DNRC - Trust Land Management Division

Environmental Assessment
For the Bunch Gulch Timber Sale

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December 2004

Montana Department of Natural
Resources and Conservation
Hamilton Unit Office

December 9 2004

TO Connie Daruk Administrative Officer Trust Land Management DNRC

FROM Sarah Pierce Forest Management Specialist Forest Management Bureau

SUBJECT EA for submittal to EOC

Attached is the Final Checklist EA for the Bunch Gulch Timber Sale The sale is located on the Southwest Land Office Please enter into the EA log and forward to the EOC

Thank you

Sarah

Sarah Pierce

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Bunch Gulch Salvage Timber Sale
Proposed Implementation Date:	August 2005
Proponent:	Hamilton Unit, Department of Natural Resources and Conservation (DNRC)
Location:	Sections 25 and 36, T2N, R19W
County:	Ravalli

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources (DNRC) proposes to harvest an estimated 1.3 million board feet (9300 tons) of timber on approximately 340 acres in Sections 25 & 36, T2N, R19W (see attached maps). The proposed timber sale would harvest trees that are infested by insects, infected by disease, or have died from previous attacks. The proposed action would include the construction of approximately one mile of new road.

Section 77-1-202, Montana Code Annotated (MCA) requires the Board of Land Commissioners and DNRC to administer trust lands for generating revenue for the trusts' benefit. Under Section 77-5-223, MCA the DNRC administered timber sale program is required to offer for sale 53.2 million board feet of timber statewide per year. The proposed Bunch Gulch Salvage timber sale would assist in achieving this mandate. The primary objectives of the timber sale are to capture value, reduce value loss that is presently occurring, and generate income for the Public School (Common Schools) Trust Grant. The secondary objective for this sale is to improve overall forest health by identifying and treating insect and disease problems that occur within the sale area, with the intent of minimizing future timber volume and income loss.

II. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

Provide a brief chronology of the scoping and ongoing involvement for this project.

Scoping notices were sent to adjacent landowners, lessees, and other parties who have expressed interest in management of State owned lands. A list of contacted individuals is located in the project file. A notice was placed in the Ravalli County Republic. Input was received internally by Renee Myers, DNRC Hydrologist; Mike McGrath, DNRC Wildlife Biologist; Patrick Rennie, DNRC Archaeologist. MDFWP Wildlife Biologist Jon Vore was contacted, toured the proposed area, and provided comments. Comments and concerns were addressed and incorporated into this Environmental Assessment.

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

USDA Forest Service - Road Use Agreement.

3. ALTERNATIVES CONSIDERED:

Alternative A: No Action

No timber sale activities would be implemented under this alternative.

Alternative B: Action, Salvage Harvest

Under this alternative, DNRC would salvage harvest approximately 1.3 million board feet (MMBF) of sawtimber from 340 acres. This would include the harvest of trees that are infested by insects, infected by disease, or have died from previous attacks. Approximately one mile of new road would be build.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify any cumulative impacts to soils.

Please refer to Attachment A, report from DNRC Hydrologist Renee Myers, for a description of existing conditions and effects of alternatives.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify cumulative effects to water resources.

Please refer to Attachment A, report from DNRC Hydrologist Renee Myers, for a description of existing conditions and effects of alternatives.

6. AIR QUALITY:

What pollutants or particulate would be produced? Identify air quality regulations or zones (e.g. Class I air shed) the project would influence. Identify cumulative effects to air quality.

No Action:
No impacts would occur beyond the current level.
Action:
Prescribed pile and jackpot burning would produce a variable amount of smoke. Smoke may drift into areas near the proposed sale area following prescribed burning activities. Smoke from other burning projects may cumulatively add to the smoke produced from this project. The project area is not located in a special impact zone identified by the Montana/Idaho State Airshed Group. Impacts are expected to be minor and temporary with slash burning to be conducted when conditions favor good to excellent smoke dispersion (as determined by the MT Dept of Environmental Quality and MT/ID State Airshed Group).
Log trucks driving to and from the area would create some road dust. Due to the relatively small area and short duration of the proposed project, this impact would be negligible.

7. VEGETATION COVER, QUANTITY AND QUALITY:

What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify cumulative effects to vegetation.

Please refer to Attachment B, Vegetation Analysis, for a description of existing vegetation and effects of alternatives.
Sensitive Plants
The Montana Natural Heritage Program was contacted, and no threatened, endangered, or sensitive plant species were identified within the project area. In addition, no plant species of special concern were identified within the project area.
Weeds
Please refer to Attachment A, report from DNRC Hydrologist Renee Myers, for a description of existing noxious weed conditions and effects of alternatives.

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify cumulative effects to fish and wildlife.

Please refer to Attachment C, wildlife analysis report from DNRC Wildlife Biologist Mike McGrath, for a description of existing conditions and effects of alternatives.

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:
Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify cumulative effects to these species and their habitat.

Please refer to Attachment C, wildlife analysis report from DNRC Wildlife Biologist Mike McGrath, for a description of existing conditions and effects of alternatives.

Plants

The Montana Natural Heritage Program was contacted, and no threatened, endangered, or sensitive plant species were identified within the project area. In addition, no plant species of special concern were identified within the project area.

10. HISTORICAL AND ARCHAEOLOGICAL SITES:
Identify and determine effects to historical, archaeological or paleontological resources.

A DNRC Archeologist consulted with the State Historical Preservation Office, and conducted a search of the DNRC's cultural resource database. In 1990, the majority of the project area was inventoried for cultural resources. No historical or archaeological sites have been identified within the project area.

11. AESTHETICS:
Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify cumulative effects to aesthetics.

The proposed sale area is visible from the Sula area and along the East Fork Bitterroot highway (State 472/Countly 101).

No Action:

More dead trees would be visually evident over time.

Action:

Due to the decrease in stand density, stands would look more open with fewer trees per acre. There would be significantly fewer dead and dying trees visible. The one mile of new road could be visible from a distance. The proposed project would be expected to have a low risk of negatively affecting the aesthetic quality of the area. Some noise from harvesting equipment and log hauling may be heard within the project area and on haul routes. This is expected to be short in duration and temporary. Due to the relatively small area and short duration of the proposed project, there would be no measurable cumulative effects on aesthetics.

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:
Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify cumulative effects to environmental resources.

No impacts are likely to occur under either alternative.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:
List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

The Sula State Forest Fire Mitigation, Salvage & Recovery Project was implemented in 2000. There are ongoing tree planting and monitoring activities associated with that project.

Other activities in the planning stages on the Hamilton Unit are the Gird Creek and Sleeping Child Timber Sales. Due to the relatively small size of these projects, and their relatively distant location from the current project area, no cumulative impacts would be likely.

IV. IMPACTS ON THE HUMAN POPULATION

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

14. HUMAN HEALTH AND SAFETY:
Identify any health and safety risks posed by the project.

Human health would not be impacted by the proposed timber sale or associated activity. Safety considerations and temporary risks would increase for the professional contractors working within the sale area, and possibly for public vehicle traffic on roads while log trucks are hauling. There are no unusual safety considerations associated with the proposed timber sale. The general public and local residents would not face increased health or long term safety hazards because of the proposed timber sale.

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:
Identify how the project would add to or alter these activities.

No Action:
No impacts would be likely.
Action:
A slight increase in forage production within the harvest units would be expected due to more open forest canopies. Over time, forest canopies would close and the increase in forage would become negligible.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:
Estimate the number of jobs the project would create, move or eliminate. Identify cumulative effects to the employment market.

People are currently employed in the wood products industry in the region. Due to the relatively small size of the timber sale, there would be no measurable cumulative impact from this proposed action on employment.

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:
Estimate tax revenue the project would create or eliminate. Identify cumulative effects to taxes and revenue.

People are currently paying taxes from the wood products industry in the region. Due to the relatively small size of the timber sale, there would be no measurable cumulative impact from this proposed action on tax revenues.

18. DEMAND FOR GOVERNMENT SERVICES:
Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify cumulative effects of this and other projects on government services

There would be no measurable cumulative impacts related to demand for government services due to the relatively small size of the timber sale, the short-term impacts to traffic, the small possibility of a few people temporarily relocating to the area, and the lack of other timber sales in the adjacent area.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:
List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.

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

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:
Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify cumulative effects to recreational and wilderness activities.

There is currently a low level of recreational activity, primarily walk in hunting, associated with the project area. Due to the timing of harvest activities and small area, there would be no cumulative effects to recreational and wilderness activities.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

Estimate population changes and additional housing the project would require. Identify cumulative effects to population and housing.

There would be no measurable cumulative impacts related to population and housing due to the relatively small size of the timber sale, and the fact that people are already employed in this occupation in the region.

22. SOCIAL STRUCTURES AND MORES:

Identify potential disruption of native or traditional lifestyles or communities.

No impacts related to social structures and mores would be expected under either alternative.

23. CULTURAL UNIQUENESS AND DIVERSITY:

How would the action affect any unique quality of the area?

No impacts related to cultural uniqueness and diversity would be expected under either alternative.

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify cumulative economic and social effects likely to occur as a result of the proposed action.

No-action:

The no-action alternative wouldn't generate any new revenue. Value of standing timber would continue to decrease as percent defect increases over time.

Action:

The proposed harvest would return approximately $380,370 to the trust based an estimated 9300 tons sold at $40.90 per ton. This value was based on comparable timber sales from the last six months. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The costs related to the administration of the timber sale program are only tracked at the land office and statewide levels. DNRC doesn't keep track of project-level costs for individual timber sales. The following table displays the revenue-to-cost ratio for the state and Southwestern Land Office:

	FY1999	FY2000	FY2001	FY2002	FY2003
SWLO	1.23	2.36	2.69	2.57	1.61
State	1.36	2.78	1.62	1.75	1.75

The action alternative would meet the project objective of generating income for the Public School (Common Schools) Trust Grant.

EA Checklist Prepared By:	**Name:** Sarah Pierce	**Date:** 11/24/04
	Title: Forest Program Specialist	

FINDING
BUNCH GULCH SALVAGE TIMBER SALE

An Environmental Analysis (EA) has been completed for the proposed Department of Natural Resources and Conservation (DNRC) Bunch Gulch Salvage Timber Sale. After a thorough review of the EA, project file, public correspondence, Department policies, Forest Management Rules, and the State Forest Land Management Plan (SFLMP), I have made the following 3 decisions:

1. ALTERNATIVE SELECTED

Two alternatives are presented and were fully analyzed in the EA: the No-Action Alternative, which includes existing activities, but does not include a timber sale (EA, page 1); the Action Alternative, which proposes harvesting approximately 1.3 million board feet of timber from 340 acres (EA, page 1).

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

a. In my opinion, the Action Alternative best meets the Purpose and Need for Action and the specific project objectives listed in the EA on page 1. The Action Alternative generates more return to the school trust than the No-Action Alternative. The environmental effects of The Action Alternative are acceptable as compared with the No-Action Alternative. No major losses in habitat, or unacceptable effects to water or soil would occur under the Action Alterative. With better vehicle access, salvage of damaged timber if it should occur in the future would be possible under the Action Alterative. The new road proposed under the Action Alterative will allow better access for land management activities and wildfire suppression and thus may reduce losses to timber values.

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

c. The Action Alternative includes activities to address environmental concerns expressed by DNRC staff and the public. For example, it includes improvements to roads in the project area to meet Best Management Practices (BMP's); and improves timber stand health and productivity where harvesting is proposed (Attachment B, page 3-4).

2. SIGNIFICANCE OF IMPACTS

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

a. Wildlife

Bighorn Sheep in the project area are the biggest concern. Minimizing the potential for disturbance of breeding and over-wintering sheep, as well as lambing areas and lamb rearing is key. This will be accomplished by restricting periods of operation. Logging and road building activities will only be allowed during the periods of January 1 through February 15 and August 1 through October 15 (Attachment C, pages 12). Neither individual effects nor total effects to Bighorn Sheep habitat are below accepted thresholds for this area. The Action Alternative will retain existing snags unless they pose an unacceptable safety hazard during logging operations. Recruitment snags will also be provided.

The project area is outside of the Northern Continental Divide Ecosystem Grizzly Bear Recovery Area (NCDE), and is within the draft Northwest Montana Wolf Recovery Area. Sensitive species such as the lynx and fisher have been detected or suspected to be in the general project area. Habitats would be improved for some species and reduced for others. However, none of the estimated changes are identified to be extensive, severe, or of a duration that would cause unacceptable impacts to threatened and endangered or sensitive species. Mitigations included in the EA would further reduce impacts.

b. Economics

The Action Alterative will provide the largest measure of reasonable and legitimate return over the long run for the Common School (C.S.) Trust Grant. This entry will generate approximately $380,370.00 (EA, page 5). In the long run, with a well-designed and constructed access/transportation route, this will provide for future entries at reduced development costs and thus higher stumpage values.

c. Roads

The construction of the new road system has played a major role in designing the action alternative and logging systems proposed in this assessment. Implementation of the Action Alternative will create approximately 1 mile of new road on this section. All roads within the project area would be closed and grass seeded following project activity and would result in zero miles of open road density. The proposed amount of new road is the minimum that is needed to access this area of school trust lands for ground based logging and future management. This road-building pattern falls well within existing parameters for this type of topography and fits in with adjacent landowners existing land uses.

d. Watershed and Soil

The obliteration of ¾ of a mile of the Bunch Gulch road that runs adjacent to the draw bottom will correct a chronic sediment problem. This level of harvest activity will not

increase water yield above the identified threshold and will pose little risk of cumulative watershed impacts (Attachment A, page 6). Stipulations to improve and mitigate water quality impacts like BMP's will be implemented by DNRC for activities within the project area.

Some soil disturbance will occur as a result of ground skidding and cable yarding. This disturbance will not exceed 15% of the area through implementation of recommended mitigation measures. Slash treatment and site preparation will also create disturbance, but not in excess of recommended levels (Attachment A, page 7).

e. Timber and Site Productivity

Logging would be completed within a typical time frame of one to two years. The proposed silvicultural treatments are conventional techniques that have been previously applied in other projects and have resulted in acceptable environmental changes. The increase in stand vigor, resistance to insects or diseases, and retention of a good gene pool for a future seed source would not only maintain, but likely improve, options for future timber management and thus revenue. No unique features would be impacted by proposed activities.

f. Precedent Setting and Cumulative Impacts

The proposed timber sale is similar to past projects that have occurred in the area. Since the EA does not identify future actions that are new or unusual, the proposed timber sale is not setting a precedent for a future action with significant impacts.

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

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

3. SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)?

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

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

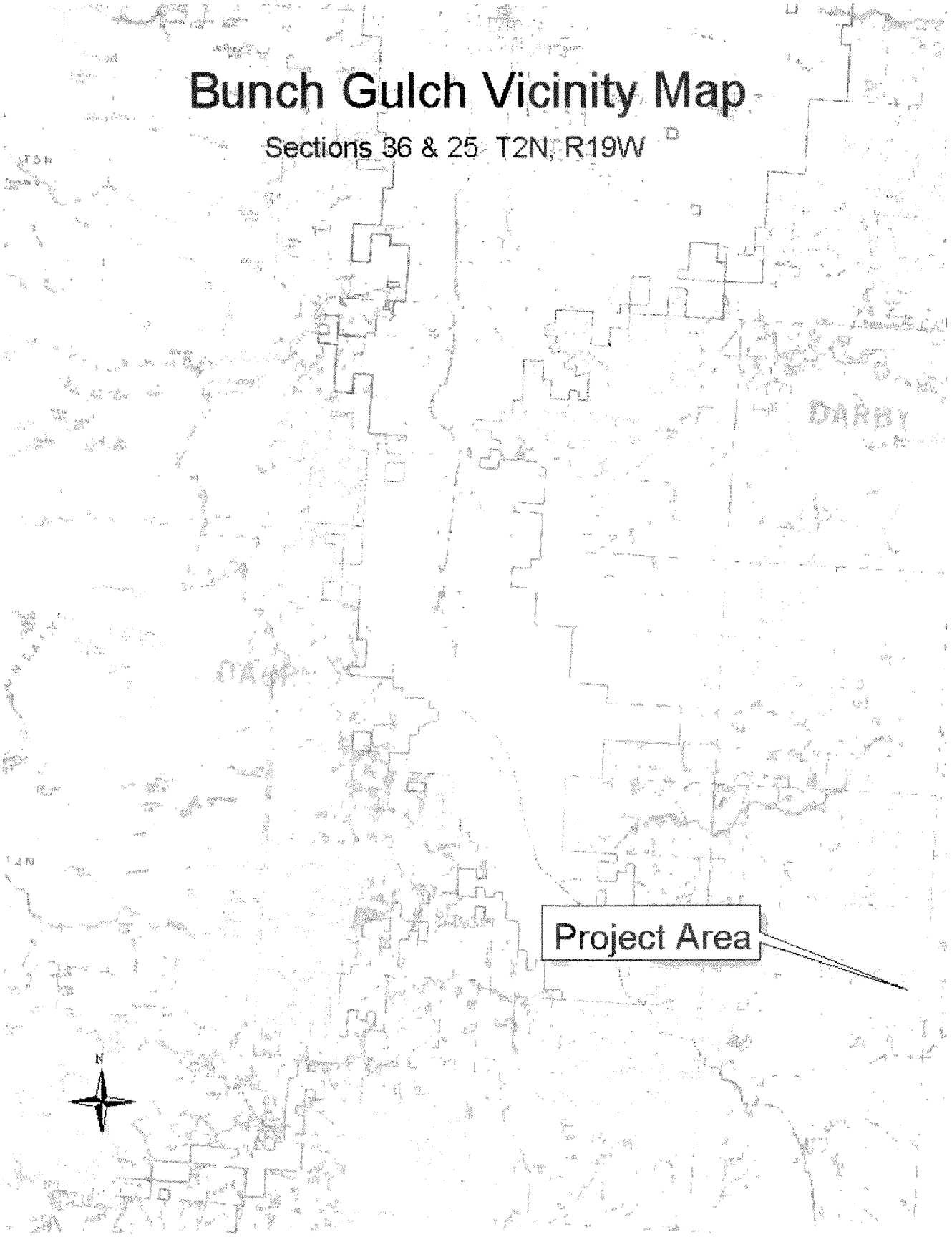
b. Evaluation of the potential impacts of the proposed timber sale indicates that no significant impacts would occur.

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

Jon M. Hayes

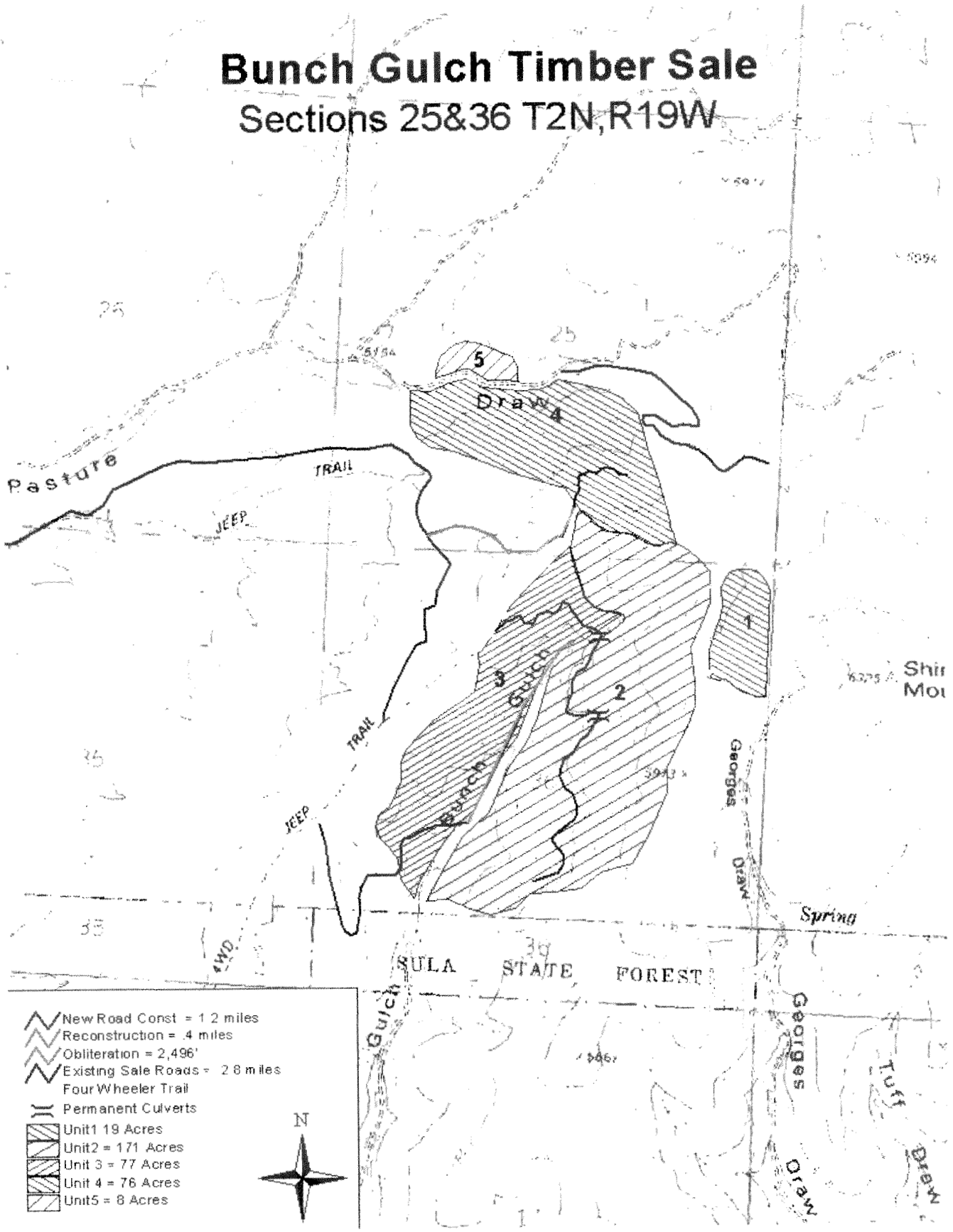
Jon M. Hayes

Area Silviculturist
Southwestern Land Office
December 8, 2004


Bunch Gulch Vicinity Map
Sections 36 & 25 T2N, R19W
DARBY
Project Area
N

Bunch Gulch Timber Sale

Sections 25&36 T2N,R19W



Renee Myers, SWLO
Hydrologist

Attachment A:
Bunch Gulch Timber Sale
Watershed and Noxious Weeds Analysis

Chapter 1: Purpose of the Project

Issues and Concerns:

1. Water Quality: Management Activities Associated with this project could have adverse effects on water quality.
2. Soils: Increased levels of compaction and erosion could occur as a result of proposed harvest activities.
3. Noxious Weeds: The proposed management could increase the spread of noxious weeds.

Issues Eliminated from Further Study

1. Fisheries: There is a concern that the proposed timber harvest could have adverse effects on fisheries habitat. Existing conditions of fisheries were collected from the Montana Department of Fish Wildlife and Parks, Forest Service and personal observation of habitat conditions. There are no known fish populations in either Bunch Gulch or Pasture Draw according to data collected by FWP and the Forest Service. Because there are no known populations of fish in either Pasture Draw or Bunch Gulch and the fact that both channels rarely contribute surface flow to another body of water, fisheries were removed as an issue from this EA.

Chapter 2: Alternatives

Please refer to Checklist Environmental Assessment for descriptions of alternatives.

Chapter 3: Affected Environment

3.2.1 Water Quality

Analysis Area: Refer to attached maps for boundaries and locations.

The proposed harvest area is located in two parcels of State School Trust Lands Section 36 T2N, R19W and Sec 25 T2N, R19W. Section 36 is located on moderate to steep slopes ranging from 25- 65%. Section 36, is drained by Bunch Gulch, which is an intermittent and discontinuous Class 2 stream channel that rarely contributes surface flow to the East Fork Bitterroot. The reach of Bunch Gulch located in the project area is drained by ephemeral draws and draws with no discernable stream channel. Ownership in the Bunch Gulch drainage is a combination of State, Forest Service and Private. Bunch Gulch has been impacted by past harvest activity, grazing and road construction.

Section 25 is located on moderate to step slopes ranging from 25-75%. This section is drained by Pasture Draw, which is an intermittent Class 2 stream channel that normally does not have return surface flow to Cameron Creek. Pasture Draw has been impacted as a result of grazing, timber harvest and road construction. Ownership in the Pasture Draw drainage is a combination of State, Forest Service and Private.

Regulatory Framework

The waters contained within the project area are classified as B-1 by the Montana Surface Water Quality Standards. The B-1 classification is for waters that are considered suitable for domestic use after conventional treatment, as well as recreation, swimming and bathing. They are also suitable for growth and propagation of salmonid fish and other associated aquatic life, waterfowl, furbearers, agricultural and industrial water supplies. Another criteria for a B-1 classification is; no increases are allowed above naturally occurring concentrations of sediment, settleable solids, oils or floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife. Naturally occurring includes conditions or materials present from runoff on developed where all reasonable land,

soil and water conservation practices are applied. Reasonable practices include methods, measure and practices that protect and present and reasonably anticipated beneficial uses.

Analysis Methods
A watershed analysis was completed by a DNRC hydrologist for the proposed harvest area to determine the existing direct, indirect and cumulative effects to water quality, soils, fisheries and noxious weeds. The project area was evaluated using a course filter approach.

All existing roads in the proposed project area were evaluated by a DNRC hydrologist for past and potential impacts to water quality. A water yield analysis was not conducted for this project due to the low potential for direct, indirect and cumulative impacts identified in the course filter approach. Approximately 50-70% of the trees removed would be beetle kill trees, which are technically considered dead and not expected to increase water yield beyond those conditions naturally resulting from beetle kill. Trees removed due to diseased conditions are not expected to have detrimental effects on water yield and increases would be minor if any.

Existing Conditions
The main potential for impacts to water quality is sediment. Effects to water quality can alter biological and physical characteristics of a stream channel by increasing sediment delivery and deposition. The existing potential of erosion in the project area is high due to the present existing geology of the area. Granitics and sandy loams, which dominate the area are erosive and naturally deliver high levels of sand and fines to the stream channel due to natural weathering processes.

Bunch Gulch
Existing conditions in the watershed have been impacted as a result of past harvest activity, poor grazing management and road construction. These impacts include increased sediment delivery beyond naturally occurring levels and stream channel alterations caused by excessive bank trampling and historic skid trail crossings.

Continuous grazing in the riparian area without rest rotation has caused excessive bank trampling, increased width depth ratios, loss of bank vegetation and increased sediment loads. Past harvest activities including skid trials across the channel have resulted in discontinuous flows, compaction and displacement in the riparian area. Isolated areas excavated as landing sites in the riparian area have caused compaction and a reduction in vegetation cover. Riparian harvest has occurred along most sections of Bunch Gulch.

Road densities are low, with approximately 1.5 miles of road in the section. A large majority of those miles are associated with the road located directly adjacent to Bunch Gulch. The road is in poor condition, does not meet BMP standards and does contribute direct sediment delivery to the stream channel. Some reaches of road are within 25 ft of the stream channel. There are trails in the section used by recreation vehicles which are in poor condition and do not have sufficient drainage features, resulted in isolated section where rilling and rutting has occurred.

Pasture Draw
Existing conditions in this drainage have been impacted by past harvest activity, grazing and road construction. These impacts include increased sediment delivery beyond naturally occurring levels, bank trampling due to grazing management activities and poor road location.

Grazing has not been excessive in the past couple years, but past intensive grazing management has resulted in increased sediment delivery, bank trampling and sloughing, increased width depth ratios in some reaches and a reduction in bank vegetation.

Stream channel alterations have occurred in isolated reaches due to skid trail crossings that have resulted compaction, displacement and bank sloughing. Some sections of stream channel are well vegetated with woody vegetation species present to provide bank stability and thermal protection. Other reaches have inadequate levels of woody species and bank stability in these reaches is poor to fair.

Road densities in the section are moderate, with approximately 2 miles of road within the section. Not all roads within the project area meet minimum BMP standards and some sections of road are directly contributing sediment to the stream channel. Most roads within this section were constructed in the bottom of draws. The main haul road within the project area is located adjacent to the stream channel, does not currently meet BMP standards and is contributing sediment directly to the stream channel in isolated sections, where surface drainage in inadequate.

3.2.2 Soils

Soils within the project area are a combination of unit types 32M70, 31D70, 30K31, 31B72, 32B30 and 31B72. See Chart 1 for specific soil properties and limitations.

32M70 Tolman-Borkies Family Complex-These soils are located on moderately steep mountain slopes ranging from 20-40%, have a mean annual precipitation of 16-24 inches and are well drained. The Tolman series was formed from colluvium/residuum from volcanic rock, mainly rhyolite and or andesite. The Borky series was also formed from colluvium/residuum from volcanic rock, mainly rhyolite and or andesite.

31D70-Worock-Leighcan-Cowood Families Complex- This map unit is located on dissected mountain slopes ranging from 30-60%, a mean annual precipitation of 18-30 inches and are well drained. Worock soils are formed from colluvium from volcanic rock, mainly rhyolite and or andesite. Leighcan soils are formed from colluvium from moderately weathered granitics. Cowood soils are formed from colluvium/residiuum from moderately weathered granitics

30K31 Perma Holter Sharrott Families Complex-These soils are located on steep mountain ranging from 40-60%, have a mean annual precipitation of 16-22 inches and are well drained. Perma soils are formed from colluvium from undifferentiated rock. Holter soils are formed from colluvium from undifferentiated rock. Sharrott soils are formed from colluvium/residuum from undifferentiated rock.

31K37 Holter-TolmanFamilies Complex- This map unit is located on 30-60% slopes, a mean annual precipitation of 16-25 inches and well drained. Holter and Tolman soils are formed from colluvium from weakly weathered calc-silicates.

31B72 Mowbray-Ambrant-Sharrott Families Complex-These soils are located on dissected mountain slopes ranging from 30-60%, well drained and have a mean annual precipitation of 18-25 inches. Mowbry soils are formed from colluvium from moderately weathered granitics. Ambrants are formed from colluvium from highly weatherd granitics. Sharrott soils are formed from colluvium/residuum from moderately weathered granitics.

32B30 Macmeal-Totelake-Sharrott Families Complex- This complex is located on slopes ranging from 20-40%, are well drained and have an annual mean precipitation of 16-24 inches. Macmeal is formed from colluvium from volcanic rock, mainly rhyolite and/or andesite. Totelake is formed from colluvium from highly weathered granitics. Sharrott is formed from colluvium/residuum from highly weathered granitics.

Chart 1: Soil Properties

Map Unit	Depth Class	Surface Layer	AWHC	Erosion Hazard	Compaction Hazard	Notes
32M70 Tolman Borkies Family Complex 20-40%	**Tolman**-Shallow 10-20 in **Borky**-moderately deep 20-40 in	Gravelly Loam Gravelly loam	Approx 2.0 inches 2.0 inches	Moderate Moderate	Moderate Moderate	-
31D70-Worock-Leighcan-Cowood Families Complex 30-60%	**Worock-** moderately deep to deep >30 inches **Leighcan-** moderately deep to deep >30 inches **Cowood-** shallow 10-20 inches	Gravelly sandy loam Gravelly sandy loam Very cobbly sandy loam	4.0 3.5 1.0	Moderate High High	Moderate Low Low	
30K31 Perma Holter Sharrott Families Complex 40-60%	**Perma** Deep to very deep >30 inches **Holter-** Moderately deep to deep 20-60 inches **Sharrott-** shallow 10-20 inches	Very gravelly sandy loam Very gravelly loam Very stony sandy loam	3.0 2.5 1.0	Moderate High High	Moderate Low Low	
31K37 Holter-TolmanFamilies Complex 30-60%	**Holter-** 25 inches **Tolman-** shallow 10-20 inches	Gravelly loam Very cobbly sandy loam	2.5 inches 1.5 inches	High High	Low Low	
31B72 Mowbray-Ambrant-Sharrott Families Complex 30-60%	**Mowbry-** moderately deep to very deep >30inches **Ambrant-** moderately deep to very deep >40inches **Sharrottt-** shallow 10-20 inches	Gravelly sandy loam Sandy loam Very gravelly sandy loam	3.0 5.0 1.0	High High High	Moderate Moderate High	
32B30 Macmeal-Totelake-Sharrott Families Complex_20-40%	**Macmeal-** Moderately deep to very deep >30inches	Gravelly snady loam	5.0	Moderate	Moderate	

	Totelake- Moderately deep to very deep >30 inches	Gravelly sandy loam	3.0	High	Low	
	Sharrott- Very gravelly sandy loam shallow 10-20 inches	Very gravelly sandy loam	1.0	High	Low	

3.2.3 Noxious Weeds

Noxious weeds occurring in both Bunch Gulch and Pasture Draw project areas are mostly knapweed (Centaurea maculosa),), houndstongue (Cynoglossum officinale L) and spot infestations of thistle (Cirsium arvense). Cattle grazing, recreation and off road vehicles are most likely the reason for the existing rate of spread of noxious weeds and the potential future spread and introduction of noxious weeds.

Knapweed (Centaurea maculosa) was found along roadsides as well as in the forested portions of the project area. Houndstongue was found mostly along roadsides and stream banks with spot infestations found within the forested area. Thistle was mostly found along roadsides with very few spot infestations found within the forested areas.

Chapter 4

4.2.1 Water Quality- Environmental Effects

Alternative A

Under the Action Alternative there would be no additional impacts to water quality. Roads in the project area that do not meet BMP standards would continue to erode and sediment delivery would continue to occur in those area where the road is poorly located next to the stream channel and direct sediment delivery is occurring. Existing trails utilized by off road vehicles and recreationists would continue to be used and the potential for erosion would increase. Impacts to water quality as a result of cattle grazing are expected to continue until a grazing management system is developed at a later date with the lessee to address this issue.

Alternative B

A watershed analysis was completed for the proposed sale area to determine potential direct, indirect and cumulative effects to water quality. Under the proposed action, impacts to water quality as a result of cattle grazing are expected to continue until a grazing management system is developed at a later date with the lessee to address this issue.

Under the action alternative minimal direct, indirect and cumulative impacts are expected as a result of implementation of the recommended mitigation measures, which would minimize the potential impacts to water quality. There are two stream channels located within the project area as described in chapter 3, Bunch Gulch and Pasture Draw. Additional season of use restrictions would be implemented due to Big Horn Sheep mitigations. Season of use restrictions require harvest operation to occur only between Jan 1st to Feb 15th and Aug 1st to Oct 15th. Units, which require winter harvest conditions, should be harvested between the Jan 1st and Feb 15th time period. However, because of time constraints and season of use restrictions, the only winter logging required, would be those areas, which utilize the stream crossing as a part of the logging trail system.

Bunch Gulch

There are two units in Bunch Gulch proposed for harvest that are located adjacent to the stream channel. All SMZ Laws and Rules would be implemented to ensure adequate numbers of leave trees are maintained and to prevent operation of mechanized equipment in the riparian areas. There is one proposed stream crossing that would be used as a skid trail located in the NW ¼ of the SE ¼ of the SW ¼ of section 36. Bunch Gulch is classified as a Class 2 stream channel in this location. A 24" culvert

would be installed at this location to reduce impacts to the stream channel that could occur during skidding practices. Rock armor would be placed over the inlet and outlet. Silt fence would be placed on the bottom portion of the skid trail if necessary, to trap any sediment before reaching the stream channel.

Approximatley 1 mile of new road would be constructed through the middle of unit 2 in section 36 to minimize the skid distance and reduce the potential for erosion and concentrated flow on skid trails. The risk of adverse effects to water quality as a result of new road construction is expected to be minimal, because of the proposed location (refer to project map for details). The new road construction would cross the upper end of Bunch Gulch. A 24" culvert would be installed as well as 50' of rock on each side of the crossing. An additional 24" culvert would be installed in a deep incised draw in the NW ¼ of the SE ¼ of Section 36, to provide ephemeral drainage.

As mentioned in Chapter 3, the existing road that runs along Bunch Gulch is a chronic sediment problem. To minimize the potential for long-term sediment delivery, the existing road (approximately ¾ of a mile) would be obliterated. The sideslopes would be recontoured, seeded and slashed to prevent future use of that road system. The haul route into the Bunch Gulch proposed harvest area would have site specific mitigations for additional road drainage that include rock armored dips, straw wattles and straw bale sediment fences. All existing road and new construction would be improved to meet BMP standards to adequately protect water quality.

Implementation of recommended mitigation measures is expected to result in minimal direct, indirect and cumulative impacts to water quality.

Pasture Draw

There are two units proposed in Pasture Draw that are adjacent to the stream channel. All SMZ Laws and Rules would be implemented to ensure adequate numbers of leave trees are maintained and to prevent operation of mechanized equipment in the riparian areas. There is one proposed crossing that would be used as a skid trail in the NE ¼ of the SW ¼ of section 25. Pasture Draw is classified as a Class 2 stream channel in this location. The crossing would be rock armored with 6-12" rock and only operated on during winter (frozen or snow covered) conditions. Silt fence would be placed on the bottom portion of the skid trail to trap any sediment before reaching the stream channel. Passes through this crossing would be minimized due to the amount of wood that would be tractor skidded from this section. An alternative practice would be required for this crossing to meet Montana Streamside Management Zone Law and Rules. As a result of the crossing, this unit would be harvested during Jan 1st and Feb 15th.

The existing road in this section runs along the main stem of pasture Draw. Some sections of road have an adequate buffer to filter sediment before reaching the stream channel. There are reaches, which are within 25ft of the stream channel and are considered a chronic sediment problem. Additional drainage and mitigations would be implemented, which include water bars, rock armored drain dips and straw bale sediment fences.

Implementation of recommended mitigation measures is expected to result in minimal direct, indirect and cumulative impacts to water quality.

4.2.2 Soils

Alternative A

Under alternative A, direct, indirect and cumulative impacts are expected to remain the same. Under this alternative there would be no potential for erosion or compaction as a result of harvest activities.

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

Cumulative effects could occur from repeated entries into a harvest area. Under the action alternative, risk of direct, indirect and cumulative impacts are expected to be minimal with the implementation of proposed mitigation measures.

Tractor units would require a skid trail plan and design approved by the forest officer to ensure soil impacts would not exceed more than 15% of the total unit area. Because soil types in the harvest area have a moderate to high erosion risk and increases with slope steepness, skidding would be limited to slope less than 40% and adverse skidding would be limited to slopes less than 30%. Additional drainage features would be installed on trials where necessary and slashed following completion of harvest activities. Due to the high erosive nature of granitic soils, cable corridors would be slashed as needed if concentrated flow occurs and in areas with extended disturbance.

Season of use restrictions would require Unit 2 be harvested under winter (frozen or snow covered) conditions only, to provide additional protection to surface soils. There would be no skidding down draws and go back trails would be constructed as necessary to return skid slash. Season of use restrictions would be implemented due to Big Horn Sheep mitigations that require restricted operational periods. Harvest operations would only occur during Jan 1st to Feb 15th and August 1st to October 15th. There are two proposed skid crossing that would require a 124 and an alternative practice. Due to seasonal restrictions on alternative practices, units 2 and 4 would require frozen or snow covered conditions to meet stream protection requirements at these crossing sites. Winter harvest operation in unit 2 would also minimize impacts to granitic soils and reduce the risks of erosion and compaction to surface soils.

10-15 tons/acre of course woody debris would be maintained or return skidded to benefit soil productivity nutrient cycling and soil moisture storage. An additional entry with an excavator would occur to pile slash for burning. The excavator would use existing trails and provide trail maintenance and rehab where necessary to ensure adequate drainage. Trails with extensive use would be scarified and slashed.

4.2.3 Noxious Weeds

Alternative A
Under Alternative A, direct, indirect and cumulative impacts are expected to remain the same. Noxious weed infestations are expected to increase if the existing level of off-road vehicle use remains the same. The potential for noxious weed spread will also increase as a result of the current grazing lease on that section of State land.

Alternative B
Under the proposed activities, an increase in ground disturbance could increase or introduce noxious weeds throughout roads and forested areas. With weed species such as thistle and to a lesser extent knapweed, weed seeds may already be scattered throughout the forested areas and the reduction of canopy cover or disturbance from the timber harvest activities could provide the catalyst for spread.

For this project an Integrated Weed Management (IWM) approach would be implemented that would include: prevention, revegetation and weed control measures for spot outbreaks, which are considered the most effective weed management treatments. Short-term goals would be to reduce existing noxious weed populations and increase native plants and seeded grasses. Where weeds are replaced with grasses, erosion would be reduced due to the improved plant cover. Localized herbicide applications would be used, primarily along disturbed roadside edges and spot treatments of small infestations. An herbicide treatment of most of the roadsides would be accomplished once prior to proposed activities

and once following completion of activities. In addition, some heavy infestations of knapweed not along roadsides would also be treated.

To protect water quality, herbicide would not be applied where runoff could enter surface waters or riparian features. Re-entry could increase the risk of cumulative impacts, if necessary mitigation measures to control noxious weeds are not implemented for each individual re-entry.

Integrated Weed Management
To reduce current noxious weed infestations and limit the spread of weeds the following integrated weed management mitigation measures of prevention and control would be implemented.

- All road construction and harvest equipment would be cleaned of plant parts, mud and weed seed to prevent the introduction of noxious weeds. Equipment would be subject to inspection by forest officer prior to moving on site.
- Revegetate all newly disturbed soils on road cuts and fills promptly with site-adapted grasses (including native species) to reduce weed encroachment and stabilize roads from erosion. For grass seeding to be effective it is important to complete seeding concurrent with road construction.
- Weed treatment measures include herbicide and/or biological applications along portions of project roads and accessible sites with a priority on spot outbreaks of noxious weeds and as designated by the forest officer. Any restricted use herbicide treatments would be implemented by a certified applicator according to herbicide label directions in accordance with applicable laws and rules of the Ravalli County Weed District.

Recommended Mitigation Measures

- Comply with Streamside Management Zone Laws and Rules.
- Avoid skidding down draws and locate trails at least 25 feet out of draws or on natural breaks away from draws.
- Use existing trails on suitable grades and location that meet BMP requirements. New additional trails would be located to meet minimum spacing requirements. Trails on steeper grades may require slash and/or grass seed following use, based on administrative review.
- Timber harvest would be designed to minimize overland flow, minimize soil erosion and displacement, and maintain water quality, through designated skid trails with 75 foot minimum spacing, adequate drainage on skid trails and proper log landing location and design.
- A majority of fine litter and slash should be left on site for nutrient cycling by in-woods processing or return skidding of slash.
- Existing roads would be inventoried and adequate drainage installed, to minimize water erosion and maintain water quality, by providing adequate surface drainage and properly installed and maintained stream crossings.
- Alternative practices for each crossing site on Bunch Gulch and Pasture Draw would be received before any changes are made to the stream channel.
- Culvert installations would be approved by the Forest Officer.
- Straw bale silt fences or straw wattles would be placed in designated locations to trap road sediment on both haul roads located in Bunch Gulch and Pasture Draw.

November 5, 2004
Sarah Pierce, FMB

Attachment B:
Bunch Gulch Timber Sale
Vegetation Analysis

Chapter 1: Purpose of the Project
Vegetation Issues:
1. Forest Health: If the proposed action does not take place, forest stand health could continue to decline, with increased competition stress from overstocking, increased severity and spread of mistletoe, and increased levels of insect and disease outbreaks.
2. Wildfire: If the proposed action does not take place, risk of high severity stand replacing fires could continue to increase.
3. Old Growth: The proposed harvest could remove or change attributes of old-growth stands on Hamilton Unit.

Chapter 2: Alternatives
Please refer to Checklist Environmental Assessment for descriptions of alternatives.

Chapter 3: Affected Environment
The analysis for vegetation is at two scales. Landscape level analysis area is defined as lands within the Hamilton Administrative Unit. Bunch Gulch project area is defined as Sections 25 and 36, Township 2 North, Range 19 West; the proposed harvest area is within these two sections.

Estimating historical conditions is important in defining what the forest was like before the widespread settlement and influence of western Europeans (pre-industrial age). The working assumption is that average historical conditions represent a healthy, sustainable, diverse forest. Appropriate conditions are based on ecological characteristics (land type, habitat type, disturbance regime, unique characteristics) and can be characterized by the proportion and distribution of forest types and structures historically present on the landscape. Estimates of current and appropriate cover types were determined for the Hamilton Unit and project area using the DNRC's Stand Level Inventory (SLI) from 2004 (Tables 1 and 3). The SLI also provides age class data, and identifies modeled old growth. At the project level, stands identified as modeled old growth are verified through additional field reconnaissance, including collection of plot-level data.

At the landscape level, the most notable characteristic is approximately 9157 non-stocked acres (Tables 1 and 2). These are generally acres that were burned by wildfire in August of 2000, and were salvage harvested. These stands currently have less than 10% sawtimber crown density or fewer than 200 established seedling/sapling sized trees per acre. Non-stocked includes recently planted acres on which the seedlings have not reached a height to be considered "established". Appropriate cover type varies for these acres, but is primarily ponderosa pine. The ongoing planting program will re-establish appropriate tree cover on most of the non-stocked acres.

Table 1: Current and Appropriate Cover Types for the Hamilton Unit

Cover Type	Current Cover Type (Acres)	Appropriate Cover Type (Acres)
Douglas-fir	3662.2	4878.2
Ponderosa pine	9380.7	16902.5
Lodgepole pine	631.5	800.3
Western larch/Douglas-fir	354.2	372.4
Mixed conifer	125.9	166.3
Subalpine	58.1	250.1
Hardwood	156.3	156.3
Non-stocked	9157.2	0
Non-forest	9046.4	9046.4
Total	32572.5	32572.5

The landscape level age class distribution also reflects the wildfires of 2000. Nearly half of the forested acres are currently in the youngest age class (Table 2). In the SLI, 958 acres on the Hamilton Unit are modeled as potential old growth. None of those stands have been field verified as meeting DNRC's definition of old growth (Green et al., 1992).

Table 2: Hamilton Unit Age Class Distribution by Current Cover Type

	Sum of Acres in Age Class (years)			
Cover Type	**0-39**	**40-99**	**Over 100**	**Total**
Douglas-fir	2368.6	495	798.6	3662.2
Ponderosa pine	2952.8	2627.4	3800.5	9380.7
Lodgepile pine	510.5	107.9	13.1	631.5
Western larch/Douglas-fir	0	97.5	256.7	354.2
Other	106.8	163.8	69.7	340.3
Non Stocked	9157.2			9157.2
Non-forest				9046.4
Total	15095.9	3491.6	4938.6	32572.5

The Bunch Gulch project area is consists primarily of multi-storied stands in the ponderosa pine and Douglas-fir cover types. In contrast to landscape level conditions, there are no nonstocked forest stands. Approximately 80 acres burned at low to medium intensities in 2000, but these were not stand replacement fires. In the project area, past management activity includes the Four Corners Timber Sale in 1989. This sale consisted of 190 acres of regeneration harvest, which now exist as young ponderosa pine stands. At the project level, current cover types the same as the appropriate cover types (Table 3).

Table 3: Current and Appropriate Cover Types for Bunch Gulch (project area)

Cover Type	Current Cover Type (Acres)	Appropriate Cover Type (Acres)
Douglas-fir	182	182
Ponderosa pine	957	957
Non-forested	141	141
Total	1280	1280

Most (63%) of the stands in the project area are in the 100-year or greater age class (Table 4). These stands are multistoried and have multiple age classes present.

Table 4: Bunch Gulch (project area) Age Class Distribution by Current Cover Type

	Sum of Acres in Age Class (years)			
Cover Type	**0-39**	**40-99**	**Over 100**	**Total**
Douglas-fir			182	182
Ponderosa pine	248	89	620	957
Non-forest				141
Total	248	89	802	1280

Within the project area, the SLI modeled 350 acres as old growth. The SLI did not identify any field verified old growth stands. From cruise data, one proposed harvest unit has been identified as meeting the criteria for DNRC's old growth definitions (Green et. al, 1992). This proposed harvest unit is 76 acres.

State lands border the project area to the north and most of the west. Private land borders the area on the west side for one half mile. US Forest Service lands border the project area to the south and east. The Forest Service lands have similar current conditions to the project area.
The private land is residential and ranch land, primarily non-forested, and with no formal forest management program.

Chapter 4: Environmental Consequences

Direct and Indirect Effects of No Action Alternative:
Under the no action alternative, there would be no short-term changes to the existing conditions. No direct effects to the baseline forest composition, cover type, age class distribution, or stand structure would be expected. No insect infested or disease infected trees would be removed.

Over time, the percentage of shade tolerant species such as Douglas-fir would increase and cover types might change as a result. Growth rates and stand vigor are likely to decline as density increases. Individual tree and stand susceptibility to Douglas-fir beetle and dwarf mistletoe would remain high. Continued insect and disease related mortality of Douglas-fir and Ponderosa pine would be expected, and fuel loading would increase.

Direct and Indirect Effects of Action (Salvage Harvest) Alternative:
The proposed harvest would remove existing dead trees, currently insect infested trees, and disease infected trees unless marked to leave. All ponderosa pine would be left unless insect damaged. An average of at least one snag would be retained for wildlife considerations, and the prescription will leave a number of snag recruits. All Douglas-fir greater than 9" diameter at breast height (DBH) with 10% or greater mistletoe infection would be cut. This harvest would cut an average of 43 trees per acre (TPA) with a DBH greater than 4". Residual trees would be protected from skidding damage.

Following the proposed harvest, residual stands would have an average of 107 TPA with a DBH greater than 4". The stands would have an average of 65 square feet per acre of basal area. These stands would still be multistoried, but with fewer TPA in most size classes (Table 5). Similarly, age class distribution would not change, although there would be fewer trees in most age classes.

Table 5: Comparison of Alternative Effects on Average Trees per Acre by Size Class.

DBH Class (inches)	No Action (Current) TPA	Action (Harvest) Alternative
3-5	5	5
5-7	26	23
7-9	31	28
9-11	31	21
11-13	19	14
13-15	12	5
15-17	9	4
17-19	5	1
19-21	3	2
21-23	3	1
23-25	2	1
25-27	1	1
27-29	0	0
29+	1	1
TOTAL	150	107

Residual stands would maintain current cover type classifications, although the component of Douglas-fir would be reduced. Species composition would reflect a slightly higher proportion of ponderosa pine.

On the proposed harvest unit 3, identified as old growth from cruise data, sufficient large live trees would be retained to meet the *Green et al.* definition of old growth (Table 6). Cut trees over 21" would be almost exclusively Douglas-fir; large ponderosa pine would be retained.

Table 6: Comparison of Alternative Effects on Live Trees per Acre over 21" DBH.

Proposed Harvest Unit	No Action (Current) TPA>21"	Action (Harvest) Alternative TPA>21"
1	5	1
2	5	3
3	10	8
4	6	2
5	5	2

The harvest would directly reduce insect and disease presence. The removal of trees across size classes would also result in decreased fuel loading. Due to the decrease in density, individual tree growth and vigor would be expected to improve. Ponderosa pine regeneration would not be expected; some Douglas-fir may regenerate in openings.

Cumulative Effects of No Action Alternative:
Cumulative effects over time would include a gradual change of cover type from Ponderosa pine to Douglas-fir. Mature stands would become increasingly multistoried as the current overstory dies and is replaced by patches of regenerated shade-tolerant species. This would be reflected in a slight change in cover types across the Hamilton Unit, away from appropriate conditions. As large live trees die, the old growth classification of unit 3 could change.

Insect and disease infestations would continue, and fuel loading would increase. These conditions would increase the risk of a fire event of greater severity than those that occurred historically. Wildfires would continue to be suppressed; however, if a fire escaped initial attack, tree mortality would likely be high in burned stands. Given these effects, the risk of stand-replacement wildfire would increase.

Over time, there would be an increased risk of insect and disease problems spreading to other forested lands on the Hamilton Unit. Adjacent ownerships would continue current land uses. A wildfire in the project area might spread to surrounding private and Forest Service lands.

Cumulative Effects of Action Alternative:
For a time, residual stands would become more resistant to beetle population expansion as individual tree vigor increases. Cumulatively this would reduce the risk of insect and disease outbreaks in the area and minimize the risk of populations building on state ownership that could affect adjacent landowners in the future. The risk of adverse cumulative effects occurring is very low since the proposed treatments are designed to bring stands toward more historic stand conditions.

The proposed harvest would have a minor impact across the Hamilton Unit, as this harvest would affect 340 acres of the 32,573 acres on the Hamilton Unit. There would be no cumulative impact on cover type, age class distribution, or stand structure across the landscape. There would be a negligible change in species composition due to the reduced component of Douglas-fir on 340 acres. This would help maintain appropriate cover types in these stands over time. The harvest would maintain old growth identified in the project area. There would be a decreased risk of insect and disease problems spreading to other forested lands on the Hamilton Unit. Additionally, there would be a decreased risk of stand-replacement wildfire. Adjacent ownerships would continue current land uses.

References
Green, P., Joy, J., Sirucek, D., Hann, W., Zack, A., and Naumann, B. 1992. Old-growth forest types of the Northern Region. Non-published report on file at the USDA Forest Service Northern Region Office, Missoula, MT, 59807. 43 p.

22 November 2004
Michael McGrath, SWLO
Wildlife Biologist

Attachment C:
Bunch Gulch Timber Sale
Wildlife Analysis

Chapter 1: Purpose and Need for Action

1.10 Issues

1.10.1 Wildlife

1.10.1.1 Endangered Species Issue

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

1.10.1.2 Sensitive Species Issue

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

1.10.1.3 Big Game Issue

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

1.10.1.4 Other Issues

The proposed project, if implemented, may negatively impact Cooper's hawks.

1.10.2 Issues Eliminated from Further Study

1.10.2.1 Bald Eagle (Federally threatened)

There is concern that timber harvest activities would alter bald eagle habitat or provide unnecessary disturbance. The project area is approximately 27 miles SE of the nearest known bald eagle nest. This nest is also located approximately 1/3 of a mile east of Hwy 93. Thus, due to the distance between the nest and project area, there would be low risk of direct, indirect, or cumulative effects to bald eagles as a result of the proposed action.

1.10.2.2 Peregrine Falcon

There is concern that timber harvest activities would disturb nesting peregrine falcons. The nearest known peregrine falcon nest is located approximately 18 miles west of the affected area. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.10.2.3 Common Loon

The common loon is a fish-eating bird that breeds and nests on lakes and ponds. The nearest known observation for common loons is approximately 20 miles northwest of the project area (Montana Natural Heritage Database). Therefore, low risk of direct, indirect, or cumulative effects would be expected to common loons as a result of the proposed project and this species will not be analyzed further in this document.

1.10.2.4 Townsend's Big-eared Bat

There is concern that timber harvest activities would disturb Townsend's big-eared bats. This species requires caves, caverns, or old mines for hibernacula. The nearest underground mine is located >500 feet from the project area, and the nearest observation of the species occurred approximately 20 miles northwest of the project area. Current conservation strategies for this species indicate that a 500-ft radius buffer be installed around mine entrances to partially mitigate for the effects of timber harvest (Pierson et al. 1999). Thus, with the proposed action located >500 feet from the mine entrance, there would be low risk of direct, indirect, or cumulative effects to this species.

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

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

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

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

1.10.2.9 Harlequin Duck
Harlequin ducks require white-water streams with boulder and cobble substrates, as well as dense riparian vegetation. Such conditions do not exist within, or downstream of the analysis area. Thus, there would be low risk of direct, indirect, or cumulative effects to this species.

2 Chapter 2: Alternatives

Please refer to Checklist Environmental Assessment for descriptions of alternatives.

3 Chapter 3: Affected Environment

3.1 Description of Relevant Affected Resources

3.1.1 Wildlife

3.1.1.1 Threatened and Endangered Species Existing Conditions

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

The project area is located approximately 23 miles east of the Bitterroot Grizzly Bear Ecosystem, which at this time is not considered to be occupied by grizzly bears. The cumulative effects analysis area (hereafter, "analysis area") is approximately 890 square miles, and incorporates forested land within the surrounding Sapphire Mountains, extending west to the West Fork Bitterroot River. In September 2002, a grizzly bear was sighted in the Burnt Fork drainage near Stevensville. This bear has since taken up residence west of Phillipsburg, approximately 40 miles northeast of the project area (J. Jonkel, MT FWP, personal comm., July 2004). Thus, there is potential for grizzly bear use of the project and analysis areas.

Finally, 355,383 acres burned within 32 miles of the project area during the fires of 2000. The vast majority of those acres were stand replacement fire, and occurred as close as 0.5 mile from the project area. As a result of the fires and subsequent Douglas-fir beetle infestation, DNRC salvage logged 5,541 acres on the adjoining Sula State Forest and nearby Sleeping Child and Spring Hill parcels from 2001 until present (Sula Salvage, Fading Hart Timber Sale, and Muncha Buncha Timber Sale). Thus, much of the area surrounding the project area has been greatly affected in recent years.

3.1.1.1.2 Gray Wolves (Federally threatened)

Wolves were recently classified as threatened under the Endangered Species Act. Cover, and road and prey densities likely have some influence on wolves. For cumulative effects analysis, the analysis area will be the same as that of the grizzly bear. Wolf activity within the analysis area is restricted to the Painted Rocks and Sapphire packs, located approximately 17 miles SW and 9 miles NE of the project area, respectively (U. S. Fish and Wildlife Service 2002). Mule deer, white-tailed deer, elk, bighorn sheep, and moose are known to use the project and cumulative effects analysis areas. Currently, no known wolf den or rendezvous site is located within 1 mile of the project area.

3.1.1.1.3 Canada Lynx (Federally threatened)

Lynx are currently classified as threatened in Montana under the Endangered Species Act. In North America, lynx distribution and abundance is strongly correlated with snowshoe hares, their primary prey. Consequently, lynx foraging habitat follows the predominant snowshoe hare habitat, early- to mid-successional lodgepole pine, subalpine fir, and Engelmann spruce forest. However, lynx are thought to avoid big game winter ranges due to interspecific competition from other predators (e.g., coyotes, mountain lions, bobcats; R. Baty, DNRC, personal comm., May 2004). For denning sites, the primary component appears to be large woody debris, in the form of either down logs or root wads (Squires and Laurion 2000, Mowat et al. 2000, Koehler 1990). These den sites may be located in regenerating stands that are >20 years post-disturbance, or in mature conifer stands (Ruediger et al. 2000, Koehler 1990).

Elevations in the project area range from 5,120 to 6,120 feet, and 28 acres of suitable habitat types (Pfister et al. 1977) for potential denning and foraging occur within section 25 of the project area. Snowshoe hares are important lynx prey and are associated with dense young lodgepole pine stands, as well as mature stands with subalpine fir understories. Additionally, red squirrels are a frequently consumed species by lynx, and are associated with mature Douglas-fir stands, as well as mature spruce/fir stands.

3.1.1.2 Sensitive Species Existing Conditions

3.1.1.2.1 Pileated Woodpecker

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

Within the project area, there are approximately 923 acres that are predominately ponderosa pine or Douglas-fir, with average stand diameter $\geq$ 15 inches dbh that would be considered suitable pileated woodpecker habitat (SLI database). In general, some of the larger Douglas-fir

have been attacked by Douglas-fir beetles, while others have been infested with Douglas-fir mistletoe in both the overstory and understory. The preponderance of ponderosa pine > 17 inches dbh would provide snags, snag recruits, and foraging substrate for pileated woodpeckers. Figure 1 depicts the current diameter distribution of all trees and snags within the proposed harvest units. On average, there are 24 trees per acre >15 inches dbh, of which 7 trees per acre are dead or dying. Thus, habitat for pileated woodpeckers does exist within the project area. On several field visits, pileated woodpeckers have been observed (both visually and aurally) throughout the project area, along with several snags and logs exhibiting pileated woodpecker-excavated cavities and foraging holes.

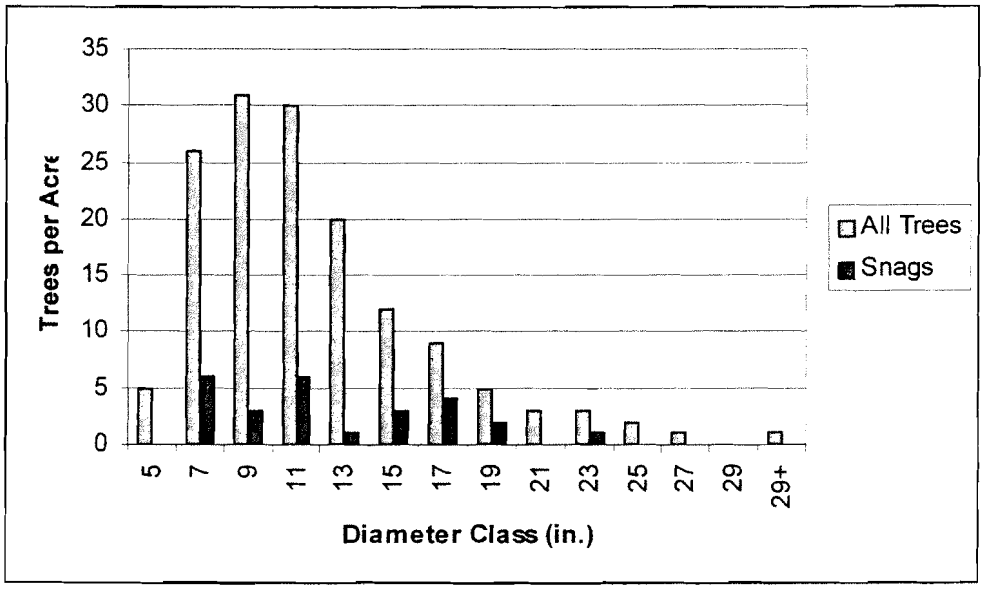


Figure 1. Trees per acre by diameter class from cruise data obtained from the proposed harvest units within the project area.

3.1.1.2.2 Black-backed Woodpecker

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

The extensive and intensive wildfires of western Montana in 2000 created large amounts of potentially suitable habitat that is currently available for black-backed woodpeckers at the landscape scale. Because of the close relationship of black-backed woodpeckers and wildfire, the analysis area was defined as an area inclusive of several major fires near the project area totaling 355,383 acres, at varying severities, in 2000. Following Hejl et al.'s (2000) guideline that burned areas provide the most benefit for black-backed woodpeckers from 2 to 5 years post-burn, these areas will likely start to decline in their usefulness to this species in 2005 or 2006. The project area is within 0.5 mile of some of the most intense burns from 2000. As discussed under the existing environment for the grizzly bear, 5,541 acres have been salvaged post-fire and post-Douglas-fir beetle infestation on these acres since 2000 on the DNRC Sula State Forest and nearby Sleeping Child and Spring Hill parcels.

3.1.1.2.3 Flammulated Owl

The flammulated owl is a tiny forest owl that inhabits warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States and is a secondary cavity nester. Home ranges are typically > 20 acres in area (McCallum 1994). Nest trees in 2 Oregon studies were 22-28 inches dbh (McCallum 1994). Habitats used have open to moderate canopy closure (30 to 50%) with at least 2 canopy layers, and are often adjacent to small clearings. It subsists primarily on insects and is considered a sensitive species in Montana. Periodic under burns may contribute to increasing habitat suitability for flammulated owls because low intensity fires would reduce understory density of seedlings and saplings, while periodically stimulating shrub growth.

Within the project area there are approximately 1,110 acres of flammulated owl preferred habitat types (SLI data), with those acres being relatively evenly distributed throughout the project area. Due to the size of both the project area and flammulated owl home range, the project area will also be the cumulative effects analysis area. Flammulated owls have been previously observed 4 miles west of the project area (Montana Natural Heritage Program Database 2004).

3.1.1.2.4 Fisher

The fisher is a medium-sized animal belonging to the weasel family. Fishers prefer dense, lowland spruce-fir forests with high canopy closure, and avoid forests with little overhead cover and open areas (Powell 1978, Powell 1977, Kelly 1977, Clem 1977, Coulter 1966). For resting and denning, fishers typically use hollow trees, logs and stumps, brush piles, and holes in the ground (Coulter 1966, Powell 1977). Because fishers prefer stands with dense canopy cover, areas that have experienced high intensity fires would not be suitable fisher habitat for several decades. However, newly created snags would provide needed coarse woody debris over time.

Fisher presence in this portion of the Sapphire Mountain Range has previously been established through examination of reports since 1968 (Vinkey 2003). Additionally, there is a well-established population of fishers across the valley in the Bitterroot Mountains (Vinkey 2003). Within the project area, there are approximately 536 acres of habitat types (i.e., Pfister et al. 1977) that fisher prefer to use. Because these habitat types are present does not necessarily indicate that these acres are currently suitable for use by fisher (i.e., stand structure, canopy closure, etc.). For example, of the 303 acres of fisher preferred habitat types in section 25, approximately 65 acres experienced stand replacing fire in 2000, and are no longer suitable. Additionally, many of the fisher preferred habitat types located in Section 36 are largely dry stands that may provide marginal habitat for fishers. However, probably the most suitable habitat for fishers within the project area occurs in the riparian area along Pasture Draw (Section 25); providing abundant coarse woody debris, diverse stand structure, and canopy closure > 60%. The cumulative effects analysis area is a rectangular 16 sq. mile area, with the project area located near the center. Nearly 1/3 (3,509 acres) of the analysis area was severely burned during the 2000 fires.

3.1.1.3 Big Game

3.1.1.3.1 Elk, White-tailed and Mule Deer

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

Elk generally avoid open roads, however, they become more tolerant of closed roads in the area over time (Lyon 1998). Densely stocked thickets of conifer regeneration and overstocked mature stands provide thermal protection and hiding cover for deer and elk in winter, which can reduce energy expenditures and stress associated with cold temperatures, wind, and human-caused disturbance. Additionally, extensive (e.g., ≥250 acres) areas of forest cover ≥0.5 miles from open roads serve as security for elk. Thus, removing cover that is important for wintering elk through forest management activities can increase their energy expenditures and stress in winter. Reductions in cover could ultimately result in a reduction in winter range carrying capacity and subsequent increases in winter mortality within local elk herds.
In recent years, the French Basin has experienced dramatic vegetative changes as a result of the fires of 2000, including post-fire salvage harvest of over 5,000 acres on the Sula State Forest. Much of the French Basin experienced stand replacement fire, which drastically reduced winter thermal cover, but also increased the abundance and quality of available forage. The French Basin and the project area both receive moderate levels of hunting pressure. Thus, maintaining security cover (Hillis et al. 1991) is of importance to big game in the analysis area. Following the concept of elk security cover, there are approximately 3,060 acres (approximately 5.5% of analysis area) and 650 acres within the analysis and project areas, respectively, after accounting for open roads and stand replacing fire. Within the French Basin, the elk population has been steadily increasing in recent years (Fig. 2), and mule deer bucks are often trophy quality. This area is covered by FWP deer and elk hunting district 270, for which 75 permits are issued for mule deer buck harvest, and in 2003 there were 2,045 resident applications for these permits (HD 270-50, 2003 drawing statistics). Finally, 101 AUMs of livestock grazing have been assigned to Sections 35 and 36, and Section 25 falls under a separate grazing allotment totaling >6,000 acres for 635 AUM. Much of the range in Section 36 is degraded by extensive spotted knapweed infestation, including under the forest canopy. As a result, much of the forage is poor, and riparian areas have received extensive livestock use.

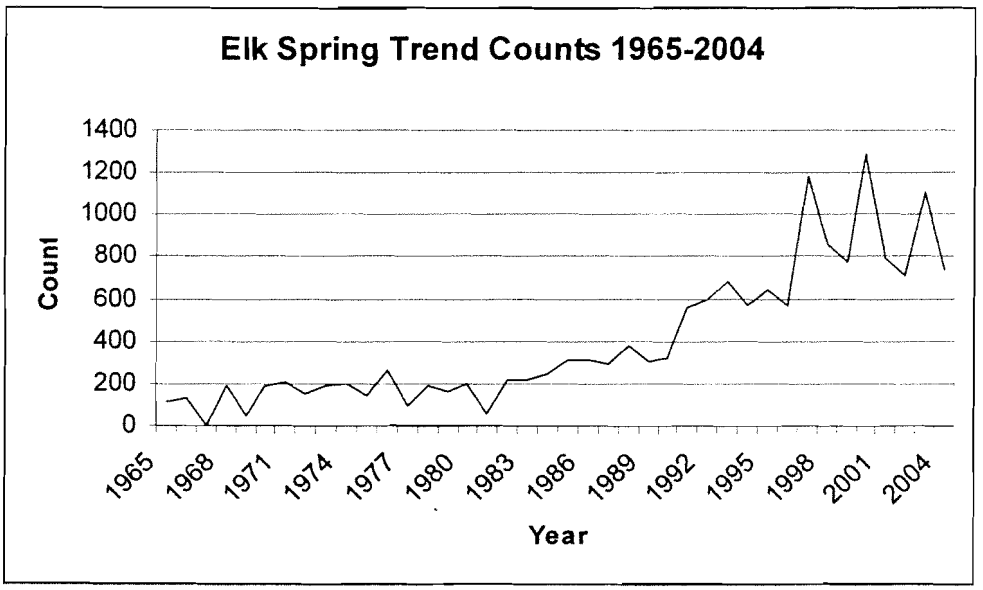


Figure 2. Elk spring trend counts for the French Basin, 1965-2004. Counts were summed from the French Basin-West Side and French Basin-East Side survey areas (J. Vore, Montana FWP, 2004. Wildlife counts and classifications in the Bitterroot Valley, 2004. 18 pp.).

3.1.1.3.2 Moose

Moose are the largest ungulate in North America, distributed throughout Alaska, Canada, and many of the border states. In general, moose habitat includes: areas of abundant high-quality winter browse; shelter areas that allow access to food; isolated sites for calving; aquatic feeding areas, young forest stands with deciduous shrubs and forbs for summer feeding; mature forest

that provides shelter from snow or heat; and mineral licks (Thompson and Stewart 1998). As such, much of the project area receives use by moose. The analysis area for moose is the French Basin. Approximately 75% of the acreage within the analysis area is regenerating forest (from the fires) or grassland.

3.1.1.3.3 Bighorn Sheep

Bighorn sheep are primarily grassland animals that require proximity to escape cover, which is typically characterized by steep, rugged terrain. Winter range habitat is typically forested habitat with well-developed grasses in the understory. The project area is inhabited by the East Fork Bitterroot bighorn sheep herd and is known to summer to the east near Shirley Mountain (J. Vore, FWP, personal communication, September 2004). However, sheep in the herd primarily winter along sparsely forested, steep, south slopes in the vicinity of Bunch Gulch, Pasture Draw, Sula Peak, Shirley Mountain, Badger Gulch, and Jakes Draw. The project area is a mixture of grassland ridges interspersed throughout drier ponderosa pine/Douglas-fir forest. However, much of the project area is heavily infested with spotted knapweed and has been heavily grazed by livestock in the past. Both circumstances lower the value of the project area for forage.

Other Issues

Cooper's Hawk

The Cooper's hawk is a medium sized bird that preys primarily on birds (songbird to jay-sized) and small mammals (e.g., red squirrels). It is a forest habitat generalist that tends to nest in patches of timber or along forest ecotones (Johnsgard 1990). Breeding season territories can be approximately 2000 acres in size, with winter territories averaging 1.5 to 2.0 miles in diameter (Johnsgard 1990). Cooper's hawks select nest sites that apparently offer overhead concealment from possible predators, and seem, in Oregon, to favor using mistletoe as a nest platform (Moore and Henny 1983). On 3 separate site visits (September 14, 20, and 27) an adult Cooper's hawk was observed repeatedly in the center of section 36 (Bunch Gulch; M. McGrath, DNRC Wildlife Biologist, personal observation). Extensive searches did not yield a nest. However, the time of year and climatic factors post-breeding season were not conducive to nest discovery. The analysis area is a 2 mile radius surrounding the Bunch Gulch parcel (Section 36).

Chapter 4: Environmental Consequences

Predicted Effects on Relevant Resources of All Alternatives

Wildlife

4.1.1.1 Threatened and Endangered Species

4.1.1.1.1 Grizzly Bear

4.1.1.1.1.1 No Action Alternative

No change from current situation would be expected.

4.1.1.1.1.2 Action Alternative

Under current and proposed conditions, the project area would contain no open roads, and open road densities would not change. Additionally, vegetative screening cover along roads and riparian areas would likely be minimally reduced because the proposed harvest would target trees $\geq$7 inches dbh (Fig. 3). Thus, many of the trees that would provide screening cover would be retained post-harvest. Within the analysis area, the proposed action would not increase open road densities and would likely only minimally reduce the amount of screening cover along roads and riparian areas due to the tree size classes that would be harvested. Should the analysis or project area be utilized by grizzly bears, the

proposed action would provide minimal direct, indirect, or cumulative effects, largely due to minimal reductions in visual screening cover.

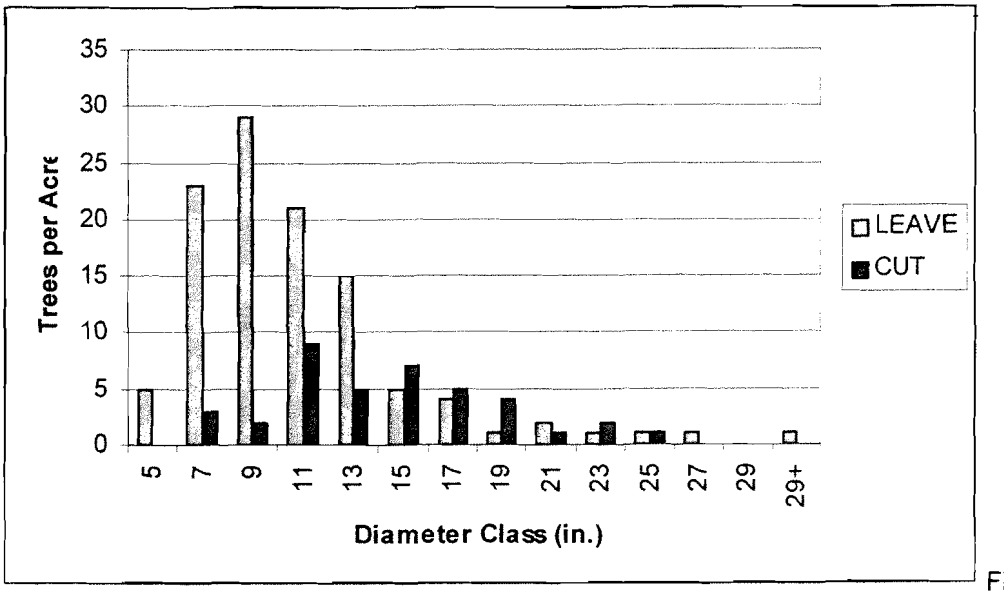


Figure 3. Average tree densities per acre within the project area that would be retained (leave) and harvested (cut) under the proposed action, based upon tree cruise data from the 5 proposed harvest units.

4.1.1.1.2 Gray Wolves

4.1.1.1.2.1 No Action Alternative
No change from current situation would be expected.

4.1.1.1.2.2 Action Alternative
Similar to the effects for grizzly bears, the proposed action would not increase the amount of open road and would only minimally reduce the amount of screening cover within the project and analysis areas. In recent years the local elk population has been at record levels (see Fig. 2), including post-2000 fires and the loss of snow-intercept cover associated with the fires. The proposed harvest would likely have little impact on big game populations, which could subsequently impact their predators (i.e., wolves). Thus, there would likely be minimal direct, indirect, and cumulative impacts to wolves as a result of the proposed action.

4.1.1.1.3 Canada Lynx

4.1.1.1.3.1 No Action Alternative
Gradually, over time the Douglas-fir beetle infestation would likely progress and kill larger Douglas-fir trees. This may be further accelerated by the presence of Douglas-fir mistletoe throughout the project area, which may increase the infected trees' susceptibility to Douglas-fir beetles. As a result, affected trees would die and eventually fall, creating coarse woody debris and potential denning habitat. However, future foraging habitat may be hampered by the current level of knapweed throughout the project area. Thus, there may be gradual increases in potential denning habitat, but no change from the current situation would be expected.

4.1.1.1.3.2 Action Alternative
The proposed action would harvest within the 28 acres of suitable habitat types for potential denning and foraging in Section 25. However, the proposed harvest would leave the "best" 14 acres largely untouched. These acres are predominately Engelmann Spruce/subalpine

fir, multi-storied, with coarse woody debris along Pasture Draw. The remaining 14 acres have sparse canopy closure, structure similar to a regenerated shelterwood unit, and sparse coarse woody debris. Over the remaining project area, the proposed action would remove trees that would eventually die, fall to the ground, and potentially provide future denning habitat and habitat features useful to snowshoe hares and red squirrels (primary prey). However, given the lack of lynx in the nearby area (Dave Lockman, Bitterroot National Forest, personal comm., September 2004, regarding recent DNA surveys), there may by low risk of direct and indirect effects to lynx as a result of the proposed action. However, examining the larger surroundings, since 2000 DNRC has salvage logged approximately 5,541 acres on the adjoining Sula State Forest and nearby Sleeping Child and Spring Hill parcels, and has proposed additional green-tree harvesting on the Gird Creek and Sleeping Child parcels, the Bitterroot National Forest also has proposed some salvage logging in Lyman Creek, 1 mile north of the project area. Thus, in recent years the landscape surrounding the project area has been radically altered by the 2000 Fire Season, which in 10 to 20 years would likely provide ample early foraging habitat. However, the subsequent salvage logging has also removed trees from the Sula State Forest that could have fallen and provided potential future denning opportunities. Thus, the proposed action would likely produce minimal direct and indirect effects to lynx, but would likely contribute to minor cumulative effects for lynx.

4.1.1.2 Sensitive Species

4.1.1.2.1 Pileated Woodpecker

4.1.1.2.1.1 No Action Alternative

Under the no action alternative, Douglas-fir trees would continue to become infested with Douglas-fir beetles and die, providing foraging opportunities as the infestation progressed. The resulting snags and coarse woody debris would provide potential nesting opportunities for several years, and perpetual foraging opportunities for decades. However, the infestation would also reduce canopy closure substantially, which may deter nesting. Thus, the no action alternative would likely aid pileated woodpeckers through increasing foraging opportunities, and possibly increasing the availability of potential nesting and roosting sites.

4.1.1.2.1.2 Action Alternative

Under the proposed action, an average of 11 trees per acre ≥ 15 inches dbh would remain post-harvest (see Figure 3 in the Grizzly Bear analysis) in the project area, based upon pre-harvest cruise data. Pursuant to ARM 36.11.411, at least 1 snag and 1 snag recruit ≥21 inches dbh, if available (or the next largest size class), per acre would be retained post-harvest. However, in the short-term, through the proposed harvest the temporary food source of Douglas-fir beetles would be reduced. Long-term, the proposed harvest would reduce canopy closure through removal of mistletoe infected trees, which would reduce the suitability for nesting and roosting habitat, and remove potential nesting, roosting, and future foraging substrate through harvesting of dead and dying Douglas-fir trees ≥ 15 inches dbh. The proposed action may displace, at least temporarily, pileated woodpeckers that are known to currently utilize the project area. Thus, there would be potential for direct and indirect effects to pileated woodpeckers as a result of the proposed action. These effects may be partially mitigated through retention of mistletoe-infected trees with higher levels of infestation (i.e, >10% infestation) to help retain canopy closure. From a cumulative effects perspective, the fires of 2000 greatly reduced the availability of potential nesting habitat north of the project area. Further reductions in potential nesting and roosting habitat are possible as a result of the proposed action, however, the extent of the reduction is unknown due to the projected average retention (based on preliminary cruise data) of trees ≥15 inches dbh post-harvest (11 tpa ≥ 15 inches dbh; see Figure 3 in the Grizzly Bear analysis).

4.1.1.2.2 Black-Backed Woodpecker

4.1.1.2.2.1 No Action Alternative

Over the next few years, the nearby burned areas may start to lose their utility to black-backed woodpeckers as a food source (Hejl et al. 2000). Thus, this species may be in search of nearby food sources that may manifest themselves in green stands currently experiencing high levels of insect activity. The project area may provide such resources under the no action alternative. This may be indicated by the presence of three-toed woodpeckers (*Picoides tridactylus*), a closely related woodpecker species, within the project area (M. McGrath, SWLO Wildlife Biologist, personal observation, 27 September 2004). Thus, in the short term, a no action alternative may provide temporary habitat for black-backed woodpeckers by allowing the Douglas-fir beetle infestation to run its course. Subsequent insect colonizers of the project area would likely be wood-boring beetles, which are preferred food items of black-backed woodpeckers. Thus, there would likely be low risk of direct, indirect, or cumulative effects to black-backed woodpeckers as a result of the no action alternative, and such an alternative may provide future temporary habitat for this species.

4.1.1.2.2.2 Action Alternative

The proposed action is designed to curtail the current Douglas-fir beetle infestation and reduce future susceptibility through reducing the level of Douglas-fir mistletoe infestation in the project area. As such, the proposed action would reduce future availability of potential food sources (Douglas-fir beetles and subsequent wood-boring beetle colonizers) that black-backed woodpeckers may require once the areas burned by the 2000 Fire Season lose their utility to this species (Hejl et al. 2000). Thus there would be potential low to moderate risk of indirect effects, and low risk of direct effects to this species as a result of the proposed action. Looking at the landscape perspective: (1) since 2000 DNRC has salvage logged 5,541 acres on the Sula State Forest and nearby Sleeping Child and Spring Hill parcels; (2) the Bitterroot National Forest has proposed to salvage log in Lyman Creek, approximately 1 mile north of the project area; and (3) DNRC has proposed additional green-tree harvesting on the Gird Creek and Sleeping Child parcels. Thus, through possible reductions in future food sources that may result from the proposed action, there may be minor cumulative effects. However, there are likely additional acres of Douglas-fir beetle infestation on nearby Federal and private lands that may provide future food sources for black-backed woodpeckers.

4.1.1.2.3 Flammulated Owl

4.1.1.2.3.1 No Action Alternative

No change from current situation would be expected.

4.1.1.2.3.2 Action Alternative

Through the proposed reduction in the Douglas-fir component within the project area, the proposed harvest may improve a good situation for flammulated owls. The proposed harvest, on average, would remove approximately half of the trees > 19 inches dbh, while reducing the intermediate to co-dominant canopy classes (Fig. 3). Such action would likely reduce canopy closure in some of the more densely stocked pockets to the 30 to 50% range that is more typical of flammulated owl habitat. However, the proposed harvest would remove some larger diameter trees that could eventually become nest sites for this species. In general, the proposed action would likely have a low risk of direct, indirect, and cumulative effects, with a potential to improve an already good situation for flammulated owls.

4.1.1.2.4 Fisher

4.1.1.2.4.1 No Action Alternative

Under the no action alternative, the insect infestation would be expected to spread, creating large diameter snags and eventually (once the snags fall over), large diameter logs. Over time, the no action alternative would be expected to create denning and foraging habitat for fisher. However, due to the loss of canopy closure, there would likely be temporary losses

(50 to 60 years) of fisher habitat. However, long-term, the no action alternative would likely create higher quality fisher habitat through large diameter snags, downed logs, etc. Given the recent fires (and corresponding loss of approximately 3,509 acres to fire), there would be low risk of direct and indirect effects to fisher within the project area, but temporary (50 to 60 years) cumulative effects as a result of the no action alternative.

4.1.1.2.4.2 Action Alternative
The proposed action would harvest timber within approximately 258 acres of the approximately 536 acres of habitat types that fisher prefer to use within the project area. However, approximately an additional 65 acres were burned during the fires of 2000. The proposed harvest would remove only approximately 2 dozen trees from the most suitable fisher habitat within the project area (a 28-acre patch within the Pasture Draw riparian area). With the exception of the 28-acre patch, the majority of the potential fisher habitat within the project area are largely dry stands that may provide marginal fisher habitat. There is also very little connectivity to more suitable fisher habitat on Bitterroot National Forest lands in the adjoining sections east of the project area. The fragmentation is caused by young clearcuts and rangeland within Section 25 (Pasture Draw) and Section 30 (T2N R18W). Thus, the proposed harvest would likely reduce the potential suitability of already naturally marginal habitat, and likely compound the habitat lost due to fires in 2000. Therefore, there would likely be low risk of direct and indirect effects to fisher, due to the marginal nature of the majority of the habitat in the project area. But there would likely be minor cumulative effects due to the additive loss of marginal habitat in the analysis area from the proposed action.

4.1.1.3 Big Game

4.1.1.3.1 Elk, White-tailed and Mule Deer

4.1.1.3.1.1 No Action Alternative
No changes from current conditions would be expected under the no action alternative.

4.1.1.3.1.2 Action Alternative
The proposed action alternatives would not affect security cover within the project or analysis areas because the project area and any proposed road construction are controlled by effective road closure devices. Thus, "Hillis-paradigm" (Hillis et al. 1991) security cover would not be reduced under the proposed action. However, the proposed action alternatives would influence hunting vulnerability due to the removal of potential hiding cover, and reduce the amount of snow-intercept cover for overwintering deer and elk, and thereby increasing their winter energy expenditures. These reductions are in addition to losses in hiding cover from the recent Spring-Child Salvage Timber Sale and the Sula post-fire salvages of 2000. Due to deer and elk's wide-ranging nature, the abundance and distribution of spotted knapweed infestation within the project area, and over-utilization of forage by livestock in Section 36, there would be low to moderate risk of direct, indirect, and cumulative effects as a result of the action alternative.

4.1.1.3.2 Moose

4.1.1.3.2.1 No Action Alternative
No changes from current conditions would be expected under the no action alternative.

4.1.1.3.2.2 Action Alternative
The proposed action would likely create more abundant and nutritious browse and forage through opening up of the canopy. Additionally, the proposed action may provide for such forage later into the summer for moose because the shade provided for by the remaining canopy may delay the curing of the forage beneath. Thus, there would likely be low risk of direct, indirect, or cumulative impacts to moose as a result of the proposed action.

4.1.1.3.3 Bighorn Sheep

4.1.1.3.3.1 No Action Alternative
No changes from current conditions would be expected under the no action alternative.

4.1.1.3.3.2 Action Alternative
Under the proposed action, there would be potential for disturbance of breeding and over-wintering sheep, as well as lambing areas and lamb-rearing. The area is considered to be important bighorn sheep winter range (John Vore, MT FWP, personal communication, November 2004). However, disturbance to breeding, wintering, and lambing could be minimized through timing and centralization of harvest operations. Disturbance from logging (e.g., skidding, hauling, felling, road construction, etc.) may cause: 1) nearby wintering sheep to expend more energy during a winter harvesting period, which may result in additional mortality, depending upon the severity of the winter and forage availability; 2) disruption of the rut within the herd; and 3) interfere with lamb-rearing. For winter disturbance, harvest operations could have the most impact from mid-February into April because it would coincide with the third trimester of pregnancy for many ewes and the period when sheep are growing new coats, both of which are physiologically stressful on bighorn sheep. In addition to the proposed action, much of Section 36 (Bunch Gulch) has been overgrazed and has high levels of spotted knapweed throughout much of the parcel, thereby further reducing forage availability and quality. Given these existing stressors, a winter logging operation may pose an additional stressor to wintering bighorn sheep.

Recommended Mitigations for Action Alternative: In order to minimize disruption to breeding, wintering, and lambing/lamb-rearing, timber sale operations (including felling, road construction, and log hauling) would be restricted to the periods of January 1 through February 15, and August 1 through October 15. Additionally, during the January 1 through February 15 operations period, operations would be restricted to a single draw (e.g., Bunch Gulch, Pasture Draw, George's Draw, etc.) at a time to minimize disturbance to wintering sheep. However, once work in one draw was completed, operations could then move to a subsequent, individual draw for work.

With implementation of the recommended mitigations, there would likely be low risk of cumulative effects to bighorn sheep as a result of the proposed action.

4.1.1.4 Other Issues

4.1.1.4.1 Cooper's Hawk

4.1.1.4.1.1 No Action Alternative
Under a no action alternative, Douglas-fir beetles would continue to infest, and likely kill, Douglas-fir within the project area, and possibly beyond. Depending upon the extent and rate of spread of the infestation, potential Cooper's hawk nesting habitat would likely be reduced under the no action alternative. Additionally, given that the fires of 2000 reduced the amount of forested habitat within the 2-mile radius analysis area by roughly 50%, the no action alternative would likely further reduce the amount of live canopy forest within the analysis area to a point where nesting may not be likely. Thus, there would be low to moderate risk of direct, indirect, and cumulative effects to Cooper's hawks under the no action alternative.

4.1.1.4.1.2 Action Alternative
The proposed harvest would primarily remove beetle and/or mistletoe infested Douglas-firs between 9 and 19 inches dbh from the project area (Fig. 3). Douglas-firs in these size classes, and with mistletoe clumps, are appealing to Cooper's hawks for potential nest trees (Moore and Henny 1983). While no nest was discovered during field work in September 2004, the repeated observations of an adult Cooper's hawk within a small portion of the project area is suggestive that this is part of a territory. The proposed harvest would retain

trees in all size classes (Fig. 3), while effectively reducing stem density and canopy closure within the project area. Such action is likely to retain many aspects of the diverse avifauna and mammalian populations upon which Cooper's hawks prey, albeit in reduced densities due to a resulting reduction in the site's carrying capacity. As a result, Cooper's hawks that may reside within the project area would likely increase their home range or be displaced in order to meet their energetic requirements. Thus, there would likely be a low risk of direct, indirect, and cumulative effects to one or more Cooper's hawks as a result of the proposed action.

Recommended Mitigation for Action Alternative: Should a nest be discovered during harvest activities, a DNRC wildlife biologist would be contacted to develop and implement mitigations to minimize effects to the nest and minimize risk of a violation of the Migratory Bird Treaty Act (during breeding season).

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