

- ***ACCESS AND ROADS***
  - A gate that was vandalized and rendered useless in the northeast quarter of Section 17, T31N, R22W, would be repaired; this gate would once more restrict nonauthorized motorized use.
  - A temporary bridge would be installed on the stream south of Harvest Area BA; the bridge would be removed following harvesting activities.
  - Temporary roads would be restricted to administrative use only.
  - Many of the temporary roads would be reclaimed to near-natural levels following the sale.

➢ ***AESTHETICS***

- The size and number of landings would be limited; landings in the area of DelRey Road would be located off the road in an area with limited visibility.
- DNRC would promote use of logging slash for biomass through the Timber Sale Contract bidding process.
- Unburned portions of landings would be buried or rebunched and burned. Some landings would have topsoil redistributed over the site to improve the regrowth of native grasses and vegetation.
- In most harvest areas, trees of all diameter size classes and species would be retained. To help provide structure or different forest levels (overstory, mid-story, and understory) for the near term as well as the long term, retention trees would generally be the healthiest trees with full crowns, although wildlife trees and snags would also be retained. In harvest areas around Smith Lake and DelRey Road and in Section 16 of Beaver, extra trees would be left near the unit boundary to help feather the edges and reduce the impacts of harvesting.
- Some harvest areas would have designated 'uncut' areas; most areas would have trees remaining in clumps or groups. These, along with strips of small trees along roads, would help reduce sight distance into the harvest areas.
- Where possible, temporary roads would be located on breaks to limit steep sideslopes so that cuts and fills would be less visible.
- Extra trees would be retained beneath Spur BC, the temporary road facing Whitefish Lake; the crowns of the trees would help reduce the visibility of the road.
- In areas where cable logging is required, the width of the cable corridor would be limited and a minimum distance between corridors would be required; this reduces the amount and visibility of corridors in the harvest areas.
- Landings in Harvest Area BC would be located on the west side of the ridge, beyond sight from Whitefish Lake.
- The temporary roads would be reclaimed after site preparation. *TABLE II-1 - ROADS* describes the reclamation levels of the temporary roads.
- Disturbed soil sites along road right-of-ways would be grass seeded.
- Within the stand that encompasses Harvest Areas SA1 through SA7, SB1, and SB2, an average of 10 or more trees per acre would be retained.

TABLE II-1 - ROADS

ROAD	ROAD LENGTH (miles)	STANDARD OF ROAD	DISCUSSION
BEAVER GEOGRAPHIC AREA			
North Beaver Road	1.0	Existing road	Maintenance
North Murray Road	3.2	Existing road	Maintenance
Woods Saddle Road	1.3	Existing road	Maintenance/reinstall gate
Spur 16	1.8	Existing road	Heavy maintenance, BMP improvements, and temporary bridge installation
Spur BC	0.8	New, temporary road	This road would be rendered undriveable upon completion of harvesting activities; portions of the road prism would remain in place.
Spur B1	0.2	New, temporary	This road was built to facilitate cable and winch-line harvesting. The road would be reclaimed to near-natural levels.
Spur B2	0.2	New, temporary	This road would be reclaimed to near-natural levels.
Private Dollar Route – Segment A	1.0	Existing	This private road is the preferred access.
Private Dollar Route – Segment B	0.25	Existing low-standard road/ trail	This route is the preferred access through private property; the road would be reclaimed as owner designates.
Dollar Spur	0.2	Reconstruction	Reconstruction and reclamation would occur only if preferred access through private is not granted.
Dollar Spur	0.1	Temporary	This road would be used if private access is not granted.
North Beaver	2.9	Existing road	This segment is from its junction with North Murray Road. If this road is used for log hauling, maintenance would take place.
Spur BF	1.0	Reconstruction into log-forwarder trail	This existing road is not suitable for standard log truck traffic. The forwarder trail would not be accessible to motorized traffic following slash disposal and site-preparation work.
South Beaver	1.8	Existing road	Maintenance

ROAD	ROAD LENGTH (miles)	STANDARD OF ROAD	DISCUSSION
SKYLES GEOGRAPHIC AREA			
Skyles Spur	0.9	New, temporary	The road would be rendered undriveable. Portions may be used for future Trail system.
Beaver-to-Skyles	2.6	Existing	Reciprocal access road.
Beaver-to-Skyles Spur	1.2	Existing	Preferred route through private.
SWIFT GEOGRAPHIC AREA			
West Smith Lake Road	0.8	Reconstruction	Reconstruct intersection, add parking area, perform BMPs, terminate road near south end of lake, change remainder of road into the trail.
Lower Whitefish	1.3	Existing road	Maintenance
King Spur	0.25	Temporary	Built to facilitate the harvesting of Harvest Area SD. The road would be reclaimed to near-natural levels.
King-NE Smith – Segment A	1.8	Existing	This route involves access through private property avoids use of stream crossings where BMPs may be difficult to achieve and, therefore, is preferable.
King-NE Smith – Segment B	0.75	New, temporary	This route which involves access through private property, avoids use of stream crossings where BMPs may be difficult to achieve and, therefore, is preferable.
Smith Spur E	0.3	New, temporary	Road would be reclaimed to near-natural levels.

- ***NOXIOUS WEED MANAGEMENT***
  - All tracked and off-road wheeled equipment would be cleaned of noxious weeds prior to beginning project operations. The contract-administrating officer would inspect equipment periodically during project implementation.
  - Prompt vegetation seeding (with a native grass seed mix) of disturbed roadside sites would be required. Roads used and closed as part of this proposal would be reshaped and seeded.
  - DNRC foresters shall monitor the project area for weeds and strive to contain and suppress Category 2 weeds, such as orange hawkweed and tansy ragwort.
- ***OLD GROWTH AND TIMBER STAND STRUCTURAL DIVERSITY***
  - Old growth, as defined by DNRC, would be maintained on the timber stand that consists of Harvest Areas SA1 through SA7, SB1, and SB2.
  - Trees of all size classes would be retained; where openings are created, sites for new regeneration would be provided. Fire, aesthetic, and

recreation issues would be considered when retaining large woody debris in the harvest areas.

- Snags would be retained as directed in the *Forest Management Rules* and as described under *ALTERNATIVE DESCRIPTIONS* in this chapter.
- Certain portions in the harvest areas would be left uncut; these areas may include large healthy trees, snag patches, small healthy trees, rocky outcrops, SMZs, small wetlands, etc.

➢ ***RECREATION***

- Several areas tributary to the proposed Trail system would be harvested at this time; thus, activity would occur now, but a long rest period or interval would take place before future disturbance would again be made to those areas affecting the Trail system.
- Treating the forest fuels would lower the risk of fire starts along the trail and in other areas from general recreationists.
- Some stand structure, including trees of all size classes and species, would be retained throughout these areas.
- Harvesting and roadwork activities in the Smith Lake area would begin in the fall to limit disruption of recreationists at the Disc Golf Course near Smith Lake.
- More parking and safer access would be provided to the west side of Smith Lake

➢ ***WATERSHED AND FISHERIES***

- SMZs and Riparian Management Zones (RMZs) would be defined along streams, lakes, and/or wetlands in or adjacent to the harvest areas.
- Most temporary roads would be reclaimed to near-natural levels following timber-harvesting activities.
- All applicable *BMPs*, including the SMZ *Law and Rules*, and *Forest Management Rules* would be applied for fisheries, soils, and wetland RMZ (*ARMs 36.11.425* and *36.11.426*).
- The *SMZ Alternative Practice* would be implemented on activities in Harvest Area BE.
- All road-stream crossings have been, and will continue to be, monitored for sedimentation and road-prism deterioration.
- One old existing culvert on the abandoned King Creek Road would be pulled and the site would be reclaimed with rock and grasses.
- The BMP audit process will continue. One of the sold timber sales from this project would likely be reviewed in an internal audit, and may be picked at random as a statewide audit site.

➢ ***WILDLIFE***

- Visual screening would be provided along open roads.
- Harvesting activities would be restricted as specified in *Forest Management Rules for Bald Eagle*s.
- New haul roads would be closed effectively following harvesting and site preparation.
- Access would be restricted on new temporary roads to administrative use only.

- Retention and future recruitment of snags would be planned.
- Activities would be minimized within 500 feet of the tunnel opening to reduce disturbance to bats.
- Activities would be restricted around the osprey nest during the nesting season.

ALTERNATIVE DESCRIPTIONS

The No-Action and Action alternatives are described in this section. The decisionmaker may select a modification or combination of these alternatives.

- ***Description of the No-Action Alternative***

  No timber harvesting, improvements to existing roads, or revenue generation for the school trust would take place in the area of the Beaver/Swift/ Skyles Timber Sale Project at this time. Salvage logging, firewood gathering, recreational use, fire suppression, noxious weed control, and other ongoing forest-improvement management activities may occur.

  Nonpoint-source sediment delivery (sediment that cannot be traced back to a single origin or source) from roads not fully meeting BMPs may occur.

  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.

  Future proposed management activities, including timber harvesting, Land Use License requests, and easements would go through the appropriate environmental analyses before implementation.

  This alternative can be used as a baseline for comparing the effects that the Action Alternative would have on the environment. The No-Action Alternative is considered a possible alternative for selection.

- ***Description of the Action Alternative***

  The ID Team developed strategies for harvesting timber within the framework of the *SFLMP* and the *Forest Management Rules*. Opportunities for harvesting timber were 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.

  The following sections describe the prescriptions as they relate to timber management and are followed by *ROADS AND ACCESS*.

  - **Timber-Management Activities**

    Under this alternative, approximately 5 MMbf would be harvested from an estimated 832 acres using a combination of harvest treatments and both skyline and ground-based harvest systems. *FIGURE II-1 - BEAVER AND SKLYES AREAS PROPOSED PROJECT MAP* and *FIGURE II-2 - SMITH LAKE AREA PROPOSED PROJECT MAP* display the proposed harvest locations, harvest treatments, and roads.

    Several types of harvest treatments would be used to meet the described management objectives. A variation of silvicultural prescriptions across the

landscape would emulate the effects of mixed-severity fires.

The preferred tree species for retention would be disease-free western white pine, western larch, ponderosa pine, and Douglas-fir. All species, including grand fir, lodgepole pine, and Engelmann spruce, would be naturally regenerated or planted.

For the regeneration prescriptions specifying reserve trees, extra trees would remain individually or in clumps in the harvest unit. Reserve trees would include existing snags, extra seedtrees, 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.

Where available, 2 snags and 2 live recruitment trees greater than 21 inches diameter at breast high (dbh) per acre would be left as wildlife trees. When 21 inch trees are not available, the next size class trees would be left. In some harvest areas, the snags and recruitment trees may be left in groups or in special leave areas, such as SMZs. If 2 snags cannot be found, up to 4 live recruitment trees would be left.

In compliance with the *Montana SMZ Law*, limited selective harvesting of individual trees may occur in SMZs. Harvesting in SMZs is planned for Harvest Areas SD and SE around Smith Lake; SA1 and SD around King Creek; BD around Dollar Lake; and around an unnamed creek and drainage ditch in Harvest Area BE. Depending on an area's timber and hydrologic characteristics, harvesting in SMZs would be determined on a case-by-case basis around springs, wetlands, and Smith Lake. An *Alternative Practice to the SMZ Law* would be implemented to allow crossing the frozen and dry creek bed in Harvest Area BE.

In areas planned for regeneration, sapling-sized trees of low vigor that remain after the harvesting of sawlogs would be fallen or cut. These trees and excess logging slash would be piled or trampled and up to 30 percent of the area would be disturbed with an excavator or dozer in order to have enough exposed soil to regenerate seedlings. This is the fuels reduction and site preparation phase of FI practices.

The proposed treatments would leave approximately 8 to 15 tons of large woody debris per acre; large woody debris is material greater than 3 inches in diameter. This debris would be spread across the harvest area and would ensure the *Hazard Reduction Law (76-13-401* through *76-13-424, MCA)* is met; this also means that those areas harvested within 1,000 feet of a structure would meet the *High Hazard Standards* of the *Hazard Reduction Law*. The *High Hazard Standard* requires the removal of 90 percent of the slash along the unit boundary within the 1,000 feet of a structure. Grants are being sought by the community of Whitefish for fuels-reduction projects. If the community is awarded these grants, some site-specific projects associated

with this alternative may be considered for additional fuels reduction.

Slash generated from harvesting may be collected, ground, or chipped and utilized as biomass. If not utilized this way, the slash may be piled in either large landing piles or smaller piles throughout the harvest areas and burned during periods when air-quality standards can be met.

TABLE II-2 - PROPOSED PRESCRIPTIONS FOR THE BEAVER/ SWIFT/SKYLES TIMBER SALE PROPOSAL displays the harvest areas and their associated harvest treatments and harvest systems.

Harvest Treatments

Seedtree with reserves - This treatment would regenerate portions of the unit by cutting all merchantable timber with the exception of 6 to 10 of the larger-diameter western larch, Douglas-fir, and ponderosa pine per acre. The selected leave trees would show the most vigor, contain the healthiest crowns, and have the potential to produce healthy cone crops. Additional reserve trees would also be retained.

Shelterwood with reserves - As with the seedtree harvest, 6 to 10 larger-diameter seed-bearing trees would be retained, as well as an additional 10 to 20 vigorous trees of all size classes. The function of these trees provides additional shade to small trees, a feather effect of the harvested areas into areas not harvested, or future crop trees. Additional reserve trees would also be retained.

Commercial thin - To reduce the stocking density and improve growth rates and vigor, 40 to 60 percent of the existing upper and middle stories would be harvested. The residual stand would consist of the most vigorous and, generally, largest-diameter trees currently on site. Additional reserve trees would also be retained.

Improvement harvest - Cuts made to improve the form, quality, health, or wildlife potential of the remaining stand.

Overstory removal - Harvesting of many of the larger trees in a stand where there is a viable and vigorous understory of small trees. Additional reserve trees would also be retained.

Combination treatments (seedtree or shelterwood with reserves, commercial thin, and/or improvement harvests) - This treatment would vary across a harvest unit, depending on stand conditions. Varying the prescription across the unit would help break up openings and create shapes that are more irregular to emulate the variation of natural disturbances across the landscape.

TABLE II-2 - PROPOSED PRESCRIPTIONS FOR THE BEAVER SWIFT SKYLES TIMBER SALE PROPOSAL

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)*	HARVEST PARTICULARS	FOLLOW-UP TREATMENTS
SWIFT GEOGRAPHIC AREA				
SA1 through SA7	With the exception of 1 defensible-space harvest treatment, all harvest areas would be harvested using a combination of regeneration harvest treatments (such as seedtree with reserves, shelterwood with extra trees reserved, or overstory-removal treatment with thinning of the understory).	30/500	– A 115-acre stand includes 7 harvest units, ranging from 3 to 5 acres in size. With the exception of the defensible space area, where 25 to 50 trees per acre would remain, these harvests areas would use a combination of harvest prescriptions – The edges of harvest areas would be feathered. – Scattered salvage would take place between the small harvest areas. – Landings would be located away from DelRey Road.	– Some advanced regeneration would be retained and thinned. – Submerchantable trees with low vigor would be removed. – Slash would be piled and burned. – The area would be mechanically site prepped. – Ponderosa pine and western larch would be interplanted, and western white pine would be interplanted where feasible.
SB1 through SB5	A combination of regeneration harvests and overstory removal.	30/275	– A 94-acre area includes 5 harvest areas, ranging from 3 to 6 acres in size. – Numerous existing, 2-track trails used by motorized vehicles would be closed with various methods; the intent is to make the trails useable for nonmotorized traffic only.	– Some advanced regeneration would be retained. – Submerchantable trees with low vigor would be removed. – Slash would be piled and burned. – The area would be mechanically site prepped. – Ponderosa pine and western larch would be interplanted, and western white pine would be interplanted where feasible.

*Mbf - thousand board feet

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)	HARVEST PARTICULARS	FOLLOW-UP TREATMENTS
SC	Regeneration	5/30	A seedtree with reserves harvest prescription would be used.	– Submerchantable trees with low vigor would be removed; slash would be piled and burned. – The area would be mechanically site prepped. – Ponderosa pine and western larch would be interplanted, and western white pine would be interplanted where feasible.
SD	Regeneration	32/350	– The primary prescription is seedtree with reserves; the southwest exposures would be left at a shelterwood spacing (15 to 30 trees per acre). – Retaining snags in groups or clusters would be considered.	– Submerchantable trees with low vigor would be removed and slash would be piled and burned. – The area would be mechanically site prepped. – Ponderosa pine and western larch would be interplanted, and western white pine would be interplanted where feasible.
SE	Improvement Cut	23/270	– Primarily, the large-diameter ponderosa pine and a few healthy western larch and Douglas-fir would be retained as overstory. The unit would likely change to a ponderosa pine covertype. – The SMZ would receive minor harvesting. – Skyline cable logging would be employed.	– Slash would be yarded to skidding/ yarding trails, piled, and burned. – Ponderosa pine would be planted in openings.

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)	HARVEST PARTICULARS	FOLLOW-UP TREATMENTS
SF	Combination regeneration and commercial thin	53/500	Approximately 30 percent of area would be commercially thinned, 65 percent would receive a seedtree/shelterwood with reserves regeneration harvest, and 5 percent, especially in SMZs, would likely be retained in small pockets.	– Submerchantable trees with low vigor would be removed and slash would be piled and burned. – The area would be mechanically site prepped. – Ponderosa pine and western larch would be interplanted, and western white pine would be interplanted where feasible.
SG	Improvement cut	4/35	– Beetle-killed Douglas-fir would be salvaged. – Logging would take place during winter.	No follow-up treatments are required.
Swift Geographic Area Totals		178/1,965		
BEAVER GEOGRAPHIC AREA				
BA	Combination regeneration and commercial thin	9/60	Approximately 20 percent of the area would be commercially thinned and 80 percent would be regenerated.	– Submerchantable trees with low vigor would be removed and slash would be piled and burned unless it is utilized as biomass. – The area would be site prepped. – Western larch would be interplanted, and western white pine would be interplanted where feasible.
BB	Combination regeneration and commercial thin	115/1,000	– Approximately 40 percent of the areas would be commercially thinned, 55 percent would receive a seedtree to shelterwood with reserves regeneration harvest, and 5 percent would likely be left in small pockets. – A combination of skyline cable and ground-based logging would be employed.	– Submerchantable trees with low vigor would be removed and slash would be piled and burned unless it is utilized as biomass. – Areas fitting regeneration specifications would be mechanically site prepped. – Western white pine and western larch would be interplanted.

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)	HARVEST PARTICULARS	FOLLOW-UP TREATMENTS
BC	Regeneration harvest	52/400	A seedtree with reserves harvest prescription would be utilized; extra reserve trees may be retained on the drier sites and ridges.	– Submerchantable trees with low vigor would be removed and slash would be piled and burned unless it is utilized as biomass. – Areas fitting regeneration specifications would be mechanically site prepped. – Ponderosa pine, western white pine, and western larch would be interplanted.
BD (Dollar)	Combination regeneration and commercial thin	33/200	Approximately 70 percent of the area would be commercially thinned, 25 percent would receive a seedtree/ shelterwood with reserves regeneration harvest, and 5 percent would likely be retained in small pockets.	– Submerchantable trees with low vigor would be removed and slash would be piled and burned unless it is utilized as biomass. – The areas fitting regeneration specifications would be mechanically site prepped. – Western white pine and western larch would be interplanted.
BE	Regeneration harvest	31 acres that includes road and SMZs/200	– A seedtree with reserves harvest prescription with extra tree retention would be utilized in SMZs. – Winter logging is required.	– Submerchantable trees with low vigor would be removed and slash would be piled and burned unless it is utilized as biomass. – Areas fitting regeneration specifications would be mechanically site prepped. – Western white pine and western larch would be interplanted.

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)	HARVEST PARTICULARS	FOLLOW-UP TREATMENTS
BF	Combination regeneration, overstory removal, and commercial thin	35/150	– Approximately 15 percent of area would be commercially thinned, 15 percent would receive an overstory removal, 70 percent would receive a seedtree to shelterwood regeneration harvest, and 5 percent would likely be left in small pockets. – The proposed Trail is located in the proposed harvest area, so designated skid trails would need to be considered, and possibly a landing/parking area. – Cut-to-length operation is planned and logs would be transported with a log forwarder.	– Submerchantable trees with low vigor would be removed and slash would be piled and burned. – Areas fitting regeneration specifications would be mechanically site prepped. – Ponderosa pine and western larch would be interplanted, and western white pine would be interplanted where feasible.
BG	Commercial thinning and understory fuels reduction	144/100	– This area would be set up primarily for small permits; lodgepole pine post and poles, scattered grand fir, and other less vigorous trees would be harvested through commercial-thin and small regeneration harvests. – The Trail is proposed to be in this proposed harvest area, so harvest locations and designated skid trails need to be considered.	– Localized areas would be thinned or, where trees show low-level vigor, slashed; slash would be piled and burned unless it is utilized as biomass. – Site preparation would be planned in openings for regeneration. – Pondereosa pine, western larch, and western white pine may be interplanted,
Beaver Geographic Area Totals		*570/2,110*		

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)	HARVEST PARTICULARS	FOLLOW-UP TREATMENTS
SKYLES GEOGRAPHIC AREA				
SKA, SKB, and SKC	Commercial thin and improvement cut	Approximately 230 in 3 units/1,000	– Commercial thinning would reduce tree stocking levels in stands or groups of trees that are healthy, vigorous, and generally less than 100 years old. The thinning is designed to promote continued vigorous growth of western larch and Douglas-fir. These areas would be fully stocked postharvest. Spacing between leave trees would be fairly regular, approximately 20 to 40 feet, allowing the crowns of leave trees to develop more fully and sustain tree growth and vigor. – The improvement cut is designed to leave the most vigorous and healthy trees at a stocking level that provides for continued crown development and diameter growth and remove diseased, suppressed, defective, and insect-infested trees. The incidence of insect and disease is higher in these stands than those proposed for commercial thinning and tree age generally has a wider range. Spacing is more variable than with the commercial thinning. Depending on the availability of healthy trees, some openings in the tree canopy would occur. Western larch and ponderosa pine would be favored for leave. – The proposed Trail is located within these 3 harvest areas.	Hazard reduction and some site prep would be done in openings larger than 0.5 acre.

- **Roads and Access**

  Some changes to road management and the current transportation system would occur with the *Transportation Plan* design for this area. *FIGURES II-1* and *II - 2*, as well as *TABLE II-1 – ROADS* show an overall plan for roads, but several specific actions include:

  - ***West Smith Lake Road*** would be improved to provide reasonable access, better sight distance, and improved parking to Smith Lake while enabling the State to meet obligations under BMPs to protect water quality and meet county road specifications at the junction of West Smith Lake and DelRey roads. A new junction would be constructed approximately 100 feet north of the existing junction, a parking area would be constructed with material generated from the new junction, and the upper portions of the road near Smith Lake would be raised to remove the existing deep ruts. A turn-around would be constructed on the upper portion of the road overlooking Smith Lake. Following the harvesting of Harvest Areas SB4 and SB5, the remaining road/trail toward the north end of Smith Lake would be reconstructed into a trail for nonmotorized traffic only.
  - ***Skyles Spur*** is a low-standard road that would be constructed for winter logging of Harvest Area SKB. Portions of this road are proposed to be utilized in the Trail project. The portions of road not used by the Trail project would be recontoured to near-natural levels.
  - ***The old King Creek Road*** (does not show on maps, but is located along King Creek at the north end of Harvest Area SD) has been effectively abandoned over the past 15 years, but several culverts are still in place. One culvert would be removed and the site would be reclaimed with rock armor and grass seed.

  TABLE II-1 - ROADS (shown earlier in this chapter) displays the roads, the amount of road, the standard of road, and, if needed, a discussion about the road.

ENVIRONMENTAL EFFECTS SUMMARY

TABLE II–3 - SUMMARY OF ENVIRONMENTAL EFFECTS contains a summary of the information found in *CHAPTER III – EXISTING ENVIRONMENT AND ENVIRONMENTAL EFFECTS.* This table displays information on the environment of the Beaver/Swift/Skyles Project Area and the entire Stillwater State Forest as it relates to the issues associated with the project proposal. The current, or existing, condition can be viewed as a baseline condition, which can be used to compare the predicted changes with the selection of either alternative. For more in-depth discussions of the individual resources, see *CHAPTER III – EXISTING ENVIRONMENT AND ENVIRONMENTAL EFFECTS.*

The following table compares the direct, indirect, and cumulative effects between the No-Action and Action alternatives. For more detailed descriptions, see *CHAPTER III – EXISTING ENVIRONMENT AND ENVRIONMENTAL EFFECTS.*

TABLE II-3 - SUMMARY OF ENVIRONMENTAL EFFECTS

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
VEGETATION		
Covertype and age class	***No-Action Alternative***	
	In the short-term no changes would be expected.	Other timber sale forest-management actions would increase the amount of western white pine and western larch/ Douglas-fir covertypes by reducing mixed-conifer, subalpine fir, and lodgepole pine covertypes. Other forest-management actions would increase the amount of area in the 0-to-39-year age class by decreasing the percent of area in the other age classes.
	Action Alternative	
	Approximately 95 acres of the mixed-conifer covertype would be converted to a western larch/Douglas-fir covertype. Approximately 23 acres of the western larch/Douglas-fir covertype would be converted to a ponderosa pine covertype. Approximately 13 acres of the lodgepole pine covertype would be converted to a western larch/Douglas-fir covertype. Approximately 693 acres would not have a covertype change. No notable changes to age class would be apparent due to DNRC's methodologies for determining age class, but the areas being treated with regeneration harvest will introduce a new age class within harvested units.	Cumulative effects would be the same as under the No-Action Alternative.
Old growth	***No-Action Alternative***	
	In the short term, no changes would be expected, but at the current rate of mortality several stands may no longer meet DNRC's old-growth definition or would have lower attribute levels.	Old-growth amounts would be reduced from 11,703 to 11,597 acres, or the amount of old growth on Stillwater Forest would be reduced from 10.1 percent to 9.9 percent.
	Action Alternative	
	Old-growth amounts would be lowered by 181 acres. An additional 68 acres of old growth would be harvested; 32 acres would be converted to a ponderosa pine covertype and remain an old-growth stand. The other 36 acres to be harvested would contain enough large-diameter trees to retain its old-growth status.	Old-growth amounts would be reduced from 11,703 to 11,416 acres, or the amount of old growth on Stillwater Forest would be reduced from 10.1 percent to 9.7 percent.

TABLE II-3 - SUMMARY OF ENVIRONMENTAL EFFECTS (continued)

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
Insects and diseases	***No-Action Alternative***	
	Mortality would likely continue causing loss of volume and value.	Forest stands would maintain dense stocking levels and contribute to the spread of insects and diseases and retain high fuel loadings, which lead to fires, unnatural forest structures, and overall poor health.
	Action Alternative	
	Mortality would likely continue, but the amount would be less than if no action was implemented. DNRC would also capture some volume and value from products harvested.	There would be reduces losses and stands being regenerated would have a species composition more resilient to insects and diseases and more in line with historic conditions.
Forest fuels	***No-Action Alternative***	
	No direct effects would take place under this alternative. Fuel loads and distribution would increase.	Fuel loading would continue to increase in these stands; similar overstories with adjacent stands would not provide fuel breaks needed to reduce the potential of high-intensity wildfires on Stillwater State Forest.
	Action Alternative	
	The existing overstory would be thinned and fuel loads and ladder fuels would be reduced. A decrease in fire intensity and created openings would help wildfire initial attack suppression efforts.	Due to the location of the harvest units, reduced fuel loads, and the reduced amount of canopy, the success against wildfire would likely be improved.
Noxious weeds	***No-Action Alternative***	
	Recreationalists and other forest-management activities using the project area would continue to introduce and spread weed seeds. No revenue would be collected to fund the noxious-weed program, but site-specific weed spraying would continue.	Open roads in the project area would continue to have dispersed traffic from recreation and other timber-management activities, thus increasing exposure to weed establishment. If funding remains available through the weed-management program, some of the large weed populations in the analysis area would be treated. Monitoring would continue as DNRC personnel travel in the project area.

TABLE II-3 - SUMMARY OF ENVIRONMENTAL EFFECTS (continued)

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
	Action Alternative	
	Additional motorized traffic would occur and mineral soil would be exposed. Mitigation measures have been designed for the project to minimize effects. FI money would be collected to help the weed-spraying program and continued site-specific weed spraying would continue.	Cumulative effects would be the same as under the No-Action Alternative.
WATER RESOURCE		
Sediment delivery and water yield	***No-Action Alternative***	
	Sediment from existing sources would continue. No increase in water yield would occur.	The potential for sediment contribution would still exist. Water yield would not increase.
	Action Alternative	
	Erosion may occur, although sediment delivery and subsequent water-quality impacts are not likely to occur. The risk of long-term adverse effects to water quality or beneficial uses would be low. Water yields would increase although the risk of increased in-channel sediment would be low.	A cumulative increase in sediment delivery would have a low risk of occurring. The degree of risk to water quality would be low as the estimated cumulative annual water-yield increases remain below the recommended thresholds.
Fish habitat	***No-Action Alternative***	
	No reduction in recruitable woody debris and no increases in water temperature would be anticipated.	No reduction in recruitable woody debris and no increases in water temperature would be anticipated. Fisheries habitat quality would be maintained at its current level.
	Action Alternative	
	The source of recruitable woody debris would continue to be present and provide habitat and cover. A measureable increase in water temperature is unlikely; therefore, the risk of impacts to lake water temperatures would be low.	Areas around the lakes would have reduced levels of recruitable woody debris, but adverse affects would not likely result. Due to the limited amount of timber being removed, the risk of cumulative increases in lake temperatures would be low.
SOILS		
	No-Action Alternative	
	No direct or indirect effects to the physical properties of soils in the project area would be expected. Skid trails would continue to recover.	No adverse cumulative effects would result.

TABLE II-3 - SUMMARY OF ENVIRONMENTAL EFFECTS (continued)

RESOURCE	DIRECT AND INDIRECT EFFECTS	DIRECT AND INDIRECT EFFECTS
SOILS (continued)		
	Action Alternative	
	The extent of impacts expected would likely be similar to those reported by *Collins (DNRC, 2004)*, or 12 to 15 percent of the harvest area. Potential impacts to soils from the cable-yarding units would be less than 10 percent of the area. Potential impacts to soils from cable yarding would generally be displacement, although some compaction could occur. In addition, cable corridors may pose a slight risk of routing water because the corridor is generally parallel to the fall-line of the hill slope. BMP implementation would minimize erosion from 111 acres of temporary road construction and reclamation.	Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15 percent of the harvest units (as recommended by the SFLMP) through implementation of BMPs, skid trail planning on tractor units, and limiting operations to dry or frozen conditions By designing the proposed harvesting operations with soil moisture restrictions, season of use, and method of harvesting, the risk of unacceptable long-term impacts to soil productivity from compaction and displacement would be low.
RECREATION AND TRAILS		
	No-Action Alternative	
	No appreciable changes or effects would occur to recreational activity or revenue from recreation; the amount of open roads will decrease slightly.	No appreciable changes or effects would occur to recreational activity or revenue from recreation; the amount of open roads will decrease slightly.
	Action Alternative	
	Recreational activities may be rerouted or suspended for short durations. Revenue generated from *Land Use Licenses* may be affected for several seasons due to winter log hauling. The amount of open roads will decrease slightly, but roadwork will improve safety and drivability.	Recreational activities may be rerouted or suspended for short durations. Revenue generated from *Land Use Licenses* may be affected for several seasons due to winter log hauling. The amount of open roads will decrease slightly, but roadwork will improve safety and drivability.
ECONOMICS		
	No-Action Alternative	
	Trust revenue from the project area would not be realized at this time.	No change to the area's economy would be expected provided a local mill purchases a substituted amount of timber. The deferral of harvesting timber may change the region where the trees are harvested, which would impact another area of the State.

TABLE II-3 - SUMMARY OF ENVIRONMENTAL EFFECTS (continued)

RESOURCE	DIRECT AND INDIRECT EFFECTS	DIRECT AND INDIRECT EFFECTS
ECONOMICS (continued)		
	Action Alternative	
	An estimated $183,750 in project revenue would be deposited into school trust accounts and approximately $105,700 would be deposited into the FI account. This sale would provide work for approximately 50 positions.	If implemented, a local mill would likely purchase this timber sale and the preservation of economic viability in Montana's timber resources would be affected. This timber sale would be part of DNRC's statewide sustained-yield annual harvest of timber from state trust lands. The net revenue of this sale would add to several school trust funds to offset tax dollars to fund education.
AESTHETICS		
	No-Action Alternative	
	Natural processes, recreational uses, and firewood gathering would continue to alter the visual resource.	Historically, harvesting private and DNRC-managed state lands has created a mosaic of forests and associated textures, lines, colors and forms on the landscape.
	Action Alternative	
	Dense multistoried and multispecied stands would be converted to stands with open spacing, yet would still maintain some structural diversity. Fully stocked stands would be regenerated within several years. Western larch would be regenerated, adding to the diversity of tree species and color. Vegetation damage and soil disturbance would have short-term effects. The view distance along open roads would be increased. Seasonal color contrasts would be most notable soon after harvesting, but would be notable for longer periods in the winter when snow is present. Change in forest canopy coverage would change texture, patterns (continuous versus patchy), color, and defined lines such as unit boundaries.	Dense multistoried and multispecied stands would be converted to stands with open spacing, yet some structural diversity would be maintained. Fully stocked stands would be regenerated within several years. Western larch would be regenerated, adding to the diversity of tree species and color. Vegetation damage and soil disturbance would have short-term effects. The view distance along open roads would be increased. Seasonal color contrasts would be most notable soon after harvesting, but would be notable for longer periods in the winter when snow is present. Change in forest canopy coverage would change texture, patterns (continuous versus patchy), color, and defined lines such as unit boundaries.

TABLE II-3 - SUMMARY OF ENVIRONMENTAL EFFECTS (continued)

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
WILDLIFE		
Forested habitats and connectivity	***No-Action Alternative***	
	No changes in wildlife use would be expected. The forest would continue to age and conditions would move toward shade-tolerant tree species with high amounts of canopy cover.	Continued use by species favoring dense stands of shade-tolerant tree species and those requiring larger areas of mature forests would be expected.
	Action Alternative	
	Minor adverse effects since harvesting would reduce stand age, thereby reducing habitats for species associated with older stands; minor changes to landscape connectivity would occur. Overall, some changes to wildlife use would be expected.	Reductions in mature forested habitats associated with this alternative would be additive to losses associated with other harvesting activities. Extensive forested habitats would still exist in the analysis area and landscape connectivity would persist.
Snags and coarse woody debris	***No-Action Alternative***	
	Negligible effects would be anticipated since no harvesting would alter present or future concentrations of snag or coarse woody debris; access for firewood gathering would have negligible changes.	Snags and snag recruits have been retained with recent harvesting across Stillwater State Forest. Wildlife relying on snags and coarse woody debris would be expected to persist across the analysis area.
	Action Alternative	
	Minor adverse effects anticipated since harvesting would reduce snags, recruitment trees, and coarse woody debris; access for firewood gathering would have negligible changes.	Minor adverse effects would be anticipated since harvesting would reduce snags and snag-recruitment trees while increasing coarse woody debris; access for firewood gathering would have a slight decrease and representation of shade-intolerant tree species would have a slight increase .
Grizzly bear	***No-Action Alternative***	
	No direct effects to grizzly bears would be expected. No changes in road densities, hiding cover, or security core would be anticipated.	No further changes to motorized access, core security or hiding cover, and spring habitat would be anticipated. In the long term, forest succession would continue and may reduce food sources, while the amount of hiding cover may increase.
	Action Alternative	
	Minor adverse effects anticipated because hiding cover would be lost in the short-term, but no changes to security habitat or long-term changes to open-road densities would occur.	Minor adverse effects would be expected since there would be minor increases in human disturbance, hiding cover would be lost for the short term, but no changes to security habitat or long-term open-road densities would occur.

TABLE II-3 - SUMMARY OF ENVIRONMENTAL EFFECTS (continued)

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
WILDLIFE		
Gray wolf	***No-Action Alternative***	
	No effects would occur since the human-disturbance levels or big game winter ranges would not change.	No effects would occur since the human-disturbance levels or big game winter ranges would not change.
	Action Alternative	
	Negligible effects are expected since minor short-term increases and negligible long-term changes in human-disturbance levels and no changes to big game winter range would be expected.	Negligible effects are expected since, beyond the direct and indirect effects, no further effects would be expected.
Bald Eagle	***No-Action Alternative***	
	No effects would be expected.	No effects would be expected.
	Action Alternative	
	Minor to moderate effects would be expected since disturbance levels would be elevated during operations and negligible changes in availability of large emergent trees would occur.	Minor to moderate effects would be expected since disturbance levels would be elevated during operations and negligible changes in availability of large emergent trees would occur.
Common loon	***No-Action Alternative***	
	No effects would be expected.	No additional effects would be anticipated.
	Action Alternative	
	Negligible effects would be anticipated since no appreciable changes in shoreline disturbance would occur and recreational use of available loon habitat would not change.	Negligible effects would be expected, but none beyond that anticipated with direct and indirect effects.
Fisher	***No-Action Alternative***	
	No effects to fishers would be expected under this alternative.	No additional effects would be anticipated.
	Action Alternative	
	Minor adverse effects would be anticipated since harvesting would largely avoid riparian areas, would reduce preferred covertypes in upland stands, would cause minor reductions in connectivity, would reduce snags while increasing coarse woody debris, but motorized access would not appreciably change.	Minor adverse effects would be anticipated since harvesting would negligibly change riparian areas, would reduce preferred covertypes in upland stands, would negligibly reduce connectivity, would decrease snags while increasing coarse woody debris, but motorized access would not appreciably change.

TABLE II-3 - SUMMARY OF ENVIRONMENTAL EFFECTS (continued)

RESOURCE	DIRECT AND INDIRECT EFFECTS	DIRECT AND INDIRECT EFFECTS
Pileated woodpecker	***No-Action Alternative***	
	Negligible adverse effects would be anticipated due to long-term, succession-related declines in the abundance of seral tree species such as western larch.	Negligible effects would be expected but none beyond that anticipated with direct and indirect effects.
	Action Alternative	
	Minor effects would be anticipated since harvesting would reduce the amount of continuous forested habitat, and would reduce potential nesting and foraging habitat, but harvest prescriptions would promote regeneration of seral species.	Minor effects would be expected, but none beyond that anticipated with direct and indirect effects.
Townsend's big-eared bat	***No-Action Alternative***	
	Negligible adverse effects would be expected since no changes in human-disturbance levels and no short-term changes in available large-diameter snags would occur.	No additional effects would be anticipated.
	Action Alternative	
	Moderate adverse effects would be anticipated since there would be an elevated disturbance level and a decrease in available large-diameter snags.	Moderate adverse effects would be expected, but none beyond that anticipated with direct and indirect effects.
Osprey	***No-Action Alternative***	
	With minor reductions in human-disturbance levels in the nest area, negligible effects would be expected .	With minor reductions in human-disturbance levels in the nest area and no further changes to potential nesting habitats, negligible effects would be expected.
	Action Alternative	
	Since increased disturbance would occur, but that disturbance would occur outside of the core nesting season, minor effects would be anticipated.	Negligible effects would be expected due to minimal changes to the existing and potential nest sites, as well as no changes to osprey foraging areas.

TABLE II-3 - SUMMARY OF ENVIRONMENTAL EFFECTS (continued)

RESOURCE	DIRECT AND INDIRECT EFFECTS	CUMULATIVE EFFECTS
BIG GAME SPECIES		
Big game winter range	***No-Action Alternative***	
	No effects would be anticipated since subtle changes to thermal cover would be anticipated, the amount of mature forested habitat in the winter would not change appreciable, and human disturbance would remain similar.	Minor positive effects could result.
	Action Alternative	
	Minor adverse effects would be anticipated since disturbance would be relatively short term and, although a high percentage of the winter range would be altered, deer are adaptable and the surrounding ownerships provide opportunity for displaced deer.	Minor adverse effects would be anticipated since disturbance would be relatively short term, a small percentage of the larger cumulative-effects area of winter range would be altered, deer are adaptable, and the surrounding ownerships provide opportunity for displaced deer.

CHAPTER III
EXISTING ENVIRONMENT AND ENVIRONMENTAL EFFECTS

INTRODUCTION

This chapter presents both the existing environment of the project area and potential consequences to that environment by implementing the alternatives presented in *CHAPTER II—ALTERNATIVES*. Discussions of environmental consequences form the scientific and analytical basis for comparing the alternatives. Direct, indirect, and cumulative effects are disclosed. The means by which potential adverse effects would be reduced or mitigated are also descried (see *CHAPTER II - ALTERNATIVES* and *STIPULATIONS AND SPECIFICATIONS*). The proposed action alternative is limited to the specific timber harvest, fuel treatments, reforestation activities, and road maintenance in the Beaver/Swift/Skyles Timber Sale Project area, although some components are analyzed across the Stillwater State Forest landscape. The description of the affected environment under the No-Action Alternative serves, in part, as a baseline to compare changes resulting from the Action Alternative.

The analysis of effects disclosed in this document includes those occurring from the entire 'scope' of the decision. Scope is defined as the range of actions, alternatives, and impacts to be considered in an environmental review. The discussions of resources and potential effects take advantage of existing information included in the SLI and other project documents. The project files for the Beaver/Swift/Skyles Timber Sale Project include all project-specific information, such as resource reports and field investigation results.

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

Direct effects are those occurring at the same time and place as the initial cause or action. Indirect effects are those that occur later in time or are spatially removed from the activity, but would be considerable in the foreseeable future. Cumulative effects result from incremental effects of actions, when added to other past, present, and reasonably foreseeable future actions, regardless of the agency or person that undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time.

VEGETATION ANALYSIS

INTRODUCTION

This section describes the conditions of the existing vegetation on Stillwater State Forest as a whole and in the project area specifically, and describes how the no-action and action alternatives would affect the various components of this resource. A number of vegetation parameters could be affected by implementation of the alternatives; therefore, each will be analyzed. Forest covertypes, age-class distributions, and the amounts, distribution, and attributes of old growth will be discussed at the landscape and stand levels to facilitate the analysis of direct, indirect, and cumulative effects. Forest fuels, fire regimes, insects, diseases, and noxious weed conditions will be discussed at the project-area level. Past, present, and reasonably foreseeable activities are identified and considered in the analysis of effects.

ANALYSIS METHODS

The *Forest Management Rules* direct DNRC to take a coarse-filter approach to biodiversity by favoring an appropriate mix of stand structures and tree-species composition; this appropriate mix is described as the desired future conditions on DNRC-managed land (*DNRC 2003*). To implement a coarse-filter approach and meet the directive, landscape-analysis techniques were used to determine the desired future conditions, including forest-covertype representation, age-class distribution, and structural characteristics.

To assess the existing condition of the project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, SLI data, and consultations with other professionals provided information for the analysis.

The current stand conditions will be compared to DNRCs desired future conditions. The SLIs for Stillwater and Kalispell units were used to assign current covertypes. DNRC's desired future conditions refer to the covertype that DNRC attempts to manage toward in a forest stand. DNRC's desired future conditions have been delineated in the Forest Management Bureau's *Desired Future Condition DATASET*.

The old-growth amounts and distribution for Stillwater Unit will utilize the old-growth acres found through *STW SLI_2006* and during field verification in the Duck-to-Dog, Olney Interface, Shorts Meadow, and Chicken/Antice timber sales and this project. Kalispell Unit does not have any old-growth stands in the project area and, therefore, old-growth discussions will only relate to Stillwater Unit.

ANALYSIS AREA

The coarse-filter analysis will consider historic conditions from Climatic Section 333B for Kalispell Unit and Climatic Section 333C for Stillwater Unit (*Losensky 1997*). The current and desired future forest conditions and old-growth amounts and distribution will be analyzed separately on forested lands administered by Stillwater Unit and Kalispell Unit. Stillwater Unit administers Stillwater State Forest, Coal Creek State Forest, and most of the scattered state lands north of Coal Creek State Forest in Flathead County and the northeastern portion of Lincoln County.

Condition assessments of forest fuels and fire regimes, insects and diseases, and noxious weeds were conducted on the project area.

VEGETATION ANALYSIS

COVERTYPES AND AGE CLASSES

EXISITING CONDITION

Covertype refers to the dominant tree species that currently occupy a forested area. *TABLE III-1 - THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT (BY PERCENT)* and *TABLE III-2 - THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY KALISPELL UNIT (BY PERCENT)* illustrate the current proportions of forest covertypes compared to desired future conditions.

Data indicates, as illustrated by *TABLE III-1 - THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT (BY PERCENT)*, that mixed-conifer and subalpine fir stands are currently overrepresented compared to DNRC's desired future conditions. Many of the species that make up the mixed-conifer and subalpine covertypes are shade tolerant, and stand structure tends to be multistoried. The multistoried structure has resulted, in part, from the ingrowth of the shade-tolerant trees over time. Therefore, the component of shade-tolerant species increases as the interval between disturbances, such as wildfires or timber harvests, is lengthened.

The western larch/Douglas-fir and western white pine covertypes are currently underrepresented on the forest compared to the appropriate covertype distribution. Western larch and western white pine are not shade tolerant and have, historically, been perpetuated through fairly intensive disturbances such as wildfires. These disturbances most often created single- and two-storied stands of primarily western larch and Douglas-fir overstories and western larch, western white pine, and Douglas-fir understories. While western larch is not shade tolerant, past silvicultural treatments have promoted multistoried western larch/ Douglas-fir stands with numerous age classes represented in small groups of trees in larger stands. Additionally, the white pine blister rust infection has drastically affected the western white pine covertype by substantially reducing the number of healthy western white pine in the overstory.

As illustrated by *TABLE III-2 - THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY KALISPELL UNIT (BY PERCENT)*, the longer intervals between disturbances and commodity extraction generally explain the decrease in western larch/Douglas-fir and ponderosa pine covertypes. The ponderosa pine, western larch/Douglas-fir, and western white pine covertypes are not as well represented on the Kalispell landscape as estimated for the early 1900s. Most notable is the conversion of over 11,000 acres in the ponderosa pine, western larch/Douglas-fir, and western white pine covertypes over the last 100 years to the present over abundance of mixed-conifer and subalpine fir covertypes by approximately 10,000 acres.

Age structure or age-class distribution of forest stands on both units varies slightly from historical conditions (*Losensky*). Stillwater Unit is mainly in Climatic Section M333C, as described in *Losensky's* report on *Historical Vegetation of Montana (1997)* and Kalispell Unit is in Climatic Section M333B, which tends to have more ponderosa pine types than M333C.

VEGETATION ANALYSIS

TABLE III-1 – THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT (BY PERCENT)

COVERTYPE	CURRENT (PERCENT)	DESIRED FUTURE CONDITION (PERCENT)
Douglas-fir	3.5	1.4
Subalpine fir	25.6	16.3
Lodgepole pine	10.7	9.9
Ponderosa pine	0.8	1.7
Mixed conifer	26.1	6.5
Western larch/Douglas-fir	24.5	47.4
Western white pine	2.6	14.8
Hardwoods	3.2	3.1
Area that does not have a covertype designated in the SLI*	4.3	

The percentages are based on Stillwater Unit's forested land base of 117,839 acres.

**A major portion of those stands not inventoried with a covertype are stands that were involved in the stand-replacement fires of the Moose Fire of 2001; at the time of data collection, 2001 and 2002, these areas were nonstocked. Since the fire and salvage harvest, reconnaissance shows that many areas are regenerating to the early successional covertypes of primarily lodgepole pine or western larch/Douglas-fir.*

TABLE III-2 – THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY KALISPELL UNIT (BY PERCENT)

COVERTYPE	CURRENT (PERCENT)	DESIRED FUTURE CONDITION (PERCENT)
Douglas-fir	2.9	1.8
Subalpine fir	3.9	0.4
Lodgepole pine	4.0	2.4
Ponderosa pine	18.6	20.9
Mixed conifer	17.9	4.0
Western larch/Douglas-fir	44.6	57.6
Western white pine	1.0	14.8
Hardwoods	0.8	6.3
Other area that does not have a covertype designated in the SLI	6.4	6.3

The percentages are based on Kalispell Unit's forested land base of 57,214.9 acres

Age-class distributions delineate another characteristic important for determining trends on a landscape level. Comparing the entire Stillwater Unit's administrative area with historical data based on the Upper Flathead Valley and *Losensky (1997)*, *TABLE III-3 - DISTRIBUTION OF AGE CLASSES ON STILLWATER UNIT* shows that Stillwater Unit is low in the 0-to-39-year (seedling/ sapling stands) and 100-to-150-year age classes, and high in the 40-to-99-year and greater-than-150-year age classes. As recognized in forest management and by the *Forest Management Rules*, age-class distributions are not static and are quite dependant upon disturbances, whether those

are natural or implemented by man through silvicultural practices.

A fairly clear picture emerges of the forest conditions when distributions are combined with information on covertypes as displayed in *TABLE III-4 - AGE-CLASS DISTRIBUTION OF CURRENT COVERTYPES*.

As was noted in *TABLE III-3 - DISTRIBUTION OF AGE CLASSES ON STILLWATER UNIT,* current age-class distributions are predominately in the oldest age class. The stand structure of these older age classes tend to be multistoried; this occurs when a stand has progressed through time and succession to the point that shade-

TABLE III-3 – DISTRIBUTION OF AGE CLASSES ON STILLWATER UNIT

AGE CLASS	HISTORIC PERCENT IN CLIMATIC SECTION M333C	HISTORIC ESTIMATES OF PERCENT ON STILLWATER UNIT	CURRENT PERCENT
0 to 39 year	36	22.8	13.6
40 to 99 year	13	17.9	22.8
100 to 150 year	22	24.7	13.8
150-plus year	29	32.8	45.8
No age provided in SLI*			3.9

**A major portion of these stands were partially burned in the Moose Fire of 2001; SLI updates in 2001 and 2002 could not discern which age class to assign these stands.*

TABLE III-4 – AGE-CLASS DISTRIBUTION OF CURRENT COVERTYPES

CURRENT COVERTYPE	AGE CLASS					
	0 TO 39 YEARS	40 TO 99 YEARS	100 TO 149 YEARS	150 YEARS AND OLDER	NO AGE DATA	TOTAL ACRES
	NUMBER OF ACRES					
Douglas-fir	97	421	576	2,372	666	4,132
Hardwoods	118	123	69	64		373
Lodgepole pine	2,571	8,594	320	407		12,865
Mixed conifer	3,335	6,724	4,507	15,884	353	30,804
Ponderosa pine	170	0	525	192		886
Subalpine fir	3,946	6,525	4,116	16,823	304	30,154
Western larch/ Douglas-fir	404	4,269	5,816	16,121	2,242	28,853
Western white pine	360	198	325	2,140		3,024
Nonstocked	5,069					5,069
Total Acres (total percent)	16,071 (13.6)	26,854 (22.8)	16,254 (13.8)	54,007 (45.8)	4,538 (3.9)	117,721

tolerant species, such as grand fir, Engelmann spruce, and subalpine fir, are replacing a shade-intolerant overstory, such as western larch. Currently the combined amount of mixed-conifer and subalpine fir covertypes is nearly 5 times higher than the desired future condition on Stillwater Unit.

Comparing the historical data based on the Lower Flathead Valley and *Losensky (1997)* for Kalispell Unit, *TABLE III-5 – DISTRIBUTION OF AGE CLASSES ON KALISPELL UNIT* shows that Kalispell Unit is low in the amount of 0-to-39-year (seedling/sapling) stands and has more area in the older age classes than might have been anticipated historically.

TABLE III-5 – DISTRIBUTION OF AGE CLASSES ON KALISPELL UNIT

AGE CLASS	HISTORIC PERCENT IN CLIMATIC SECTION M333B	CURRENT PERCENT
0 to 39 year	36	10
40 to 99 year	13	21
100 to 150 year	15	30
150-plus year	36	39

ALTERNATIVE EFFECTS TO COVERTYPES AND AGE CLASSES

Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Covertypes and Age Classes***

  In the short term, neither covertypes nor age-class distributions in the analysis area would be directly or indirectly affected. Over time, lacking substantial disturbances such as timber harvests or wildfires, the proportion of seedling-/sapling-sized stands would gradually decrease.

- ***Direct and Indirect Effects of the Action Alternative to Covertypes and Age Classes***

  On Stillwater Unit, those areas where treatment is proposed within the mixed-conifer covertype, approximately 95 acres would be converted to the western larch/Douglas-fir covertype. Approximately 23 acres of the western larch/Douglas-fir covertype would be converted to a ponderosa pine covertype. Approximately 13 acres of the lodgepole pine covertype would be converted to a western larch/Douglas-fir covertype. Most of these treatments would result in multistoried stands following regeneration. Overall, the Action Alternative would move stands in the proposed project area toward desired future conditions.

  In areas on both Stillwater and Kalispell units, where treatment is proposed in the current western larch/Douglas-fir (approximately 536 acres), mixed-conifer (approximately 78 acres), Douglas-fir (approximately 68 acres), and lodgepole pine (approximately 11 acres) covertypes, no change in covertypes would occur.

  Of the 832 acres proposed for harvesting, no notable change in age class would occur due to the amount of older-aged trees being retained and DNRC's SLI methodologies used in determining age class. Based on SLI methodologies, when the sawtimber component of a stand has greater than 10-percent canopy coverage, the stand will be evaluated and classified with the age class of the sawtimber component; therefore, not all areas of seedtree harvests would change to the 0-to-39-year age class. Most stands

receiving harvest treatments are multistoried stands that would retain those characteristics. The overstory of these stands would consist primarily of older-aged western larch, Douglas-fir, and western white pine, the second story would primarily be Douglas-fir, and within 2 to 3 years, another story of western larch, western white pine, ponderosa pine, and Douglas-fir would become established. The created openings would be typical of mixed-severity fires.

The proposed action would mimic the effects of historic fire behavior, thus creating openings for wildlife, reducing the potential of high-intensity wildfires, and regenerating stands toward desired future conditions.

Cumulative Effects

- ***Cumulative Effects of the Action and No-Action Alternatives to Covertypes and Age Classes***
  - ***Stillwater Unit***

    The cumulative effects of timber-stand management on Stillwater Unit trend toward increasing seral covertypes in areas where recent forest-management activities have taken place.

    In addition to the changes in covertype distributions from the proposed action, the stands involved in the stand-replacement fires of the 2001 Moose Fire have not been inventoried. Other timber sale projects have been initiated since the compilation of *STW 2006 SLI*; several are reflected in the *STW 2008 SLI*, but not all. The timber sale projects that have been designed or sold since the *STW 2006 SLI* increase the amount of the western larch/ Douglas-fir covertype over the analysis area and, subsequently, reduce the amount of area in the mixed-conifer and subalpine fir covertypes. Stillwater Unit has a precommercial thinning program that often favors the retention of western larch and western white pine saplings; in some cases this changes a mixed-conifer or lodgepole pine covertype to a western larch or western white pine covertype. A minor increase in the amount of the 0-to-39-year age class has occurred partly due to SLI methodologies for calculating age class.
  - ***Kalispell Unit***

    Trends from harvesting over the past decade have reduced the amount of mixed-conifer and subalpine fir covertypes. A minor increase in the amount of the 0-to-39-year age class has occurred partly due to SLI methodologies for calculating age class.

OLD GROWTH

EXISTING CONDITION

DNRC uses the minimum criteria described by *Green et al*. (*Old-Growth Forest Types of the Northern Region, 1992*) to determine old-growth stands on State lands. *Green et al.* described characteristics of old-growth forests in Montana and provided minimum amounts of trees per acre of a given dbh and age for each old-growth type. DNRC classifies stands that meet or exceed those minimums as old growth. For this analysis, existing conditions and effect on old growth are presented according to this definition.

Based on SLI data and field surveys in the project area, approximately 10.09 percent (11,703 acres) of the Stillwater State Forest Analysis Area can be classified as old

growth. *FIGURE III - 1 - OLD-GROWTH IN BEAVER/SWIFT/SKYLES TIMBER SALE PROJECT AREA* shows the old-growth stands in the project area.

TABLE III-6 - OLD-GROWTH STANDS ON STILLWATER STATE FOREST (2008) OLD-GROWTH ACRES BY COVERTYPE displays old growth by forest covertype. Covertype is related to habitat type, habitat-type groups, and successional stages. Subalpine fir and mixed conifer are the dominant old-growth covertypes on Stillwater State Forest.

OLD-GROWTH ATTRIBUTES

DNRC has developed a tool called the FOGI to describe the level of attributes commonly associated with old growth for stands on state lands. The attributes considered are:

- number of large live trees,
- number of snags,
- amount of coarse woody debris,
- amount of decadence,
- multistoried structures,
- gross volume, and
- crown cover.

TABLE III-6 - OLD-GROWTH STANDS ON STILLWATER FOREST (2008) OLD-GROWTH ACRES BY COVERTYPE

COVERTYPE	ACRES
Douglas-fir	531
Lodgepole pine	407
Mixed conifer	3,309
Subalpine fir	3,980
Western larch/Douglas-fir	2,608
Western white pine	868
Total	11,703

These attributes are assigned a value or index rating that, when summed with the values or index ratings of the other attributes, indicate a total score or index rating for the stand. These scores can be grouped into *low*, *medium*, and *high attribute* categories. This provides an indication of the condition of the stand in reference to attributes that are often associated with old-growth timber stands. These attribute levels are not necessarily an indication of quality, but are tools to compare and classify a collection of older stands over the landscape.

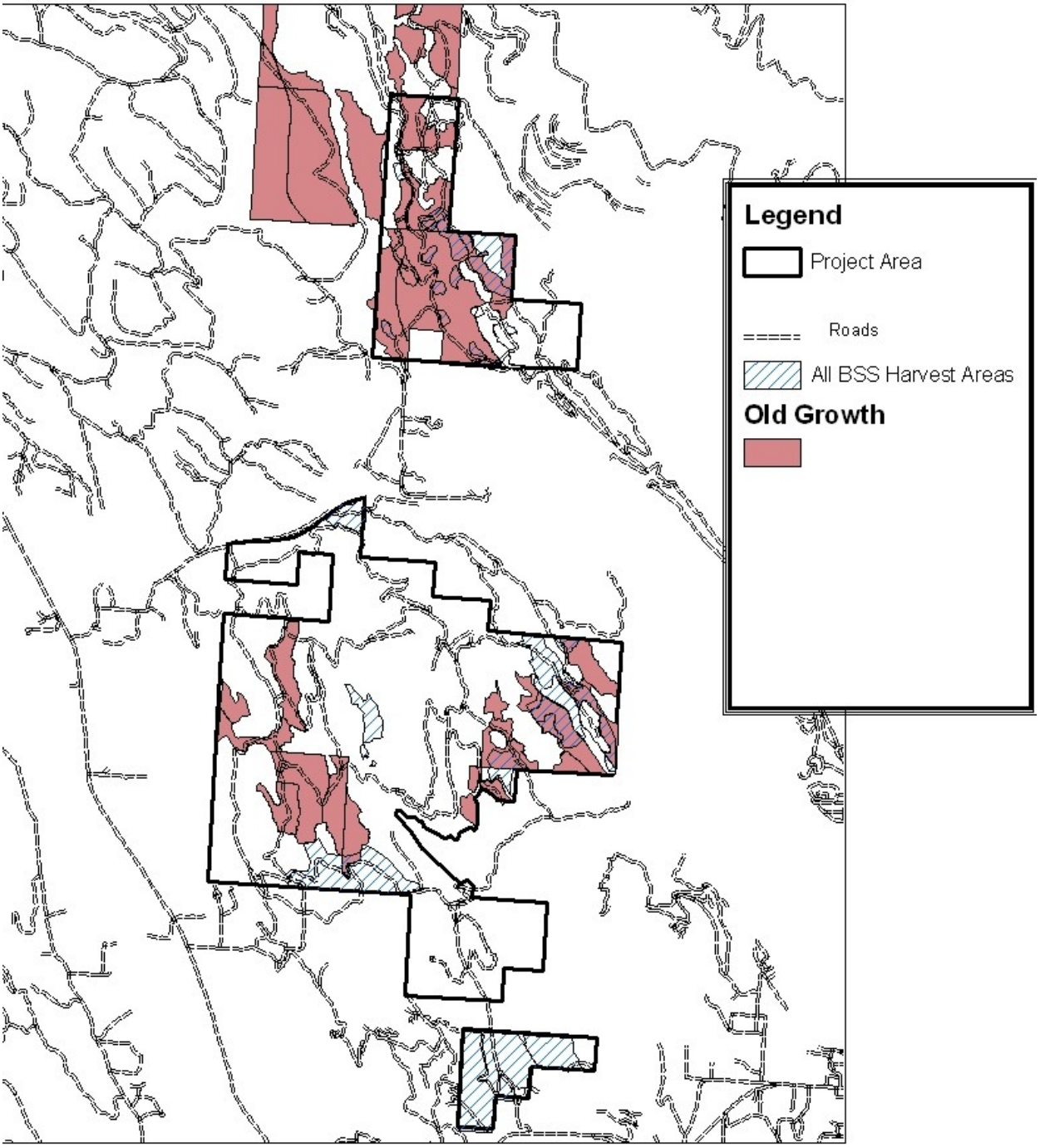
Currently, SLI shows that approximately 40.4 percent of the old-growth stands are in the *high attribute* category, 45.7 percent are in the *medium attribute* category, and 13.9 percent are in the *low attribute* category.

Some old-growth characteristics in the project area:

- Western larch and Douglas-fir are the main tree species, although ponderosa pine is prominent in some stands on the southwest exposures near Smith Lake.
- Very few larger-diameter western white pine remain on site.
- The stand structures are multistoried, comprised of seedling to large sawtimber-sized trees.
- Vigor is below average to poor.
- Evidence of Armillaria root-rot and Douglas-fir bark beetle activities is present in the Douglas-fir. Areas of western larch mortality and mistletoe infections are prominent in some of the old-growth stands proposed for treatment.
- Snags greater than 15-inches dbh range from 0 to 25 per acre. The predominant

VEGETATION ANALYSIS

FIGURE III-1 - OLD GROWTH IN THE BEAVER /SWIFT/SKYLES TIMBER SALE PROJECT AREA



species are Douglas-fir, western larch, and grand fir.

ALTERNATIVE EFFECTS TO OLD GROWTH

Direct Effects

- ***Direct Effects of the No-Action Alternative to Old-Growth Distribution and Attributes***

  The distribution or attributes of old-growth stands would not be affected.

  At the current rate of mortality in large-diameter trees and firewood cutting, numerous of these old-growth stands may either no longer meet DNRC's old-growth definition or would have a lower attribute level due to the reduction in large-diameter green trees.

- ***Direct Effects of the Action Alternative to Old-Growth Distribution and Attributes***

  Approximately 248 acres of old-growth would be harvested under the Action Alternative. Implementation would decrease the level of old growth on Stillwater Unit by 181 acres.

  About 198 acres of the western larch/ Douglas-fir covertype would be harvested; approximately 32 acres would still meet the definition of old-growth in the ponderosa pine covertype, and 166 acres would no longer be considered old growth. About 50 acres of the mixed-conifer covertype would be harvested, but only 15 acres would no longer meet the old-growth definition. The remaining 35 acres proposed for harvest are small group openings within a larger stand and, as a whole, the stand would retain enough large-diameter trees to continue to meet DNRCs old-growth specifications.

  In the *medium attribute* category, approximately 137 acres would be harvested, and these acres would no longer meet DNRC's old-growth definition following harvesting. In the *high attribute* category, approximately 111 acres would be harvested. The *high attribute* stands involve Harvest Areas BA, SA1 through SA7, SB1, SB2, SE, SG. Approximately 68 acres of the 111 acres would still retain the old-growth status due to either the small size of the harvest areas or the restoration of a ponderosa pine covertype old-growth stand; 43 acres would no longer meet DNRC's old-growth definition. The overall attribute level would likely be reduced within the old-growth stands being harvested.

Indirect Effects

- ***Indirect Effects of Both Alternatives to Old-Growth Distribution and Attributes***

  Stands that currently meet DNRC's old-growth definition and are not proposed for harvesting would become more decadent. Stocking levels and the loading of down woody debris would increase in some stands and covertypes, increasing wildfire hazards. Shade-tolerant species would remain dominant in stands. Various factors, such as insects, diseases, and decreasing vigor, would eventually cause more snags to occupy portions of the stands.

- ***Indirect Effects of the Action Alternative to Old-Growth Distribution and Attributes***

  Timber would be harvested in or near old-growth stands and structurally create more-abrupt stand edges. Harvesting the proposed units would likely increase the amount of sunlight along the edges of harvested and unharvested areas. This additional sunlight would increase the growth of some trees established in that zone. Potentially, the risk of blowdown

along the proposed unit boundaries would increase and likely add to the down fuel loading. Harvested areas next to the old-growth stands could possibly act as a fuel break, which could slow or stop wildfires before they could burn the old growth.

Cumulative Effects

- ***Cumulative Effects of the No-Action Alternative to Old-Growth Distribution and Attributes***

  In addition to this proposed action, the Olney Urban Interface and Chicken-Antice timber sale projects are proposing to harvest in old-growth stands on Stillwater State Forest. The Chicken-Antice EA has been released, but the projects have not been sold. If these projects are implemented, approximately 106 acres of old growth would be harvested. Old growth would be reduced to an estimated 11,597 acres; approximately 9.9 percent of the analysis area. There would be a 28-acre reduction in the amount of mixed-conifer old growth, a 25-acre reduction in the western larch/Douglas-fir covertype, and a 53-acre reduction in the western white pine covertype. The 106 acres planned for harvest are all in the *medium attribute* category.

- ***Cumulative Effects of the Action Alternative to Old-Growth Distribution and Attributes***

  As noted above, the Olney Urban Interface and Chicken-Antice timber sale projects would have an effect on the old-growth amounts on Stillwater State Forest. In combination with the implementation of this proposed action alternative, old-growth would be reduced to an estimated 11,416 acres; approximately 9.7 percent of the analysis area. A 43-acre reduction would occur in the amount of mixed-conifer old growth, a 223-acre reduction in the western larch/Douglas-fir covertype, and a 53-acre reduction in the western white pine covertype. Approximately 32 acres of the ponderosa pine covertype would be introduced to the old-growth covertypes on Stillwater Unit. Attributes related to old growth would be reduced.

INSECTS AND DISEASES

Insects and diseases can exert major influences on forest conditions over time by causing major shifts in species composition, stand structure, and other characteristics by causing mortality to selective stand components. Though insects and diseases are a natural component of the ecosystem and accepted as such, their effects (particularly at epidemic levels) may not be a desired condition in some areas from a management or social perspective. In the wildland urban interface, for example, large and/or contiguous areas of dead and down trees that might result from high levels of insects or diseases are not considered desirable. In the event of a fire, this amount of fuel would increase fire intensities and reduce our ability to safely attack and control fire.

In addition, the *SFLMP* 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…*" and *MCA 77-5-207* states:

> ***Salvage Timber Program.*** *(1) The Department [DNRC] shall establish a salvage timber program that provides for the timely salvage logging on state forests of dead or dying timber or timber that is threatened by insects, disease, fire, or windthrow. In managing the*

harvest of salvage timber, the department shall consider:
(a) the economic value of the timber to be salvaged;
(b) the cost of salvage efforts; and
(c) the long-term costs to all forest resources from insects, disease, or fire that otherwise might be controlled through salvage operations.
(2) The Department shall, to the extent practicable, harvest dead and dying timber before there is substantial wood decay and value loss.
(3) The Department may sell salvage timber pursuant to this part.
(4) The Department's salvage timber program may not take precedence over the timely sale and harvest of green timber.

EXISTING CONDITION

Planning for the long-term management of forest insects and diseases is an important part of designing project-level timber sales. Various forest-species compositions and structures are more vulnerable to certain insects and diseases, windthrow, and wildfires than others. Insect and disease activities are recorded and mapped annually from aerial-flight surveys. New occurrences and the progression of existing pockets of infestation, along with approximate acreages and locations, are collected. Field surveys identify areas with insect and disease activities for timber-harvesting opportunities. The following is a discussion of the major insects or diseases that have been influencing vegetation in the project area:

- **Larch Dwarf Mistletoe**

  Most of the Smith Lake area and portions of Harvest Areas BB, BC, and BD have large pockets of upper-story western larch that are heavily infected with dwarf mistletoe. Infected western larch normally develop many small, dense witches' brooms throughout their crown. Because the wood of branches that form brooms becomes extremely brittle over time, witches' brooms often break off during the winter when snow accumulates in the brooms and makes them extremely heavy.

  Infected stands typically have many trees with stunted growth, witches' brooms, dying or dead tops, and dead trees. These stands eventually contain numerous dying and dead trees, usually bearing remnants of brooms. Dieback occurs as the nutrients and water needed by growing tree tops are diverted to the brooms, which are usually concentrated in the lower or middle crowns. Height growth slows and ceases, foliage above the brooms becomes sparse and off-color, and gradually the tops die. Spiked tops indicate a tree suffering typical decline. Tree volume growth can be reduced by as much as 50 percent, cone production is greatly reduced, and viable seeds are fewer. Eventually loss of vigor becomes great enough that infected trees die either as a direct result of dwarf mistletoe or from secondary insects and/or diseases. In addition, trees that are infected will likely infect incoming generations of western larch in the middle and understories.

- **Douglas-fir Beetles**

  Douglas-fir beetles are aggressive and opportunistic organisms. They feed on the living tissue (phloem) of the tree and breed under the bark. They generally require older, larger trees with a stem

circumference adequate to sustain themselves. Douglas-fir trees greater than 16-inches dbh and older than 120 years are the most susceptible, though younger trees as small as 7-inches dbh may be attacked when beetle populations are high. At epidemic beetle-population levels, individual trees are often overwhelmed by the sheer numbers of beetles attacking, and large numbers of trees may be killed. Warm, dry weather conditions, such as western Montana has had, favor beetle survival and increases stress on trees, which can lead to a high level of tree mortality.

Examples of beetle-killed trees are prevalent with many of the harvest areas near Smith Lake, as well as Harvest Areas BB, BC, SKA,SKB, and SKC.

- **Fir Engraver**

All of the proposed harvest areas contain pockets of dead and dying grand fir, which is the result of the fir engraver beetle. The fir engraver is a major pest of true firs in western forests. It attacks trees from pole-sized to full maturity. Outbreaks often occur during and following periods of drought. High populations of beetles feeding on the living tissue of the tree eventually girdle the tree. This leads to mortality, which, in turn, leads to high accumulations of downed woody debris, increased fuels, and a loss of timber value for the trusts. In the forest, stand sanitation and improvement measures to keep the trees in healthy, vigorous condition are the most practical means for minimizing losses caused by the fir engraver.

- **Armillaria Root Disease**

The most common root disease fungus in Douglas-fir is Armillaria. This fungus kills the cambium of roots and the root collar, girdling and killing the tree. Infected trees are often attacked by bark beetles. Because Armillaria lives in the soil, not only current populations of Douglas-fir and grand fir are killed, but also incoming generations.

ALTERNATIVE EFFECTS

Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Insects and Diseases***

If this alternative were implemented, seral and other shade-intolerant species, such as western larch/Douglas-fir and ponderosa pine, would continue to be lost from insect infestations and disease infections. Mortality from insects and diseases would likely continue and, in many cases, increase, causing loss of sawlog volume and value. Additionally, as mortality increases, the accumulation of standing and down woody debris would continue, increasing wildfire hazard.

- ***Direct and Indirect Effects of the Action Alternative to Insects and Diseases***

Mortality from some insects and diseases that are currently active in the project area would likely continue, but the amount would significantly decrease as a) older, decadent components of the timber stands are harvested and eventually replaced with young vigorous trees and b) species susceptible to current insect infestations and disease infections are reduced and more-resistant species are regenerated. Harvest treatments would target those species or individuals

affected by insects and diseases, as well as recently killed trees. By removing green infected trees, the continued spread of various insects and diseases would be hampered.

Seedtrees, primarily western larch, Douglas-fir and, where available, ponderosa pine, would be left scattered throughout the harvest units to provide a seed source for natural regeneration; seedlings would be planted in a majority of the units.

CUMULATIVE EFFECTS

- ***Cumulative Effects of the No-Action Alternative to Age Class Distribution***

  No live, dead, dying, or high-risk trees would be harvested. Some insect-infested and disease-infected trees would be salvage harvested, but at a slower, less-effective rate and not as a result of this analysis or in association with this project. Forest stands would maintain dense stocking levels, which contribute to the spread of insects, diseases, and fuel loading, which could lead to high-intensity fires, unnatural forest structures, and overall poor stand health.

- ***Cumulative Effects of the Action Alternative to Age Class Distribution***

  Timber-management activities on Stillwater State Forest and Kalispell Unit, including those proposed under this alternative, have generally implemented prescriptions that would reduce losses and recover mortality caused by insects and diseases. Older stands are most susceptible to many of the identified insect and disease problems in the project area due to lack of vigor, stand age, drought, and other factors. Stand-regeneration treatments that would bring older stands to a younger age class are producing stands with species compositions more resilient to the impacts of forest insects and diseases and more in line with historic forest conditions.

FIRE REGIMES AND FOREST FUELS

Habitat types depicting fire regimes for stands in the 3 geographic areas are quite variable due to the broken topography, aspects, and soil characteristics. A majority of the area (60 percent) is within a warm and moist habitat grouping, but there are areas, such as draw bottoms, where cooler air can be trapped; there are also areas on southwest exposures with poor soil conditions that are warm and moderately dry. Much of this occurs within a particular timber stand.

Fires are predominantly within the mixed-severity fire regimes. As a whole, the forest exists as a mosaic of differing ages and size classes that have developed from different human activities and fire frequencies and intensities in relation to other site factors, such as aspect, elevation, weather, stand structure, and fuel loading. As fire intervals have become longer, more shade-tolerant tree species have begun to develop in the understory and stands tend to be multistoried with varied patch sizes. A mosaic of even-aged and multi-aged patches is present in the project area.

Timber management, fire suppression, and the subsequent stand development have influenced the amount and distribution of fuels on these various stands in the project area. Stands in these sections have developed a high number of stems per acre and several levels of canopy. Under these forest conditions, fires can reach the upper canopy level through the available ladder fuels, causing torching and, under some

conditions, resulting in crown fires.

Units recently harvested in all 3 geographic areas have met the *Montana Hazard Reduction Law* standards of reduced ladder fuels and have retained approximately 15 tons of large woody debris on site to facilitate nutrient cycling for the soils. Those areas within 1,000 feet of structures met the *High Hazard Reduction* standard as defined in the Law.

ALTERNATIVE EFFECTS TO FOREST FUELS

Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Forest Fuels***

  Stands would continue to retain ladder fuels and dense stands until disturbance, man-caused or natural, occurs. Risk of torching and crown fires would remain high. As the trees in the more-recently harvested areas grow, ladder fuels would increase.

- ***Direct and Indirect Effects of the Action Alternative to Forest Fuels***

  Areas treated with regeneration treatments would retain approximately 8 to 15 tons of large woody debris per acre following site-preparation treatments. Fire is always a potential, but the ladder fuels to crowns would be removed in the proposed harvest units and the fuel treatments would limit the fire intensity under most circumstances. The success of aerial and ground attacks on wildfires would likely be improved because any fire occurring would most likely be a ground fire burning in the understory rather than a stand-replacing crown fire.

  Areas treated with commercial-thin and intermediate treatments would reduce the amount of trees and, thereby, fuel loads would be reduced. The connectivity of fuel and ladder fuels may not be reduced. In some circumstances, the risk of wildfires may be increased due to an increased amount of wind, dry fuels on the forest floor, and ladder fuels that have not been significantly reduced.

  Slash left in the woods would meet the *State Hazard Reduction Law*. Slash would be piled at the landings; these piles would be burned or otherwise disposed of within 2 years of their creation.

  The proposed harvesting would also decrease the risk of uncontrollable fires to adjacent land and homesites. The thinning and removal of forest fuels, especially in the canopies, would be expected to decrease fire intensities, which would allow fire personnel to control these fires more easily. A high level of hazard reduction would remove 90 percent of the slash in areas adjacent to homesites.

Cumulative Effects

- ***Cumulative Effects of the No-Action Alternative to Forest Fuels***

  In the past 10 years, approximately 1,200 acres of the project area have had fuels treated to levels that meet Montana's *Hazard Reduction Law*. Under this alternative, no changes would occur except the fuel reductions that would occur with firewood cutting.

- ***Cumulative Effects of the Action Alternative to Forest Fuels***

  In addition to the actions displayed under the *CUMULATIVE EFFECTS OF THE NO-ACTION ALTERNATIVE TO FOREST FUELS*, 832 acres would be harvested and the slash and fuel loading would be reduced to meet the *Hazard Reduction Law*;

in many areas of the Wildland Urban Interface, slash reduction would meet the '*High Standards*' set forth in the *Hazard Reduction Law*.

Due to the location of the proposed harvest units, reduced fuel loads, and reduced amount of canopy, the success of aerial and ground attacks on wildfire would likely be improved.

NOXIOUS WEEDS

EXISTING CONDITIONS

A noxious weed is defined as a nonnative plant competing with desirable plants for nutrients, water, and sunlight and is harmful to agriculture, wildlife, forestry, and other beneficial uses, thus reducing the value and productivity of the land. Most noxious weeds are exotic species, originating in Eurasia (*Flathead County Weed-Management Plan*). Montana has declared 15 weeds noxious; Flathead County has added 10 to their *Noxious Weed Management* list.

The following noxious weeds have been located on State land managed by DNRC and along access routes to the project area:

- spotted knapweed (*Centraurea maculosa*)
- St. John's-wort (*Hypericum perforatum*)
- oxeye daisy (*Chrysanthemum leucanthemem*)
- common tansy *(Tanacetum vulgare)*
- hound's-tongue *(Cynoglossum officinale)*
- orange hawkweed (*Hieracium aurantiacum*)
- tansy ragwort (*Senecio jacobea*)

The first 5 species listed are Category 1 weeds, which are established weeds with high disbursement; orange hawkweed and tansy ragwort are Category 2 weeds, which means the weed is established, but has a moderate disbursement level. These invading weed species are not new to Flathead County; new invading weed species would be listed as Category 3 weeds.

Spotted knapweed and oxeye daisy, the most widely distributed noxious weeds in the project area and on Stillwater State Forest, is found in areas where ground disturbances such as landings, skid trails, powerlines, and roadsides occur.

The Flathead County Weed Department , under contract with DNRC, has sprayed weeds along roads and collected seed heads from tansy ragwort over the past 7 years in the Beaver Lake area.

ALTERNATIVE EFFECTS TO NOXIOUS WEEDS

Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Noxious Weeds***

  Additional mineral soil would not be exposed and heavy tree canopies would continue to compete with weeds; therefore, the risk of additional establishment of weed populations would not increase. Currently, the project area is used extensively for dispersed recreation and weed seed is introduced primarily from motor vehicle use. Established infestations of noxious weeds are being addressed with an ongoing program of site-specific herbicide spraying along roads and in small areas of infestation.

- ***Direct and Indirect Effects of the Action Alternative to Noxious Weeds***

  The proposed activities would result in an increase in ground disturbance. Mechanized equipment and ground disturbance could increase or introduce noxious weeds along roads and throughout forested areas. Weed seeds are likely to be scattered throughout the forested areas, and the reduction of

canopy and disturbance from the timber-harvesting activities are expected to provide the catalyst for spread. Mitigation measures would include:

- washing equipment before entering the site,
- sowing grass seed on roads after harvesting has been completed, and
- applying herbicide applications along roadsides and on spots of weed outbreaks.

Cumulative Effects

- ***Cumulative Effects of the Action and No-Action Alternatives to Noxious Weeds***

The open roads in the project area have traffic from dispersed recreation, timber-management activities, and other uses on a regular basis. These disturbances and illegal motorized use increase exposure to weed establishment. The weed-management program at Stillwater Unit, including cooperation with the United States Forest Service (USFS) and weed departments of Flathead and Lincoln counties, has improved over time and more weed control is taking place.

WATERSHED ANALYSIS

INTRODUCTION

This analysis is designed to disclose the existing condition of the hydrologic and fisheries resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, issues were identified regarding water quality, water quantity, and fisheries resources. After reviewing public and internal comments, DNRC developed the following issue statements regarding the potential effects of the proposed timber harvesting:

- Timber harvesting and road construction has the potential to increase water yield, which, in turn, may affect stream channel stability.
- Timber harvesting and road construction may increase sediment delivery into streams/lakes and affect water quality.
- Timber harvesting activities may adversely affect fish habitat parameters of large woody debris, channel complexity, stream shading, and stream temperature.

These issues can best be evaluated by analyzing the anticipated effects of sediment delivery and water yield on the water quality of streams in the project area and by assessing the level of riparian harvesting and the potential risk of changing fisheries habitat parameters.

The *ENVIRONMENTAL EFFECTS* section discloses the anticipated indirect, direct, and cumulative effects to water resources in the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships in each analysis area have been taken into account for the cumulative-effects analysis.

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

- miles of new road construction and road improvements
- potential for sediment delivery to streams
- increases in ECA and annual water yield
- increases or decreases in fish habitat parameters

ANALYSIS METHOD

SEDIMENT DELIVERY

The methods applied to the project area to evaluate potential direct, indirect, and cumulative effects include a field review of potential sediment sources from haul routes. Stream crossings and roads were evaluated to determine existing sources of introduced sediment. Potential sediment delivery from harvest units will be evaluated from a risk assessment. This risk assessment will use soil information provided in *SOILS ANALYSIS* and the results from soil monitoring on past DNRC timber sales.

WATER YIELD AND CUMULATIVE EFFECTS

As described in the *Forest Management Rules (ARM 36.11.423*), DNRC will determine the level of analysis dependent upon (1) the extent of the proposed activity; (2) the level of past activities; and, (3) beneficial uses present.

Annual water yield will be disclosed as a cumulative effect under *EXISTING CONDITIONS* of this analysis because the existing condition is a result of all past harvesting and associated activities. Under *ENVIRONMENTAL EFFECTS* of this

analysis, water-yield increases as a result of this project will be disclosed as a direct effect. The water-yield increase that includes all past, current, and planned state actions will be disclosed in the cumulative-effects section.

The annual water-yield increase for watersheds in the project area was estimated using the ECA method as outlined in *Forest Hydrology, Part II (Haupt et. al., 1976)*. Data for the ECA method is derived from aerial-photo interpretation, previous timber sale contracts, and local knowledge.

ECA is a function of total area roaded, harvested, or burned; percent of canopy removed during harvesting or wildfires; and amount of vegetative recovery that has occurred in the harvested or burned areas. As live trees are removed, the water that would have evaporated and transpired either saturates the soil or is translated to runoff. This method also estimates the recovery of these increases as new trees revegetate the site and move toward preharvest water use.

In order to evaluate the potential effects of water-yield increases, a threshold of concern for each watershed was established per *ARM 36.11.423*. Thresholds were established based on evaluating the acceptable risk level, resources value, and watershed sensitivity.

FISH HABITAT PARAMETERS

Expected effects to fisheries habitat will be addressed qualitatively using the current condition as a baseline, disclosing the expected changes due to the alternatives proposed. The analysis method for woody debris recruitment will evaluate the potential reduction in available woody debris and shading due to timber-harvesting activities. Stream temperature will be addressed by evaluating the risk of stream temperature increases due to reduced shading from existing vegetation.

ANALYSIS AREA

SEDIMENT DELIVERY

This section will be organized into 3 areas:

- Beaver Lakes area, which includes the Beaver Lake/Creek watershed, Boyle Lake watershed, and unnamed tributaries to Whitefish Lake and Stillwater River watersheds;
- Skyles Lake area, which includes the Skyles and Spencer Lake watershed; and
- Smith Lake area, which includes Smith Creek, King Creek, and Brush Creek watersheds.

The analysis area for sediment delivery is limited to harvest units and the roads used for hauling. This includes upland sources of sediment that could result from this project. In addition, in-channel sources of sediment, such as mass wasting locations or excessive scour/deposition, will be discussed for streams near proposed harvest units.

WATER YIELD AND CUMULATIVE EFFECTS

Water yield will be discussed on a scale relevant to potential effects. Due to the wide distribution of potential harvest units, the amount of harvesting in 6th code watersheds is inadequate to display potential effects. Therefore, this analysis will use smaller watersheds as the analysis area. These watersheds include King Creek, Smith Creek, Brush Creek, Unnamed tributary to Whitefish Lake, Beaver Lake/Creek, Unnamed tributary to Stillwater River, and Boyle Lake. These smaller watersheds will

be listed as part of the larger 6th code watersheds.

FISHERIES HABITAT PARAMETERS

The analysis area for fisheries-habitat parameters is the proposed harvest units immediately adjacent to fish-bearing streams and lakes. This includes proposed harvest units near Smith and Dollar lakes. Because no fisheries resources were identified in Brush and King creeks, no impacts would be expected from this proposal; therefore, no effects discussion will occur for these streams.

WATER USES AND REGULATORY FRAMEWORK

WATER-QUALITY STANDARDS

This portion of the Flathead River basin, including Whitefish Lake and its tributaries, is classified as A-1 by the State of Montana DEQ, as stated in *ARM 17.30.608*. The water-quality standards for protecting beneficial uses in A-1 classified watersheds are located in *ARM 17.30.622*. Water in A-1 classified waterways is suitable for drinking, culinary and food processing purposes after conventional treatment for naturally present impurities; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life; waterfowl and furbearers; and agricultural and industrial water supply. State water-quality regulations limit any increase in sediment above naturally occurring concentration in water classified A-1. Naturally occurring "means condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied" (*ARM 17.30.602 [19]*). Reasonable land, soil, and water conservation practices include "methods, measures or practices that protect present and reasonably anticipated beneficial uses…" (*ARM 17.30.602 [25]*). The State of Montana has adopted BMPs through its nonpoint-source management plan as the principle means of meeting *Water Quality Standards* (*DEQ, 2007*).

WATER QUALITY LIMITED WATERBODIES

Within the project area, Swift Creek is the only waterbody listed as a water-quality-limited waterbody in the 2006 *303(d)* list. Swift Creek is listed on the 2006 *303(d)* list for partially supporting cold-water fisheries and aquatic life. The probable causes of impairment are listed as total phosphorous, suspended solids and bedload, and alteration of streamside vegetative cover. The listed probable source of impairments is silvicultural activities. The *303(d)* list is compiled by DEQ as required by *Section 303 (d)* of the *Federal Clean Water Act* and the *Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR, Part 130)*. Under these laws, DEQ is required to identify waterbodies that do not fully meet water-quality standards, or where beneficial uses are threatened or impaired.

STREAMSIDE MANAGEMENT ZONE LAW

All rules and regulations pertaining to the SMZ Law will be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater than 35 percent. An SMZ width of 50 feet is required when the slope is less than 35 percent. Alternative practices that deviate from the SMZ law are allowed with appropriate environmental review and documentation.

WATERSHED ANALYSIS

WATER RIGHTS AND BENEFICIAL USERS

Surface water rights exist within 3 miles downstream of the project area for fish and wildlife propagation, lawn and garden use, industrial use, stock watering, domestic use, and irrigation uses.

EXISTING CONDITION

GENERAL DESCRIPTION

The project area includes DNRC-managed lands in 4 distinct 6th-code hydrologic units (HUCs): Lazy Creek, Swift Creek, Whitefish Lake, and Stillwater River. *TABLE III-7 – 6th CODE HUC WATERSHEDS IN RELATION TO PROJECT* shows the project area acres and proposed harvest acres located in each watershed.

While this displays the distribution of the project area and proposed harvest acres, due to the distribution of the proposal, smaller watersheds within these will be used for water yield and the cumulative-effects analysis.

All of the streams in the project area were generally stable with limited in-channel erosion beyond what would be expected from natural channels. Some bank scouring at outcurves and constriction is present although not frequent.

Brush Creek

Brush Creek is a Class I, perennial tributary to Whitefish Lake. The headwater of this small 283-acre watershed consists of springs that maintain a consistent year-round flow. During field reconnaissance, no fish were found in the stream above Brush Lake, likely due to the naturally high pH and poor habitat conditions.

Ownership in the watershed is approximately 276 acres of state land managed by DNRC and 7 acres of private land. Two main roads (DelRey and Lower Whitefish) cross Brush Creek.

King Creek

King Creek is a 636-acre watershed that contributes surface flow to Swift Creek. While the lower reach of the stream is perennial and likely contains fish, no defined channel was found for several hundred feet immediately above and below the Lower Whitefish Road crossing. Above this dry reach, perennial flow was located and the spring source was found. However, likely due to poor habitat, a naturally high pH, and disconnected flows from downstream (*Bower, 2008*), no fish were found during electrofishing in 2008 by DNRC personnel. Therefore, this is a Class II stream.

TABLE III-7 - 6TH CODE HUC WATERSHEDS IN RELATION TO PROJECT

6TH-CODE HUC WATERSHED NAME	ACRES	APPROXIMATE ACRES OF PROJECT AREA	APPROXIMATE PROPOSED HARVEST ACRES
Lazy Creek	10,432	3	2.5
Swift Creek-Hemlock Creek	18,248	480	13.5
Whitefish Lake	17,109	1,190	348.0
Stillwater River-Tobie Creek	28,662	3,900	468.0
Totals	*74,451*	*5,573*	*832.0*

Ownership in the watershed includes approximately 279 acres of private land, 225 acres of land managed by Flathead National Forest (FNF) and 132 acres of state land managed by DNRC. Only 1 main road crossing is found on the stream; however, this is in the dry reach. One other crossing upstream from Lower Whitefish Road was found, although no scoured channel was located near the crossing site.

Smith Creek

Smith Creek is a Class I, perennial, fish-bearing tributary to Whitefish Lake. The headwaters of this stream are located on FNF -managed land and the stream flows through private land into Smith Lake, which is located on DNRC-managed state land.

Smith Lake is approximately 18 acres and is impounded by a DNRC-managed, man-made earthen dam and concrete spillway. The lake was used by DFWP for fish propagation in the 1930s, 1940s, and 1950s. Eastern brook trout are the only species found in Smith Lake and downstream in Smith Creek. In 2000, the dam was listed as a 'high hazard' dam by the DNRC Water Resources Division, Dam Safety Bureau. To reduce the risk of a breach by high water, the level of Smith Lake was reduced by nearly 6 feet.

Ownership in the 2,019-acre watershed includes approximately 901 acres of private land, 802 acres of FNF-managed land, and 316 acres of DNRC-managed state land.

Unnamed Tributary to Whitefish Lake

This second order stream flows in a northwest-to-southeast direction toward Whitefish Lake; however, surface flow ends prior to leaving DNRC-managed state lands and, therefore, likely does not reach Whitefish Lake. Field reconnaissance during 2008 revealed that this perennial Class II stream percolated into the ground near the state land/private land boundary on the east line of Section 16, T32N, R22W. During field review, no fish were seen in the stream as it flowed through 2 wet meadows and exhibited subsurface flows in 2 locations. Because the extent of surface flow ceased above the railroad tracks on private land, no investigation was made regarding a culvert under the railroad tracks.

Ownership in this 374-acre watershed consists of approximately 87 acres of private land and 287 acres of DNRC-managed state land. One road/trail crossing was found on the stream. Currently, this crossing is a ford used primarily by ATVs and foot traffic.

Beaver Lake/Creek

This watershed area is approximately 2,400 acres and contains 3 lakes and 1 perennial stream. The lakes included in the watershed are Dollar, Little Beaver, and Beaver. Beaver Creek is considered a Class I, perennial stream. Due to discrepancies in contour mapping by some agencies, this watershed is in two 6th-code HUC watersheds, Stillwater River-Tobie Creek and Whitefish Lake.

Beaver Creek is the principal surface-water outlet of Beaver Lake; however, the upper portion of the stream likely only flows during high-water periods when Beaver Lake is full. During the rest of the year, the creek is maintained via groundwater and seasonal rains. Other streams in this watershed are generally nonscoured, ephemeral features that rarely contain flowing surface water. A more thorough description of Beaver Creek and the pothole lakes in this watershed can be found in the

Beaver Lake Draft/Final EIS published in 1998 (*DNRC, 1998*).

Ownership in this watershed includes approximately 850 acres of private land and 1,550 acres of DNRC-managed state land. Several roads that cross ephemeral draws are found in the watershed, but only 2 road crossings were identified on Beaver Creek, both on private lands and, therefore, they were not reviewed.

Boyle Lake

The Boyle Lake watershed is 1,368 acres and includes all lands draining into Boyle Lake. This watershed does not include the outflow of Boyle Lake into Stillwater River.

Boyle Lake is a perennial, fish-bearing lake with several unnamed tributaries contributing surface flow. However, due to the location of the railroad on the south side of the lake, the tributaries are somewhat disconnected from the lake via surface water. During field review, the culvert under the railroad tracks did not appear to have been accessed by streams on the south side of the tracks in the recent past.

These streams on the south side of the railroad tracks are generally Class II streams that do not contain fish, but do contribute surface water to a man-made ditch adjacent to the tracks. Due to the short period of surface flow, these streams do not provide fish habitat.

Ownership in the Boyle Lake watershed consists of approximately 405 acres of private lands and 963 acres of DNRC-managed state lands. Several roads in the watershed have crossings on the tributaries to Boyle Lake.

Skyles/Spencer Lakes

The Skyles/Spencer Lakes watershed includes ephemeral, intermittent, and perennial streams that ultimately contribute surface flow into Stillwater River. These lakes are likely only connected by surface water during extremely high spring runoff; during most years, groundwater is likely the only linkage between the two lakes. Although the **USGS** topographic quadrangle map shows perennial and intermittent streams on the state parcel in Section 33 of T31N, R22W, no scoured channels were found on the parcel during field review in the summer of 2008.

Fish present in Skyles Lake includes largemouth bass, northern pike, pumpkinseed, redside shiner, westslope cutthroat trout, and yellow perch. Spencer Lake contains the same species except for the redside shiner.

Ownership in the watershed includes approximately 2,020 acres of private land, 1,447 acres of DNRC-managed state land, and 42 acres of FNF-managed land. Several main roads are in the watershed, including U.S. Highway 93 and Twin Bridges Road, which contain stream crossings.

Unnamed Tributary to Stillwater River

This ephemeral stream drains a small portion of the project area near the Beaver Lakes area, although no scoured streams were found on the DNRC-managed state lands during field review. Due to the ephemeral nature of the channel, this tributary likely does not support fish.

Ownership in this watershed includes approximately 1,257 acres of private land, 429 acres of DNR-managed state land, and 244 acres of FNF-managed land.

Sediment Delivery

Very few direct sediment sources were noted from the proposed haul routes in the project area. In the Beaver Lakes portion of the project area, no direct sediment sources to streams were noted, mostly due to substantial improvements made by DNRC as part of the Beaver 99 and Beaver 2000 timber sales during 2000 and 2001. However, the road around Dollar Lake may contribute some sediment due to its close proximity to the waterbody. The trail in the unnamed tributary to Whitefish Lake has direct sediment delivery, primarily due to ATV use at the crossing. Due to the disconnected characteristic of this stream, no adverse impacts to fish-bearing streams currently exist at this site.

In the Skyles Lake area, no streams are present and, therefore, no direct sediment delivery to streams is present.

In the Smith Lake area, no direct sediment delivery to streams or lakes was noted. Although the road leading to the west side of Smith Lake has several large potholes, no streams are near the road and, therefore, no direct sediment delivery was noted during field review.

Fish Habitat Parameters

Large Woody Debris

Woody debris in Smith Lake is limited because much of the debris floated to the dam and spillway. This material has been removed over the years to maintain the spillway for safety. In Dollar Lake, woody debris is also limited, although this is likely a natural condition because no record exists of debris removal from the lake. Existing woody debris consists of a few trees on the east and south sides of the lake. Woody debris provides habitat and cover for fish.

Stream Temperature

No temperature data has been collected on Dollar or Smith lakes. Although a reasonable assumption is that conditions are suitable for fish because fish currently inhabit both lakes. Riparian vegetation growing within 100 feet of the high-water marks on the lakes is expected to be one (of many) variable that affects lake water temperatures. This riparian vegetation is also the only variable affecting lake water temperatures that could be potentially affected by the proposed actions. Currently, approximately 90 percent of the riparian vegetation around the lakes is within the expected historic range of conditions. Consequently, the current temperature regime of the lake is not likely substantially influenced by riparian harvesting.

Water Yield and Cumulative Effects

After reviewing the beneficial uses, existing channel conditions, and existing watershed condition per *ARM 36.11.423*, the threshold of concern for the each watershed was set. The recommended threshold value is compared to the expected annual water yield of a fully forested condition. An annual water-yield value less than this threshold value would be expected to result in a low to moderate degree of risk to beneficial uses due to water-yield increases as described in *ARM 36.11.423(f)(iv)*. The recommended thresholds listed in the text below reflects the previously discussed stability of the stream and the fish species present, if any.

Brush Creek exhibits very little canopy removal on aerial photographs. The estimated ECA condition is less than 1 percent, which is mainly due to DelRey and

Lower Whitefish roads. Precipitation in this watershed ranges from 20 to 40 inches per year. The recommended threshold for this watershed is 14 percent over a fully forested condition.

King Creek has an estimated annual water-yield increase of 10.1 percent over a fully forested condition, which includes recent harvesting on private lands above the DNRC -managed lands. The recommended threshold for this watershed is 13 percent over a fully forested condition.

Smith Creek has an estimated annual water-yield increase of 6 percent over fully forested conditions, which includes recent harvesting on private lands above the DNRC-managed land. The recommended threshold for this watershed is 13 percent over a fully forested condition.

Unnamed Tributary to Whitefish Lake has an estimated annual water-yield increase of 2.2 percent, which includes past harvesting on state land near the top of the watershed and approximately 1.5 miles of road. Wet meadows dampen flows in the watershed. The recommended threshold for this watershed is 14 percent over a fully forested condition.

Beaver Lake/Creek was modeled during the *Beaver Lake EIS* preparations in 1998. At that time, the annual water-yield increase was estimated at 4.4 percent over a fully forested condition, which was well below the threshold of 12 percent. Since that time, no major timber harvesting has occurred on DNRC-managed state lands and only limited canopy removal has occurred on private lands.

Boyle Lake was modeled during the *Beaver Lake EIS* preparations as well. At that time, the annual water-yield increase was estimated at 0.8 percent. No major timber harvesting has occurred on state land since that time. The recommended threshold for this watershed is 12 percent over a fully forested condition.

Skyles/Spencer Lakes are generally not connected except during extreme high-water events. Furthermore, these lakes serve to dampen water-yield increases during the peak runoff and, therefore, reduce the potential for destabilizing downstream channels. After reviewing the 2005 aerial photographs of the watershed, an estimated 1,500 acres appear to be fully forested. The remaining 520 acres has varying levels of forest canopy. This watershed is approximately 2,020 acres in size, and the proposal would harvest about 240 acres with commercial-thin and improvement harvests. Due to the proposed light treatment and lack of stream channels in the proposed harvest area, further discussion will be qualitative.

Unnamed Tributary to Stillwater River - Due to the ephemeral and intermittent nature of this channel and the low level of proposed harvesting in this watershed, no quantitative analysis was deemed necessary

ENVIRONMENTAL EFFECTS

DESCRIPTION OF ALTERNATIVES

- ***No-Action Alternative***

  No timber harvesting or associated activities would occur under this alternative. Existing activities such as recreational use, individual Christmas tree harvesting, and firewood gathering would continue.

- ***Action Alternative***

  Twenty-seven harvest areas totaling approximately 832 acres would be

commercially harvested under this alternative. Most of the units would be suitable for ground-based harvesting; 2 units would require cable yarding. In addition, approximately 0.9 mile of road reconstructed, 3.7 miles of temporary road would be constructed, 0.9 mile of road would be abandoned/obliterated; 20 miles of road would be maintained or have minor drainage improvements installed as necessary to protect water quality. Three of the harvest units (113 acres) would be completed under winter conditions, which require frozen and/or snow-covered conditions. The remainder of the units (719 acres) may be completed under summer or winter conditions.

Existing activities such as recreational use, individual Christmas tree harvesting, and firewood gathering would continue.

DIRECT AND INDIRECT EFFECTS

- ***Direct and Indirect Effects of the No-Action Alternative to Water Resources***

Sediment Delivery

Under this alternative, no timber harvesting or related activities would occur. The existing direct sediment-delivery sources would continue until repaired by another project or funding source. In-channel sources of sediment would continue to exist and erode as natural events dictate.

Fish Habitat Parameters

– ***Large Woody Debris Recruitment***

No reduction in recruitable large woody debris would result from the implementation of this alternative.

– ***Stream Temperature***

No increases in stream temperature from a reduction in stream shading would be expected under this alternative.

Water Yield

No increase in water yield would be associated with this alternative.

- ***Direct and Indirect Effects of the Action Alternative to Water Resources***

Sediment Delivery

Past monitoring of DNRC timber harvests has shown erosion on approximately 6 percent of the sites monitored, although no water-quality impacts from the erosion were found (*DNRC, 2004*). These sites were harvested during the summer period, and the erosion was attributed to inadequate skid-trail drainage. By minimizing displacement, less erosion would likely occur compared to other harvest methods with more extensive disturbance (*Clayton, 1987 in DNRC, 2004*).

During a review of BMP effectiveness, including the effectiveness of stream buffers, *Raskin et al.* found that 95 percent of erosion features (disturbed soil) greater than 10 meters (approximately 33 feet) from the stream did not deliver sediment. His findings indicated that the main reasons stream buffers are effective include: 1) keeping active erosion sites away from the stream and 2) stream buffers may intercept and filter runoff from upland sites as long as the runoff is not concentrated in gullies or similar features (*Raskin et al, 2006*).

The proposed temporary road construction includes 1 improved stream crossing. This crossing is the current ford used by ATVs; the improvement would be a temporary bridge crossing. All construction would occur well away from

streams on soils that are suitable for road construction (*Martinson and Basko, 1998*). Because revegetation may be difficult on the road fill, erosion may occur, but due to the distance from streams, sediment delivery and subsequent water-quality impacts are not likely to occur.

Existing roads would have drainage improvements and BMP upgrades implemented under this alternative. Existing sources of sediment would be mitigated or repaired as part of the *Timber Sale Contract* requirements. Minor drainage improvements include reshaping drain dips, cleaning ditch-relief culvert catchbasins, as well as ditch reshaping and ditch-relief culvert extensions. Current maintenance activities would continue to provide drainage to area roads.

Because DNRC would incorporate BMPs into the project design as required by *ARM 36.11.422 (2)* and all laws pertaining to SMZs would be followed, a low risk of sediment from timber-harvesting activities would result from the implementation of this alternative. An alternative practice for skidding across a Class II stream during winter would be required. However, the mitigation for potential sediment delivery would include winter conditions, filter fabric, and a slash mat to minimize soil disturbance. Therefore, the risk of long-term adverse direct or indirect effects to water quality or beneficial uses would be low.

Fish Habitat Parameters

- ***Large Woody Debris Recruitment***

  No harvesting would occur within 50 feet of Dollar Lake, and up to 50 percent of merchantable trees may be removed from 50 to 100 feet from the lakeshore. This level of harvesting would be expected to continue to provide recruitable woody debris to provide habitat and cover in the lake with a low degree of risk.

  Along Smith Lake, up to 25 percent of the merchantable trees would be harvested in the 100-foot SMZ; therefore, a majority of the recruitable trees would remain. The riparian harvest prescription would be expected to retain adequate levels of recruitable woody debris to the lake. Adequate levels of habitat and cover in the lake would also be expected to be provided by recruitable large woody debris. Nevertheless, since minor amounts of riparian vegetation would be harvested, a low-risk impact to these features would be expected. This level of retention would be expected to continue to provide habitat and cover with a low degree of risk.

- ***Stream Temperature***

  Because harvesting would be limited near fish-bearing lakes, a measurable increase in water temperature from the implementation of this alternative is unlikely. Therefore, a low risk of impacts to lake water temperatures would be expected.

Water Yield

If this alternative were selected, approximately 832 acres would be harvested using conventional ground-based and cable yarding methods. Approximately 572 ECA would be generated from these activities in 11 watersheds, although 2 of these

watersheds would see undetectable increases. *TABLE III-8 – ECA AND ANNUAL WATER-YIELD INCREASE FOR PROJECT WATERSHEDS* displays the ECA increase and percent of annual water -yield increase for applicable watersheds.

Because proposed harvest levels under this alternative would not substantially increase water yield or stream flow, only a low risk of increased in-channel sediment would result from this alternative. No increases of in-channel sources of sediment would be expected.

TABLE III-8 - ECA AND ANNUAL WATER-YIELD INCREASE FOR PROJECT WATERSHEDS

WATERSHED	6TH-CODE HUC WATERSHED NAME	HARVEST ACRES	ECA INCREASE	ANNUAL WATER -YIELD INCREASE
Brush Creek	Whitefish Lake	46.7	43.6	6.9%
King Creek	Swift Creek-Hemlock Creek	8.2	8.0	0.3%
Smith Creek	Whitefish Lake	101.5	83.8	0.4%
Beaver Lake/ Creek	Stillwater River-Tobie Creek and Whitefish Lake	115.7	81.0	<1%
Unnamed tributary to Whitefish Lake	Whitefish Lake	46.7	82.0	10.7%
Boyle Lake	Stillwater River-Tobie Creek	30.6	29.5	<.5%
Skyles/Spencer Lake	Stillwater River-Tobie Creek	240.0	134.8	*
Unnamed tributary to Stillwater River	Stillwater River-Tobie Creek	144.7	87.0	**

Implementation of the Action Alternative would result in approximately 1 ECA in Swift Creek and 2 ECA in the Lazy Creek watersheds. In addition, approximately 23 ECA would be generated in the Whitefish Lake watershed. Due to the small scale of harvesting relative to the watershed size, the proposed activities would not result in detectable annual water-yield increases in these watersheds.

**Due to the lack of scoured stream channels in the state parcel and the proposed light treatment of a commercial thin, that a measurable increase would be detectable is unlikely.*

***Due to the small scale of harvesting in relation to the watershed size and the lack of scoured channels near the proposed harvest area, that a measurable increase in water yield would result in this watershed is unlikely.*

CUMULATIVE EFFECTS

- ***Cumulative Effects of the No-Action Alternative to Water Resources***

Sediment Delivery

Under the No-Action Alternative, the potential for sediment contribution from the proposed haul route would still exist as described in *EXISTING CONDITION*. The limited number of existing sediment-delivery sources would continue until repaired by another project or funding source.

Fish Habitat Parameters

– ***Large Woody Debris Recruitment***

No reduction in recruitable large woody debris would result from the implementation of this alternative.

– ***Stream Temperature***

No increases in water temperature from a reduction in shading would be expected under this alternative because no harvesting would occur.

Water Yield

No increase in water yield would be associated with this alternative.

Cumulative Effects Summary

Because no timber harvesting or associated activities would occur under this alternative, cumulative effects would be limited to the natural progression of the existing condition. Sediment sources would continue unless repaired under a separate project. Conditions would continue to support fish-habitat parameters, provide adequate levels of large woody debris for habitat, and also support a natural range of water temperatures. Under this alternative, fisheries-habitat quality would be maintained at its current level with a low degree of risk of change due to management actions.

- ***Cumulative Effects of the Action Alternative to Water Resources***

Sediment Delivery

Under this alternative, the proposed timber-harvesting and road-construction activities would occur. Minor drainage improvements would occur on the haul route, and the direct sediment source on the ATV trail would be repaired. A cumulative increase in sediment delivery as a result of timber harvesting would have a low risk of occurring because of BMP applications, limited activities near surface water, and adequate buffers to filter potential displaced soil.

Fish Habitat Parameters

– ***Large Woody Debris Recruitment***

Areas on the south side of Dollar Lake and the east side of Smith Lake would have reduced levels of recruitable woody debris. Because a majority of the recruitable woody debris in the proposed harvest units would be retained, adverse affects would not likely result from the reduction.

– ***Stream Temperature***

Because of the limited amount of shade -producing vegetation that would be removed, a low risk of cumulative temperature increases above naturally occurring ranges would result from the implementation of this alternative.

Water Yield

The estimated cumulative annual water-yield increases in the project watersheds would remain below the recommended thresholds if this alternative were selected (*TABLE III-9 –ECA AND CUMULATIVE*

ANNUAL WATER-YIELD INCREASE FOR PROJECT WATERSHEDS). Because this level would remain below the thresholds set in accordance with *ARM 36.11.425(g)*, a low degree of risk to water quality would result from the implementation of this alternative. Other watersheds would have very small increases that would likely be immeasurable.

Cumulative Effects Summary

Because all timber-harvesting activities would follow BMPs as required by *ARM 36.11.422*, and the direct and indirect effects would have a low risk of impacts, additional adverse cumulative effects would not be expected to occur under this alternative. This expectation includes the results of (1) a reduction in direct sediment delivery on the ATV trail; (2) a slight reduction in potential recruitable large woody debris near Dollar and Smith lakes; and (3) slight increases in modeled annual water-yield estimates. Conditions would continue to support fish-habitat parameters, provide adequate levels of large woody debris for fish habitat, and also support a natural range of water temperatures. Under this alternative, fisheries-habitat quality would be maintained at its current level with a low degree of risk of change due to management actions.

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

TABLE III-9 - ECA AND CUMULATIVE ANNUAL WATER-YIELD INCREASE FOR PROJECT WATERSHEDS

WATERSHED	RECOMMENDED THRESHOLD	PREPROJECT ANNUAL WATER-YIELD INCREASE	CUMULATIVE ANNUAL WATER-YIELD INCREASE
	(PERCENT)		
Brush Creek	13	1.2	8.1
King Creek	13	10.1	10.4
Smith Creek	13	6.0	6.4
Beaver Lake/Creek	12*	4.4*	<5.4
Unnamed tributary to Whitefish Lake	14	2.2	12.9
Boyle Lake	12*	0.8*	<1.3

**Modeled as part of Beaver Lake EIS*

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SOILS ANALYSIS

INTRODUCTION

This analysis is designed to disclose the existing condition of the soil resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, issues were identified by the public regarding soil impacts. The following issue statement was expressed from comments regarding the effects of the proposed timber harvesting:

> *Timber harvesting activities may result in reduced soil productivity and increased erosion due to compaction and displacement.*

ANALYSIS AREA

The project area for this proposal includes approximately 5,570 acres that are divided into 3 geographic areas: Swift Area, Beaver Area, and Skyles Area. In the project area are 10 individual landtypes; however, only 4 of these landtypes have proposed units for timber-harvesting activities, which includes road construction, reconstruction, or obliteration. The analysis area for soil impacts will be the area within harvest units and where proposed road activities would take place. This analysis area will adequately allow for disclosure of existing conditions and direct, indirect, and cumulative impacts. This analysis also looks at cumulative effects for the entire project area.

ANALYSIS METHODS

Methods for disclosing impacts include using general soil descriptions and the management limitations for each landtype. *Landtype* refers to a unit of land with similar designated soil, vegetation, geology, topography, climate, and drainage. This analysis will qualitatively assess the risk of negative effects to soils from erosion, compaction, and displacement from each alternative, using insight from previously collected soils-monitoring data from over 70 DNRCs postharvest-monitoring projects.

While the anticipated impacts from each alternative will disclose the direct/indirect effects, the cumulative impacts will be the result of previous and proposed activities.

EXISTING CONDITIONS

GENERAL CONDITIONS

The *Soil Survey of Flathead National Forest Area, Montana (Martinson and Basko, 1998)* combines landform and soil information with habitat types to inventory and map soils in the project area. While this soil survey covers a majority of the project area, information on the Skyles Lake parcel is found in a separate publication. This report, *Soils Survey of Upper Flathead Valley Area, Montana (USDA, 1946)*, also looks at soil and habitat information. Ten landtypes were identified in the project area; however, activities are proposed on only 4 of these landtypes; therefore, only 4 landtypes will be discussed. Additional information for all landtypes is available in the project file. *TABLE III-10 - PROJECT AREA LANDTYPE DESCRIPTIONS* provides a brief description of the landtypes affected in the project area, while *FIGURE III-2 - SMITH AREA LANDTYPES* and *FIGURE III-3 - BEAVER AREA LANDTYPES* provides a visual depiction of the all landtype locations in the Smith and Beaver geographic areas. The Skyles Geographic Area consists entirely of 1 landtype; therefore, a map is unnecessary.

Stillwater State Forest and this portion of Kalispell Unit, like much of northwest Montana, are dominated by bedrock consisting of metasedimentary rocks from the Proterozoic age. Rocks in this formation

TABLE III-10 - PROJECT AREA DESCRIPTIONS

LANDTYPE	NAME	SOIL AND VEGETATION DESCRIPTIONS	MANAGEMENT CONSIDERATIONS	MANAGEMENT CONSIDERATIONS	MANAGEMENT CONSIDERATIONS
			K FACTOR**/ EROSION POTENTIAL	TIMBER	ROADS
10-2	Fluvent, stream bottoms 0- to 5-percent slopes	This landtype is built on alluvial deposits underlying a loamy sand surface layer. Vegetation is a mixed forest of subalpine fir, Engelmann spruce, Douglas-fir, western white pine, western larch, and lodgepole pine. The understory is comprised of a wide variety of forbs in a community dominated by tall shrubs.	K=0.32 Erosion potential is moderate. Sediment delivery efficiency is low due to the gentle terrain; however, disturbed soils on or adjacent to streambanks can result in substantial sedimentation.	Potential productivity: Moderate Equipment: Tractor Regeneration: Can be limited by wet soil, frost pockets, and competition.	Low soil strength. Wet soils may limit road locations. Flooding may damage culverts/bridges.
23-8	Glaciated mountain slopes. 20- to 40-percent slopes	Soils of this landtype are formed in glacial till. Vegetation found ranges from a moist, mixed forest to a dry, mixed forest.	K=0.32 Erosion potential is low to moderate. Sediment delivery efficiency is moderate.	Potential productivity: Moderate/high. Equipment: Tractor/ cable. Regeneration: Can be limited by wet soil, frost pockets, and competition.	Roads perform well with standard location, construction, and maintenance practices. Some cutslopes may be difficult to revegetate due to moisture stress. Some slopes over 40 percent are present.

LANDTYPE	NAME	SOIL AND VEGETATION DESCRIPTIONS	MANAGEMENT CONSIDERATIONS	MANAGEMENT CONSIDERATIONS	MANAGEMENT CONSIDERATIONS
			K FACTOR**/ EROSION POTENTIAL	TIMBER	ROADS
27-8	Kettles, kames, terraces 10- to 20-percent slopes	Cobbly, sandy, glacial till sorted by meltwater, but not stratified, underlies a surface loess influenced by 2 to 10 inches of volcanic ash. Vegetation consists of Douglas-fir, ponderosa pine, subalpine fir, lodgepole pine, and western larch over an understory dominated by low shrubs.	K=0.32 Erosion potential is low to moderate. Sediment delivery efficiency is moderate.	Potential productivity: Moderate. Equipment: Tractor Regeneration: Can be limited by droughtiness and frost pockets in low-lying areas.	Material exposed during construction tends to ravel on steep cutbanks. Moisture stress can make revegetation difficult.
28-7	Terraces 0 to 20-percent slopes	Stratified glacial outwash underlies a volcanic ash influenced loess layer approximately 2 to 7 inches thick. Vegetation consists of Douglas-fir, ponderosa pine, subalpine fir, and lodgepole pine over an understory dominated by low shrubs.	K=0.43 Erosion potential is low to moderate. Sediment delivery efficiency is moderate.	Potential productivity: Moderate. Equipment: Tractor Regeneration: Can be limited by droughtiness. Trees are susceptible to windthrow because the coarse -textured substrate restricts root penetration.	Moisture stress can make revegetation difficult. Tread erosion of fine material from unsurfaced roads can result in a rough, cobbly road.
Mr	Mountainous lands, low hills and mountains	Soils lower on the slopes are from the Whitefish series, which consists of deep, well -drained gravelly, silty soils.	K=0.20 This K factor is for the Whitefish Series, with slopes up to 45 percent.	Management considerations for production potential, equipment use, and regeneration success are very similar to Landtype 23-8.	Management considerations for production potential, equipment use, and regeneration success are very similar to Landtype 23-8.

***Erosion Factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water. (NRCS, 1996)*

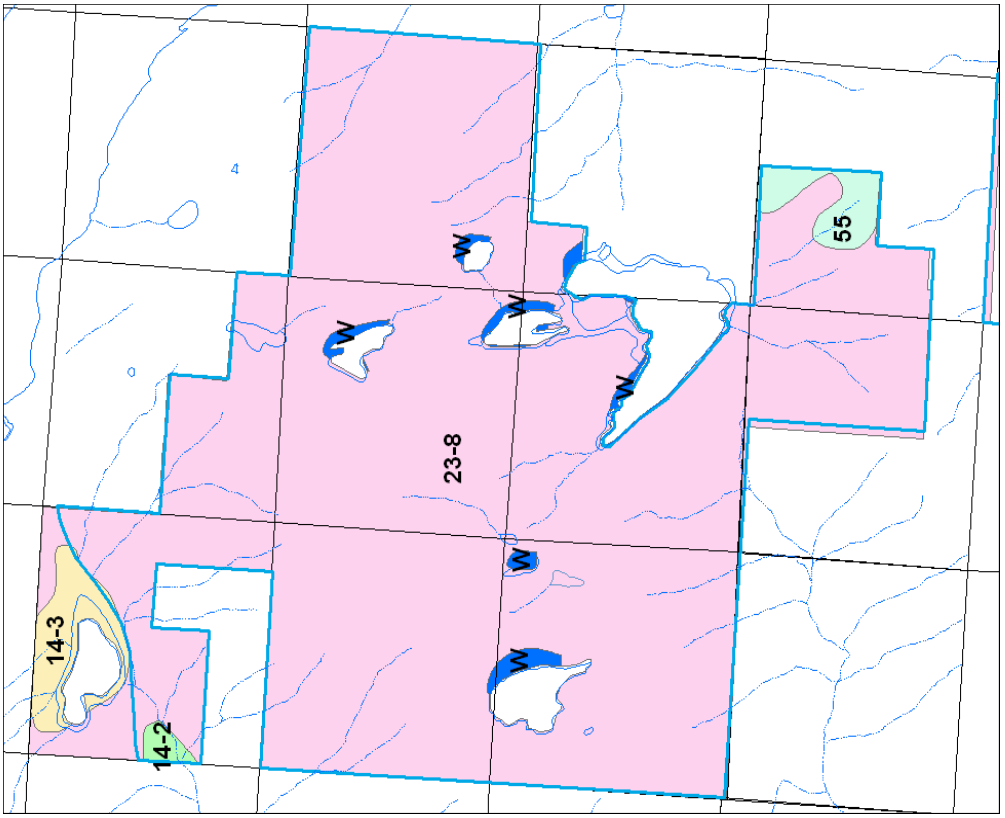


FIGURE III-3 - BEAVER AREA LANDTYPES

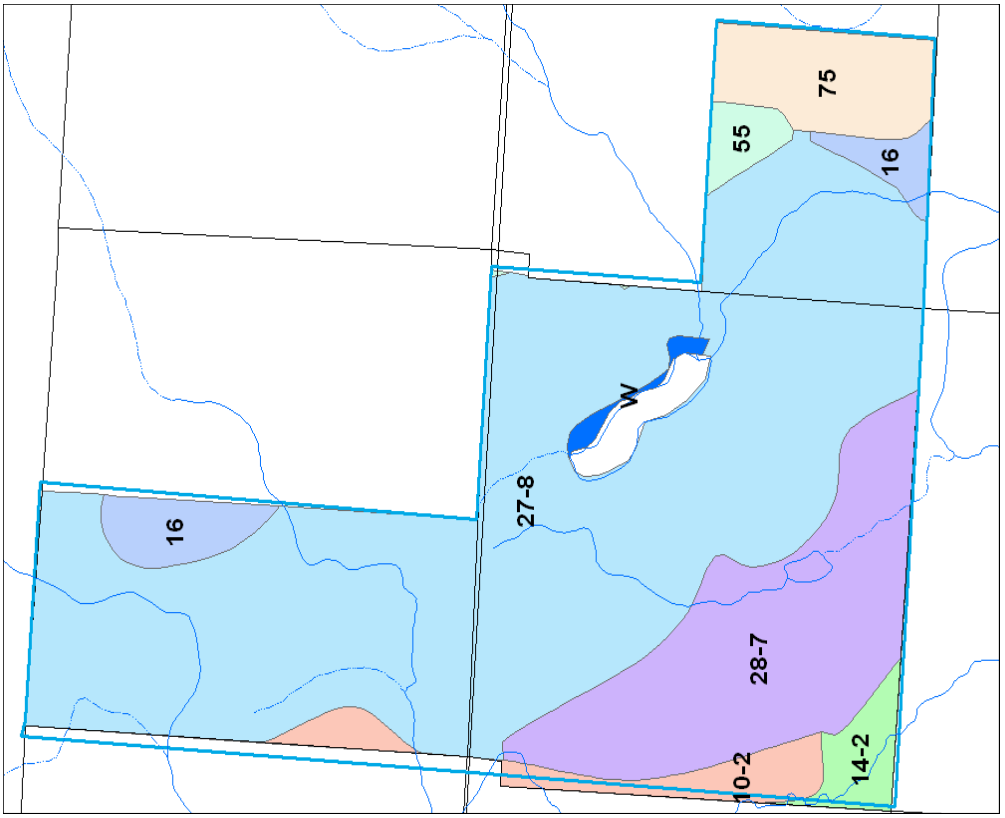


FIGURE III-2 - SMITH AREA LANDTYPES

are generally comprised of argillites, quartzites, and siltites. Surface deposits of glacial till, outwash, and lacustrine sediments can be found throughout the area. Overlying these sediments is a layer of loess that has been influenced by volcanic ash deposited and redeposited from Mount Mazama approximately 6,700 years ago (*Martinson and Basko, 1998*).

EXISTING CONDITION DUE TO PAST MANAGEMENT ACTIVITIES

DNRC strives to maintain soil productivity by limiting cumulative soil impacts to 15 percent or less of a harvest area, as noted in the *SFLMP* (*DNRC, 1996*). As a recommended goal, if existing detrimental soil effects exceed 15 percent of an area, proposed harvesting should minimize any additional impacts. Harvest proposals on areas with existing soil impacts in excess of 20 percent should avoid any additional impacts and include restoration treatments as feasible based on site-specific evaluation and plans.

Past monitoring on DNRC timber sales from 1988 to 2006 has shown an average of 13.1-percent soil impacts across all parent materials. The majority of soils in the project area are comprised of cobbly and/or gravelly silty loams from glacial till. Stratifying the results by texture similar to the majority of the proposed harvesting shows an average of approximately 14.7 percent of the harvest areas impacted by displacement and severe compaction (*DNRC, 2004*).

When winter harvesting is implemented on these areas, the impacts are typically less than summer operations due to frozen soils being more difficult to compact or displace. Winter-harvesting operations on similar soils shows an average of 12.3 percent of the harvest area impacted by displacement or severe compaction (*DNRC 2004*).

Cumulative effects from past and current uses on the proposed harvest units are limited, although evidence of selective or salvage actions is present in some of the proposed harvest units. In addition, stands adjacent to proposed harvest areas have been entered in the past. During field reconnaissance, it was noted that impacts in these areas are limited to a few skid trails and roads.

Past-harvesting operations in the project area started around 1913 with primarily harvests for making railroad ties. Harvests for tie logs generally were selective with very little site preparation (*DNRC, 2000*). Since that time, harvesting has continued with a variety of harvest types, from clearcuts to thinnings. Recent harvests near or in the project area include Taylor South Timber Sale (2000), King Bear Timber Sale (2006), and the Beaver Lake Timber Sales (1998 through 2002). The most recent harvesting in the proposed units took place in the mid-1920s near Skyles Lake; in the early 1950s near Smith Lake; and in the Beaver Lake area in 1945 through 1961 (*DNRC Section Record Cards, NWLO*).

Smaller forest-product removals include small salvage harvests; post-and-pole harvests; firewood gathering, and individual Christmas tree harvesting throughout the last 80-plus years.

Nearly all of DNRC-managed land in the project area has been harvested since logging first started in 1913. While some of these skid trails and roads are still discernable, vegetation similar to the surrounding vegetation is generally present and growing. Through the freeze-thaw cycles and root-mass penetration of the soil, impacts from

past entries are substantially reduced. Adverse compaction and displacement impacts from past logging are estimated to cover less than 10 percent of the project area.

ENVIRONMENTAL EFFECTS

DESCRIPTION OF ALTERNATIVES

- ***No-Action Alternative***

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

- ***Action Alternative***

  Twenty-seven units totaling approximately 832 acres would be commercially harvested under this alternative. Most of the units would be suitable for ground-based harvesting; 2 units would require cable yarding. In addition, approximately 0.9 mile of road would be reconstructed; 3.7 miles of temporary road would be constructed; and 0.9 mile of road would be abandoned/ obliterated; 20 miles of road would be maintained or have minor drainage improvements installed as necessary to protect water quality. Three harvest units (113 acres) would be completed under winter conditions, which require frozen and/or snow-covered conditions. The remainder of the units (719 acres) may be completed under summer or winter conditions.

ALTERNATIVE EFFECTS

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

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

- ***Direct and Indirect Effects of the Action Alternative on Soils***

  To provide an adequate analysis of potential impacts to soils, a brief description of implementation requirements is necessary. *ARM 36.11.422 (2)* and *(2)(a)* state that appropriate BMPs shall be determined during project design and incorporated into implementation. To ensure that the incorporated BMPs are implemented, the specific requirements would be incorporated into the DNRC *Timber Sale Contract*. As part of this alternative design, the following BMPs are considered appropriate and, therefore, would be implemented during harvesting operations:

  1) Equipment operations would be limited to periods when soils are relatively dry (less than 20 percent moisture), frozen, or snow-covered to minimize soil compaction and rutting and maintain drainage features. Soil moisture conditions would be checked prior to equipment start-up.
  2) On ground-based units, the logger and sale administrator would agree to a general skidding plan prior to equipment operations. Skid-trail planning would identify which main trails to use and what additional trails are needed. Trails that do not comply with BMPs (i.e. draw-bottom trails) would not be used without additional mitigation. These trails may be closed with additional drainage installed where needed or seeded with grass to stabilize the site and control erosion.
  3) Tractor skidding should be limited to slopes of less than 40 percent unless the operation can be completed without

causing excessive erosion. Based on site review, short, steep slopes above incised draws may require a combination of mitigation measures, such as adverse skidding to a ridge or winchline skidding from the more moderate slopes of less than 40 percent.

4) Skid trails shall be kept to 20 percent or less of the harvest-area acreage. Drainage in skid trails and roads shall be provided concurrently with operations.

5) Slash disposal - The combination of disturbance and scarification shall be limited to 30 to 40 percent of the harvest units. No dozer piling will be done on slopes over 35 percent; no excavator piling will be done on slopes over 40 percent unless the operation can be completed without causing excessive erosion.

6) Lopping and scattering or jack-pot burning shall be considered on the steeper slopes. Disturbance incurred during skidding operations will be adopted to provide adequate scarification for regeneration.

6) Ten to 15 tons of large woody debris and a majority of all fine litter feasible will be retained following harvesting. On units where whole-tree harvesting is used, one of the following mitigations for nutrient cycling will be implemented: 1) use in-woods processing equipment that leaves slash on site; 2) for whole-tree harvesting, return-skid slash and evenly distribute in the harvest area; or 3) cut tops from every third bundle of logs so tops are dispersed as skidding progresses. Sites near private property would have less large woody debris and fine litter left to reduce fire hazards.

Considering data from the *DNRC SOIL MONITORING REPORT (DNRC, 2004)*, the implementation of Forestry BMPs has resulted in less risk of detrimental soil impacts from erosion, displacement, and severe compaction. While the report noted that the impacts were more likely on the fine-textured soils and steep slopes, reduced soil productivity due to compaction and displacement may occur on coarser parent materials similar to those found in the state parcels. Also, the greatest impacts were noted where harvesting implementation departed from BMPs, such as ground-based skidding on steep slopes.

Comparing the soil type map, field reconnaissance notes and topographic map features with the proposed harvest unit map indicates that under this alternative ground-based skidding would occur on a majority of the proposed harvest areas. The extent of impacts expected would likely be similar to harvest areas monitored by DNRC and reported in the monitoring report *(DNRC, 2004)*, or approximately 14.7 percent of the harvest area. Potential impacts to soils from the cable-yarding units would be less than 10 percent of the area. This level of impact assumes corridor spacing of at least 75 feet, and impacts generally confined to a 6- to 8-foot width. Potential impacts to soils from cable yarding would generally be displacement, although some compaction could occur. In addition, cable corridors may pose a slight risk of routing water because the corridor is generally parallel to the fall-line of the hill slope. *TABLE III-11 –*

SOILS ANALYSIS

TABLE III-11 - EXPECTED ACRES OF IMPACT TO SOIL FROM COMPACTION AND DISPLACEMENT

HARVEST METHOD AND SEASON	NO-ACTION ALTERNATIVE	ACTION ALTERNATIVE
Ground-based summer harvest (672 acres with up to 14.7-percent of harvest-area impacts)	0	87.6 acres
Ground-based winter harvest (37 acres with up to 12.3-percent of harvest-area impacts)		13.9 acres
Cable (123 acres with up to 10 percent of the harvest-area impacts)	0	12.3 acres
Total area of impacts (acres)	0	113.8
Total harvest acres	0	832
Percent of area impacted	0	13.7

EXPECTED ACRES OF IMPACT TO SOIL FROM COMPACTION AND DISPLACEMENT summarizes the expected impacts to soils in the harvest units.

In addition to the potential impacts from harvesting, up to 11 acres would be impacted by new temporary road construction. All of the temporary road would be recontoured and seeded with grass and littered with slash and brush at the termination of the project. Road construction would likely result in more erosion than native topography; however, BMP implementation would minimize the risk of erosion. The ATV ford on a small tributary near Whitefish Lake would be replaced with a temporary bridge, which is expected to reduce sediment delivery into this stream. For more information on water quality, see *WATER RESOURCES ANALYSIS*.

- ***Cumulative Effects of the No-Action Alternative to Soils***

  No additional adverse cumulative effects to soils would result from the implementation of this alternative because no timber harvesting or associated activities would occur. As vegetation begins to establish on the impacted areas and freeze-thaw cycles occur, the area of reduced productivity would decrease.

- ***Cumulative Effects of the Action Alternative to Soils***

  Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15 percent of the harvest units (as recommended by the *SFLMP*) through implementation of BMPs, skid-trail planning on tractor units, and limiting operations to dry or frozen conditions. Future harvesting opportunities would likely use the same road system, skid trails, and landing sites to reduce additional cumulative impacts. Large woody debris would be retained for nutrient cycling for long-term soil productivity.

  On a project area analysis, DNRC estimates that an additional 116 acres of land may be impacted by skid trails and landings; an additional 11 acres of ground would be removed from production or have reduced productivity due to road

construction. After considering the existing condition due to management activities and the expected impacts from the proposed harvesting, the level of adverse impacts would likely remain below the recommended goal of 15 percent of the area. As vegetation begins to establish on the impacted areas and freeze-thaw cycles occur, the area of reduced productivity would decrease.

By designing the proposed harvesting operations with soil-moisture restrictions, season of use, and method of harvesting, the risk of unacceptable long-term impacts to soil productivity from compaction and displacement would be low.

REFERENCES

DNRC, 2004. DNRC compiled soils monitoring report on timber harvest projects. Missoula, Montana

DNRC Section Record Cards. Kept at NWLO for a record of past management activities on DNRC-managed lands.

DNRC, 1996. State Forest Land Management Plan. Montana Department of Natural Resources and Conservation. Missoula, Montana

Martinson, A. H., and W. J. Basko. 1998. Soil survey of Flathead National Forest area, Montana. USDA Forest Service, Flathead National Forest, Kalispell, Montana

RECREATION AND TRAILS ANALYSIS

INTRODUCTION

Many residents and nonresidents in Montana enjoy recreational opportunities on the state trust lands that surround the greater Whitefish area. Over 155,000 acres, which are managed by DNRC's Stillwater and Kalispell units, are available for various recreational activities.

This analysis describes recreational uses in the project area and surrounding areas and discloses the potential environmental effects the proposed no-action and action alternatives may have on those uses.

ANALYSIS AREA

The project area will be the analysis area used to determine direct and indirect environmental effects of the proposed no-action and action alternatives on the recreation resource. The analysis area used to determine cumulative effects of the proposed action will include Stillwater Unit, Kalispell Unit, and the roads used to access state lands described in *CHAPTER 1 - PURPOSE AND NEED.*

ANALYSIS METHODS

The methods used to portray the existing conditions and determine the impacts that the project would have on recreation include determining recreational uses and the conflict between timber-harvesting activities and recreational uses and revenue. Measurement criteria were established to 'measure' the extent of the potential direct, indirect, and cumulative effects the proposed action may have on recreational uses in the area. These established criteria reflect changes in:

- general recreation use – trail use, disc golfing, fishing, walking, etc.;
- revenue generated from recreational and land use licenses; and
- road-management miles of open and closed roads to public motorized use

RELEVANT LAWS, LICENSES, AGREEMENTS, AND PLANS

DNRC RECREATIONAL USE RULES

DNRC *Recreational Use Rules (ARM 36.25.146* to *162)* regulate and provide for the reasonable use of legally accessible school trust lands. Recreational use is divided into 2 categories, commercial and noncommercial, and subsequently requires 2 different licenses to engage in recreational activities on state trust lands.

GENERAL RECREATIONAL USE LICENSE

General Recreational Use refers to recreational activities that are nonconcentrated and noncommercial. Examples of these activities include snowmobiling, hiking, bicycling, horseback riding, alpine and Nordic skiing, snowshoeing, and berry picking.

Any person over the age of 12 who wishes to engage in activities that pertain to general recreational uses is required to obtain a 12-month *General Recreational Use License*. For recreationists younger than 17 or older than 60, the license is $5. For recreationists between the ages of 17 and 60, the license is $10. All license holders are required to abide by current restrictions, closures, and regulations.

CONSERVATION LICENSE

Similar to the *General Recreational Use License*, recreationists wanting to engage in hunting and fishing on State trust lands must obtain the appropriate game and fishing licenses and a Conservation License, which includes the *General Recreational Use License* for these activities only. For other general use activities, the *General Recreational Use License* must be obtained.

MEMORANDUM OF AGREEMENT AFFECTING RECREATIONAL USE OF STATE SCHOOL TRUST LANDS

This agreement entered into by DFWP and DNRC, required DFWP to reimburse DNRC $2 for every Wildlife Conservation License and certain game animal licenses sold in accordance with *MCA 87-2-202,505,510* and *511*.

SPECIAL RECREATIONAL USE LICENSE

Special Recreational Use Licenses are issued for commercial recreational activities in which an entity charges a participant a fee for specific noncommercial organized group activities and for overnight activities using nondesignated campground areas. Specific examples of such activities include annual events such as Flathead Sled Dog Days, the Two-Bear Marathon, overnight horse camping, or a wedding.

People who wish to engage in activities that pertain to special recreational uses are required to obtain a *Special Recreational Use License Application* from DNRC. The cost of each license is determined by DNRC and is assessed at what is considered to be the full market value of that use.

LAND USE LICENSE

DNRC *Surface Management Rules (ARM 36.25.102[14])* define and allow state lands to be used for purposes other than for which the land is classified. Such uses are allowed for a specific fee and a term not to exceed 10 years (*ARM 36.25.106[2]*). An example of this is the dog sled tours that occur on portions of Stillwater State Forest.

WHITEFISH AREA TRUST LANDS NEIGHBORHOOD PLAN

The 13,000-plus acres of Montana school trust land surrounding the community of Whitefish is included in this plan. The goal of this plan is to provide increased revenue for the beneficiaries of the school trusts while maintaining the economic, environmental, recreational, and cultural vitality of Whitefish and the surrounding area.

EXISTING CONDITON

GENERAL RECREATION

The Beaver/Swift/Skyles project area, which contains lakes, forests, old and new logging roads, and skid trails, is a prime area for recreation. The primary dispersed recreational uses include hunting, fishing, hiking, berry picking, horseback riding, firewood gathering, bicycling, and camping. With the exception of the DFWP boat ramp on Beaver Lake, the project area has no developed recreation sites such as day-use areas or overnight camping. Some undeveloped sites do exist along roads and near lakes throughout the project area. These sites usually consist of rock fire rings and/or small openings for tent sites.

Many of the existing trails in the project area are old skid trails; however, these trails have been further developed over time by hunters, hikers, mountain bikers, horseback riders, and motorized recreational vehicles without the knowledge of, or input from, DNRC management. Efforts are in place to create a

more formal trail system through the proposed Trail project.

Another popular activity near the north end of Whitefish Lake is disc golf. Although DNRC was aware and had allowed the activity to occur on State Land no structures or permanent trails between holes were ever authorized. This 18-hole course has developed into a more popular activity than DNRC ever anticipated. The intense use associated with this activity is leaving wide swaths of trampled vegetation, compacted soils, litter, parking issues with the county road, and occasional fires from discarded cigarettes.

An activity such as this would normally fall under a *Special Recreation Use Permit* or *Land Use License*. This recreational activity is not supported by a permit or license; therefore, this activity is unauthorized use of trust land. A proponent made an effort to formalize the interests of disc golf during the scoping process. Unfortunately, the proponent received little support from the public for this endeavor at that time. Stillwater State Forest is continuing discussion on a long-term solution that can be developed for this activity through a *Land Use License*.

Other recreation uses through leases and licenses in the project area include:

- the Beaver Lake boat launch;
- cabinsite leases around Beaver and Skyles lakes;
- groomed Nordic ski trails;
- snowmobile parking, trailhead, and groomed trails; and
- the proposed Trail project, which is at the design and layout stage at this time.

ROAD MANAGEMENT

Many of the roads in the project area were constructed to minimum standards to facilitate log hauling during the 1920s and 1930s. Since then, other timber sales have provided upgrades such as turn-outs, drainage features, improved visibility, and safe driving surfaces to these road systems during the 1970s and from 1999 through 2002.

Over 19 miles of open roads are available for recreational opportunities in the project area. This is important as the majority of the recreational activities occur on or adjacent to open roads. Currently, most gates and other barriers that restrict motorized use are effective to protect road surfacing, water quality, and wildlife security. A gate that was installed with the Beaver 2000 Timber Sale to restrict motorized traffic into Section 16 (Beaver Geographic Area) has been vandalized and is currently open.

ENVIRONMENTAL EFFECTS

- ***Direct and Indirect Effects of the No-Action Alternative to Recreation***

  No appreciable changes would occur to recreational activity, recreation revenue, or road management in the Swift, Beaver, or Skyles geographic areas. Recreation would remain at its current level or increase slightly; revenue may also increase slightly as more of the general public becomes educated about purchasing *General Recreation Use Licenses*. The amount of road miles open to motorized use would not change. The gate near Section 16 in the Beaver Area would be repaired. This repair would return the area to its original nonmotorized status. Roads would not be improved and some road conditions, such

as access to Smith Lake, may continue to decline. As a result, no direct or indirect effects to recreational use due to the No-Action Alternative would be expected.

- ***Direct and Indirect Effects of the Action Alternative to Recreation***
  - **Swift Geographic Area**

    General Recreation

    In order to provide for safety during harvesting activities, general recreational activities may need to be rerouted for short durations. Some weekday noise would be associated with timber-harvesting activities for fishermen on Smith Lake or the north end of Whitefish Lake. Furthermore, for the safety of recreationalists, disc golf would be suspended for the duration of harvesting activities. DNRC's intent is to harvest the disc golf course area in the autumn when use of the course has slowed down. These harvests would retain some stand structure, which would include trees of all size classes and species, throughout these areas. The more-open stands would lend themselves to longer par 4 and 5 holes instead of the current par 3 holes. Logging debris would be treated in the near future to lower the risk of fire starts throughout the area. Lastly, harvesting activities may have minor effects on snowmobiling, but this should be for only a short duration.

    Recreation Revenue

    Recreation revenue should remain at its current level or increase slightly as the general public becomes educated about purchasing *General Recreation Use Licenses*. Since the disc golf course is not currently operating under a Land Use License, no revenue would be lost by suspending operations for a period of time. Revenue from general recreation use would not likely be directly or indirectly affected at this time.

    Road Management

    Approximately 0.25 mile of the West Smith Road would no longer be open to motorized traffic. A trail would be constructed on the old skid roads along the west side of Smith Lake. Furthermore, the proposal would provide funding for road improvements to West Smith Road, thus enabling DNRC to meet their BMP obligations as well as providing adequate sight distance when entering the county road. Finally, some roads that directly access harvest areas may be closed during the weekdays to provide for safer harvesting operations.

  - **Beaver Geographic Area**

    General Recreation

    This action would directly affect the groomed Nordic Ski Trail by rerouting or closing trails due to the requirement of winter operations in Harvest Area BE; possible winter operations could occur in Harvest Areas BA, BB, BC and BF. Depending on the harvest unit, activities may last 1 to 3 months in duration over a 3-year period. DNRC would work with the *Land Use License* holder to minimize impacts to trail users. Additionally, noise from heavy equipment may disturb fishermen on Dollar Lake during harvesting activities on Harvest Area BD.

This action alternative would harvest areas BF and BG, which are adjacent to the proposed Trail system. This would create an early, short, intense period of timber-management activity before the trail is built, but would also provide a long interval before future disturbance is again made adjacent to the proposed Trail system.

Recreation Revenue

Revenue generated from the groomed Nordic Ski Trail could be affected as portions of the groomed course could be closed for a short period of time. Timing restrictions would be discussed with the leaseholder to minimize impacts to this *Land Use License*. Otherwise, this proposal should have minimal direct or indirect effects to recreation revenue. Recreation revenue should remain at its current level or may increase slightly as the general public becomes educated about purchasing *General Recreation Use Licenses*.

Road Management

Once the vandalized gate is repaired in Section 17, T31N, R22W, the amount of open road will decrease slightly; this repaired gate will return this road to its restricted status. Temporary roads would be built to access portions of the harvest areas; these temporary roads would be restricted to authorized use only. Many of these temporary road segments would be returned to near-natural contours upon completion of harvesting activities. Finally, to provide for safer harvesting operations some roads that are currently open to motorized use and directly access harvest areas may not be available to the public during the weekdays.

– **Skyles Geographic Area**

General Recreation

This action alternative would harvest areas SKA, SKB, and SKC, which are adjacent to the proposed Trail system as currently designed. This would create an early, short, intense period of timber-management activity, but would also provide for a long interval before future disturbance is again made adjacent to the proposed Trail system.

Recreation Revenue

This proposal should have no direct or indirect effects to recreation revenue, which should remain at its current level. Revenue may even increase slightly as the general public becomes educated about purchasing *General Recreation Use Licenses* as the proposed Trail project reaches completion in the Skyles Geographic Area.

Road Management

The amount of open roads would not change in this area. Temporary roads would be built to access harvest areas. Most of these road segments would remain in place, but would be grass seeded and closed to motorized use. In fact, portions of these temporary road prisms may be used as future trails for the proposed Trail project. Finally, some roads that are currently open to motorized use and directly access harvest areas may be closed during the weekdays to provide for safer harvesting operations.

CUMULATIVE EFFECTS

- ***Cumulative Effects of the No-Action Alternative to Recreation***

  Cumulative effects to recreational use would not be expected.

- ***Cumulative Effects of the Action Alternative to Recreation***

  Ongoing and proposed future actions outside of the proposed action would likely continue on state land and adjacent properties. *Land Use Licenses* and *Special Recreation Use Licenses* on state land throughout Stillwater and Kalispell units would continue to generate revenue for the trust beneficiaries. Revenue may even increase slightly as the general public becomes more educated about purchasing *General Recreation Use Licenses*.

  Increased recreational traffic may occur in the Skyles Geographic Area as the proposed trail project finishes its initial phase of construction. Traffic to East Lakeshore Drive may increase with the road improvements associated with Swift Geographic Area. Traffic associated with the proposed action would likely occur during the work week and would not likely conflict with recreational traffic on the weekend and outside of typical business hours.

  Recreationists may be temporarily displaced from area where timber-harvesting activities occur. However, adverse cumulative effects are expected to be minor since recreationists would continue to have recreational opportunities in the other areas of Stillwater and Kalispell units during these timber-management activities.

ECONOMIC ANALYSIS

INTRODUCTION

This analysis describes the existing economic environment and identifies the potential direct, indirect, and cumulative economic effects associated with the proposed action.

ISSUES AND MEASUREMENT CRITERIA

Concerns were raised during the scoping period regarding the potential effects the proposed action may have on the economic resource. The following issue statement was crafted to account for those concerns and guide the analysis of this section:

> *The proposed action may affect revenue generated for the Common School, Montana Tech School of Mines, Montana State University Agricultural Collage, School for the Deaf and Blind, State Normal Schools, Public Buildings, and Montana State University Morrill trusts, funding for FI projects, timber-related employment, and revenue generated in the regional economy.*

The following measurement criteria were selected to describe the existing environment of the economic resource in the area and to 'measure' the extent of the potential direct, indirect, and cumulative economic effects under each alternative:

- For revenue, the measurement criterion is dollars distributed to the aforementioned trusts, FI program, and regional economy.
- For employment, the measurement criterion is the number of timber-related jobs provided.

ANALYSIS AREA

The geographic scope of the economic analysis is located within Flathead, Lincoln, and Missoula counties and is economically relevant to the proposed action.

ANALYSIS METHODS

The economic analysis for the timber sale proposal will include estimates of costs, revenues, and returns; these estimates are intended for the relative comparison of alternatives and are not intended for use as absolute estimates of return. The stumpage value was estimated by subtracting operating costs from current delivered log prices, minus costs. Operating costs include estimated road development, logging, hauling, FI payments, profit margins, and risk. The *Western Wood Products Association Inland Lumber Price Index for 2008* was used for estimating the delivered price of the logs.

FI fees are estimated using the current FI fee schedule set at $21.14 per Mbf.

Estimated forest-management revenues and expenditures for the Beaver/Swift/Skyles Timber Sale Project were based on a 2005 through 2007 average operational revenue/ cost ratio of $2.09 for the Northwestern Land Office (NWLO). This ratio means that an average of $2.09 was earned in revenue for every $1.00 spent over the last 3 years in the NWLO forest-management program.

The employment multiplier used in this analysis is an average of 10.0 jobs supported by every MMbf of timber harvested in the analysis area (*Bureau of Business and Economic Research, 2008*). The exactness of this employment multiplier is limited as the real change in employment varies from sale to sale. Jobs calculated using this multiplier represent mostly existing direct industry jobs that are maintained 1 full year due to this timber sale.

EXISTING ENVIRONMENT

The proposed action would take place on state lands managed by DNRC's Stillwater

and Kalispell units. Timber sales in this area generally supply raw materials for lumber and pulp industries in Lincoln, Flathead, and Missoula counties. Flathead County includes the northern portion of Flathead Lake and the west side of Glacier Park. Lincoln County encompasses the northwestern corner of Montana. Missoula County is located south of Flathead County and encompasses Missoula Valley and the greater surrounding area.

Though the overall economy in each county is different, they share forestry and logging industries. Employment and wages for Forestry and logging (*North American Industry Classification System*) in the 3-county area are described in detail below *(TABLE III -12 - EMPLOYMENT AND WAGES).* Forestry and logging employment data *(Montana Department of Labor and Industry, Research and Analysis Bureau*) is likely lower than actual employment due to missing data on a number of small informal logging and milling operations.

Historically, harvesting activity in Montana's timber-related industries has fluctuated. *FIGURE III-4 - TIMBER HARVEST* shows the aggregate timber-harvesting activity in Montana. The more recent volume decline is, in part, a reflection of the diminishing contribution of USFS to statewide-harvest levels. Currently, DNRC has an annual statewide-sustained yield of 53.2 MMbf.

DNRC-managed forests contribute revenues to trusts based on endogenous (harvested volume) and exogenous (market prices) factors. Timber sale revenues distributed to the trusts vary more widely than the respective volume sold. This additional variability in revenue comes from timber prices that fluctuate according to supply and demand events in national and international markets. *TABLE III –13 - TIMBER SALE REVENUE* shows gross revenue from harvests, net revenues distributed to the trusts, and FI fees collected over the last 5 years.

In addition to timber sale revenues, FI fees are collected on non-Morrill Grant lands and used to finance projects that improve the health, productivity, and value of forested trust lands. FI activities may include the piling and disposal of logging slash, reforestation, thinning, prescribed burning, site preparation, noxious weed control, seed collection, acquiring access and maintaining roads necessary for timber harvesting, monitoring, other activities necessary to improve the condition and income potential of forested state lands, and to comply with other legal requirements associated with timber harvesting (*77-5-204, MCA*).

ENVIROMENTAL EFFECTS

Direct economic environmental effects are those that alter trust land revenues and timber-related industries in the 3-county area. Indirect economic environmental effects are those that alter other sectors in the economy. Cumulative economic environmental effects are typically seen as those that contribute to long-term changes in any part of the economy.

- ***Direct and Indirect Effects of the No-Action Alternative to Economics***

  As displayed in *TABLE III-14 - COSTS AND BENEFITS ASSOCIATED WITH THE PROJECT BY ALTERNATIVE*, revenue from the project area would not be realized at this time. If timber from this project is not sold, equivalent volumes would need to come from sales elsewhere. Additionally, local mills may not be able

ECONOMIC ANALYSIS

TABLE III-12 - EMPLOYMENT AND WAGE . *County Employment and Average Wages 2007*

COUNTY	INDUSTRIAL SECTOR	JOBS	NUMBER OF ESTABLISHMENTS	TOTAL WAGES
Flathead	Forestry and logging	198	49	$7,517,203
Lincoln	Forestry and logging	178	38	$6,964,875
Missoula	Forestry and logging	231	46	$9,607,454

FIGURE III-4 -TIMBER HARVEST. *Total Timber Harvesting in Montana Forests 1945 through 2008*

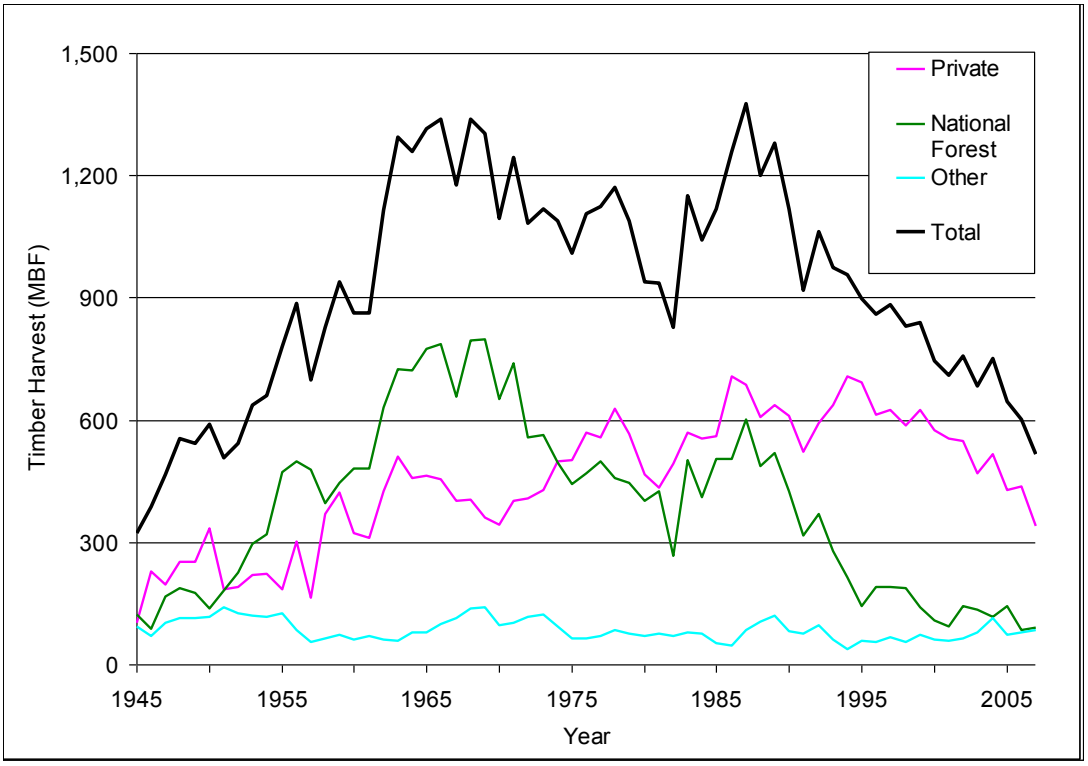


TABLE III-13 - TIMBER SALE REVENUE

YEAR	GROSS TIMBER REVENUE ($)	TIMBER REVENUE DISTRIBUTED TO TRUSTS ($)	FI FEES COLLECTED ($)
2008	10,000,724	Unpublished	1,098,577
2007	8,799,298	2,286,943	1,316,404
2006	15,875,615	8,262,120	2,875,277
2005	16,596,191	9,075,011	2,944,559
2004	11,043,524	4,783,274	2,029,625

to substitute the potential loss of logs that would not be generated from this alternative. Trust funding would not benefit from this alternative.

- ***Direct Effects of the Action Alternative to Economics***

  As displayed in *TABLE III-14 - COSTS AND BENEFITS ASSOCIATED WITH THE PROJECT BY ALTERNATIVE*, an estimated $183,750 in revenue would be deposited into the school trust and an estimated $105,700 would be deposited into the FI account. Approximately $70,300 of road development and maintenance work would be accomplished. An estimated $68,400, or $127.25 per acre, would be spent from the FI budget to reduce fire hazards and prepare harvested areas for natural and planted regeneration. An estimated $30,300 would be spent from the Morrill Grant budget.

- ***Indirect Effects of the Action Alternative***

  Approximately 400 acres of timber that is declining due to insects and diseases would be treated, and 824 acres would be moved toward a more desirable future condition. All 3 counties have a substantial presence in the wood-processing industry. To the extent that sales provide employment, and using the employment multiplier, this sale would provide work for approximately 50 positions. As a result, the short-term impact would be positive.

TABLE III-14 – COSTS AND BENEFITS ASSOCICATED WITH THE PROJECT BY ALTERNATIVE

	ALTERNATIVES	
	NO-ACTION	**ACTION**
Estimated total harvest volume (MMbf)	0	5.0
Road development costs ($/Mbf)	0	14.06
Estimated stumpage value ($/Mbf)	0	36.75
FI fee ($/Mbf)*	0	21.14
Estimated stumpage value, FI, and development cost ($/Mbf)	0	71.95
Total timber-dollar value based on estimated stumpage value, FI, and road-development value, multiplied by the estimated harvest volume ($).	0	359,750
Estimated stumpage value and FI ($/Mbf)		57.89
Total revenue ($) to the State (stumpage value and FI)	0	289,450
Total revenue ($) to the involved trusts (stumpage value)	0	183,750

**The scheduled FI fee is $39.10 per Mbf on non-Morrill Grant lands. For this analysis, the total estimated amount of FI fees collected would be $105,700; spread this out over the 5 MMbf to be harvested and the average amount that may be collected is $21.14 per Mbf.*

- ***Cumulative Effects of the No-Action Alternative on Economics***

  DNRC has a statewide sustained-yield annual harvest goal of 53.2 MMbf. If this project were 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. This forest area would again be available for harvesting considerations.

- ***Cumulative Effects of the Action Alternative on Economics***

  The action alternative would contribute volume to the annual sustained yield of 53.2 MMbf. This yield establishes a relatively stable supply of state trust land timber for the regional market. The state's regional market share is growing more significant as other timber supply sources dwindle. While the region's market health ultimately relies on energy and lumber prices established in international markets, an affordable local timber supply is still necessary for regional processing facilities to remain competitive and open. Therefore, one of the cumulative effects of the proposed action in conjunction with other timber harvests is the preservation of economic viability in Montana's timber resources.

  The proposed action also contributes proportionally to public school funding. Funds distributed by the state trusts partially offset tax dollars needed to fund public education. The cumulative effect of this proposed action in conjunction with revenue-generating activities of other trust land is the continued financial contribution to public education in Montana. Tax dollars offset by these contributions either go to improve the State of Montana's budget for other public services or they benefit Montana taxpayers by partially reducing their tax burden.

  The proposed action also contributes to the overall size of the FI fund. In the long term, FI funding represents an investment in forest health, future income-generating opportunities, fire protection, and other associated benefits. The economic benefits of work conducted with FI funds cannot be directly measured, but they represent an additional cumulative effect related to the proposed action.

REFERENCES

U.S. Bureau of Labor Statistics, "North American Industry Classification System," at: http://www.bls.gov/bls/naics.htm

Western Wood Products Association, "2008 Inland Index," at: http://www.wwpa.org/pdf/About_Indexes.pdf

University of Montana, "Bureau of Business and Economic Research," at: http://www.bber.umt.edu/

AESTHETICS ANALYSIS

INTRODUCTION

This analysis describes the existing landscape as it relates to attributes associated with aesthetic quality and viewsheds and discloses the potential environmental effects the proposed action may have on those visual attributes.

ANALYSIS AREA

Primarily, the analysis of direct and indirect effects to aesthetics and viewshed looks qualitatively at the effects to foreground (close-up) views, middleground views, and background views from identified observation points. Observation points or areas that were determined to be important areas of concentrated public viewing are noted below. The cumulative-effects analysis area utilizes the middleground and background observation points and considers views of a larger landscape, including private ownerships.

In the analysis of the foreground views (0 to 0.50 mile), the observation points are along primary road systems where continual views into the project are of interest. These viewpoints include:

- open roads in the Beaver Lake area;
- open roads, including Delrey Road, in the Smith Lake area;
- the Beaver-to-Skyles Road; and
- the proposed Trail location in the Beaver and Skyles areas.

In analysis of the middleground views (0.25 to 4.0 miles), the following areas were used as observation points:

- several locations near the eastern shore of Whitefish Lake and
- along East Lakeshore Drive.

Background views (more than 4 miles) used observation points from the ski slopes on Whitefish Mountain Resort.

ANALYSIS METHODS

Potential impacts on the visual resource caused by timber harvesting and road building were determined based on the following assessments:

- How the visibility of the harvest areas would be impacted by harvesting and road-building/improvement activities.
- How visual attributes associated with past and proposed harvest treatments would change color and texture as determined by the amount and distribution of retained trees, size characteristics, and species of retained and regenerating trees, and the distinct lines of harvest boundaries and roads.
- How the locations of existing roads and the proposed new temporary roads would impact the view.
- The length of time that the impact would affect the visual resource.

The locations of the observation points were based on field reconnaissance, aerial-photograph interpretation, use of the *Arcview GIS* (Geographical Information System) programs, and *Google Earth*.

EXISTING CONDITIONS

The 3 geographical areas of Beaver, Swift, and Skyles will be described separately.

➢ **BEAVER GEOGRAPHIC AREA**

Observation locations in the Beaver Geographic Area include those areas along open roads proposed for harvesting activities (foreground views), several locations on Whitefish Lake (middleground views), and on Whitefish

Mountain Resort's ski slopes (background views).

Timber sales in the Beaver Lake area started around 1919, but the most recent, large-scale activity was between 1999 and 2004. In this recent time frame, the existing road system was revamped and approximately 6 MMbf of timber was harvested with several harvest prescriptions.

Although Section 16 is a nonmotorized-use area, over 19 miles of road allow public motorized use; therefore, the duration of view of the forest from roads is extensive in the Beaver Lake area. The characteristics of past harvest treatments display a wide range of tree sizes (diameter and height), stocking densities (number of trees per acre), and tree species. Large down woody material lies across the landscape in both previously harvested and unharvested areas and is notable in foreground views. Sight distance into the forest varies and these views are often limited by tree-stocking densities and topography.

The middleground views related to this proposed action are mostly limited to the east-facing slopes in Section 16, primarily Harvest Areas BA and BB. Past regeneration harvest treatments and existing roads are nearly undetectable except for a slight coloration difference related to hardwood species that regenerated due to the ground disturbance. Dying trees with their red crowns have been visible since the early 2000s. The drive along East Lakeshore Drive does have views into Section 16, but trees on the west side of the road fracture any prolonged view into the areas expected to be affected by the proposed action.

From various areas on the Whitefish Mountain Resort's ski slopes, much of the Beaver Geographic Area is visible. One noticeable feature is the broken topography and geology due to glacial deposits from the last ice-age period. Topography has played a key role in the boundary location of the harvest areas; the topography has created natural barriers to harvest equipment accessibility. Past harvest areas are detectable from Big Mountain. The most recent harvests, between 1999 and 2004, cover approximately 25 percent of the Beaver Geographic Area. Characteristics viewed from the ski slopes include sizes and shapes of harvest areas, stocking densities, and patterns of trees left on those sites. Areas that have undergone more intensive treatment (i.e., clearcuts with reserves/ seedtrees with reserves) often appear lighter in color than those that have undergone intermediate treatments that were less intensive. Winter conditions with snow on the ground define these areas more than summer conditions.

- **SWIFT GEOGRAPHIC AREA**

Observation points for foreground views are along the following open roads: DelRey, West Smith Lake, and Lower Whitefish. Lower Whitefish Road leads to Upper Whitefish Lake from Whitefish via East Lakeshore Drive and DelRey Road.

In the Swift Area, some harvesting activities took place on a 30-acre unit in 2003 and on a 21-acre unit in 2006; both were regeneration harvests that addressed health issues such as beetle-killed grand

fir and western larch mistletoe and mortality. Firewood has been salvaged regularly over the past 15 years, with an increase in the amount harvested since 1998 and an increase in tree mortality.

The visible timbered stands are generally multistoried with a range of tree sizes and species. Most notable in the unharvested stands along DelRey and Lower Whitefish roads are the large-diameter trees, some over 30 inches; the mix of species, including ponderosa pine; and the ingrowth of sapling-sized, shade-tolerant trees, primarily grand fir and Douglas-fir.

Based on the factors given above, sight distance into the forest varies, although stocking densities and topography are the most limiting to views into the forest.

➢ **SKYLES GEOGRAPHIC AREA**

Observation points are along the Beaver-to-Skyles Road and the proposed location of the Trail project.

In the Skyles Geographic Area, insect-infested Douglas-fir and grand fir have been salvage-harvested over the past 10 years. The timbered stands are generally multistoried, with stocking levels of the larger-diameter trees variable; these trees are scattered in some places and concentrated in groups in other areas. The second story is a mixture of western larch, lodgepole pine, Douglas-fir, and grand fir. These trees occupy the area that was opened up by a mixed-severity wildfire in 1910. The third story of grand fir and Douglas-fir is made up of shade-tolerant, sapling-sized ingrowth that is approximately 35-years old.

Sight distance into the forest varies based on the factors given above, although stocking densities and topography are the most limiting to views into the forest.

ALTERNATIVE EFFECTS

DIRECT AND INDIRECT EFFECTS

- ***Direct and Indirect Effects of the No-Action Alternative to Aesthetics***

  Timber harvesting or road construction would not take place at this time. Effects to the visual resource in all 3 geographic areas would be from activities such as firewood gathering and recreational use, which are presently taking place. In time, tree growth would create more timber stands with closed canopies. Natural processes on the landscape, such as wildfire, blowdown events, insect infestations, or disease infections, would continue to alter the visual resource over time.

- ***Direct and Indirect Effects of the Action Alternative to Aesthetics***

  General

  The proposed silvicultural treatments discussed in *CHAPTER II - ALTERNATIVES* would convert multistoried and multispecied conifer stands to stands with open spacing, yet those stands would still maintain structural diversity. Structural diversity means the stands have a variety of tree sizes (heights and diameters), tree species, deadwood (standing and down), broken-topped trees, and large downed logs. In order to maintain structural diversity in stands, DNRC would retain:

  - as many of the larger snags as is safe to leave,
  - 2 to 30 larger-diameter, disease-free trees per acre, with preference given to ponderosa pine, western larch, western white pine, and Douglas-fir;

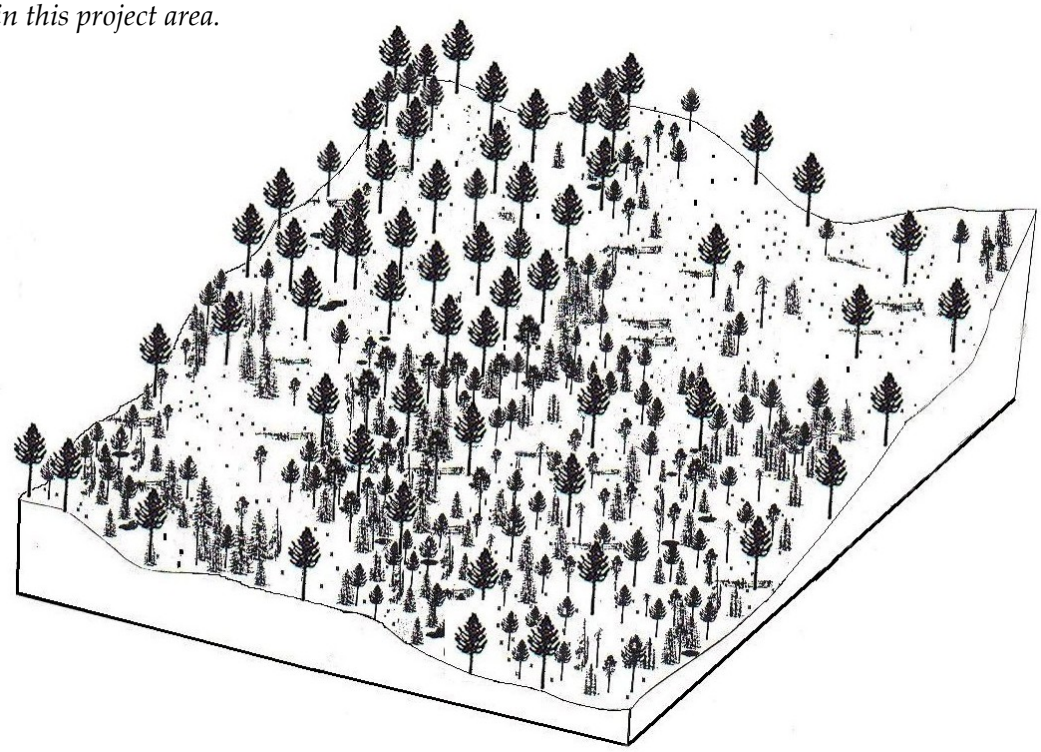
- healthy, vigorous, intermediate-sized trees with greater than 35 percent of the tree having a live crown that is conical in shape;
- healthy, vigorous, sapling-sized trees along roads and scattered throughout the stands; and
- large, down woody debris in varying amounts, depending on its location in the wildland/urban interface.

Once the regeneration (seedtree and shelterwood with reserve harvest treatments) harvest areas are logged, the stands would be more open, but would still contain most of the same trees species. Western larch would be regenerated, adding to the diversity of small trees as well as to the colors associated with western larch in the spring and fall.

In the commercial-thin or improvement-cut areas, similar attributes would be retained, but more trees per acre would be left, although generally they would be within the 8- to 14-inch size class. These remaining trees would generally have live crown ratios greater than 40 percent and would likely be either Douglas-fir or western larch tree species.

Many of the harvest areas lend themselves to a combination of several prescriptions and may appear as displayed in *FIGURE III-5 - VISUAL REPRESENTATION OF HOW THESE TREATMENTS MAY APPEAR FOLLOWING HARVESTING.*

FIGURE III-5 - VISUAL REPRESENTATION OF HOW THESE TREATMENTS MAY APPEAR FOLLOWING HARVESTING*. The visualizations are only a qualitative approximation of what would be expected to occur on the ground due to the variations and diversification of the stands treated in this project area.*



General Assessment of Attributes and Mitigations Associated with Foreground Views

With the application of the following project design elements, vegetation damage and soil disturbance would have short-term effects to the visual resource as seen from each observation point. These elements and mitigations include, but are not limited to:

- slashing (cutting down) small trees and shrubs that are damaged during logging;
- limiting the location, size, and number of landings (areas where trees or logs are taken to be prepared for transport to sawmills);
- grass seeding disturbed areas around landings and along roads; and
- feathering or leaving more trees along the edges of harvest units.

Some large logs or large down woody debris would be left on site for soil, water, and wildlife conservation. The finer branches and tops would be piled and burned or trampled into the duff layer to reduce fire risks. Through plant succession, initially grasses and forbs, then trees and shrubs, would regenerate and begin to cover the downed material.

Fully stocked stands of natural and planted trees would be regenerated in several years, continuing a forest with a multistoried structure.

The view distance into the harvest units and to broader landscapes would be increased due to the reduction in tree densities along roadways and trails. Retaining areas of brush and small trees along roadways, across topographic breaks, and near the edge of harvest areas would reduce viewing distances and soften the edge effect near harvest area boundaries.

The harvest area size and the length of harvest unit along maintained roadways were considered in evaluating effects for viewing distances and will be discussed by geographic area.

General Assessment of Attributes and Mitigations Associated with Middleground and Background Views

Seasonal color contrast would be the most notable effect at these landscape levels. Short term, the contrasts would be most notable soon after harvesting and, for a longer period of time when snow is present on the ground.

The proposed action would change the texture from the surrounding untreated forest canopy and would define boundary lines along adjacent uncut timber stands. The regeneration harvest areas often appear lighter and thinner than those areas that have undergone less intensive treatments. Several units would have a combination of regeneration and commercial-thin harvests that would show a patchy distribution of these texture and color variations.

The angle of view also has an effect on texture. Looking up from Whitefish Lake, the tree crowns intercept the direct view of the ground and make the area appear more uniform. Looking down at the project area from the ski slopes, the ground can be seen through the tree crowns; this presents a view that defines the patchiness or uniformity of the leave trees and often a clearer view of road systems.

Many of the harvest boundaries are defined by topographic features such as sharp ridgelines, cliffs, or draws. These boundaries would often be aligned with boundaries noted following wildfires.

Assessment of Attributes and Mitigations Specific to Geographic Areas

- ***Beaver Geographic Area***

  Changes in the foreground views would be apparent in the harvested areas. Landings would likely be visible, although landings would be located off open roads where possible. The piles of slash may be chipped, loaded, and transported offsite or burned. Some unburned material often remains following the burning of slash piles; this material may be repiled to burn, spread out and distributed, or buried. In order to enhance recovery of grasses and forbs on several landings near recreational areas and along South Beaver Road, reclamation would include distributing topsoil over the landing site and grass seeding.

  The use of *Google Earth Pro* demonstrations and other GIS applications show that portions of Harvest Areas BA and BB would be visible from Whitefish Lake.

  The view distance from City Beach is over 2.5 miles and the changes would be nearly imperceptible. Traveling north on the lake, the range to the project area is reduced and the angle of view into BA and BB becomes more direct. Houston Point appears to display the highest number of acres visible *FIGURE III-6—SIMULATED VIEW FROM HUSTON POINT*

Earth View from Houston Point into Section 16 shows a 2-dimensional picture of portions of the proposed harvest areas that might be seen from Houston Point. The yellow area is primarily the cable-yarding ground and the purple is the area that would be harvested with ground-based equipment. Though these images display the topographic elevations, they do not portray the additional tree heights that would likely block portions of the harvest areas shown here.

Locations north of Point C as seen in *FIGURE III-7 -VIEWSHED ASSESSMENT MAP* would see very little impacts since a ridge intercepts the line of sight.

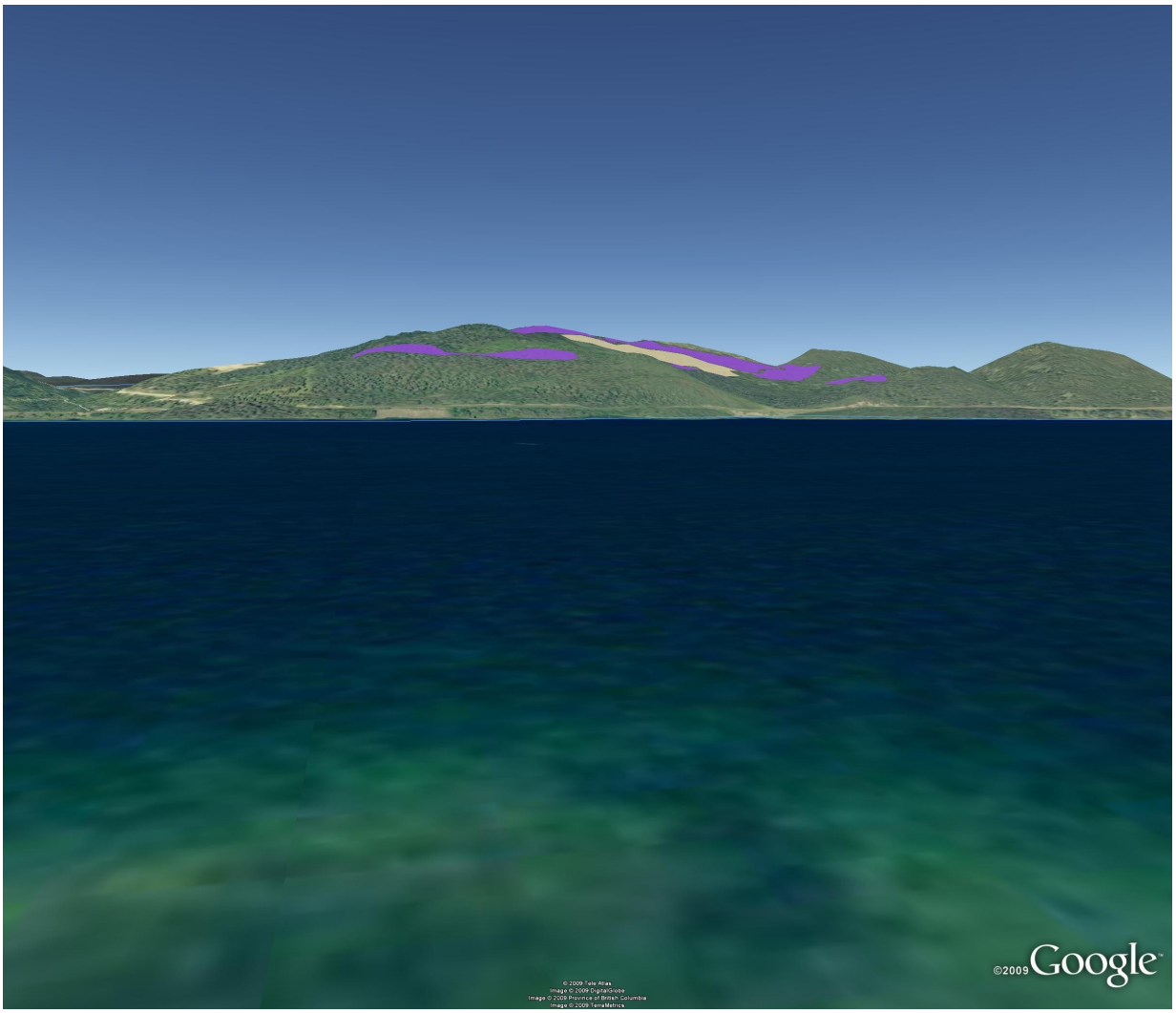
The combined acreage of Harvest Areas BA and BB is approximately 125 acres and, depending upon location, a noticeable change would be visible from the currently closed-canopied stand of

trees on many of those acres. The prescription for leave trees would result in a pattern of areas with light tree stocking to areas with heavier stocking. Cable corridors would be visible as straight lines, especially when viewing straight into the corridors.

The proposed temporary road could be intermittently visible. Much of the road is designed to be on benches, but the steeper areas would require excavation and fills; these areas of exposed soil would be the most likely to be visible from the lake.

The following mitigation measures

FIGURE III-6 - SIMULATED VIEW FROM HUSTON POINT



would be implemented to reduce the effects of harvesting in this area:

- Cable corridors would be angled toward a ridgeline in the northeast portion of Section 16; this ridgeline is a partial barrier to views from Point C north on Whitefish Lake.
- The amount of trees left near cable corridors would vary, which would tend to not define the corridors when openings are transitioned into corridor lines.
- The number and width of corridors would be minimized.
- Topography would be used to define unit boundaries and feather unit edges by leaving more trees per acre near the edges, softening boundary lines.
- Areas with exposed soil would be grass seeded following road construction.
- Much of Temporary Spur BC and temporary skid trails would be reclaimed to near-natural contours, allowing them to blend into the

AESTHETICS ANALYSIS

FIGURE III-7 -VIEWSHED ASSESSMENT MAP. *The viewshed assessment map helps demonstrate view points used in the following assessment.*

landscape in the near future

Portions of all harvest areas in the Beaver Geographic Area would likely be visible from Whitefish Mountain Resort. Patterns from the timber harvest would range from an even distribution to a clumpy distribution of trees. Cable corridors would be visible and roads would likely be more visible because the view comes from above.

- ***Swift Geographic Area***

Landings would likely be visible, though landings would be located off open roads where possible. Additionally, effects would occur due to the location of the King Temporary Road and the stand structure related to the areas around Harvest Areas SA3 through SA7 and SB1 through SB5.

Portions of the King Spur Road would be constructed on an area with steep sideslopes and would be visible from Lower Whitefish Road. This road could be in place for approximately 4 years; during this time, the road would be grass seeded to reduce soil exposure. Reclamation would involve

recontouring the slope, seeding the area with native grasses, and placing slash on the surface. When the fuel-reduction and site-preparation projects have been completed, the road would be reclaimed. These disturbances would be noticeable, but the regeneration of trees and brush would disrupt the view of the open road systems over time.

Due to the small size of the harvest units and the number of trees retained per acre, as well as the size of the trees, the harvested areas would not be as stark as the 2 harvest units that were completed in 2003 and 2006.

- ***Skyles Geographic Area***

Effects to the foreground views would be similar to those with the Beaver and Swift geographic areas. View distances from Beaver-to-Skyles Road and along the planned Trail project are dependent on stocking densities and topography. Landings and excess slash in harvest areas would be piled and burned. The Skyles Spur Road would be reclaimed to varying levels depending on how and where the Trail project incorporates the road surfaces into the trail.

In order to lessen disruption with trail users, winter harvesting is proposed. Impacts to the forest floor are often reduced during winter logging and, therefore, fewer tracks and skid trails are noticeable by the next summer.

Cumulative Effects

- ***Cumulative Effects of the No-Action Alternative on Aesthetics***

No harvesting associated with this project would occur at this time. Those DNRC timber stands that had been recently regenerated from harvests around 2003 would continue to grow and canopy coverage would begin to lessen the view of the ground. Western larch is regenerating and the seasonal color changes associated with this species would become more apparent over time. Those mature stands with tree mortality would begin to show a change in stand texture as deadfalls create spaces in the tree canopies.

Historically, much of the private ownership and DNRC-managed lands has been harvested creating a mosaic of forests and associated textures, lines, colors, and forms on the landscape.

- ***Cumulative Effects of the Action Alternative on Aesthetics***

Those timber stands managed by DNRC that have been recently regenerated from harvests around 2003 would continue to grow and canopy coverage would begin to lessen the view of the ground. Western larch is regenerating and the seasonal color changes associated with this species would become more apparent over time. Additionally, mature stands harvested in this proposal would be regenerated with a mix of timber species, including western larch.

AESTHETICS ANALYSIS

Historically, much of the private ownership and DNRC-managed state land has been harvested, creating a mosaic of forests and associated textures, lines, colors, and forms on the landscape. The proposed action would be similar, but would be additive to changes that have taken place within the viewshed historically.

WILDLIFE ANALYSIS

INTRODUCTION

This analysis is designed to disclose the existing condition of the wildlife resources and display the anticipated effects that may result from each alternative of this proposal. DNRC *Forest Management Rules* and several comments during initial scoping led to the following list of issues:

- Timber harvesting could reduce forested cover, which could reduce the amount of mature forested habitats available to those species that rely on these habitats and/or decrease the ability of some wildlife species to move through the landscape, which could alter their ability to use the area and or successfully reproduce.
- Timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependent on these resources, which could alter their survival and/or reproductive ability.
- Timber harvesting and associated activities could alter cover, increase access, and reduce secure areas, which could adversely affect grizzly bears by displacing grizzly bears from important habitats and/or increasing risk to bears of human-caused mortality.
- Timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.
- Timber harvesting and associated activities could reduce bald eagle nesting and perching habitats and/or disturb nesting bald eagles.
- Timber harvesting and associated activities could displace adult common loons from nest sites and/or disturb nesting loons, reducing loon productivity.
- Timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.
- Timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests, resulting in increased mortality to pileated woodpecker chicks.
- Timber harvesting and associated activities could disturb Townsend's big-eared bats and/or cause abandonment of maternity roosts and/or hibernacula.
- Timber harvesting and associated activities could disturb nesting osprey and/or remove active nests, resulting in reduced productivity of osprey in the vicinity.
- Timber harvesting and associated activities could remove thermal cover on big game winter range, which could reduce the carrying capacity of the winter range.

The following sections disclose the anticipated direct, indirect, and cumulative effects to these wildlife resources in the analysis area from the proposed actions.

Past and current activities on all ownerships in each analysis area, as well as planned future agency actions, have been taken into account for the cumulative-effects analysis.

ANALYSIS AREA

WILDLIFE ANALYSIS

The discussions of existing conditions and environmental effects will focus on 2 different scales. The first will be the 'project area', which consists of approximately 5, 570 acres of DNRC-managed lands in Sections 7, 8, 16, 17, 18, 19, 20, 21, 28, 29, and 33 (north of Highway 93 only) in T31N, R22W, and Sections 29, 32, and 33 in T32N, R22W. The second scale or the 'analysis area' relates to the surrounding landscape for assessing cumulative effects to wildlife species and their habitats. The scales of these analysis areas vary according to the species being discussed, but generally approximate the size of the home range of the discussed species.

ANALYSIS METHODS

DNRC attempts to promote biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state lands (*ARM 36.11.404*). Appropriate stand structures are based on ecological characteristics (e.g., landtype, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which the species evolved, the full complement of species would persist and biodiversity would be maintained. This coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape. DNRC cannot assure that the coarse-filter approach will adequately address the full range of biodiversity; therefore, DNRC also employs a 'fine-filter' approach for threatened, endangered, and sensitive species (*ARM 36.11.406*). The fine-filter approach focuses on a single species' habitat requirements.

To assess the existing condition of the proposed project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, SLI data, aerial photographs, *Montana Natural Heritage Program* (MNHP) data, and consultations with other professionals provided information for the following discussion and effects analysis. Specialized methodologies are discussed under the species in which they occur. Species were dismissed from further analysis if habitat did not exist in the project area or would not be modified by any alternative.

RELEVENT AGREEMENTS, LAWS, PLANS, RULES, AND REGULATIONS

Various legal documents dictate management criteria for the management of wildlife and their habitats on state lands. The documents most pertinent to this project include: DNRC *Forest Management Rules*, the *Endangered Species Act*, the *Migratory Bird Treaty Act*, and the *Bald and Golden Eagle Protection Act*.

COARSE FILTER WILDLIFE ANALYSIS

Of the 108 mammal species found in Montana, 74 are suspected or known to occur in Flathead County (*Foresman 2001*). The majority of terrestrial vertebrates that were present at the time of European settlement likely still occur in the vicinity of the proposed project area. Six amphibian and 7 reptile species have also been documented in Flathead County (*Maxell et al. 2003*) and at least 65 species of birds have been documented in the vicinity in the last 10 years (*Lenard et al. 2003*). Terrestrial species that rely on special habitat elements, such as white bark pine (*Pinus albicaulis*), western

white pine (*Pinus monticola*), or burned areas, may not be present or may occur in lower abundance due to the decline of these elements across the landscape. Over time, due to fire suppression, tree densities have increased and shade-tolerant species, such as Douglas-fir and grand fir, have become more prevalent than they were historically. These departures probably benefit wildlife species that rely on shade-tolerant tree species and/ or closed-canopy habitats, while negatively affecting species that rely on shade-intolerant tree species and/or open habitats. However, in the vicinity of the project area, the forests are a mosaic of mature stands, which benefit species relying on mature forests, and regenerating forests, which benefit wildlife species that use early seral stages either exclusively or seasonally. Past-timber harvesting that led to the early seral stages has likely reduced the quality and quantity of snags and coarse woody debris compared to historical conditions, reducing habitat for those wildlife species that require these components.

MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY

Issue: Timber harvesting could reduce forested cover, which could reduce the amount of mature forested habitats available to those species that rely on these habitats and/or decrease the ability of some wildlife species to move through the landscape, which could alter their ability to use the area and or successfully reproduce.

Introduction

A variety of wildlife species rely on mature to old stands for some or all life requirements. A partial list of these species includes pileated woodpeckers (*Dryocopus pileatus)*, American marten (*Martes americana*), brown creepers (*Certhia americana)*, and winter wrens (*Troglodytes troglodytes*). Wildlife species that require connectivity of forest habitat types between patches or those species that are dependent upon interior forest conditions can be sensitive to the amount and spatial configuration of appropriate habitats. Some species are adapted to thrive near patch edges, while others are adversely affected by the presence of edge or the other animals that prosper in edge habitats. Connectivity of forested habitats facilitates movements of those species that avoid nonforested areas and other openings; connectivity under historical fire regimes likely remained relatively high as fire differentially burned various habitats across the landscape.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the contiguous Stillwater State Forest and the state lands managed by DNRC Kalispell Unit that are north of Highway 93 and west of Whitefish. This scale of analysis would be large enough to support a diversity of species that use mature forested habitats and/or require connected forested habitats.

Analysis Methods

Mature forested habitats and landscape connectivity were assessed using field evaluations, aerial-photograph interpretation, and a GIS analysis. Factors considered in the analysis include the level of timber harvesting the amount of densely forested habitats, and connectivity.

Existing Environment

The project area currently contains approximately 4,077 acres of mature stands

(100-plus years in age) of Douglas-fir/ western larch and lesser amounts of mixed-conifer stands that have a reasonably closed canopy. Of these older stands, approximately 1,336 acres meet the definition of old growth (*Green et al. 1992*). These stands are interspersed with a variety of Douglas-fir/western larch, lodgepole pine, and mixed-conifer stands of varying ages and stocking densities. Currently, forested areas cover much of the project area, facilitating use by those species requiring connected forested conditions and/or forested interior habitats. However, connectivity in the project area has been compromised with past timber harvesting, the Burlington Northern Santa Fe (BNSF) Railroad, and a fairly extensive network of open roads.

The network of open roads in the cumulative -effects analysis area, coupled with timber management on roughly 21,936 acres in the past 40 years, has reduced some of the landscape-level connectivity. Ongoing harvesting associated with the Point of Rocks, Duck-to-Dog, West Fork of Swift Creek, and Lion Mountain timber sale projects, along with the Chicken Creek gravel pit development, would continue reducing forested habitats and/or altering connectivity. Similarly, the proposed Chicken/Antice and Olney Urban Interface timber sale projects, along with the proposed lease site of the U.S. Post Office building, could further alter forested habitats and connectivity. No appreciable changes to forested habitats or landscape connectivity would be anticipated with the various ongoing projects for special uses (land exchanges, recreational licenses, etc.). Across the cumulative-effects analysis area, landscape connectivity has largely been retained and considerable forested, interior habitats exist. Considerable amounts (approximately 52,725 acres) of mature western larch/Douglas-fir, subalpine fir, and mixed-conifer habitats that have a reasonably closed canopy exist across the cumulative-effects analysis area.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity***

  Forest conditions would continue to age, and denser stands of shade-tolerant tree species with high amounts of canopy cover would gradually develop. Largely, no appreciable changes to forest age, the distribution of dense-forested cover, or landscape connectivity would be anticipated. No changes in wildlife use would be expected; wildlife favoring dense stands of shade-tolerant tree species would benefit, while those requiring conditions likely found under natural disturbance regimes would continue to be underrepresented. Habitat for forested interior species and old-stand-associated species, such as American marten, northern goshawk, and pileated woodpecker, would likely improve with this alternative; however, western larch, western white pine, and ponderosa pine, the preferred snag species, could decline in abundance over time. Thus, no direct or indirect effects to mature-forested habitats and connectivity would be expected that could affect wildlife in the project area since: 1) no changes to existing stands would occur; 2) no appreciable changes to forest age, the distribution of dense forested cover, or landscape connectivity would be

anticipated; and 3) no changes to wildlife use would be expected.

- ***Direct and Indirect Effects of the Action Alternative on Mature Forested Habitats and Connectivity***

  Approximately 832 acres of western larch/ Douglas-fir and mixed-conifer stands would be harvested, including roughly 776 acres of mature stands with closed canopies. Roughly 35 percent of these acres of mature, forested habitats would receive a regeneration-type treatment, which would reduce habitat for those species relying on mature, closed-canopy forested habitats. Much of the remaining 61 percent of these acres of mature, forested habitats would receive a commercial-thin-type treatment, which again reduces habitat for species needing a mature, closed-canopied stand. However, these stands could provide lower-quality habitats for those species requiring mature, forested conditions more quickly than some stands receiving regeneration-type treatments due to the anticipated retention levels. This reduction in mature forested habitats would include the proposed harvesting of approximately 236 acres that meet the old-growth definition (see *VEGETATION ANALYSIS*). Overall, the resultant changes in stand age and density would reduce habitats for species associated with older stands, such as the American marten and pileated woodpecker, which benefited from the increasing stand ages and densities caused, in part, by modern fire suppression. Minor reductions in landscape connectivity would be anticipated with the proposed harvesting; however, landscape connectivity has been compromised in the vicinity with past harvesting, human development, roads, and BNSF Railroad. In general, under this alternative, habitat conditions would improve for species adapted to the more-open forest conditions, while reducing habitat quality for species that prefer dense, mature forest conditions. Thus, minor adverse direct and indirect effects to mature forested habitats and connectivity would be expected that could affect wildlife in the project area since: 1) harvesting would revert succession in several stands, reducing stand age and the amount of forested cover; 2) minor changes to landscape connectivity would occur; and 3) some changes to wildlife use would be expected.

- ***Cumulative Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity***

  Habitats in the cumulative-effects analysis area are a mosaic of habitat types and age classes. Past harvesting has reduced the amount of mature, forested habitats; however, continued successional advances in the cumulative-effects analysis area is advancing stands towards mature forests. This alternative would continue to contribute to the mature-forested stands in the cumulative-effects analysis area. Losses of individuals and pockets of trees would not likely alter the overall age or landscape connectivity. Ongoing activities would continue to reduce forested habitats and/or alter connectivity, and proposed activities could alter forested habitats and connectivity depending on the alternative selected.

  Under this alternative, continued use of the analysis area by species favoring

dense stands of shade-tolerant tree species and those species requiring larger areas of mature forests would be expected. Habitat for forested-interior species and old-stand-associated species, such as the American marten, northern goshawk, and pileated woodpecker, would likely persist. Thus, no cumulative effects to mature-forested habitats and connectivity would be expected that could affect wildlife in the cumulative-effects analysis area since: 1) no changes to existing stands would occur; 2) no further changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated; and 3) no changes to wildlife use would be expected.

- ***Cumulative Effects of the Action Alternative on Mature Forested Habitats and Connectivity***

  Despite advancing succession leading to more mature forested habitats, past harvesting has reduced the amount of mature forested habitats across Stillwater State Forest. Reductions in mature forested habitats associated with this alternative would be additive to losses associated with past harvesting activities, the ongoing activities, and the ongoing Chicken Creek gravel pit development. Across the cumulative-effects analysis area, forested habitats would still exist and landscape connectivity would largely persist. Habitats for forested interior species and old-stand-associated species, such as the American marten, northern goshawk, and pileated woodpecker, would be expected to be reduced; however, continued use of the analysis area would be expected. Thus, minor adverse cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative-effects analysis area since: 1) harvesting would remove mature stands, further reducing the amount of forested cover in the cumulative-effects analysis area; 2) no appreciable changes to landscape connectivity would occur; and 3) some changes to wildlife use would be expected.

SNAGS AND COARSE WOODY DEBRIS

Issue: Timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependent on these resources, which could alter their survival and/or reproductive ability.

Introduction

Snags and coarse woody debris are important components of forested ecosystems. The following are 5 primary functions of deadwood in the forested ecosystems: 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4) provide critical habitat for wildlife, and 5) act as a storehouse for nutrient and organic matter recycling agents (*Parks and Shaw 1996*).

Snags and defective trees (e.g. partially dead, spike top, broken top) are used by a wide variety of wildlife species for nesting, denning, roosting, feeding, and cover. Snags and defective trees may be the most valuable individual component of Northern Rocky Mountain forests for wildlife species (*Hejl and Woods 1991*). The quantity, quality, and distribution of snags affect the presence and population size of many of these wildlife species relying on these resources. Snags provide foraging sites for insectivorous species and offer opportunities for primary

cavity-nesting species to excavate nests. The cavities created by primary excavators (i.e. woodpeckers) also provide habitat for secondary cavity users, including other birds and small and mid-sized mammals. Snags and defective trees can also provide nesting sites for secondary cavity users where cavities are formed by broken tops and fallen limbs. Larger, taller snags tend to provide nesting sites, while shorter snags and stumps tend to provide feeding sites (*Bull et al. 1997*). Many species that use smaller-diameter snags will also use large snags; however, the opposite is not true. Typically, older-aged stands will have greater numbers of large snags. Finally, snag densities are another important aspect of habitat value for cavity-nesting birds, as many of these species tend to nest in areas where snag densities are high, using one snag for nesting, but having others nearby for foraging or roosting opportunities.

Meanwhile, coarse woody debris provides food sources, areas with stable temperatures and moisture, shelter from the environment, lookout areas, and food-storage sites for several wildlife species. Several mammals rely on deadwood for survival and reproduction. The size, length, decay, and distribution of woody debris affect their capacity to meet these life requisites. Logs less than 6 feet in length tend to dry out and provide limited habitat for wildlife species. Single, scattered downed trees could provide lookout and travel sites for squirrels or access under the snow for small mammals and weasels, while log piles provide foraging sites for weasels and denning sites for lynx.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the contiguous Stillwater State Forest and state lands managed by Kalispell Unit that are north of U.S. Highway 93 and west of Whitefish. This scale of analysis would be large enough to support a diversity of species that use coarse woody debris resources, from birds to small mammals and meso-carnivores.

Analysis Methods

Snags and coarse woody debris were assessed during site visits and while reviewing past DNRC-harvesting information. Factors considered in the analysis include the level of harvesting, number of snags and coarse woody debris, and the risk level of firewood gathering.

Existing Environment

During field visits to the proposed harvest areas, between 0 and 8 variably-spaced snags per acre of different sizes and species were observed. Large snags (greater than 21 inches dbh) were more abundant in the older stands and away from open roads where firewood cutting often occurs. Likewise, coarse woody debris is typically abundant in these older stands, with much of the volume coming from larger pieces of downed wood (greater than 10 inches dbh). In other portions of the project area, large snags were less abundant, but smaller and medium-sized snags (15 to 21 inches dbh) were typically present. Generally, in all proposed harvest areas, evidence of snag use for feeding and/or cavity building was observed and coarse woody debris is fairly abundant due to tree mortality. Elsewhere in the project area, harvest areas that have been harvested in the past decade or so typically have a couple of snags or snag recruits per acre and abundant coarse woody debris. Additionally, the fairly extensive network of

open roads in the project area has facilitated firewood gathering, which has affected snag and coarse woody debris levels in the vicinity.

Past harvesting in the cumulative-effects analysis area has reduced the availability of snags and snag recruits while increasing coarse woody debris levels; however, minimum-retention thresholds for each of these resources have been retained in the recent past. Ongoing harvesting associated with the Point of Rocks, Duck-to-Dog, West Fork of Swift Creek, and Lion Mountain timber sale projects, as well as any potential harvesting associated with the proposed Chicken/Antice and Olney Urban Interface timber sale projects, the ongoing Chicken Creek gravel pit development, and the proposed lease site for the U.S. Post Office building could further alter snags, snag recruits, and coarse woody debris. No appreciable changes to snags and coarse woody debris would be anticipated with the various ongoing special uses projects (land exchanges, recreational licenses, etc.). Snags and coarse woody debris are frequently collected for firewood, especially near open roads, and considerable firewood gathering occurs in the cumulative-effects analysis area.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Snags and Coarse Woody Debris***

  No direct changes in the deadwood resources would be expected. Existing snags would continue to provide wildlife habitats, and new snags would be recruited as trees die. However, in the long term, densities of shade-intolerant trees and resulting snags could decline as these species are replaced by increasing numbers of shade-tolerant species. Shade-intolerant species tend to provide important habitats, such as nesting structures and foraging habitats, for cavity -nesting birds. Coarse woody debris would persist without other disturbances influencing its distribution and quality. Continued decay and decline in existing snags and trees would continue to contribute to the coarse woody debris in the project area. Thus, negligible direct and indirect effects would be anticipated to snags, and coarse woody debris would be expected to affect wildlife species requiring these habitat attributes since: 1) no harvesting would occur that would alter present or future snag or coarse woody debris concentrations, and 2) negligible changes to human access for firewood gathering would occur with the reinstallation of the gate in Section 17 of the Beaver Geographic Area.

- ***Direct and Indirect Effects of the Action Alternative on Snags and Coarse Woody Debris***

  Present and future snags and coarse woody debris would be reduced due to timber harvesting on 832 acres in the project area. Portions of the project area adjacent to open roads or in stands that lack larger snags would not see appreciable changes in the availability of large snags and/or coarse woody debris since these attributes are currently limited in those areas. Prescriptions call for a minimum of 2 large snags per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), 2 large snag recruits per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class; additional large

-diameter recruitment trees may be left if sufficient large snags are not present), and 8 to 15 tons of coarse woody debris per acre would be planned for retention in the proposed harvest areas. However, some snags and/or recruit trees could be lost due to safety and operational concerns, but replacements would be identified in order to stay in compliance with *ARM 36.11.411*. Some areas lack sufficient large snags currently, while other areas are either close to private property and/or open roads, where snag loss could continue due to legal and illegal firewood and forest product gathering, and could further influence these habitats. Future snag quality in the harvested areas would be enhanced with proposed silvicultural prescriptions that should lead to the reestablishment of shade-intolerant species that tend to provide important habitats, such as long-lasting nesting structures and foraging habitats, for cavity nesting birds. Given the amounts, range of variability in sizes, and decay classes of snags and coarse woody debris present in the project area, prescriptions aiming to maintain a variety of these resources would benefit the suite of species that rely on these habitat components. No appreciable changes in human access would occur and, therefore, no changes to the potential risk for snag and coarse woody debris loss due to firewood gathering would occur. Thus, minor adverse direct and indirect effects to snags and coarse woody debris would be anticipated that would affect wildlife species requiring these habitat attributes for 30 to 100 years since: 1) harvesting would reduce snags, snag recruitment trees, and coarse woody debris and 2) negligible changes to human access for firewood gathering would occur with the reinstallation of the gate in Section 17 of the Beaver Geographic Area.

- ***Cumulative Effects of the No-Action Alternative on Snags and Coarse Woody Debris***

  Snags and coarse woody debris would not be altered in the project area. The species composition of future snags could be altered with changing species composition in the stands due to advances in succession. Snags have been retained during much of the past harvesting across the cumulative-effects analysis area, with greater numbers away from open roads and reduced numbers near these open roads. Snags and snag recruits have been retained with recent harvesting across the cumulative-effects analysis area and are being retained with the ongoing projects (except the lease site of the U.S. Post Office building) and would be retained with the proposed projects should an action alternative be selected. Firewood and other forest-product gathering have reduced these deadwood resources in the vicinity. Wildlife species in the cumulative-effects analysis area that rely on snags and coarse woody debris would be expected to persist. Thus, no cumulative effects to snags and coarse woody debris would be anticipated since: 1) no further harvesting would occur, 2) changes in the numbers of snags would be negligible, and 3) no change in the level of firewood gathering would be expected.

- ***Cumulative Effects of the Action Alternative on Snags and Coarse Woody Debris***

  Some snags and coarse woody debris could be removed from the project area, while others may be recruited. Across the

cumulative-effects analysis area, snags and coarse woody debris are common, and past-harvesting activities have placed an emphasis on the retention of these landscape attributes. The losses of snags and coarse woody debris associated with this alternative would be additive to the losses associated with past harvesting, ongoing harvesting, any harvesting associated with the proposed projects, ongoing firewood gathering, the ongoing Chicken Creek gravel pit development, and the lease site of the U.S. Post Office building. However, the project requirements to retain a minimum of 2 large snags per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), 2 large snag recruits per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), and 8 to15 tons of coarse woody debris per acre would mitigate additional cumulative effects associated with this project. Due to a lack of snags, the risk of firewood gathering, or higher removal requirements for fire protection purposes, some areas would not meet these requirements. No appreciable change in human access would be anticipated; thus, no changes to the potential loss of snags and coarse woody debris to firewood gathering would occur. Wildlife species that rely on snags and coarse woody debris in the cumulative-effects analysis area would be expected to persist at similar levels, albeit slightly lower numbers, on proposed harvest sites following treatment. Thus, minor adverse effects to wildlife species requiring snags and coarse woody debris would be anticipated in the cumulative-effects analysis area for 30 to 100 years since: 1) a slight, but cumulative amount of the cumulative-effects analysis area would be harvested, reducing snags and snag-recruit trees while increasing coarse woody debris levels; 2) a slight decrease in access for the general public and associated firewood gathering would be anticipated; and 3) the slightly increased representation of shade-intolerant species that could become snags in the long term.

FINE-FILTER ANALYSIS

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species listed as threatened or endangered under the *Endangered Species Act* of 1973, species listed as sensitive by DNRC, and species managed as big game by DFWP. *TABLE III-15 – STATUS OF SPECIES CONSIDERED IN THE FINE-FILTER ANALYSIS FOR THIS PROPOSED PROJECT* summarizes how each species considered was included in the following analysis or removed from further analysis because suitable habitat does not occur in the project area or proposed activities would not affect their required habitat components.

THREATENED AND ENDANGERED SPECIES

In northwestern Montana, 3 terrestrial species are classified as 'threatened' or 'endangered' under the *Endangered Species Act* of 1973. The grizzly bear and Canada lynx are classified as 'threatened' and the gray wolf is classified as 'endangered' under this act. The United States Fish and Wildlife Service (USFWS) recently delisted the gray wolf (March 28, 2008); however, a preliminary injunction recently (July 18, 2008) lead to the relisting of wolves in this area as 'endangered.' Following the injunction, the USFWS requested the

TABLE III-15 – STATUS OF SPECIES CONSIDERED IN THE FINE-FILTER ANALYSIS FOR THIS PROPOSED PROJECT

SPECIES/HABITAT	DETERMINATION - BASIS
Grizzly bear (*Ursus arctos*) Habitat: Recovery areas, security from human activity	***Included*** - Portions of the project area are within the Lazy Creek Grizzly Bear Subunit of the North Continental Divide Ecosystem (NCDE), while other portions are within 'occupied habitat' area, and yet some other areas are outside of areas expected to be used by grizzly bears.
Canada lynx (*Felis lynx*) Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone	***No further analysis conducted*** - The project area largely occurs outside of the elevations and habitat types where lynx are commonly found in Montana. Existing Canada lynx habitats are marginal in quality and scattered across the project area. These isolated pockets of habitat would be insufficient to support even an individual lynx, and use of the project area would not be expected. Thus, no direct, indirect, or cumulative effects to Canada lynx would be expected to occur as a result of either alternative.
Gray Wolf (*Canis lupus*) Habitat: Ample big game populations, security from human activities	***Included*** - Portions of the project area are in the annual home range of the Lazy Creek wolf pack.
Bald eagle (*Haliaeetus leucocephalus*) Habitat: Late-successional forest more than 1 mile from open water	**Included** - Portions of the project area are within the Whitefish Lake bald eagle nest territory.
Black-backed woodpecker (*Picoides arcticus*) Habitat: Mature to old burned or beetle-infested forest	***No further analysis conducted*** - No recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
Coeur d'Alene salamander (*Plethodon idahoensis*) Habitat: Waterfall spray zones, talus near cascading streams	***No further analysis conducted*** - No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
Columbian sharp-tailed grouse (*Tympanuchus Phasianellus columbianus*) Habitat: Grassland, shrubland, riparian, agriculture	***No further analysis conducted*** - No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.

TABLE III-15 – STATUS OF SPECIES CONSIDERED IN THE FINE-FILTER ANALYSIS FOR THIS PROPOSED PROJECT (continued)

SPECIES/HABITAT	DETERMINATION - BASIS
Common loon (*Gavia immer*) Habitat: Cold mountain lakes, nest in emergent vegetation	***Included*** - Loons have nested on Boyle and Beaver lakes in the past and have been observed on Little Beaver, Murray, and Whitefish lakes in the past.
Fisher (*Martes pennanti*) Habitat: Dense mature to old forest greater than 6,000 feet in elevation and riparian	***Included*** - Potential fisher habitats occur in the project area.
Flammulated owl (*Otus flammeolus*) Habitat: Late-successional ponderosa pine and Douglas-fir forest	***No further analysis conducted*** - Although a few small, scattered pockets of suitable dry ponderosa pine and Douglas-fir exist in the project area, the size and scattered nature of these isolated pockets of habitat would not support a pair of flammulated owls. Use of the project area by flammulated owls would not be expected given the matrix of habitats in the area. Thus, no direct, indirect, or cumulative effects to flammulated owls would be expected to occur as a result of either alternative.
Harlequin duck (*Histrionicus histrionicus*) Habitat: White-water streams, boulder and cobble substrates	***No further analysis conducted*** - Suitable high-gradient stream habitats occur on Swift Creek, and harlequin ducks have been observed on Swift Creek. However, neither alternative would disturb habitats in or near the stream (nearest activity would occur greater than 130 feet away and only during the winter period). Therefore, harlequin ducks should not be disturbed, nor should any nesting habitat be altered, with either alternative. Thus, no direct, indirect, or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
Northern bog lemming (*Synaptomys borealis*) Habitat: Sphagnum meadows, bogs, fens with thick moss mats	***No further analysis conducted*** - No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
Peregrine falcon (*Falco peregrinus*) Habitat: Cliff features near open foraging areas and/or wetlands	***No further analysis conducted*** - No suitable cliffs/rock outcrops occur in the project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.

TABLE III-15 – STATUS OF SPECIES CONSIDERED IN THE FINE-FILTER ANALYSIS FOR THIS PROPOSED PROJECT (continued)

SPECIES/HABITAT	DETERMINATION - BASIS
Pileated woodpecker(*Dryocopus pileatus*) Habitat: Late-successional ponderosa pine and larch-fir forest	***Included*** - Mature western larch/Douglas-fir and ponderosa pine habitats exist, along with numerous cottonwoods, in the project area.
Townsend's big-eared bat (*Plecotus townsendii*) Habitat: Caves, caverns, old mines	***Included*** - A potentially suitable cave/tunnel associated with the BNSF Railroad occurs in the project area.
Big game winter range	***Included*** - White-tailed deer, mule deer, and elk winter range exists in the project area.
Elk security habitat	***No further analysis conducted*** - No elk security habitat exists in the project area and no large blocks of security habitat exist that contribute to a larger block of elk security habitat outside of the project area. Thus, no direct, indirect, or cumulative effects to elk security habitat would be anticipated as a result of either alternative.

Supreme Court to allow them to voluntarily withdraw its decision to delist wolves and reevaluate information and make a new decision, which was granted (October 14, 2008). Subsequently, USFWS has reopened the public-comment period on its proposal to delist gray wolves in the Rocky Mountains (October 24, 2008). Thus, gray wolves are currently listed as 'endangered' and will be included in this section.

GRIZZLY BEAR

Issue: Timber harvesting and associated activities could alter cover, increase access, and reduce secure areas, which could adversely affect grizzly bears by displacing grizzly bears from important habitats and/or increasing risk to bears of human-caused mortality.

Introduction

Grizzly bears are native generalist omnivores that use a diversity of habitats found in western Montana. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. Primary habitat components in the project area include meadows, riparian areas, and big game winter ranges. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (*Mace and Waller 1997*). Forest-management activities may affect grizzly bears by altering cover and/or by increasing access to humans into secure areas by creating roads (*Mace et al. 1997*). These actions could lead to the displacement

of grizzly bears from preferred areas and/or result in an increased risk of human-caused mortality by bringing humans and bears closer together and/or making bears more detectable, which can increase their risk of being shot illegally. Displacing bears from preferred areas may increase their energetic costs, which may, in turn, lower their ability to survive and/or reproduce successfully.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on a 52,394-acre area that includes the 34,560-acre Lazy Creek Grizzly Bear Subunit of the Northern Continental Divide Ecosystem (NDCE) and the 17,834-acre portion of the 'occupied habitat' area south of the Lazy Creek Subunit that is east and north of U.S. Highway 93 and west of Whitefish Lake. This combined area exceeds the size of the home range of a female grizzly bear.

Analysis Methods

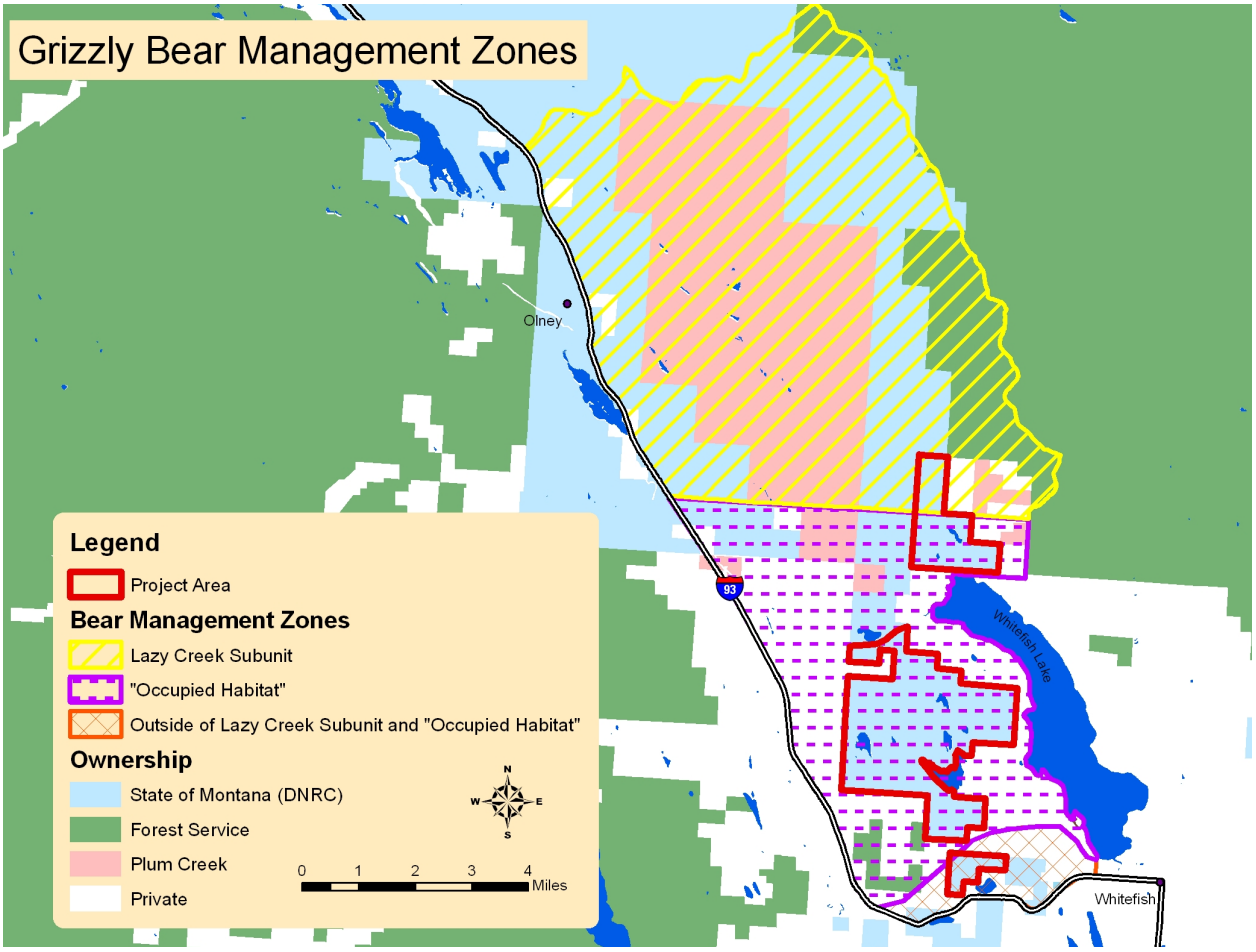
Field evaluations, aerial-photograph interpretation, and GIS analysis were the basis for this analysis. A moving-windows analysis (*Ake 1994*) was conducted to determine open-road densities and security core in the Lazy Creek Grizzly Bear Subunit. Results of the analysis included areas that exceeded an open-road density of 1 mile per square mile and areas that are free of motorized human access that could contribute to security habitats. Security habitats are areas that are greater than 0.3 mile (500 meters) from any open, restricted, or high-use roads and trails and meet a minimum size of 2,500 acres. In the 'occupied habitat' portion of the cumulative-effects analysis area, open-road densities were calculated using a simple linear calculation method. Factors considered in the analysis include the amount of the area with open-road densities greater than 1 mile per square mile, the amount of available security habitat, and the availability of timbered stands for hiding cover.

Existing Environment

The project area exists in the interface between grizzly bear recovery areas and nonoccupied urban interface areas (*FIGURE III-8 – GRIZZLY BEAR MANAGEMENT ZONES*). A relatively small portion of the project area (329 acres) occurs in the Lazy Creek Grizzly Bear Subunit of the NCDE Recovery Area (*USFWS 1993*). The majority of the project area is outside of the NCDE Recovery Area, but within 'occupied habitat' as mapped by grizzly bear researchers and managers to address increased sightings and encounters of grizzly bears in habitats outside of recovery zones (*T. Wittinger, Unpublished Interagency Map*). Meanwhile the majority of the Skyles parcel in the southernmost part of the project area is outside of both the recovery zone and the 'occupied habitat' area. Grizzly bears have not been documented in this part of the project area, but use is possible. Grizzly bears generally use different habitats relative to season. The project area primarily provides habitat for grizzly bears in the spring, due to the lower elevations and the presence of springs, seeps, meadows, and riparian areas in which vegetation greens up earlier in the spring. Summer or autumn habitat values are fairly low in the area.

Managing human access is a major factor in management for grizzly bear habitat. Open-road densities in both the subunit (47.5 percent of the subunit) and the state-managed portion of the subunit (70.5 percent

FIGURE III-8 - GRIZZLY BEAR MANAGEMENT ZONES. *Relationship of the project area to the zones used in the cumulative-effects analysis, including the Lazy Creek Grizzly Bear Management Subunit, the portions of 'occupied habitat' south of the Lazy Creek Subunit that is east and north of U.S. Highway 93 and west of Whitefish Lake, and areas outside of the recovery zone and occupied habitats.*



of the state-managed portion) are at the 1996 thresholds. Open-road densities in the 'occupied habitat' portion of the cumulative-effects analysis area are also fairly high with between 2.7 and 3.2 miles per square mile (simple linear calculation), depending on the class of those roads on private ownerships. No security core exists in the project area, and security habitat is fairly limited on DNRC-managed lands in the subunit due to the existing network of open roads. Currently, security core comprises 12 percent of the Lazy Creek Subunit (all ownerships) and 19 percent of the DNRC-managed lands in the subunit. These values are the same as the baseline values from 1996 (*TABLE III-16 - EXISTING AND 1996 BASELINE OPEN-ROAD DENSITIES IN THE LAZY CREEK SUBUNIT*). Considerable hiding cover exists in both the project area and Lazy Creek Subunit. No harvesting is ongoing on DNRC -managed lands in the cumulative-effects analysis area, but the proposed Olney Urban Interface Timber Sale Project could further alter grizzly bear habitats and/or human-disturbance levels in the cumulative-effects analysis area. No appreciable changes to grizzly bear habitats would be anticipated

TABLE III-16 –EXISTING AND 1996 BASELINE OPEN-ROAD DENSITIES IN THE LAZY CREEK SUBUNIT

ANALYSIS UNIT	OPEN-ROAD DENSITY THRESHOLD	BASELINE LEVELS (1996)	EXISTING LEVELS
Lazy Creek Subunit	Greater than1 mile per square mile	16,443 acres (47.6 percent of analysis area)	16,443 acres (47.6 percent of analysis area)
DNRC-managed lands in Lazy Creek Subunit		10,157 acres (70.5 percent of analysis unit)	10,165 acres (70.5 percent of analysis unit)

with the various ongoing special-uses projects (land exchanges, recreation licenses, etc.). Some increased disturbance to grizzly bears could be realized with the Trail project, but those additional effects would be analyzed once a more complete proposal is finalized; this project will not be covered further in this analysis given the uncertainty associated with the proposal.

ENVIRONMENTAL EFFECTS

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

  No direct effects to grizzly bears would be expected. No changes to the level of disturbance to grizzly bears would be anticipated. Foraging opportunities might decline due to the lack of diversity in habitat such as forest edge and younger age-class stands. No changes in security core, open-road densities, or hiding cover would be anticipated. Thus, no direct or indirect effects to grizzly bears would be anticipated since: 1) no disturbance or displacement would be expected, 2) no changes in hiding cover would occur, 3) security habitat would not be altered, and 4) no changes in long-term open-road densities would be anticipated.

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

  This alternative might affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources. Activities in 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; therefore, the season of disturbance is important in addressing impacts to grizzly bears. Approximately 60 acres in 3 harvest areas would be harvested during the denning period, which would result in no direct effects to grizzly bears. The remaining 773 acres in 24 harvest areas could be harvested during the denning or nondenning period; no direct effects to grizzly bears would be anticipated if harvesting occurred during the denning period, and harvesting would likely have minor direct effects if conducted during the nondenning period. Additionally, several harvest areas would be harvested from along open roads where disturbance from the open road has already reduced habitat quality. Disturbance associated

with the proposed harvesting of harvest areas away from existing disturbance sources and open roads could affect grizzly bears in the area, should they be using the area. Overall, the proposed activities would occur in areas where low levels of grizzly bear use would be anticipated or during the time periods when grizzly bears would not be using the area, leading to negligible disturbance and displacement of grizzly bears.

Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced on much of the 832 acres in the proposed harvest areas in the short term; however, cover would improve with time as shrub and tree regeneration proceeds. Hiding cover is especially important along open roads and in areas that receive human disturbance. Some hiding cover in the form of brush, shrubs, and submerchantable trees would be retained along open roads where feasible, and hiding cover throughout the harvested areas would be expected to regenerate in 5 to 10 years. Security core would not be entered or altered with this alternative.

No changes to motorized human access would occur. Up to 3.7 miles of temporary road would be constructed. However, since open roads reduce habitat quality for grizzly bears, the location of the proposed road construction and obliteration would be important to bears; approximately 0.47 mile would be constructed in the Lazy Creek Subunit. Existing, closed roads that would be opened with this alternative, along with the 3.0 miles of temporary roads constructed to access additional areas, would be closed in a manner to discourage motorized access after the proposed harvesting. Of the 3 harvest areas (or parts thereof) in the Lazy Creek Subunit, one (SC) would be harvested from the open road that already receives considerable disturbance. A temporary road that would be used to access Harvest Areas SA1 and SD would be located in an area that already has an open-road density greater than 1 mile per square mile. Thus, the proposed road construction would increase the overall amount of open roads in the subunit during harvesting, but would not affect long-term open-road densities. Following the proposed harvesting, this road would also be recontoured and would not facilitate motorized travel. Meanwhile in the 'occupied habitat' portion of the project area, up to 3.2 miles of temporary roads would be constructed, which would increase the overall disturbance and nonmotorized access, but would not affect long-term open-road densities since these would be managed as restricted roads after the proposed harvesting. Collectively, no changes in open-road densities and negligible increases in the total road densities would be anticipated. Thus, minor adverse direct or indirect effects to grizzly bears in the local area would be expected in the short term since: 1) negligible disturbance and displacement would be anticipated; 2) hiding cover would be lost in the short term, but would be expected to recovery fairly rapidly; 3) no changes to security habitats would be expected; and 4) no changes to long-term open-road densities, coupled with slight increases in total road densities, would be anticipated.

- ***Cumulative Effects of the No-Action Alternative on Grizzly Bears***

  Motorized access to the area, security and hiding cover, and spring habitat would all remain unchanged. Existing forested stands throughout the cumulative-effects analysis area would be expected to persist into the future; in the long term, forest succession would continue and may reduce food sources, but may increase the amount of hiding cover in the subunit. Human-disturbance levels would be expected to continue into the future. No changes to existing security habitats would be anticipated. Any potential disturbance and/or habitat modification associated with the proposed Olney Urban Interface Timber Sale Project could continue. Thus, no further adverse cumulative effects would be expected to affect grizzly bears in the cumulative-effects analysis area since: 1) no changes in human-disturbance levels would be expected, 2) no further losses of hiding cover would occur, 3) no changes to security habitats would be anticipated, and 4) no changes to open-road densities would occur.

- ***Cumulative Effects of the Action Alternative on Grizzly Bears***

  The increased use of road systems during the proposed project would temporarily increase human disturbance to grizzly bears in a portion of the cumulative-effects analysis area. Proposed activities would occur in one area of the cumulative -effects analysis area that is already experiencing relatively high levels of human disturbance, largely associated with open roads and private ownerships. Collectively, negligible increases in human disturbance would be expected in the recovery zone, with moderate increases in human-disturbance levels anticipated in the 'occupied habitat' area. Continued use of the cumulative-effects analysis area and Lazy Creek Subunit by grizzly bears would be anticipated. Reductions in hiding cover would be additive to the reductions from past timber harvesting, as well as more permanent land-cover changes in the cumulative-effects analysis area; however, appreciable amounts of the cumulative-effects analysis area are currently providing hiding cover. Early successional stages of vegetation occurring in harvest areas could provide foraging opportunities that do not exist in some mature stands. No changes to existing security habitats would be anticipated. No appreciable changes in long-term open-road densities would be expected in the cumulative-effects analysis area; a fairly extensive road system would persist that would facilitate considerable human access in the cumulative-effects analysis area. In the Lazy Creek Subunit portion of the cumulative-effects analysis area, no changes in open-road densities would be anticipated. Any potential disturbance and/or habitat modification associated with the proposed Olney Urban Interface Timber Sale Project could continue occurring. Thus, minor adverse cumulative effects to grizzly bears would be expected in the short term since: 1) minor increases in human-disturbance levels would be expected in the recovery zone and moderate increases in human-disturbance levels would be anticipated outside of the recovery zone; 2) hiding cover would be lost in the short term on a small portion of the cumulative-effects

analysis area, but would be expected to recovery fairly rapidly; 3) no changes to security habitats would be expected; and 4) no changes in long-term open-road densities would be anticipated.

GRAY WOLF

Issue: Timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.

Introduction

The gray wolf was listed as 'endangered' under the *Endangered Species Act* in the northern portion of Montana, which includes the project area. To meet the delisting criteria, the 3 recovery areas need to support a minimum of 30 breeding pairs for 3 consecutive years. The 3 recovery zones have met the recovery objectives for breeding pairs since 2000. In 2007, 107 packs that met the definition of a 'breeding pair' were documented in the tri-state region (*USFWS et al. 2008*). Of those 107 packs, 73 occurred in Montana, with 23 of those found in the northern Montana portion of the recovery area, along with 13 additional packs that did not meet the requirements to be considered a 'breeding pair' (*Sime et al. 2007*).

Wolves are a wide-ranging, mobile species that occupy a wide range of habitats, which possess adequate prey and minimal human disturbance, especially at den and/or rendezvous sites. The Lazy Creek pack has been in the vicinity for at least the last 7 years and has been a breeding pair counted toward the recovery goals for 4 of the last 5 years. The home range for this pack is variable, but typically includes at least part of the project area (*USFWS et al. 2008*).

Wolves are opportunistic carnivores that frequently take vulnerable prey (including young individuals, older individuals, and individuals in poor condition). In general, wolf densities are positively correlated to prey densities (*Oakleaf et al. 2006, Fuller et al. 1992*). Wolves prey primarily on white-tailed deer, and, to a lesser extent, elk and moose, in northwest Montana (*Kunkel et al. 1999*). However, some studies show that wolves may prey on elk more frequently during certain portions of the year (particularly winter) or in areas where elk numbers are higher (*Arjo et al. 2002, Kunkel et al. 2004, Garrott et al. 2006*). Thus, reductions in big game populations and/or winter range productivity could indirectly be detrimental to wolf populations.

Wolves typically den during late April in areas with gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas. When the pups are 8 to 10 weeks old, wolves leave the den site and start leaving their pups at rendezvous sites while hunting. These sites are used throughout the summer and into the fall. Disturbance at den or rendezvous sites could result in avoidance of these areas by the adults or force the adults to move the pups to a less adequate site. In both situations, the risk of pup mortality increases.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on the 52,394-acre cumulative-effects analysis area defined under *GRIZZLY BEAR* in this analysis. This area includes most of the annual home ranges for the Lazy Creek wolf

pack and would be large enough to support this wolf pack.

Analysis Methods

Since changes in winter range could have a sizable effect on the availability of prey for wolves, portions of the analysis are tied to the big game winter range section. Meanwhile, disturbance at den and rendezvous sites are important during certain portions of the year, and the timing of proposed activities in relation to these sites is also important. Direct and indirect, as well as cumulative effects, were analyzed using field evaluations, aerial-photograph interpretation, and a GIS analysis of habitat components. Factors considered in the analysis include the amount of winter range modified and the level of human disturbance in relation to any known wolf dens or rendezvous sites.

Existing Environment

Big game species are fairly abundant in the project area and considerable amounts of big game winter range (refer to *BIG GAME* in this analysis for compete details) exist in the project area. In the project area, numerous landscape features commonly associated with denning and rendezvous sites occur, including meadows and openings, big game winter range, and several water sources. Wolves from the Lazy Creek wolf pack have been documented in the project area in the past and would be expected to continue using the area into the future. No known den or rendezvous sites occur in the project area; however, landscape features that are frequently associated with these sites, including meadows and other openings near water and in gentle terrain, occur in the project area. Wolves may be using the vicinity of the project area for hunting, breeding, and other life requirements.

Within the larger, cumulative-effects analysis area, big game species are abundant, but winter range is limited in the central portions and is generally concentrated along the southern and western portions of the cumulative-effects analysis area, which includes the project area. Numerous landscape features commonly associated with denning and rendezvous sites, including meadows and other openings near water and in gentle terrain, occur in the cumulative-effects analysis area. The known den site, along with the suspected rendezvous sites for this wolf pack, occurs on private ownership in the vicinity and not in the project area (*K. Laudon, DFWP, personal communication, September 18, 2008).* Wolves from the Lazy Creek wolf pack have utilized a fairly large portion of the cumulative-effects analysis area in the past and would be expected to continue using this area into the future. Past harvesting on all ownerships in the subunit altered big game and wolf habitats. Similarly, any potential harvesting associated with the proposed Olney Urban Interface Timber Sale Project could further alter wolf and big game habitats; however, all of these activities, as well as any proposed harvesting, would be expected to have negligible effects to wolves or their prey. No appreciable changes to gray wolf habitats would be anticipated with the various ongoing special-uses projects (land exchanges, recreational licenses, etc.). Some increased disturbance to gray wolves and/or their prey could be realized with the Trail project, but those additional effects would be analyzed once that proposal is finalized and will not be covered further in this analysis given the uncertainty associated with the proposal.

Environmental Effects

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

  Disturbance to wolves would not increase. No changes in big game habitat, including no changes to forested cover on white-tailed deer, mule deer, or elk winter range would be expected during the short term; therefore, no changes in wolf prey availability would be anticipated. Wolf use of the project area would be expected to continue at current levels. Thus, no direct and indirect effects would be expected to affect gray wolves in the project area since: 1) no changes in human-disturbance levels would occur, and 2) no changes to big game winter range would occur.

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

  Wolves using the area could be disturbed by harvesting activities and are most sensitive at den and rendezvous sites, which are not known to occur in the project area. After harvesting activities, human-disturbance levels would likely revert to preharvest levels, and no changes in human access or open-road densities would be anticipated. Likewise, wolf use of the project area for denning and rendezvous sites would likely revert to preharvest levels. In the short term, the proposed harvest areas could lead to shifts in big game use, which could lead to a shift in wolf use of the project area. Thus, negligible direct and indirect effects would be expected to affect gray wolves in the project area since: 1) minor short-term increases and negligible long-term changes in human-disturbance levels would occur, with no increases near known wolf den and/or rendezvous sites anticipated, and 2) no changes to big game winter range would occur.

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

  White-tailed deer, mule deer, and elk winter range would not be affected and substantive change in big game populations, distribution, or habitat use would be not anticipated. Levels of human disturbance would be expected to remain similar at present levels. Proposed harvesting associated with the Olney Urban Interface Timber Sale Project may cause shifts in white-tailed deer use and, subsequently, gray wolf use of the cumulative-effects analysis area; however, no changes would be anticipated that would alter levels of gray wolf use of the cumulative-effects analysis area. A slight decrease in open-road densities could be realized should the action alternative be selected for the Olney Urban Interface Timber Sale Project, which could reduce disturbance to wolves and their prey in the small area. Thus, no further cumulative effects would be expected to affect gray wolves in the Lazy Creek wolf pack since: 1) no changes in human-disturbance levels would occur, particularly near known wolf den and/or rendezvous sites, and 2) no changes to big game winter range would occur.

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

  Some slight shifts of big game use may occur. Reductions in cover may cause slight decreases in use by deer and elk; however, no appreciable changes would be expected in the cumulative-effects analysis area. No changes to white-tailed deer, mule deer, or elk winter range

would be anticipated. These reductions in cover would be additive to losses from past timber-harvesting activities and any potential habitat alterations associated with the proposed Olney Urban Interface Timber Sale Project in the cumulative-effects analysis area. Human-disturbance levels would be expected to revert to levels similar to current levels after the proposed harvesting has been completed and roads would again be closed. A slight decrease in open-road densities could be realized should the action alternative be selected for the Olney Urban Interface Timber Sale Project, which could reduce disturbance to wolves and their prey in the small area. No substantive change in wolf use of Lazy Creek wolf pack home range would be expected; wolves would continue to use the area in the long term. Thus, negligible further cumulative effects would be expected to affect gray wolves in the Lazy Creek wolf pack since: 1) negligible short-term and long-term changes in human-disturbance levels would occur with no increases near known wolf den and/or rendezvous sites anticipated, and 2) no changes to big game winter range would occur.

SENSITIVE SPECIES

When conducting forest-management activities, the *SFLMP* directs DNRC to give special consideration to sensitive species. These species may be sensitive to human activities, have special habitat requirements, are associated with habitats that may be altered by timber management, and/or may, if management activities result in continued adverse impacts, become listed under the *Federal Endangered Species Act*. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful 'fine filter' for ensuring that the primary goal of maintaining healthy and diverse forests is met. A search of the *Montana Natural Heritage Database* documented common loons and bald eagles in the vicinity of the project area. As shown in *TABLE III-15 - STATUS OF SPECIES CONSIDERED IN THE FINE-FILTER ANALYSIS FOR THIS PROPOSED PROJECT*, the sensitive species portion of this analysis will focus on bald eagles, common loons, fisher, pileated woodpeckers, Townsend's big-eared bats, and osprey.

BALD EAGLE

Issue: Timber harvesting and associated activities could reduce bald eagle nesting and perching habitats and/or disturb nesting bald eagles.

Introduction

Bald eagles are diurnal raptors associated with significant bodies of water, 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 are screened from disturbance by vegetation.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on the home range of the Whitefish Lake bald eagle

territory. This cumulative-effects analysis area likely includes the areas used by the pair of eagles using the territory.

Analysis Methods

Effects were analyzed using a combination of field evaluations and aerial-photograph interpretation within the bald eagle home range. Factors considered in this analysis include disturbance levels and the availability of large, emergent trees with stout horizontal limbs for nests and perches.

EXISTING ENVIRONMENT

The project area is partially included in the Whitefish Lake bald eagle territory, and observations of eagles nesting near Whitefish Lake have been recorded since 1985. For many years in the 1980s and 1990s, nesting occurred on private property (Section 5, T31N, R22W) along Swift Creek at the head of Whitefish Lake. For a few years (1999 through 2001), eagles nested on DNRC-managed land near Smith Lake (Section 32, T32 N, R22W). No nesting was observed in 2002 through 2005, but , a pair was documented on a new nest near Swift Creek (Section 31, T32N, R22W) in 2006 and 2007. In 2008, no nesting activity was observed in this territory.

The aquatic habitat associated with the bald eagle territory includes Whitefish Lake, Smith Lake, and several smaller lakes in the project area, as well as Swift Creek. These waterbodies may all be important components of the Whitefish bald eagle territory. Aquatic and terrestrial prey species are fairly common in the home range. The terrestrial habitat incorporated by the Whitefish Lake Bald Eagle Territory is a coniferous/deciduous mixture along the lakeshores and riparian areas, with coniferous forests in the upland areas. In the present home range, black cottonwood is the deciduous tree of primary importance to bald eagles, while large emergent conifers also provide important nesting, roosting, and perching habitats.

Bald eagle habitat is managed at 3 spatial scales according to *ARM 36.11.429* - the nest area (an area within a 0.25-mile radius of the active nest tree or nest sites that have been active within 5 years), the primary use area (an area 0.25 to 0.50 mile from the nest tree), and the home range (an area within 2.5 miles of all nest sites that have been active within 5 years). The most recently used nest has an associated nest-site area that encompasses 126 acres of DNRC-managed lands. The primary-use area, where it is assumed approximately 75 percent of the foraging, resting, and associated behaviors occur (*Montana Bald Eagle Working Group, 1994*), consists mostly of DNRC-managed lands (92 percent; 345 of 377 acres). The delineated home range incorporates 12,064 acres of DNRC-managed (4,019 acres), private (4,075 acres), Plum Creek Timber Company (2,238 acres), and FNF-managed (874 acres) lands, along with 858 acres of water.

Human disturbance, including timber harvesting, residential development, and various forms of recreation, are potential sources of disturbance to the nesting territory. Several large emergent trees are available across portions of the home range, but logging in the last 100 years has likely reduced some of these trees, while others have experienced mortality and are declining in quality. No other DNRC timber-management activities are ongoing in the home range of this nesting pair. No appreciable changes to bald eagle habitats would be anticipated with the various

ongoing special-uses projects (land exchanges, recreational licenses, etc.). Disturbance from some of the recreational licenses could be influencing the nesting bald eagles, but given the location of the nest, any disturbance from those activities would not likely be affecting the nesting pair. Similarly, some disturbance from the proposed Trail project could occur, but those additional effects would be analyzed once a proposal is completed; therefore, given the uncertainty associated with the proposal, this project will not be covered further in this analysis.

ENVIRONMENTAL EFFECTS

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

  No direct or indirect effects to bald eagles would be expected. Human disturbance would continue at approximately the same levels. No changes in available nesting habitats would occur. Thus, negligible direct and indirect effects would be expected to affect bald eagles using the territory since: 1) no changes to human-disturbance levels would occur, and 2) no changes in the availability of large, emergent trees would be expected.

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

  One proposed harvest area (SG) would be entirely in the bald eagle nest area. This harvest area would be harvested during the nonnesting period (August 16 through February 1). Approximately 1.9 acres on the western edge of 2 harvest areas (SA3 and SA4) exist in the primary-use area, which would also be harvested during the nonnesting period. No other harvesting would occur in the nest area or primary-use areas. However, within the home range, proposed timber harvesting would alter forested canopy on approximately 204 acres in portions of 17 harvest areas. Several of these harvest areas (SA1 through SA3, SB1 through SB5, and SC, SD, SE, and SF) lack seasonal restrictions and could be harvested when appropriate soil conditions are met. A few harvest areas (SA4 through SA7) would be harvested during the fall period. Meanwhile, portions of the BE harvest area that is in the home range would only be harvested under winter conditions. Those harvest areas in the home range that would be harvested when the eagles are not using the nest (August 16 through February 1) would be expected to have minimal effects to bald eagles, and any harvesting during the nesting phase (February 1 through August 15) would be expected to have moderate effects to bald eagles, with a gradual decrease in effects as time progresses through the nesting period. Efforts to limit harvesting in the portions of these harvest areas in the home range to the nonnesting period would have the least risk of displacing the bald eagle pair and/or disrupting their breeding. The potential for displacement would only be expected to affect eagles during the activities and not beyond. Prescriptions for these harvest areas in the home range would be largely a regeneration-type treatment and the resultant stands would be fairly open after completion, which could slightly increase visibility and associated disturbance. In the home range, prescriptions call for the retention of some large snags and emergent trees that could be used in the future as nest or perch trees as the stands develop around these resources. No appreciable changes to human access to

the home range would occur, thus limiting the potential for introducing additional human disturbance to this territory. Any motorized or nonmotorized use of Harvest Area SG during important segments of the nesting season could cause the bald eagles to abandon their nest given the resultant reductions in visual screening in close proximity to the bald eagle nest; therefore, efforts to discourage human use of this area after the proposed harvesting by ensuring effective closures are installed on any skid trails accessing this harvest area and minimizing views of this harvest area from the open road using visual screening would be beneficial. Thus, minor to moderate direct and indirect effects would be expected to affect bald eagles using the territory since: 1) disturbance would be elevated in the territory during operations, 2) no appreciable changes in human access in the project area would occur, and 3) negligible changes in the availability of large, emergent trees would be expected.

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

  Nesting bald eagles would continue to experience varying levels of disturbance from the ongoing recreational use associated with Whitefish Lake and the surrounding area, as well as disturbance associated with the BNSF Railroad. Additionally, human developments on private lands would continue to provide potential sources of disturbance to the territory. Emergent trees exist across portions of the home range. No further changes in human disturbance, development, recreation, timber harvesting, or firewood gathering in the home range area would be anticipated. Thus, no cumulative effects would be expected to affect bald eagles using the territory since: 1) no changes to human-disturbance levels would occur, and 2) no changes in the availability of large, emergent trees would be expected.

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

  Nesting bald eagles would continue to experience varying levels of disturbance from the ongoing recreational use of Whitefish Lake and surrounding area, as well as disturbance associated with the BNSF Railroad. Additionally, human developments on private lands would continue to provide potential sources of disturbance to the territory. Any potential disturbance and/or noise from the proposed harvesting would be additive to any of these other forms of disturbance; however, no changes in bald eagle behavior would be anticipated. Emergent trees exist across ownerships in the home range. Thus, minor to moderate cumulative effects would be expected to affect bald eagles using the territory since: 1) disturbance would be elevated in the territory during operations, 2) no appreciable change in human access in the territory would occur, and 3) negligible changes in the availability of large, emergent trees would be expected.

COMMON LOON

Issue: Timber harvesting and associated activities could displace adult common loons from nest sites and/or disturb nesting loons, reducing loon productivity.

Introduction

The common loon is a large and mainly aquatic bird that preys largely on fish, but

also consumes frogs, salamanders, snails, leeches, and aquatic insects. Loons are highly territorial, and typically, just one pair will nest on a small to mid-size lake. Nests can be located on small islands, partially submerged logs, or on floating mats of herbaceous vegetation. Loons are poorly adapted to living out of the water; therefore, nests are generally located where loons can slip directly from the nest into the water. Loons are rather sensitive to human disturbance and are usually associated with waterbodies with lower levels of human disturbance. Human disturbance during the nesting and early chick-rearing period (mid-April through mid-July) could lead to nest failures if the adults are disturbed and leave the nest unattended for even short periods of time.

The southern edge of the loon's breeding range extends into the United States across many of the eastern states and into the Rocky Mountains. The original extent of the population is unknown, although populations have declined with the settlement of the west. Currently, the total Montana population is comprised of about 60 to 65 successfully breeding pairs and approximately 200 birds. Chick production in Montana has ranged between 33 and 51 chicks. In general, besides direct loss of nesting and nursery habitat, loon reproduction tends to be most seriously affected by disturbance by recreationists.

Analysis Area

Direct, indirect, and cumulative effects were analyzed within a 500-foot buffer of the shorelines of the potential loon lakes in the project area. Since loons are almost exclusively dependent upon water and numerous lakes exist in the project area, this area would be suitable to support at least 2 pairs of loons.

Analysis Methods

Effects were analyzed using a combination of field evaluations and aerial-photograph interpretation in the project area. Factors considered include the level of shoreline disturbance, level of recreational pressure on the lakes, and available nesting habitats.

Existing Environment

Several lakes in the vicinity are large enough for loon nesting, including Beaver, Boyle, Murray, and Little Beaver. Additionally, numerous other lakes could be suitable foraging lakes. In the project area, a couple of loon territories have been used regularly by nesting loons, including a rather successful territory on Boyle Lake and an active, but rather unproductive, territory in the Beaver/Little Beaver lakes area. Use of the numerous other lakes in the vicinity by these territorial pairs for foraging is unknown, but loons have been observed on most of the lakes in the project area in the past, including Beaver, Little Beaver, Murray, Smith, Whitefish, and Boyle, but have not historically been observed on Dollar and Woods lakes. Chick production on the Boyle Lake territory has been rather consistent with an average productivity of 1.2 chicks per year for the last 5 years. Nesting was attempted in the past on Beaver Lake, but this territory has not been known to produce chicks in the last 5 years. Despite the presence of the active BNSF Railroad along the shores of Boyle Lake, human-disturbance levels are relatively low due to lack of road access. Conversely, Beaver, Little Beaver, and Murray lakes, along with several less suitable lakes in the project area,

have greater human-recreation disturbance levels due to relatively easy human access. No appreciable changes to common loon habitats would be anticipated with the various ongoing special-uses projects (land exchanges, recreational licenses, etc.). Similarly, some disturbance from the proposed Trail project could occur, but those additional effects would be analyzed once a proposal is completed; therefore, given the uncertainty associated with the proposal, this project will not be covered further in this analysis.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Common Loons***

  No direct or indirect effects to loons would be expected. Human disturbance along the shoreline would continue at similar levels. No changes in human access or recreational use would occur. No changes in available nesting habitats would be anticipated. Thus, no direct and indirect effects to common loons in the project area would be anticipated since: 1) no changes in shoreline disturbance would be anticipated, 2) levels of human recreational use of available loon habitats would not change, and, 3) no changes to available nesting habitats would be anticipated.

- ***Direct and Indirect Effects of the Action Alternative on Common Loons***

  Proposed harvesting operations in the uplands would not be expected to alter available nesting habitats. DNRC is committed to the limiting of construction of permanent roads or structures and mechanized activity within a 500-foot radius of nest sites between April 15 and July 15 (*ARM 36.11.441*). No permanent roads, developments, or harvesting would occur within 500 feet of any known nest sites. Although portions of 9 harvest areas would be within 500 feet of any of the lakes in the project area, these areas would be associated with Smith, Dollar, and Whitefish lakes, with some SMZ harvesting associated with Smith and Dollar lakes. Typically, loons have not used Smith and Dollar lakes, and any use of Whitefish Lake would likely be for staging, not nesting. Prescribed tree-retention levels would not likely affect potential nesting habitats on these lakes as retention levels would be fairly high and harvest treatments would be conducted in a manner to minimize the potential for sediment delivery to the lakes. Additionally, activities close to Whitefish Lake would be separated from the lake by areas of high human disturbance associated with a paved road and residential development. Should a pair establish a nest on any of these lakes, additional mitigation measures would be developed to minimize effects to the nesting loons prior to harvesting activities. No appreciable changes in human access to any of the lakes in the project area would be anticipated, and slight decreases might occur with some of the proposed activities that may eliminate evolved trails and roads, which would benefit loons should they use these lakes. Thus, negligible direct and indirect effects to common loons in the project area would be anticipated since: 1) no appreciable changes in shoreline disturbance would be anticipated, 2) levels of human recreational use of available loon habitats would not change, and, 3) no changes to

available nesting habitats would be anticipated.

- ***Cumulative Effects of No-Action Alternative A on Common Loons***

  No other DNRC projects are occurring or are proposed in the cumulative-effects analysis area. No changes to lake access or the level of recreational use would occur. Shoreline disturbance would not change, and available nesting habitats would persist. Thus, no further cumulative effects to common loons in the cumulative-effects analysis area would be anticipated since: 1) no further changes in shoreline disturbance would be anticipated, 2) levels of human recreational use of available loon habitats would not change, and, 3) no changes to available nesting habitats would be anticipated.

- ***Cumulative Effects of Action Alternative B on Common Loons***

  No other DNRC projects are occurring or are proposed in the cumulative-effects analysis area. No additional changes to human access or level of recreational use for either lake would occur. Shoreline disturbance would not change, and available nesting habitats would persist. Thus, negligible cumulative effects to common loons in the cumulative-effects analysis area would not be anticipated since: 1) no appreciable changes in shoreline disturbance would be anticipated, 2) levels of human recreational use of available loon habitats would not change, and 3) no changes to available nesting habitats would be anticipated,.

FISHER

Issue: Timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.

Introduction

Fishers are a mid-sized forest carnivore whose prey includes small mammals such as voles, squirrels, snowshoe hares, and porcupines, as well as birds (*Powell and Zielinski 1994*). They also take advantage of carrion and seasonally available fruits and berries (*Foresman 2001*). Fishers use a variety of successional stages, but are disproportionately found in stands with dense canopies (*Powell 1982, Johnson 1984, Jones 1991, Heinemeyer and Jones 1994*) and avoid openings or young forested stands (*Buskirk and Powell 1994*). However, some use of openings may occur for short hunting forays or if sufficient overhead cover (shrubs, saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites and tend to use areas within 150 feet of water (*Jones 1991*). Resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on a 54,564-acre area described under *GRIZZLY BEAR* in this analysis and includes the 34,560 -acre Lazy Creek Grizzly Bear Subunit and

17,834 acres of DNRC-managed lands outside of the Lazy Creek Subunit that occur north of U.S. Highway 93 and west of Whitefish. This scale includes enough area to approximate overlapping home ranges of male and female fishers (*Heinemeyer and Jones 1994*).

Analysis Methods

To assess potential fisher habitat and travel cover on DNRC-managed lands in the cumulative-effects analysis area, sawtimber stands in preferred fisher covertypes (*ARM 36.11.403[60]*) below 6,000 feet in elevation with 40 percent or greater canopy closure were considered potential fisher habitat. Fisher habitat was further divided into upland and riparian-associated areas, depending on the proximity to streams and based on stream class. Effects were analyzed using field evaluations, GIS analysis of potential habitat, and aerial-photograph interpretation. Factors considered include the amount of suitable fisher habitats, landscape connectivity, and human access.

Existing Environment

The project area ranges from 3,120 to 4,000 feet in elevation, with approximately 3.4 miles of perennial streams and at least another 2.6 miles of intermittent streams. DNRC manages preferred fisher covertypes within 100 feet of Class 1 and 50 feet of Class 2 streams, so that 75 percent of the acreage (trust lands only) would be in the sawtimber size class in moderate to well-stocked densities (*ARM 36.11.440[1][b][i]*). Approximately 112 acres are in these riparian areas in the project area along the 6.0 miles of Class 1 and 2 streams. Modeling fisher habitats using SLI data generated an estimate of 3,577 acres of fisher foraging, resting, denning, and travel habitats (3,477 upland acres and 100 riparian acres) in the project area (*Heinemeyer and Jones 1994*). In the riparian areas, most of the preferred fisher covertypes (100 of 101 acres, or 99 percent) are moderately or well-stocked and likely support the structural features necessary for use as fisher resting and denning habitats in addition to serving as travel habitats and maintaining landscape connectivity.

In the cumulative-effects analysis area are roughly 2,184 acres within 100 feet of the 78 miles of Class 1 streams and 50 feet of the 25 miles of Class 2 streams. In the riparian habitats on DNRC-managed lands, roughly 95.5 percent (773 of 809 acres) of the area in preferred fisher covertypes presently provides structural features necessary for use as fisher resting and denning habitats. Additionally, roughly 12,696 acres of upland fisher habitats exist on DNRC-managed lands in the cumulative-effects analysis area. Since *ARM 36.11.440(1)(a)* requires an analysis of fisher habitats by grizzly bear management subunit, the analysis will also identify habitat values at the subunit level; presently 96.5 percent (634 of 657 acres) of the preferred fisher covertypes in the Lazy Creek Subunit are supporting structural attributes necessary for use by fisher, which exceeds the required threshold of 75 percent. In the cumulative-effects analysis area, no harvesting is ongoing, but the proposed Olney Urban Interface Timber Sale Project could further alter fisher habitats. No appreciable changes to fisher habitats would be anticipated with the various ongoing special-uses projects (land exchanges, recreational licenses, etc.). Similarly, some disturbance from the proposed Trail project could occur, but those additional effects would be analyzed once a proposal is

completed; therefore, given the uncertainty with this proposal, this project will not be covered further in this analysis.

Environmental Effects

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

  No effects to fishers would be expected under this alternative. Minimal changes to the stands providing fisher habitats would be expected. Habitats that are conducive to fisher denning and travel may improve in time due to increases in tree growth and canopy closure; however, foraging opportunities may decline in future decades if disturbance is minimized, as habitats such as edges and younger age-class stands that support a variety of prey species would decline in abundance on the landscape. Human disturbance and potential trapping mortality would expect to remain similar to current levels. No changes in landscape connectivity would occur. Thus, no direct and indirect effects would affect fishers in the project area since: 1) no changes to existing habitats would be anticipated; 2) landscape connectivity would not be altered; 3) no appreciable changes to snags, snag recruits, and coarse woody debris levels would be anticipated; and 4) no changes to human access or potential for trapping mortality would be anticipated.

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

  Approximately 2.4 acres of the 101 acres (2.4 percent) of riparian habitats in the project area would be included in proposed harvest areas. All of these acres are presently meeting the structural requirements of fisher. Overall, these habitats would be unsuitable for fisher after the proposed harvest utilizing seedtree with reserves and shelterwood prescriptions that would result in stands that would be too open to be used by fisher. Additionally, approximately 533 of the 3,477 acres (15.3 percent) of upland fisher habitats in the project area would receive treatments, with much of those acres likely being too open for appreciable fisher use. No changes in open roads would be anticipated, which would not likely alter trapping pressure and the potential for fisher mortality. Minor reductions in connectivity would be expected in a landscape where connectivity has already been compromised (see *MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY* in this analysis), but activities would avoid riparian areas where connectivity has been retained in the past. Thus, minor adverse direct and indirect effects would be anticipated that would affect fisher in the project area for 70 to 100 years since: 1) harvesting would largely avoid riparian areas; 2) harvesting would reduce or remove upland fisher habitats and mature upland stands in preferred covertypes; 3) minor reductions in landscape connectivity would occur, but those areas associated with riparian areas would largely remain unaffected; 4) harvesting would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller sized pieces; and 5) no appreciable changes in motorized human-access levels would be anticipated.

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

  Fisher denning and resting habitats would be retained. Suitable fisher foraging, denning, and resting habitats occur across the Lazy Creek Subunit and cumulative-effects analysis area. Landscape connectivity in both the cumulative-effects analysis area and Lazy Creek Subunit is largely intact, particularly along the numerous streams. Road access in the cumulative-effects analysis area would not appreciably change; therefore, fisher vulnerability to trapping would remain unchanged. Fisher habitats could be altered with the proposed Olney Urban Interface Timber Sale Project. Thus, no further cumulative effects to fishers would be anticipated in the cumulative-effects analysis area since: 1) no changes to existing habitats on DNRC-managed lands would occur, 2) landscape connectivity afforded by the stands on DNRC-managed lands would not appreciably change, 3) no changes to snags, snag recruits, or coarse woody debris levels would be expected, and 4) no changes to human access or the potential for trapping mortality would be anticipated.

- ***Cumulative Effects of the Action Alternative on Fishers***

  Approximately 2.4 acres of potential riparian fisher habitats in the portion of the cumulative-effects analysis area outside of the Lazy Creek Subunit would be harvested. This would reduce the amount of the preferred fisher covertypes meeting structural requirements for fishers in the cumulative-effects analysis area from 95.5 to 95.3 percent. Since no changes in the amount of the preferred fisher covertypes meeting structural requirements for fishers would occur in the Lazy Creek Subunit, the subunit would remain at 96.5 percent of the subunit, which exceeds the 75-percent threshold established in *ARM 36.11.440(1)(b)(i)*. Roughly 533 acres of the 12,696 acres (4.2 percent) of potential upland fisher foraging and travel habitats would be harvested. These reductions would be additive to the losses associated with past timber harvesting in the cumulative-effects analysis area and the proposed Olney Urban Interface Timber Sale Project. Landscape connectivity in the cumulative-effects analysis area and subunit would remain largely intact. No appreciable changes in human disturbance and potential trapping mortality would be anticipated. Thus, minor adverse cumulative effects would be anticipated that would affect fisher in the cumulative-effects analysis area for 70 to 100 years since: 1) harvesting would remove upland fisher habitats and mature upland stands in preferred fisher covertypes, but considerable upland habitats would persist; 2) negligible changes to preferred covertypes or fisher habitats associated with the riparian areas in the cumulative-effects analysis area would be anticipated; 3) negligible reductions in landscape connectivity would be anticipated; 4) harvesting would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces; and 5) no appreciable changes to motorized human access would occur.

PILEATED WOODPECKER

Issue: Timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests, resulting in increased mortality to pileated woodpecker chicks.

Introduction

Pileated woodpeckers play an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are western larch, ponderosa pine, cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. *Aney and McClelland (1985)* described pileated nesting habitat as..."stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy." The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and downed wood for feeding, closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*).

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on the contiguous Stillwater State Forest and the state lands managed by Kalispell Unit that are north of Highway 93 and west of Whitefish. This scale includes enough area to support many pairs of pileated woodpeckers (*Bull and Jackson 1995*).

Analysis Methods

To assess potential pileated woodpecker nesting habitats on DNRC-managed lands in the cumulative-effects analysis area, SLI data were used to identify sawtimber stands with more than 100 square feet basal area per acre, older than 100 years, had greater than 40-percent canopy closure, and occurring below 5,000 feet in elevation. Foraging habitats are areas that do not meet the definition above, but include the remaining sawtimber stands below 5,000 feet in elevation with greater than 40-percent canopy cover. Direct and indirect effects, as well as cumulative effects, were analyzed using a combination of field evaluation, aerial-photograph interpretation, and these mapped potential habitats. Factors considered included the amount of potential habitat, degree of harvesting, and amount of continuous forested habitat.

Existing Environment

In the project area, potential pileated woodpecker nesting habitat exists on approximately 3,352 acres that are dominated by western larch/Douglas-fir. Additionally, 1,524 acres of sawtimber stands dominated by western larch/Douglas-fir and mixed conifers exist in the project area that may be lower-quality foraging stands. Although nesting habitat is defined differently than foraging habitat, nesting habitat also provides foraging opportunities for pileated woodpeckers.

Removal of large western larch by past timber-harvesting activiies has reduced the quality of habitat for pileated woodpeckers. Large live and dead trees are less common than would occur naturally due to these past

timber-harvesting activities in portions of the project area. Black cottonwood occurs in some riparian areas in the project area. During field visits, numerous feeding sites and 0 to 8 variably spaced, large (greater than 14 inches dbh) snags per acre were observed in the project area; these provide foraging and nesting opportunities for pileated woodpeckers. Pileated woodpeckers and associated large cavities were detected in the project area.

In the cumulative-effects analysis area, potential pileated woodpecker nesting habitat exists on approximately 20,143 acres, with at least an additional 49,128 acres of sawtimber-sized stands that may be suitable foraging habitats. Similar to the project area, these nesting habitats are dominated by western larch/Douglas-fir and mixed conifers, with a larger percentage of subalpine fir. In the cumulative-effects analysis area, extensive harvesting has occurred in the past, which has fragmented the contiguous forest to a degree. However, in the more recent past, stands have been managed for mature western larch and western white pine, snags, and snag-recruit trees, which benefit pileated woodpeckers in the long term. Ongoing harvesting associated with the Point of Rocks, Duck-to-Dog, West Fork of Swift Creek, and Lion Mountain timber sale projects, along with the Chicken Creek gravel pit development, would continue reducing pileated woodpecker habitats. Similarly, the proposed Chicken/Antice and Olney Urban Interface timber sale projects, along with the proposed lease site for the U.S. Post Office building, could further affect pileated woodpecker habitats. No appreciable changes to pileated woodpecker habitats would be anticipated with the various ongoing special-uses projects (land exchanges, recreational licenses, etc.). Similarly, some disturbance from the proposed Trail project could occur, but those additional effects would be analyzed once a proposal is completed; therefore, given the uncertainty associated with this proposal, this project will not be covered further in this analysis.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Pileated Woodpeckers***

  No disturbance of pileated woodpeckers would occur. Forest succession and natural disturbance agents would continue to bring about changes in existing stands. Trees would continue to grow, mature, and die, thus providing potential nesting and foraging structure for pileated woodpeckers. Continual conversion to shade-tolerant species would reduce the quality of habitat for pileated woodpeckers over time. Therefore, a reduction in suitable nesting trees would be likely over time, which could lead to decreased reproduction in the project area. Thus, negligible adverse indirect effects to pileated woodpeckers in the project area would be expected until some other disturbance reverses stand succession since: 1) no further harvesting would occur; 2) no changes in the amount of continuously forested habitats would be anticipated; 3) no appreciable changes to existing pileated woodpecker habitats would be anticipated; and 4) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would be anticipated.

- ***Direct and Indirect Effects of the Action Alternative 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. Harvesting 832 acres would reduce continuously forested habitats for pileated woodpeckers. At least 313 acres of potential nesting habitat would be removed, with another 335 acres of potential nesting habitats that would be altered, some to the point of being unusable; meanwhile, an additional 176 acres of potential foraging habitats would be modified, some to the point of being unusable. Where regeneration harvests are proposed, potential pileated nesting and foraging habitats would be removed for 30 to 100 years, depending on the density of trees retained. Elements of the forest structure important for nesting pileated woodpeckers would be retained, including snags, coarse woody debris, numerous leave trees, and snag recruits. Elements of the forest structure important for nesting pileated woodpeckers, including snags (a minimum of 2 snags greater than 21 inches dbh per acre where they exist and would be expected to persist if they are not lost due to firewood gathering), coarse woody debris (8 to 15 tons per acre), numerous leave trees, and snag recruits (a minimum of 2 trees per acre greater than 21 inches dbh where they exist) would be retained in the proposed harvest areas. Some areas currently lack sufficient large snags, while other areas are either close to private property and/or open roads, where snag loss could continue due to legal and illegal firewood and forest-product gathering. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*), pileated woodpecker densities in the project area would be expected to be reduced on 832 acres, and at least 281 of those acres would be too open to be considered pileated woodpecker habitats following proposed treatments. The silvicultural prescriptions would retain healthy western larch, western white pine, ponderosa pine, cottonwood, and Douglas-fir while promoting the regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Thus, minor direct and indirect effects would be anticipated that would affect pileated woodpeckers in the project area for 30 to 100 years since: 1) harvesting would reduce the amount of continuous forested habitats available; 2) potential nesting and foraging habitats would be reduced; 3) several snags and snag recruits per acre would be removed; however, mitigation measures to retain a minimum of 2 snags per acre and 2 snag recruits per acre in most of the harvest areas would be included, and 4) harvest prescriptions would promote seral species in the proposed harvest areas.

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

  No disturbance of pileated woodpeckers would occur. Trees would continue to grow, mature, and die, thus providing potential nesting and foraging structure for pileated woodpeckers. Continued widespread use of the cumulative-effects analysis area by pileated woodpeckers would be expected. Ongoing harvesting would continue to remove potential

pileated woodpecker habitats while reducing the amount of the cumulative-effects analysis area that would be in mature, forested covertypes. Similarly, proposed harvesting, the ongoing Chicken Creek gravel pit development, and the lease site of the U.S. Post Office building could further alter pileated woodpecker habitats. Thus, negligible adverse cumulative effects to pileated woodpeckers in the cumulative-effects analysis area would be expected since: 1) no further changes to existing habitats would occur; 2) no further changes to the amount of continuously forested habitats available for pileated woodpeckers would be anticipated; and 3) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would occur.

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

  Under this alternative, reductions in pileated woodpecker habitat would be expected. Several snags, coarse woody debris, and some potential nesting trees would be retained in the project area; however, future recruitment of these attributes may be reduced by the proposed activities. In the project area, the canopy on at least 281 acres proposed for regeneration-type treatments would likely be too open for appreciable pileated woodpecker use. Stands recently harvested in the cumulative-effects analysis area reduced pileated woodpecker habitats as well. Ongoing harvesting, the Chicken Creek gravel pit development, and the lease site for the U.S. Post Office building would continue to remove potential pileated woodpecker habitats while reducing the amount of the cumulative-effects analysis area that would be in mature, forested covertypes. Additionally, any potential harvesting associated with the proposed projects could also further alter pileated woodpecker habitats. The loss of pileated woodpecker habitats under this alternative would be additive to habitat losses associated with past harvesting; continued widespread use of the cumulative-effects analysis area would be expected. Additionally, continued maturation of stands across the cumulative-effects analysis area is increasing suitable pileated woodpecker habitats. Thus, minor cumulative effects would be anticipated that would affect pileated woodpeckers in the cumulative-effects analysis area for the next 30 to 100 years since: 1) harvesting would reduce the amount of continuous forested habitats available in the cumulative-effects analysis area, but considerable forested habitats would persist; 2) potential nesting and foraging habitats would be reduced, but extensive habitats would persist in the cumulative-effects analysis area; 3) several snags and snag recruits per acre would be removed in the proposed harvest areas; however, mitigation measures would retain some of these attributes in several of the harvest areas; and 4) harvest prescriptions would promote seral species in the proposed harvest areas.

TOWNSEND'S BIG-EARED BAT

Issue: Timber harvesting and associated activities could disturb Townsend's big-eared bats and/or cause abandonment of maternity roosts and/or hibernacula.

WILDLIFE ANALYSIS

Introduction

Townsend's big-eared bats are a widely distributed species that exist in low densities. Townsend's big-eared bats feed on a variety of nocturnal insects, including moths, beetles, flies, and wasps. Townsend's big-eared bats occur in a wide variety of habitats, yet its distribution tends to be strongly correlated with the availability of caves and old mines for roosting habitat. In western Montana, Townsend's big-eared bats are most closely associated with caves, abandoned mines, other cavernous habitats, and rocky outcrops of sedimentary or limestone origin, which are used for roosting or hibernacula (*Foresman 2001*). It is a relatively nonmigratory bat, for which no long-distance migrations have been reported. The Townsend's big-eared bat does not generally associate with other species in its roosts, particularly at maternity and hibernating sites. For maternity sites, important characteristics include: roost temperature, roost dimensions, light quality, and airflow. Of these, roost temperature is the most important. The maternity roost is generally spacious, with the room at least 100 feet long and 6.5 feet high. For hibernacula, the Townsend's big-eared bat selects roosts with stable, cold temperatures and moderate airflow. Temperatures within hibernacula typically range from 28.4 to 55.4 degrees Fahrenheit, with temperatures below 50 degrees Fahrenheit preferred (*Pierson et al. 1999*). Individuals roost on walls or ceilings, often near entrances and, as such, are generally susceptible to disturbance (*Foresman 2001*). If disturbed, these bats may permanently abandon hibernating sites and roosts.

Analysis Area

Direct, indirect, and cumulative effects were analyzed for activities conducted in the project area since DNRC is unaware of any other potentially suitable caves/tunnels/ mines in the project area or surrounding area. This scale includes enough area to support many pairs of Townsend's big-eared bats.

Analysis Methods

Effects were analyzed using a combination of field evaluations and aerial-photograph interpretation in the project area. Factors considered include level of human disturbance around caves/tunnels and changes in availability of large snags as alternate roost sites.

Existing Environment

There are no documented records of this bat in the project area. A cave associated with the BNSF Railroad exists on the edge of the project area that could be suitable habitat for Townsend's big-eared bats. DNRC is unaware of any other caves, mines, or tunnels in the project area or cumulative-effects analysis area. Large-diameter snags exist in the project and cumulative-effects analysis areas, which may also be used for roosting. Considerable disturbance associated with the BNSF Railroad already influences this tunnel/cave, likely either reducing the likelihood of use by Townsend's big-eared bats or acclimatizing any bats that may be using the tunnel/cave to higher disturbance levels. No appreciable changes to Townsend's big-eared bat habitats would be anticipated with the various ongoing special-uses projects (land exchanges, recreational licenses, etc.). Similarly, some disturbance from the proposed Trail project could occur, but those

additional effects would be analyzed once a proposal is completed; therefore, given the uncertainty of the proposal, this project will not be covered further in this analysis.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Townsend's Big-Eared Bat***

  No disturbance of Townsend's big-eared bats would occur. Trees in the vicinity of the existing cave/tunnel would continue to grow, mature, and die, thus providing potential roosting habitats into the future. Thus, negligible adverse direct and indirect effects to Townsend's big-eared bats in the project area would be expected since: 1) no changes in human-disturbance levels would be anticipated, and 2) no short-term changes in availability of large-diameter snags and gradual increases in large-diameter snag availability could occur.

- ***Direct and Indirect Effects of the Action Alternative on Townsend's Big-Eared Bat***

  Elevated noise levels and increased human presence in the project area could disturb Townsend's big-eared bats; however, 25 of the 26 harvest areas would likely be far enough from the tunnel/cave, and any activities in those harvest areas would not be expected to disturb Townsend's big-eared bats. One harvest area (BE) would be close to the tunnel/cave, and activities could disturb Townsend's big-eared bats should they be using the cave/tunnel. A regional conservation strategy for this species (*Pierson et al. 1999*) recommends implementation of a minimum 500-foot horizontal radius buffer be maintained around roost entrances, with seasonal restrictions depending upon the type of roost (maternal or hibernacula). In general, disturbance associated with activities within 500 feet of roost entrances influence the use of the roost, and parts of the proposed harvest area would be within 500 feet of the tunnel/cave opening. Disturbance to the tunnel/cave could occur when it would be serving as a hibernaculum since this harvest area would be harvested during the winter. Additionally, some disturbance could occur when the tunnel/cave would be serving as a maternity roost with the postharvest site preparation that could occur during the summer. Despite the existing disturbance levels associated with the tunnel/cave entrance, minimizing disturbance within 500 feet of the tunnel/cave opening by excluding landing and processing and minimizing the duration of harvesting activities in this zone would minimize potential disturbance to roosting bats should they be using this tunnel/cave as a hibernaculum. Additionally, harvesting across 832 acres could reduce the availability of large-diameter trees and snags, which could be suitable roosting habitat now or into the future. Thus, moderate adverse direct and indirect effects to Townsend's big-eared bats in the project area would be expected should they be using the tunnel/cave or no effects to Townsend's big-eared bats would be expected if they are not using the tunnel/cave since: 1) elevated disturbance levels during both the winter and summer periods could affect Townsend's big-eared bat use of the tunnel/cave as a maternity roost and/or hibernaculum, and 2) a decrease in availability of large-diameter snags and trees could occur.

- ***Cumulative Effects of the No-Action Alternative on Townsend's Big-Eared Bat***

  Townsend's big-eared bats utilize very specific resources on the landscape (i.e., caves, mine shafts, etc.). As such, no other known habitats exist in the cumulative-effects analysis area. No further disturbance to potential Townsend's big-eared bat habitats would be anticipated. Thus, no adverse cumulative effects to Townsend's big-eared bats in the cumulative-effects analysis area would be expected since: 1) no changes to human-disturbance levels would occur, and 2) no short-term changes in the availability of large-diameter snags and gradual increases in large-diameter snag availability could occur.

- ***Cumulative Effects of the Action Alternative on Townsend's Big-Eared Bat***

  Townsend's big-eared bats utilize very specific resources on the landscape (i.e., caves, mine shafts, etc.). As such, no other known habitats exist in the cumulative-effects analysis area. No further disturbance to potential Townsend's big-eared bat habitats would be anticipated with any other potential activities in the cumulative-effects analysis area. Thus, moderate adverse cumulative effects to Townsend's big-eared bats in the cumulative-effects analysis area would be expected if they are using the tunnel/cave or no cumulative effects if the tunnel/cave is not being used since: 1) elevated disturbance levels during both the winter and summer periods could affect Townsend's big-eared bat use of the tunnel/cave as a maternity roost and/or hibernaculum, and 2) a reduction in availability of large-diameter snags and trees could occur.

OSPREY

Issue: Timber harvesting and associated activities could disturb nesting osprey and/or remove active nests, resulting in reduced productivity of osprey in the vicinity.

Introduction

Ospreys are migratory birds that eat many different species of medium-sized fish. In general, they nest near large lakes, reservoirs, and rivers in Montana. Ospreys build large nests on trees, tall dead snags, utility poles, rock pinnacles, cliffs, and artificial nesting platforms. It has been suggested (*Beebe 1974 in Johnsgard 1990*) that breeding habitat needs include only 3 components: fish that move slowly near the water surface, an ice-free season long enough to permit reproduction, and elevated or inaccessible nest sites, or at least freedom from disturbance during the breeding season. In Montana, the breeding season occurs from April through the end of July each year. Reasons for population declines are typically cited as excessive human disturbance or destruction, declining fishery stocks, and persistent pesticides (*Evans 1982 in Johnsgard 1990*).

Analysis Area

Direct, indirect, and cumulative effects were analyzed within a mile of Whitefish Lake, the only large waterbody in the area. Since osprey are almost exclusively dependent upon water and reasonably large fish, this is the only area likely able to support osprey. The cumulative-effects analysis area could support at least 2 pairs of osprey.

Analysis Methods

Effects were analyzed using a combination of field evaluations and aerial-photograph interpretation in the project area. Factors

considered include human access to osprey foraging habitats and levels of human disturbance in nesting areas.

Existing Environment

An osprey nest is in the project area in a sharply leaning tree that appears to have been used for numerous years. The nest is approximately 0.5 mile from Whitefish Lake and adjacent to a switchback of a restricted road. No appreciable changes to osprey habitats would be anticipated with the various ongoing special-uses projects (land exchanges, recreational licenses, etc.). Similarly, some disturbance from the proposed Trail project could occur, but those additional effects would be analyzed once a proposal is completed; therefore, given the uncertainty associated with the proposal, this project will not be covered further in this analysis.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Osprey***

  A slight decrease in human access would be anticipated with the replacement of the existing closure to make it more effective, which should limit human-disturbance levels in the vicinity of the nest. Forests in the vicinity of the existing nest would not change appreciably. Overall, no changes to nesting habitats would be anticipated. Thus, negligible direct and indirect effects to osprey in the project area would be anticipated since: 1) no changes in human access to osprey foraging areas would be anticipated, and 2) minor reductions in human-disturbance levels in the nest area would be anticipated.

- ***Direct and Indirect Effects of the Action Alternative on Osprey***

  A slight decrease in human access would be anticipated with the replacement of the existing closure to make it more effective, which should limit human-disturbance levels in the vicinity of the nest. The proposed harvesting in Harvest Areas BA, BB, and BC would likely disturb nesting at the existing nest tree. An unharvested buffer of roughly 150 feet around the nest would be retained. Mechanical operations (i.e., harvesting, decking, road construction, and hauling) associated with these harvest areas would occur only between September 1 and March 31 to limit disturbance to the nest site when the nesting pair would be using the area. Should the area no longer be occupied (due to mortality or nest destruction/ relocation, etc.) or if the pair has abandoned the territory for the season (nest failure, mortality, etc.), seasonal restrictions would be eased in those 3 units if determination is made that the osprey are not using the territory. Large snags and snag recruits would be retained across the harvest areas, which could serve as alternate nest sites in the future. Harvesting in other portions of the project area would not be anticipated to alter human-disturbance levels or affect the nest site. No changes in human access to osprey foraging areas would be anticipated with the proposed harvesting. Thus, minor direct and indirect effects to osprey in the project area would be anticipated since: 1) no changes in human access to osprey foraging areas would be anticipated, and 2) increased human disturbance in the vicinity of the nest

would occur outside of the core nesting season.

- ***Cumulative Effects of the No-Action Alternative on Osprey***

  Negligible changes to human access in the cumulative-effects analysis area would be anticipated; however, no changes to human access to Whitefish Lake would occur; thus, no changes in human-recreation pressure on the existing fishery would be anticipated. Forests in the cumulative-effects analysis area would not change appreciably and many suitable nest sites would persist. Ongoing harvesting and development on private ownerships could alter habitats along the lakeshore and/or disturb osprey. Overall negligible changes to existing nest sites would be anticipated and no appreciable changes to potential nesting habitats in the cumulative-effects analysis area would be anticipated. Thus, negligible cumulative effects to osprey in the cumulative-effects analysis area would be anticipated since: 1) no changes in human access to osprey foraging areas would be anticipated, 2) negligible changes in human-disturbance levels in the vicinity of the existing nest would be anticipated, and 3) no further changes in potential nesting habitats across the cumulative-effects analysis area would be expected.

- ***Cumulative Effects of the Action Alternative on Osprey***

  Negligible changes to human access in the cumulative-effects analysis area would be anticipated; however, no changes to human access to Whitefish Lake would occur; thus no changes in human-recreation pressure on the existing fishery would be anticipated. Forests in the cumulative-effects analysis area would be reduced slightly with the proposed harvesting, but many suitable nest sites would persist. Slight increases in disturbance levels could be realized with the proposed harvesting, but harvesting would target time frames when activities would not disturb nesting osprey. The effects of the proposed harvesting would be additive to ongoing harvesting and development on private ownerships, which may be altering habitats along the lakeshore and/or disturbing osprey. Overall negligible changes to existing nest sites would be anticipated and no appreciable changes to potential nesting habitats in the cumulative-effects analysis area would be anticipated. Thus, negligible cumulative effects to osprey in the cumulative-effects analysis area would be anticipated since: 1) no changes in human access to osprey foraging areas would be anticipated, 2) negligible changes in human-disturbance levels in the vicinity of the existing nest would be anticipated, and 3) no further changes in potential nesting habitats across the cumulative-effects analysis area would be expected.

BIG GAME WINTER RANGE

Issue: Timber harvesting and associated activities could remove thermal cover on big game winter range, which could reduce the carrying capacity of the winter range.

INTRODUCTION

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. The effect is that temperatures are moderated and snow depths are lowered, which enables big game movement and access to forage with less energy expenditure than in areas with deeper snow and colder temperatures. Snow depths differentially affect big game; white-tailed deer are most affected, followed by mule deer, elk, and then moose.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the contiguous 115,818-acre white-tailed deer winter range that includes portions of the project area. This scale includes enough area to support hundreds of white-tailed deer.

Analysis Methods

Effects were evaluated using a combination of field evaluation, aerial-photograph interpretation, and GIS analysis. Factors considered in this cumulative-effects analysis area include acres of winter range harvested and the level of human disturbance and development.

EXISTING ENVIRONMENT

DFWP identified elk (1,876 acres), white-tailed deer (4,205 acres), and mule deer (1,896 acres) winter ranges in the project area. These winter ranges are part of larger elk (7,247 acres), white-tailed deer (112,420 acres), and mule deer (7,114 acres) winter ranges, respectively. Winter snow depths and suitable microclimates influence big game distribution and use in the vicinity. Mature Douglas-fir/western larch, ponderosa pine, and mixed-conifer stands in the project area are providing attributes facilitating use by wintering big game. In the recent past, roughly 276 acres of the elk winter range, 834 acres of the white-tailed deer winter range, and 274 acres of the mule deer winter range in the project area has been harvested by DNRC and is not yet providing winter-range attributes. Proximity to human developments and open roads has likely slightly reduced the capacity of the winter range in the project area. Evidence of use by deer and elk was noted throughout the project area during field visits.

Presently, a variety of stands across the winter range in the cumulative-effects analysis area are providing thermal cover and snow intercept for big game. In the recent past, harvesting on all ownerships in this area has reduced thermal cover and snow intercept. Human disturbance in the winter range is associated with development of the Flathead Valley in the last 100-plus years, including residential development, agricultural clearing, numerous highways, secondary roads, and railroads. Other disturbance to the winter range occurs from recreational snowmobile use, other winter recreation, and commercial timber harvesting, all of which likely influences wintering big game populations and their habitats.

ENVIRONMENTAL EFFECTS

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

  No direct effects to big game winter range would be anticipated. No additional disturbance or displacement would be anticipated in the project area. Big game thermal cover in the project area would not be altered in the near term. In the longer term, continued succession could reduce forage production while increasing

thermal cover in these stands. No appreciable changes to winter carrying capacity would be anticipated. No direct or indirect effects to big game winter range would be expected since: 1) subtle changes in thermal cover due to mortality and successional advances increasing canopy densities would be anticipated, 2) the amount of mature-forested habitats on the winter range would not change appreciably, and 3) the levels of human disturbance would remain similar,.

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

  Some displacement would be expected as a result of the proposed harvesting operations, particularly in the harvest areas that could be harvested during the winter. However, winter logging provides felled tree tops, limbs, and slash piles that could concentrate feeding deer during nighttime and quiet periods when logging operations are shut down. Increasing short-term forage availability in this manner may partially offset some of the effects associated with temporary displacement caused by logging disturbance. This short-term benefit would not be expected to offset impacts associated with the removal of thermal cover over the long term (several decades). The prescriptions on much of these acres of the winter range would create open stands on approximately 421 acres of white-tailed deer winter range, 449 acres of mule deer winter range, and 419 acres of elk winter range that would be largely too open to function as thermal cover or snow intercept, thus eliminating habitat attributes that would enable concentrated winter use by deer and elk. These losses of thermal cover and snow intercept would require 40 to 60 years for suitably sized trees (greater than 40 feet tall) to develop in the stand. Proposed timber harvesting would not prevent big game movement through the project area appreciably in winter and could stimulate browse production in the harvest areas. Thus, minor adverse direct or indirect effects to white-tailed deer would be expected for the next 20 to 30 years since: 1) logging activities would create disturbance in this area for a relatively short term, 2) a high percentage of the winter range in the project area would be altered, 3) the behavior of white-tailed deer is adaptable, and 4) the availability of cover on surrounding ownerships provides some opportunity for deer should they be displaced in the short or long term.

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

  No changes would be anticipated in thermal cover and snow intercept. Stands that are providing thermal cover would be expected to continue providing this resource under this alternative. Continued winter use of the larger winter range would be expected. Harvesting on private lands and DNRC-managed lands could continue to displace wintering big game and reduce available winter-range habitats. Those portions of the winter range where timber harvesting occurred in the last 30 years could start developing thermal cover and snow intercept in the next 10 to 30 years. Those areas that have been converted to agriculture or other human developments would not be expected to provide thermal cover or snow intercept in the future. Human-disturbance levels would be anticipated to

continue at similar levels. Thus, minor positive cumulative effects to big game winter range would occur as a result of this alternative.

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

  Thermal cover would be largely removed from approximately 421 acres of white-tailed deer winter range, 449 acres of mule deer winter range, and 419 acres of elk winter range, which would be additive to ongoing and past reductions across the winter ranges. Portions of the winter range are expected to start providing some habitat attributes suitable for big game winter use in the near future as they continue maturing with time. Displacement associated with this alternative could also be additive to the displacement associated with ongoing timber sales, but would be partially offset by the increased forage availability that would occur. In addition to the direct displacement associated with harvesting, human-disturbance levels could increase slightly with the increasing openness that could facilitate more human use and/or elevate the disturbance levels associated with ongoing activities Thus, minor adverse cumulative effects to white-tailed deer would be expected for the next 20 to 30 years since: 1) the disturbance that logging activities would create in a small portion of the cumulative-effects analysis area would be relatively short term, 2) a small percentage of the winter range in the cumulative-effects analysis area would be altered, 3) the behavior of white-tailed deer is adaptable, and 4) the availability of lower-quality cover on surrounding ownerships provides some opportunity for deer should they be displaced.

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STIPULATIONS AND SPECIFICATIONS

Stipulations and specifications for the Action Alternative include provisions in the project design that follow Forest Management Rules and relevant laws and regulations. Also included are mitigations that were designed to avoid or reduce potential effects to the 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.

The Timber Sale Contract will contain stipulations and specifications that apply to operations required by the contract and occur during the contract period; as such, they are binding and enforceable. Project administrators enforce stipulations and specifications relating to timber sale activities (eg., hazard reduction, site preparation, planting) that may occur during or after the contract period.

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

ACCESS AND ROADS

- For safety purposes, no hauling on East Lakeshore Drive will be allowed during winter conditions.
- Pup trailers are prohibited on East Lakeshore Drive.
- Temporary roads are restricted to administrative use only.
- Many roads will be reclaimed to near-natural levels following timber sale activities.

AESTHETICS

- Damaged residual vegetation will be slashed.
- The size and number of landings will be limited.
- Unburned portions of specified landings will be rebunched and burned or buried. Some landings will have topsoil redistributed over the site to improve the regrowth of native grasses and vegetation.
- Disturbed soil sites along road right-of-ways will be grass seeded.
- Landings will be placed off DelRey Road in an area with limited visibility.
- Edges of harvest areas around Smith Lake, DelRey Road, and in Section 16 will be feathered to reduce the impacts of harvesting.
- Where possible, temporary roads will be located on breaks to limit steep slideslopes with large cuts and fills.
- On the down hillside of the roadway in Section 16, strips of trees will be targeted for retention.
- Landings in Harvest Area BC will be located on the west side of the ridge, out of sight from Whitefish Lake.
- Temporary roads will be reclaimed after harvesting and site preparation.
- Logging activities in the Skyles Lake section would take place during winter conditions to reduce visible skid trails.
- In areas where cable logging is required, the width of the cable corridor would be

limited and a minimum distance between corridors would be required.

AIR QUALITY

- To minimize cumulative effects during burning operations, and provide for burning during acceptable ventilation and dispersion conditions burning will be done in compliance with the Montana/ Idaho Airshed Group reporting regulations and burning restrictions imposed in Airshed 2..
- Debris will be piled clean to allow ignition during fall and spring when ventilation is good and surrounding fuels are wet. The Forest Officer may require piles to be covered so they are drier, ignite easier, burn hotter, and extinguish sooner.
- Some large woody debris will be left on site to minimize the number of burn piles and reduce smoke production.
- Due to the proximity of residences and private property, dust abatement may be applied on some road segments depending on seasonal conditions and the level of public traffic.

ARCHAEOLOGY

- Operations will be suspended if cultural resources are discovered; operations may resume only as directed by the Forest Officer.
- If cultural resources are discovered, the Confederated Salish-Kootenai Tribe will be notified as requested.

FISHERIES

- All applicable BMPs; the SMZ Law and Rules, including an SMZ alternative practice; and Forest Management Rules will be applied for fisheries, soils, and wetland RMZs (*ARMs 36.11.425* and *36.11.426*).
- The SMZ Law and Rules will be applied to all streams and lakes.
- All road-stream crossings will be monitored for sedimentation and road-prism deterioration.
- Equipment traffic at road-stream crossings will be allowed only when road prisms have an adequate load-bearing capacity.
- CMPs will be removed on the abandoned King Creek Road be pulled.

FOREST FUELS

- Defensible space will be created around private residences on East Lakeshore Drive.
- All fuel reduction activities will meet the Hazard Reduction Law.
- All areas harvested within 1,000 feet of a structure and along open roads will meet the High Hazard Reduction Standards.
- Ladder fuels will be reduced in harvest areas.

NOXIOUS WEED MANAGEMENT

- All tracked and wheeled equipment will be cleaned of noxious weeds prior to beginning project operations. The contract administrator will inspect equipment periodically during project implementation.
- Disturbed roadside sites will be promptly seeded with a native grass seed mix. Roads used and closed as part of this proposal will be reshaped and seeded.

RECREATION

- Forest fuels will be treated to lower the risk of fire starts.
- Some stand structure, including trees of all size classes and species, will be retained.

- Harvesting and roadwork activities in the Smith Lake area will begin in the fall to limit the disruption of recreationists at the Disc Golf Course near Smith Lake.
- More parking and safer access will be provided to the west side of Smith Lake.

SOILS

EROSION

- Ground-skidding machinery will be equipped with a winchline to limit equipment operation on steeper slopes.
- Following use of roads, the purchaser will reshape the roads and redefine the ditches to reduce surface erosion.
- Drain dips and gravel will be installed on roads as needed to improve road drainage and reduce maintenance needs and erosion.
- Some sections of road will be repaired to reduce erosion potential and maintenance needs and upgrade the roads to design standards.
- Certified weed-free grass seed and fertilizer will be applied in a timely manner to all newly constructed road surfaces, cutslopes, and fillslopes. These applications will also be applied to any existing disturbed cutslopes, fillslopes, and landings immediately adjacent to open roads. Seeding to stabilize soils and reduce or prevent the establishment of noxious weeds will include:
  - seeding all road cuts and fills concurrent with construction,
  - applying "quick-cover" seed mix at culvert installation sites involving stream crossings within 1 day of work completion, and
  - seeding all road surfaces and reseeding culvert installation sites when the final blading has been completed for each specified road segment.
- Based on ground and weather conditions, water bars, logging-slash barriers, and, in some cases, temporary culverts will be installed on skid trails where erosion is anticipated and as directed by the Forest Officer. These erosion-control features will be periodically inspected and maintained throughout the contract period or extensions thereof.

SOIL COMPACTION AND DISPLACEMENT

- Logging equipment will not operate off forest roads unless:
  - soil moisture is less than 20 percent,
  - soil is frozen to a depth that will support machine operations, or
  - soil is snow-covered to a depth that will prevent compaction, rutting, or displacement.
- Existing skid trails and landings will be used where their design is consistent with prescribed treatments and meets current BMP guidelines.
- To reduce the number of skid trails and the potential for erosion, designated skid trails are required where moist soils or short steep pitches (less than 300 feet) will not be accessed by other logging systems.
- The density of skid trails in a harvest area will not exceed 20 percent of the total area.
- Conventional ground-based skidding equipment will not operate on steep slopes (greater than 40 percent) unless the effects to soil displacement can be mitigated. Soft-tracked yarders are suitable on slopes up to 55 percent with less impact than conventional tractor skidding. Cable yarding will be used on steeper slopes.

- Piling and scarification on gentle slopes will be completed with a dozer. Slash treatment and site preparation on steeper slopes will be done with an excavator.
- A majority of fine litter and 10 to 15 tons of large woody debris will be retained following harvesting (*ARM 36.11.410* and *36.11.414*) on most harvest areas.

VEGETATION

- Insect-infested and disease-infected trees will be removed.
- Grand fir will be removed to facilitate the regeneration of early successional trees, such as western larch.
- Some dead and dying trees will be harvested while they still have commercial value.

OLD GROWTH

Old growth, as defined by DNRC will be maintained on those stands within Harvest Area SA and SB that currently meet old-growth standards by harvesting areas less than 5 acres in size.

WATERSHED AND FISHERIES

- Planned erosion-control measures will 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 *ATTACHMENT B* of the *TIMBER SALE AGREEMENT*.
- SMZs and RMZs will be defined along those streams and/or wetlands that occur within or adjacent to the harvest areas. This project will meet or exceed SMZ and RMZ rules.
- Brush will be removed from existing road prisms to allow for effective road maintenance to reduce sediment delivery.
- The SMZ Alternative Practice will be implemented on activities within Harvest Area BE.
- The contractor will be responsible for the immediate cleanup of any spills (fuel, oil, dirt, etc.) that may affect water quality.
- Leaking equipment will 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 statewide audit site.

WILDLIFE

- If a threatened or endangered species is encountered, a DNRC biologist will develop additional mitigation measures that are consistent with managing threatened and endangered species (ARM 36.11.428 through 36.11.435).
- Roads and skid trails opened with the proposed activities will be closed following timber sale activities to reduce the potential for use by unauthorized motor vehicles.
- Motorized public access will be restricted on closed roads that have been opened forthe proposed activities.
- A combination of topography, group retention, and roadside vegetation will be utilized to reduce views into harvest areas along open roads.
- A 2007 bald eagle nest site will be monitored and harvest-related activities will be restricted within the primary use area from February 1 to August 15.

- Large emergent trees and snags will be retained near open bodies of water in the project area.
- Open-road densities will not have a net increase in the project area. Temporary roads would be reclaimed.
- A minimum of 10 percent of total lynx habitat will be maintained in mature and/ or young foraging habitats.
- Harvesting in SG, SA3, and SA4 will be restricted to August 16 through February 1 to avoid disturbing the nesting bald eagle pair. Any harvesting in the remaining Smith harvest areas, as well as the Beaver E harvest areas, will be encouraged to be harvested during this same time period (August 16 through February 1).
- Lakes in the project area will be monitored for common loon presence and time restrictions will be imposed if nesting is observed.
- Ponderosa pine and western larch snags will be favored in stands identified as flammulated owl habitat.
- A one-and-a-half tree length no-cut buffer will be maintained around the osprey nest in Harvest Area BB, and harvesting and hauling in the vicinity will be restricted (within 0.5 mile) between April 1 and August 31.
- Activities would be minimized within 500 feet of the tunnel opening near Harvest Area BE.
- Forested corridors will be retained to maintain landscape connectivity and patches of dense vegetation, when possible, to provide security cover.
- Snags, snag recruits, and coarse woody debris will be managed according to ARM 36.11.411 through 36.11.414, particularly favoring western larch.
- Contractors and purchasers conducting contract operations will be prohibited from carrying firearms while operating on restricted roads.

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.

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

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.

Coarse-filter
An approach that supports diverse wildlife habitat by managing for a variety of forest structures and compositions instead of focusing on habitat needs for individual species.

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.

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

Covertype
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.

Desired future conditions
The land or resource conditions that will exist if goals and objectives are fully achieved. It is considered synonymous with appropriate conditions.

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.

Edge
The border between two or more habitats such as a wetland and mature forest.

Equivalent clearcut acres (ECA)
This method equates the area harvested and the 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.

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.

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.

Hibernacula
A shelter occupied during the winter by dormant animal, such as bats.

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

Interdisciplinary team (ID Team)
A team of resource specialists brought together to analyze the effects of a project on the environment.

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

Landscape
An area of land with interacting ecosystems.

Live Crown Ratio
The percentage of the length of tree having live limbs divided by the tree's height.

Meter
A measurement equaling 39.37 inches.

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

Multistoried stands
Timber stands with 3 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. This area is either mapped for a specific nest based on field data, or, if that is impossible, is defined as the area within a

quarter-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 bogs, natural meadows, avalanche chutes, 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 *REFERENCES).*

Open-Road Densities
Percent of the grizzly bear subunit exceeding a density of 1 mile per square mile of open roads.

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.

Phloem
The living tissue of the tree.

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 West Fork of Swift Creek Timber Sale EIS 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 harvesting 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. The 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.

Seedlings
Live trees less that 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, 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 species.

Slash
Branches, tree tops, and cull trees left on the ground following a harvest.

Snag
A standing dead tree or the 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 and 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 the 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.

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 or site preparations, 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
In general, the term 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 and bucking standing 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.

Total Road Densities
Percent of grizzly bear subunit with more than 2 miles per square mile of total road.

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; 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 individual trees remain unprotected from the force of the wind.

ACRONYMS

ARM	Administrative Rules of Montana
BMP	Best Management Practices
BNSF	Burlington Northern Santa Fe
dbh	diameter at breast height
DEQ	Department of Environmental Quality
DFWP	Department of Fish, Wildlife and Parks
DNRC	Department of Natural Resources and Conservation
EA	Environmental Assessment
ECA	Equivalent Clearcut Acres
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FI	Forest Improvement
FNF	Flathead National Forest
GIS	Geographical Information System
HUC	Hydrologic Unit Code
Mbf	thousand board feet
MCA	Montana Codes Annotated
MEPA	Montana Environmental Protection Agency
MMbf	million board feet
MNHP	Montana Natural Heritage Program
NCDE	Northern Continental Divide Ecosystem
NWLO	Northwestern Land Office
RMZ	Riparian Management Zone
SFLMP	State Forest Land Management Plan
SLI	Stand Level Inventory
SMZ	Streamside Management Zone
Trail	Trail Runs Through It Project
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
ID Team	Interdisciplinary Team
Land Board	Montana Board of Land Commissioners
124 Permit	Stream protection Act Permit
318 Authorization	Authorization A — Short-term Exemption from Montana's Surface Water-Quality Standards
Forest Management Rules	Administrative Rules of Forest Management

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