CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Crazyman Timber Sale
Proposed Implementation Date:	2010
Proponent:	Libby Unit, Montana Department of Natural Resources and Conservation (DNRC)
Location:	Section 36, Township 29 North, Range 31 West
County:	Lincoln

I. TYPE AND PURPOSE OF ACTION

The Montana Department of Natural Resources and Conservation (DNRC), Libby Unit, is proposing a commercial timber harvest approximately 11 air miles southeast of Libby, MT in Section 36, Township 29 North, Range 31 West (Attachment A, Vicinity Map). Under the proposed Crazyman Timber Sale, DNRC would harvest and sell approximately 0.25 million board feet of wood products from 1 harvest unit totaling approximately 20 acres (seedtree harvest) using ground based logging equipment. As a result of this proposed timber sale, an estimated $32,500.00 would be generated for the Common Schools Trust. Additional actions would include the construction of approximately 0.25 miles of temporary roads (Attachment A, Project Area Map). Post timber harvest operations on 20 acres could include scarification as well as planting Western White Pine, Ponderosa pine, or Western Larch. Logging slash would be treated to meet state laws. Timber sale activities would likely begin during the calendar year of 2010 and conclude in the year 2012. Site specific objectives for the project area are: (1) Move the stand to a healthier, more vigorous condition (desired future condition), (2) Reduce forest fuels.

Lands involved in this proposed project are held by the State of Montana in trust for the Common Schools (Enabling Act of February 22, 1889: 1972 Montana Constitution, Article X Section 11). The Board of Land Commissioners and the DNRC are required, by law, to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). The DNRC would manage lands involved in this project in accordance with the State Forest Land Management Plan (DNRC 1996), the Administrative Rules for Forest Management (ARM 36.11.401 through 450), and all other laws applicable to timber harvest activities on State lands.

II. PROJECT DEVELOPMENT

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

Provide a brief chronology of the scoping and ongoing involvement for this project. List number of individuals contacted, number of responses received, and newspapers in which notices were placed and for how long. Briefly summarize issues received from the public.

A public notice was published in the Western News on August 12th and 14th, 2009. Scoping letters were sent to adjacent land owners and other interested parties on the Libby Unit mailing list for scoping notices. Those involved in project development from DNRC include Katie Mally – Wildlife Biologist, Tony Nelson - Hydrologist, and Soil Specialist, Patrick Rennie – Archeologist, Dave Marsh – Project leader and forester, and John Shotzberger, Libby Unit Manager. Comments and concerns were addressed and incorporated in to the final Environmental Assessment in November, 2009.

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

Examples: cost-share agreement with U.S. Forest Service, 124 Permit, 3A Authorization, Air Quality Major Open Burning Permit.

DNRC is classified as a major open burner by the Montana Department of Environmental Quality (DEQ), and is issued a permit from the DEQ to conduct burning activities on State lands managed by the DNRC. As a major open burning permit holder, DNRC agrees to comply with all of the limitations and conditions of the permit.

DNRC is a member of the Montana/Idaho Airshed Group, which regulates prescribed burning, including both slash and broadcast burning, related to forest management activities done by DNRC. As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit in Missoula, MT.

3. ALTERNATIVE DEVELOPMENT:

Describe alternatives considered and, if applicable, provide brief description of how the alternatives were developed. List alternatives that were considered but eliminated from further analysis and why.

Action:

Under the proposed Crazyman Timber Sale, DNRC would harvest and sell approximately 0.25 million board feet of wood products from 1 harvest unit totaling approximately 20 acres (seedtree harvest) using ground based logging equipment. As a result of this proposed timber sale, an estimated $32,500.00 would be generated for the Common Schools Trust. Additional actions would include the construction of approximately 0.25 miles of temporary roads. The harvest treatment would move the stand to a healthier, more vigorous condition (desired future condition). Forest fuels would be reduced, which would reduce the potential for stand replacement wildfire.

No Action:

DNRC would not harvest and sell approximately 0.25 million board feet of wood products. An estimated $32,500.00 would not be generated for the Common Schools Trust at this time. No new, temporary roads would be constructed. Timber would continue to decay and no forest fuel reduction would occur.

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 direct, indirect, and cumulative effects to soils.

The inventoried landtypes are listed as 104 and106 by soil survey of Kootenai National Forest area, Montana and Idaho. These are not considered highly erosive soils. Frozen or dry conditions will limit the risk of compaction.

Due to the small scope of the project, distance from surface water bodies, and the gentle to level topography, impacts to the soil resource are expected to be low. Impacts to soil physical properties (compaction, displacement) are expected to be less than 15% of the harvested area, provided soils are dry, frozen, or snow covered and skid trails are spaced so that 20% or less of the area is trafficked by equipment. No streams are found within the proposed project area, so sediment delivery is not an issue with this project.

A DNRC Hydrologist / Soil Scientist reviewed the proposed project area. See Attachment C, Soils Analysis (e-mail communication).

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 direct, indirect, and cumulative effects to water resources.

All new road construction is located away from streams, would comply with all applicable BMP standards, and all closed road segments would be left with all necessary erosion control to provide long-term protection from erosion and sediment delivery. The risk of sediment delivery from roads in the proposed project area would be low following project implementation due to the addition of BMPs for erosion control in the absence of streams or draws in the project area.

No impacts to water quality from timber harvesting are expected in the project area.

The proposal to harvest approximately 0.25 MMBF from approximately 20 acres would have a very low risk of water yield increases in the wetland and surrounding watershed.

Adverse cumulative affects to water quality are not expected in the proposed project area. The risk of increasing sediment loads is very small since all proposed activities are located well away from a stream or draw.

Adverse cumulative impacts to the unnamed tributary of Libby Creek watershed are not expected as a result of the proposed project.

A DNRC Hydrologist / Soil Scientist reviewed the proposed project area. See Attachment B, Watershed and Hydrology Analysis for the Crazyman Timber Sale).

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6. AIR QUALITY:

What pollutants or particulate would be produced (i.e. particulate matter from road use or harvesting, slash pile burning, prescribed burning, etc)? Identify the Airshed and Impact Zone (if any) according to the Montana/Idaho Airshed Group. Identify direct, indirect, and cumulative effects to air quality.

The project area is located in Montana Airshed 1. Smoke would be generated from the burning of slash; however, adherence to the Montana/Idaho State Airshed Group regulations requires that burning occur during periods with adequate airshed ventilation. This would reduce the potential for detrimental contributions of associated air pollutants. Dust may be created from log hauling on portions of native surface roads during summer and fall months. Contract clauses would provide for the use of dust abatement if necessary to reduce dust near any affected residences.

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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 direct, indirect, and cumulative effects to vegetation.

The project area is bordered by USFS, industrial private and small private ownerships. The private ownerships are intensively managing their lands for timber, recreation, grazing, and residential uses. The project area currently is dominated by the Western larch/Douglas-fir cover type. Silvicultural prescriptions would promote historic stand conditions favorable for the conversion or maintenance of approximately 20 acres to the western white pine cover type. This treatment would assist Libby Unit in meeting its unit wide desired future condition cover types.

Rare plants or cover types listed by the Montana Natural Heritage program have not been found within the project area. There are no old-growth stands located within the project area. An integrated weed management approach would be implemented to limit the potential for the spread and introduction of noxious weeds into the project area.

For detailed analysis, please refer to Attachment E, Vegetative Analysis for the Crazyman Timber Sale. For a complete list of Vegetative Resource Mitigations, please refer to Attachment F, Summary of Mitigations Incorporated in to the Crazyman Timber Sale.

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8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

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

A DNRC Wildlife Biologist has reviewed the project area, transportation system and harvest plan. Recommendations to minimize impacts have been incorporated in to the project design.

(See attachment D, Wildlife Analysis for the Crazyman Timber Sale for effects to species that may occur as a result of the proposed action - Pages 6-8. See Attachment F, Summary of Mitigations Incorporated in to the Crazyman Timber Sale for the Crazyman Timber Sale for a complete list of mitigations.)

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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 direct, indirect, and cumulative effects to these species and their habitat.

A DNRC Wildlife Biologist has reviewed the project area, transportation system and harvest plan. Recommendations to minimize impacts have been incorporated in to the project design.

(See attachment D, Wildlife Analysis for the Crazyman Timber Sale for effects to species that may occur as a result of the proposed action - Pages 6-8. See Attachment F, Summary of Mitigations Incorporated in to the Crazyman Timber sale for a complete list of mitigations.)

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

The DNRC staff archaeologist considered the proposed project area. No cultural resource concerns associated with the action alternative were identified.

See project file, Archeology, Patrick Rennie memo (e-mail communication).

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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 direct, indirect, and cumulative effects to aesthetics.

Proposed harvest areas would not be located on a prominent topographic feature, or visible from any populated or scenic areas. Active forest management is prevalent in this area on adjacent private ownerships. Within the project area, the approximately 20 acre harvested stand would look more open with fewer trees per acre. 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 area and on haul routes. This would be expected to be short in duration.

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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 direct, indirect, and cumulative effects to environmental resources.

No impacts would be likely to occur under either alternative.

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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.

There are no other environmental documents that pertain to the project area.

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.*

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

Harvesting would result in a short term increase of flashy fuels within the project area from the resulting logging slash, thereby increasing the potential fire hazard. Slash treatments prescribed as part of the action plan would meet or exceed the standards for treating logging slash under the Fire Hazard Reduction Law and associated administrative rules.

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

Commercial logging would occur on approximately 20 acres of land over a 1-2 year period.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:

Estimate the number of jobs the project would create, move or eliminate. Identify direct, indirect, and 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 program, there will be no measurable direct, indirect, and cumulative impacts 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 direct, indirect, and cumulative effects to taxes and revenue.

Due to the relatively small size of the timber sale program, there will be no measurable direct, indirect, and cumulative impacts from this proposed action on tax base or 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 direct, indirect, and cumulative effects of this and other projects on government services

There would be no measurable direct, indirect, and cumulative impacts related to demand for government services due to the relatively small size of the timber sale program. There would be short-term increases in traffic, and the small possibility of a few people temporarily relocating to the 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.

The DNRC operates under the State Forest Land Management Plan (SFLMP, DNRC 1996) and Administrative Rules for Forest Management (ARM 36.11.401 through 450, DNRC 2003). The SFLMP established the agency's philosophy for management of forested trust lands. The Administrative Rules provide specific guidance for implementing forest management projects.

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 direct, indirect, and cumulative effects to recreational and wilderness activities.

The area is used for hiking, hunting, cross-country skiing, snowmobiling and general recreating. Currently, roads through the area are closed to motorized use and used only for administrative purposes. There would be no change in road closure status and the selection of either alternative would not affect the ability of people to recreate on this parcel.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

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

There will be no measurable direct, indirect, and cumulative impacts related to population and housing due to the relatively small size of the timber sale program, 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.

The communities and lifestyles of this area have traditionally been and still are dependent on forest management and timber production for employment and other benefits received from this type of land use and management. The action alternative would be consistent with current and traditional lifestyles in this area.

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 direct, indirect, and cumulative economic and social effects likely to occur as a result of the proposed action.

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 estimated stumpage is based on comparable sales analysis. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay for.

No Action: The No Action alternative would not generate any return to the trust at this time.

Action: The timber harvest would generate additional revenue for the Common Schools Trust. The estimated return to the trust for the proposed harvest is $$32,500.00 based on an estimated harvest of 250 thousand board feet (1,625 tons) and an overall stumpage value of $20.00 per ton. 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.

EA Checklist Prepared By:	**Name:** Dave Marsh	**Date:** 11-25-09
	Title: Forest Management Supervisor	

V. FINDING

25. ALTERNATIVE SELECTED:

Upon review of the Checklist EA and appendices I find Action Alternative as proposed meets the intent of the project objectives as stated on page 1, Type and Purpose of Action. It complies with all pertinent environmental laws, DNRC State Forest Land Management Plan, and a consensus of professional opinion on limits of acceptable environmental impact. The No Action Alternative does not meet the project objectives. For these reasons I have selected the Action Alternative for implementation on this project.

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

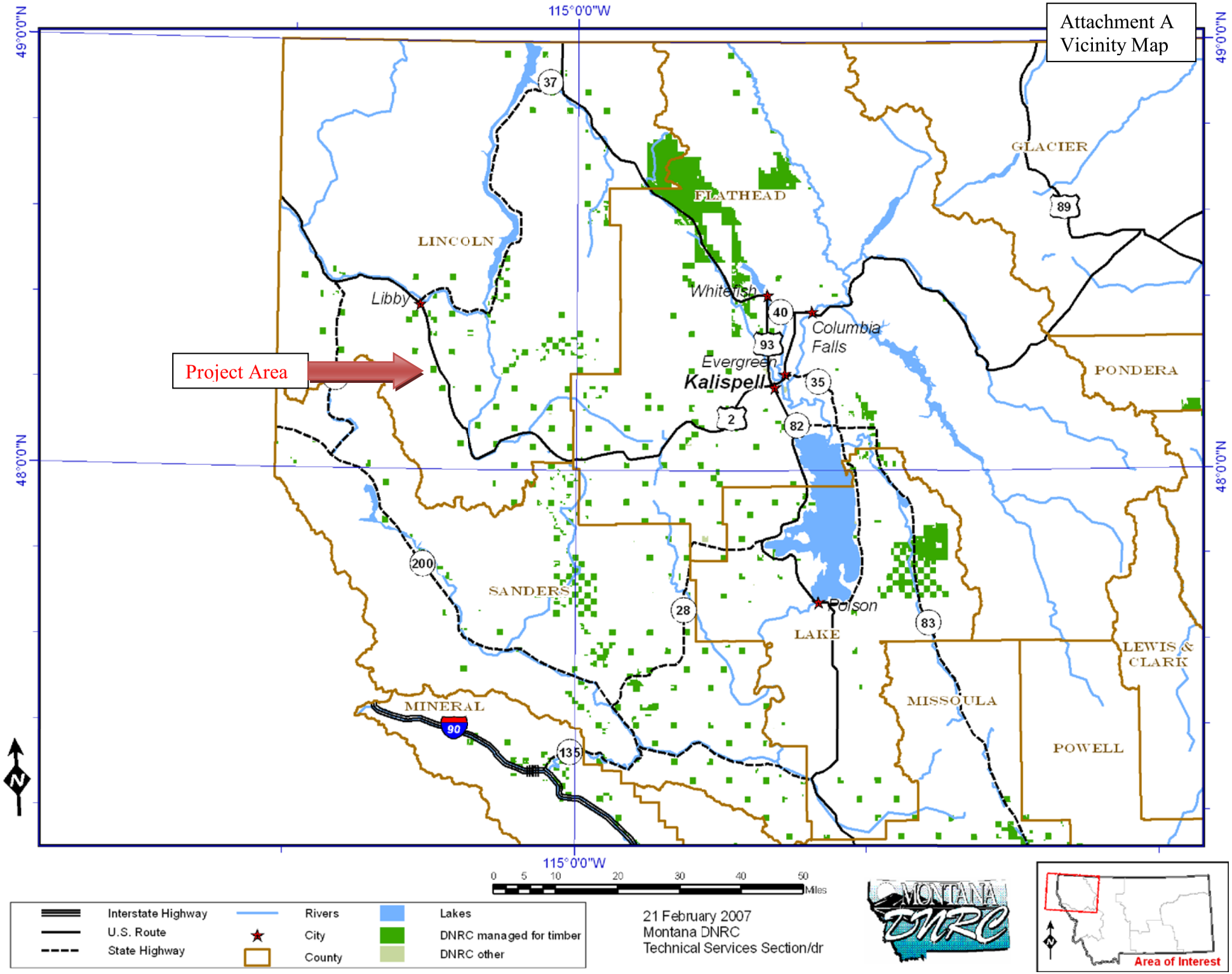
After a thorough review of the scoping documents, Department policies, standards, guidelines, and the State Forest Land Management Plan (SFLMP), I find all the identified resource management concerns have been fully addressed in this Checklist EA and it's appendices. Specific mitigation measures for each resource concern are listed in Appendix F. The action alternative provides for income to the school trust and promotes the development of a healthy, biologically diverse, and productive forest. It also provides the opportunity to improve access and road maintenance within the project area. I find there will be no significant impacts to the human environment as a result of implementing the action alternative. Specific project design features and various resource management specialist recommendations have been implemented to ensure that this project will fall within the limits of acceptable environmental change and result in no significant effects.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

[ ] EIS	[ ] More Detailed EA	[X] No Further Analysis

EA Checklist Approved By:	**Name:**	John Shotzberger
	Title:	Libby Unit Manager
Signature: /s/John Shotzberger		**Date**:12/1/09

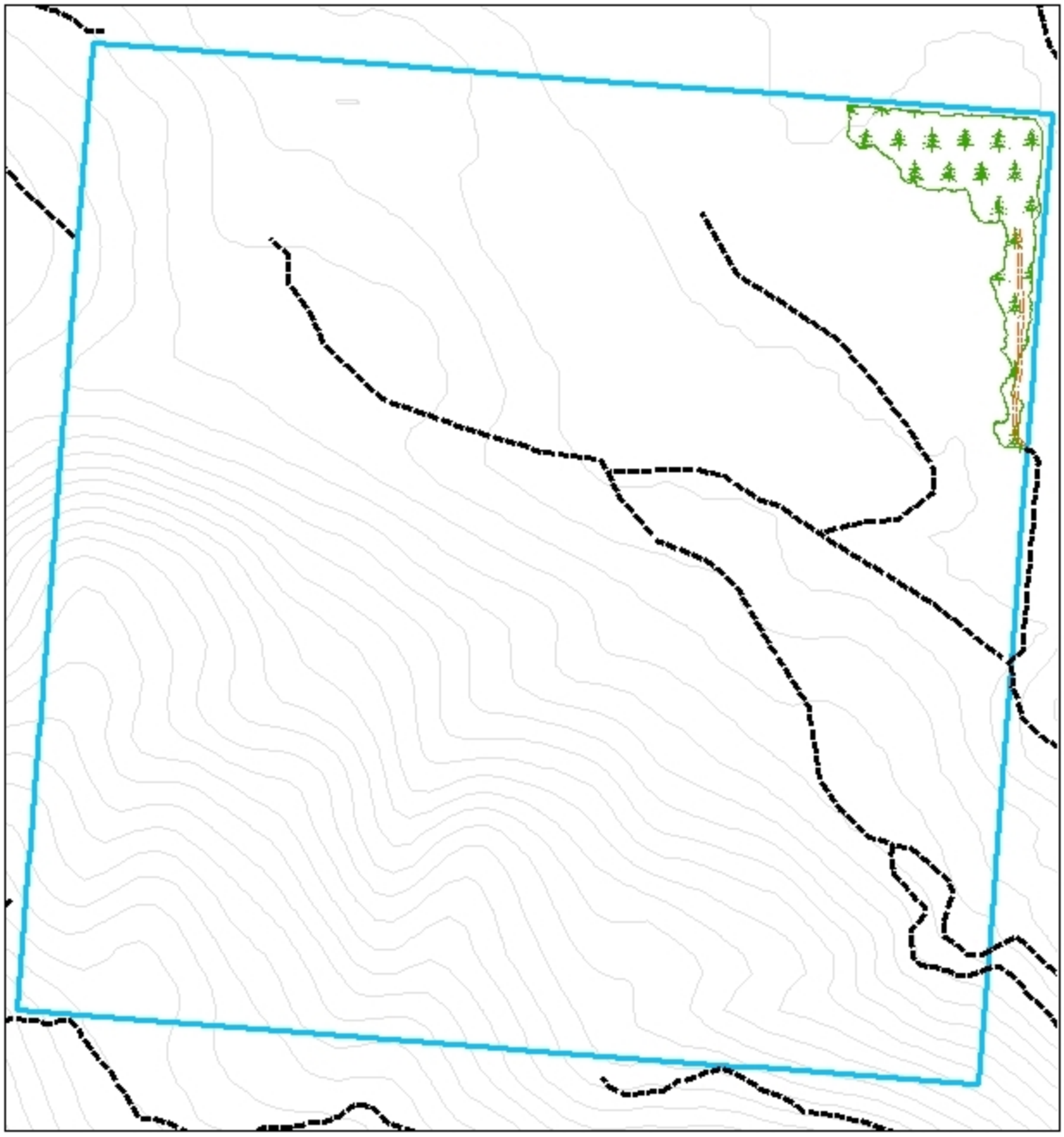
Attachment A
Vicinity Map



Attachment A
Project Area Map

Crazyman Timber Sale

Section 36, Township 29N, Range 31W



Legend

- State Trust Land
- Harvest Unit
- Existing Roads
- New Temporary Road
- Contours

N

0 0.1 0.2 0.4 Miles

WATERSHED AND HYDROLOGY ANALYSIS FOR THE CRAZY MAN TIMBER SALE

INTRODUCTION

Water Quality
The primary parameter of concern for water quality is sediment. Increased sediment delivery and deposition can affect physical and biological water quality, channel stability and geomorphology. Sediment yield can be affected by a number of activities. Timber harvesting and associated road construction can increase sediment yield through exposure of bare soil. These impacts can be mitigated through implementation of Best Management Practices (BMPs), and other erosion control measures.

Water Yield
Timber harvesting and associated activities can affect the timing, distribution, and amount of water yield in a harvested watershed. Similarly, effects of stand replacement wildfire also affect water quantity and yield in a watershed. Water yields increase proportionately to the percentage of canopy removal, because removal of live trees reduces the amount of water transpired, leaving more water available for soil saturation and runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt, which lead to further water yield increases. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition.

ANALYSIS METHODS

Water Quality
Existing conditions for water quality were analyzed using field site visits and visual inspection of the drainage features and road systems in the proposed project area.

Water Yield
The water yield increase for the watershed in the project area was determined using field review and aerial photo interpretation. Visual inspection of the runoff patterns within the proposed project area was used to assess the impacts of past management to water yield. Aerial photo interpretation was used to determine the extent of past management in project area watersheds.

ANALYSIS AREA

Water Quality
The analysis area for water quality is the DNRC ownership in the unnamed tributary to Libby Creek and all forest roads that lead into the parcel from other ownership. The primary focus of the sediment delivery analysis was on the draw located within the proposed project area.

Water Yield

The analysis area for water yield is the unnamed tributary to Libby Creek watershed.

EXISTING CONDITIONS

Regulatory Framework

Montana Surface Water Quality Standards: According to MCA 17.30.609 (1), the Kootenai River drainage and its tributaries, including the unnamed draw in Section 36, are classified as B-1. Among other criteria for B-1 waters, no increases are allowed above naturally occurring levels of sediment, and minimal increases over natural turbidity. Naturally occurring, as defined by MCA 17.30.602 (17), includes conditions or materials present from runoff on developed land where all reasonable land, soil and water conservation practices (commonly called BMPs) have been applied. Reasonable practices include methods, measures or practices that protect present and reasonable anticipated beneficial uses. These practices include but are not limited to structural and non-structural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of potentially impactive activities.

No designated beneficial surface water uses were identified within the project area.

Water Quality Limited Waterbodies: No portion of the proposed project area is listed in the 2008 List of Waterbodies in Need of Total Maximum Daily Load (TMDL) Development publication produced by the Montana Department of Environmental Quality (DEQ, 2008).

Montana Streamside Management Zone (SMZ) Law: By the definition in ARM 36.11.312 (20), there are no streams in the proposed project area. There are draws and swales found in the project area, but none contain a defined stream channel and flow water only during extreme runoff events.

Water Quality

The existing road system leading to the proposed project area is a subdivision standard road that is in the process of being paved with asphalt. No stream crossings were located on the road system leading to this parcel. No surface erosion or sediment delivery sites were identified in or leading to the proposed project area.

Water Yield

The project area is adjacent to a wetland. No stream channel was identified either within the wetland or the project area. Due to the lack of stream channels, the ability of wetlands to store peaks in runoff, and due to the limited size and amount of harvesting proposed, the proposed project area is a low risk for impacts to water yield, and a detailed analysis of watershed cumulative effects is not necessary for this parcel (ARM 36.11.423).

DIRECT AND INDIRECT EFFECTS

No Action Alternative

Direct and indirect effects of the No Action alternative would be similar to the conditions described under the existing conditions for water quality and water yield. The water quality and

water yield would be unaffected by the no action alternative, and the streams in the proposed project area would continue to be affected by natural and pre-existing conditions.

Action Alternative

Water Quality
The action alternative would construct approximately 0.25 miles of new road to access the proposed harvest units. All new road construction is located away from streams, would comply with all applicable BMP standards, and all closed road segments would be left with all necessary erosion control to provide long-term protection from erosion and sediment delivery. The risk of sediment delivery from roads in the proposed project area would be low following project implementation due to the addition of BMPs for erosion control and an absence of streams or draws in the project area.

No impacts to water quality from timber harvesting are expected in the proposed project area. All proposed ground-based yarding would take place on level to gentle slopes (0-10%) and be located 50 feet away from the edge of the wetland according to ARM 36.11.426 (1) (a). As a result, no bare soil disturbance is expected within 50 feet of the wetland and no streams or draws would be affected by potential sediment delivery.

Water Yield
The proposal to harvest approximately .25MMBF from approximately 20 acres would have a very low risk of water yield increases in the wetland and surrounding watershed. The extent and area of proposed timber harvest would likely have no measurable impact to water table levels in the wetland adjacent to the proposed harvest. No other potential impacts to water quantity or water yield are expected as a result of the proposal.

CUMULATIVE EFFECTS

No Action Alternative
Cumulative effects of the No Action alternative on water quality and water yield would be similar to the situations described in the existing conditions. The water quality and water yield would be unaffected by the No Action alternative. Wetland water levels and existing runoff patterns in the proposed project area would continue to be affected by natural and pre-existing conditions.

Action Alternative

Water Quality
Adverse cumulative effects to water quality are not expected in the proposed project area. Construction of 0.25 mile of new road would increase the risk of sediment loads on these sites where vegetation was lost. Ground-based harvest activities may also increase the risk of erosion by exposing bare soil on skid trails and landings. This risk would be elevated for 2-3 years after project completion until sites begin to re-vegetate. The risk of increasing sediment loads is very small since all proposed activities are located well away from a stream or draw.

Water Yield

Adverse cumulative impacts to the wetland or downstream waters in and near the project area are not expected as a result of the proposed project for the following reasons: 1) the limited area of the proposal would not have a measurable effect on the small, subsurface flow regimes in this parcel, 2) the absence of a stream channel shows that the watershed containing the project area is not prone to impacts of water yield increases, and 3) the presence of wetlands within and below the proposed activity act as storage of increases in water yield.

To: Dave Marsh, Project Leader

From: Tony Nelson

Date: October 8, 2009

Subject: Crazy Man Soils Analysis

The proposed see tree harvest on the Libby Unit would occur in section 36, T29N, R31W. The total area of harvest in proposal is approximately 20 acres. This would yield an estimated 250 mbf of saw logs. All work would be completed under dry, frozen and/or snow covered ground conditions.

The inventoried landtypes are listed as 104 and 106 by *Soil Survey of Kootenai National Forest Area, Montana and Idaho*. These are not considered highly erosive soils. Frozen or dry conditions will limit the risk of compaction.

Conclusion

Due to the small scope of the project, distance from surface water bodies, and the gentle to level topography, impacts to the soil resource are expected to be low. Impacts to soil physical properties (compaction, displacement) are expected to be less than 15% of the harvested area provided soils are dry, frozen or snow-covered and skid trails are spaced such that 20% or less of the area is trafficked by equipment. No streams or draws are found within the proposed project area, so sediment delivery is not an issue with this project.

WILDLIFE ANALYSIS
FOR THE
CRAZYMAN TIMBER SALE

INTRODUCTION

This analysis is designed to identify and document existing conditions for wildlife resources found in the vicinity of this project and display the anticipated effects that may result from each alternative of this proposal. During initial scoping, several comments were received regarding the effects of proposed timber harvesting that led to the development of the following list of issues:

- Timber harvesting could reduce forested cover that could reduce the amount of mature forested habitats available to those species that rely upon these habitats and/or decrease the ability of some wildlife species to move through the landscape.
- Timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependant upon these resources.
- Timber harvesting and associated activities could alter cover, increase access, and reduce secure areas, which could adversely affect grizzly bears by displacing grizzly bears from important habitats and/or increasing risk to bears of human-caused mortality.
- Timber harvesting and associated activities could remove canopy closure or alter stand conditions, which could result in the reduction or modification of habitat components, leading to a decreased ability for the area to support Canada lynx.
- Timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.
- Timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests.

The following sections disclose the anticipated direct, indirect and cumulative effects to these wildlife resources in the analysis area from the proposed actions. Past and current activities on all ownerships within each analysis area as well as planned future agency actions have been taken into account for the cumulative effects analysis.

Analysis Areas

The discussions of existing conditions and environmental effects will focus on two different scales. The first will be the "project area", which consists of section 36 in T29N, R31W (approximately 640 acres). The second scale or the "cumulative effects analysis area" relates to the surrounding landscape for assessing cumulative effects to wildlife and their habitats. For several resources analyzed below where no specific biological parameters were indicated (such as the home range area for a particular species) the 9 sections surrounding the project area and the project area (9 square miles total) is delineated for analysis of cumulative effects. These 9 parcels represent a land area of approximately 5,760acres. Within this cumulative effects analysis area, the ownership pattern is a mosaic of U.S. Forest Service managed lands (47%), DNRC managed lands (11%), industrial private timberland (16%), and other private landowners (26%). A second 36,282 acre cumulative effects analysis area was also identified and is also used for wide-ranging mammals and their habitats, such as grizzly bears, Canada lynx, and fishers. Within this larger cumulative effects analysis area, the ownership pattern is a mosaic of U.S. Forest Service managed lands (71%), DNRC managed lands (5%), other private landowners (11%), industrial private timberland (12%), and a minor component of water (1%).

Analysis Methods

DNRC attempts to promote biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on State lands (ARM 36.11.404). Appropriate stand structures are based on ecological characteristics (e.g., land type, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which the species evolved, the full complement of species would persist and biodiversity would be maintained. This coarse-filter

approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape. DNRC cannot assure that the coarse-filter approach will adequately address the full range of biodiversity; therefore, DNRC also employs a "fine-filter" approach for threatened, endangered, and sensitive species (ARM 36.11.406). The fine-filter approach focuses on a single species' habitat requirements.

For each species or habitat issue, existing conditions of wildlife habitats are described and compared to the anticipated effects of the No Action Alternative and the proposed Action Alternative to determine the foreseeable impacts to potentially affected wildlife species and their habitats.

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

COARSE FILTER WILDLIFE ANALYSIS

Of the 108 mammal species found in Montana, 71 are suspected or known to occur in Lincoln County (Foresman 2001). The majority of terrestrial vertebrates that were present at the time of European settlement likely still occur in the vicinity of the proposed project area. Eight amphibian and eight reptile species have also been documented in Lincoln County (Maxell et al. 2003) and at least 118 species of birds have been documented in the vicinity in the last 10 years (Lenard et al. 2003). Terrestrial species that rely on special habitat elements, such as white bark pine (*Pinus albicaulis*), western white pine (*Pinus monticola*), or burned areas, may not be present or occur in lower abundance due to the decline of these elements across the landscape. Over time, due to fire suppression, tree densities have increased and shade-tolerant species, such as Douglas-fir and grand fir have become more prevalent than they were historically. These departures probably benefit wildlife species that rely on shade-tolerant tree species and/or closed-canopy habitats, while negatively affecting species that rely on shade-intolerant tree species and/or open habitats.

MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY

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

INTRODUCTION

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

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the 9 surrounding sections and the project area (approximately 5,760 acres). Habitats and wildlife found on these lands would be those most likely to be influenced by cumulative effects associated with nearby activities and habitat alteration on project area lands. This scale of analysis was also selected because it is large enough to support a diversity of species that require connected forested habitats in the geographic vicinity of the project area.

Analysis Methods
Mature forested habitats and landscape connectivity were assessed using field evaluations, aerial photograph interpretation, and GIS analysis. Factors considered within the analysis include the level of harvesting, amount of densely forested habitats, and connectivity.

EXISTING ENVIRONMENT
The project area currently contains approximately 403 acres of mature stands (100 plus years in age) of mature mixed-conifer stands that have a reasonably closed canopy. These stands are interspersed with a variety of mixed-conifer stands of varying ages and stocking densities. There are no acres within the project area that currently meet Green et al. (1992) standards for old growth classification and are at least 180 years old. Connectivity within the project area has been compromised with past timber harvesting and other human development on other land ownerships.

The network of open roads in the cumulative effects analysis area coupled with timber management within the cumulative effects analysis area in the past 40 years has reduced landscape-level connectivity. No other timber management is proposed or ongoing on any of the DNRC-managed parcels in the cumulative effects analysis area; timber harvesting could continue on other lands within the cumulative effects analysis area. Across the cumulative effects analysis area, landscape connectivity has been compromised, but some connectivity, particularly along streams and riparian features has been partially retained. Considerable forested habitats exist in the cumulative effects analysis area, but much of these forested habitats have been bisected with roads and/or have been harvested in the recent past. There are areas of forested-interior habitats that provide habitats for the suite of species that rely upon these habitat conditions in the cumulative effects analysis area; however, these habitats are far less common than they were historically

<u>Direct and Indirect Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity</u>
Forest conditions would continue to age and move toward denser stands of shade-tolerant tree species with high canopy cover. Largely, no appreciable changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated. No changes in wildlife use would be expected; wildlife favoring dense stands of shade-tolerant tree species would benefit, while those requiring conditions likely found under natural disturbance regimes would continue to be underrepresented. Habitat for forested interior species and old-stand-associated species, such as American marten, northern goshawk, and pileated woodpecker, would likely improve with this alternative; however western larch and ponderosa pine, which are preferred snag species, could decline in abundance over time. Thus, since 1) no changes to existing stands would occur, 2) no appreciable changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated, and 3) no changes to wildlife use would be expected, no direct or indirect effects to mature forested habitats and connectivity would be expected that could affect wildlife in the project area.

<u>Direct and Indirect Effects of the Action Alternative on Mature Forested Habitats and Connectivity</u>
Approximately 20 acres of mixed-conifer stands would be harvested, including roughly 20 acres of mature stands with a closed canopy. Most of these acres of mature, forested habitats proposed for treatments would receive a regeneration-type treatment which would reduce habitat for those species relying upon mature, closed-canopy forested habitats. Overall, the resultant changes in stand age and density would reduce habitats for species associated with older stands, such as American marten and pileated woodpeckers, which benefited from the increasing stand ages and densities caused by modern fire suppression. Minor reductions in landscape connectivity would be anticipated with the proposed harvesting; however, landscape connectivity has been compromised in the vicinity with diversity of ownership, past harvesting, human development, and road systems. Some habitat connectivity would be retained through heavier cover retention in stream management zones. In general, under this alternative habitat conditions would improve for species adapted to more open forest conditions, while reducing habitat quality for species that prefer dense, mature forest conditions. Thus, since 1) harvesting would reverse succession in several stands, reducing stand age and the amount of forested cover, 2) minor changes to landscape connectivity would occur, and 3) some changes to wildlife use would be expected, minor adverse direct and indirect effects to mature forested habitats and connectivity would be expected that could adversely affect some species of wildlife in the project area.

Cumulative Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity
Habitats in the cumulative effects analysis area are a mosaic of habitat types and age classes. Past harvesting has reduced the amount of mature, forested habitats; however the general trend within the cumulative effects analysis area is conversion to mature forests. This alternative would continue to contribute to the mature forested stands within the cumulative effects analysis area. Losses of individuals and pockets of trees due to natural events such as high winds would not likely alter the overall age or landscape connectivity. Under this alternative, continued use of the analysis area by species favoring dense stands of shade-tolerant tree species and those species requiring larger areas of mature forests would be expected. Habitat for forested-interior species and old-stand –associated species, such as American marten, northern goshawk, and pileated woodpecker, would likely persist. Thus, since 1) no changes to existing stands would occur, 2) no near term changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated, and 3) no changes to wildlife use would be expected, no cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative on Mature Forested Habitats and Connectivity
Despite the general trend of conversion to mature forested habitats within the cumulative effects analysis area, past harvesting has reduced the amount of mature, forested habitats. Reductions in mature, forested habitats associated with this alternative would be additive to losses associated with past harvesting activities. Habitats for forested interior species and old-stand-associated species, such as American marten, northern goshawk, and pileated woodpecker, would be expected to be reduced; however continued use of the analysis area would be expected. Thus, since 1) harvesting would remove mature stands, further reducing the amount of forested cover in the cumulative effects analysis area, 2) no appreciable changes to landscape connectivity would occur, and 3) some changes to wildlife use would be expected, minor adverse cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative effects analysis area.

SNAGS AND COARSE WOODY DEBRIS

Issue: Timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependant upon these resources.

INTRODUCTION

Snags and coarse woody debris are important components of forested ecosystems. The 5 primary functions of dead wood in the forested ecosystems are to: 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4) provide important habitat for wildlife, and 5) act as a storehouse for nutrient and organic matter recycling agents (Parks and Shaw 1996). Snags and defective trees (partially dead, spike top, broken top) are used by a wide variety of wildlife species for nesting, denning, roosting, feeding, and cover. Snags and defective trees may be the most valuable individual component of Northern Rocky Mountain forests for wildlife species (Hejl and Woods 1991). The quantity, quality, and distribution of snags affect the presence and population size of many of these wildlife species.

Snags provide foraging sites for insectivorous species and offer opportunities for primary cavity-nesting species to excavate nests. The cavities created by primary excavators (i.e. woodpeckers) also provide habitat for secondary cavity users, including other birds and small and mid-sized mammals. Snags and defective trees can also provide nesting sites for secondary cavity users where cavities are formed by broken tops and fallen limbs. Primary risk factors for snags include loss to legal and illegal firewood cutting, prescribed burning, removal for wood fiber, purposeful felling during timber harvest operations for human safety, and incidental loss during logging due to equipment operation and yarding activities.

The tree species, diameter, height, decay stage, and densities of snags determine the snag-habitat value for wildlife species. Larger, taller snags tend to provide nesting sites, while shorter snags and stumps tend to provide feeding sites (Bull et al. 1997). Many species that use smaller diameter snags will also use large snags; however, the opposite is not true. Typically, older-aged stands will have greater numbers of large snags. Snags in early stages of decay are often used more for feeding substrates, while mid-level decay provides opportunities for cavity excavation (Schepps et al. 1999). Some species of trees decay at slower rates than others, thereby providing habitat for longer periods of time. For example, western larch, western white pine, and ponderosa pine are harder woods that decay less rapidly than Douglas-fir, subalpine fir, or Engelmann spruce trees. Finally, snag densities are another important

aspect of habitat value for cavity-nesting birds, as many of these species tend to nest in areas where snag densities are high, using one snag for nesting but having others nearby for foraging or roosting opportunities.

Coarse woody debris provides structural diversity and promotes biological diversity by providing habitat for many wildlife species. Many small mammals require coarse woody debris to survive. In turn, these species distribute fungi which are beneficial for seedling establishment and tree growth (Graham et al. 1994). Additionally, coarse woody debris can provide feeding substrates for species such as pileated woodpeckers and black bears, as logs will often host high densities of insects (Aney and McClelland 1985). Forest carnivores such as pine marten and lynx rely on coarse woody debris to provide resting and denning habitat (Patton and Escano 1990, Squires et al. 2008).

The quality and distribution of coarse woody debris can affect habitat quality for wildlife species that rely upon it to meet various life requisites. Longer lengths of large diameter downed wood typically provide higher quality habitat for wildlife than do smaller and/or shorter pieces. Single scattered logs can provide lookout and travel sites while log piles provide denning and resting habitat. Under natural conditions, logs tend to occur in patches or clumps, often where a blow-down event has occurred, with scattered lone logs occasionally distributed in between.

Analysis Areas

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the 9 surrounding sections and the project area (approximately 5,760 acres). Wildlife species associated with snags and coarse woody debris found on these lands would be those most likely to be influenced by cumulative effects associated with nearby activities and proposed habitat alteration on the project area. This scale of analysis would be large enough to support a diversity of species that use coarse woody debris resources, from birds to small mammals and meso-carnivores.

Analysis Methods

Snags and coarse woody debris were assessed both visually and through vegetation plots collected during site visits as well as by reviewing past DNRC harvesting information. Factors considered within the analysis include the level of harvesting, number of snags, relative amounts of coarse woody debris, and risk level of firewood harvesting.

EXISTING ENVIRONMENT

During field visits to the proposed units, between 0 and 6 variably spaced snags per acre of different sizes and species were observed and approximately 30-40 tons of coarse woody debris per acre were observed in the project area. Large (>21” dbh) and small (<15” dbh) snags were moderately limited within the project area, with greater numbers of medium (15-21” dbh) snags. In portions of the project area, evidence of snag use for feeding and/or cavity building was observed. Elsewhere in the project area, units that have been harvested in the past decade or so typically have a few snags per acre and abundant coarse woody debris. The approximate 30-40 tons of coarse woody debris per acre also exhibits a large range of decay classes from sound to fully decayed.

Within the cumulative effects analysis area, past harvesting has limited snag and coarse woody debris densities in some of the area. Snags and coarse woody debris are often collected for firewood, especially near open roads. Firewood gathering in areas adjacent to open roads may have significantly reduced densities of snags and coarse woody debris in the cumulative effects analysis area.

<u>Direct and Indirect Effects of the No-Action Alternative on Snags and Coarse Woody Debris</u>

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

Direct and Indirect Effects of the Action Alternative on Snags and Coarse Woody Debris
Present and future snags and coarse woody debris would be reduced due to timber harvesting on 20 acres within the project area. Prescriptions call for retention of a minimum of 2 large snags per acre (> 21 in. dbh where they exist, otherwise the next largest size class), 2 large snag recruits per acre (>21 in. dbh where they exist, otherwise the next largest size class), and 5-10 tons of coarse woody debris per acre would be planned for retention within the proposed units where it exists. However, some snags and/or recruit trees could be lost due to safety and operational concerns, but replacements would be identified to ensure ample amounts are present after logging. Future snag quality in the harvested units would be enhanced with proposed silvicultural prescriptions that should lead to the re-establishment of shade-intolerant species that tend to provide important habitats, such as long lasting nesting structures and foraging habitats, for cavity nesting birds. Given the amounts, range of variability in sizes and decay classes of snags and coarse woody debris present in the project area, prescriptions aiming to maintain a variety of these resources would benefit the suite of species that rely on these habitat components. Additionally conditions within the stand post treatment would reduce the risk of the loss of these snag recruitment trees due to bug infestations or fire. While the proposed harvest could reduce density of snags and their recruits in the near future, the sustainability of snags in the area would increase. Thus, since: 1) harvesting would reduce snag, snag recruitment trees, and coarse woody debris, 2) no changes to human access for firewood gathering would occur, minor adverse direct and indirect effects to snags and coarse woody debris would be anticipated that would affect wildlife species requiring these habitat attributes.

Cumulative Effects of the No-Action Alternative on Snags and Coarse Woody Debris
Snags and coarse woody debris would not be altered in the project area. The species composition of future snags could be altered with changing species composition in the stands due to advances in succession. Snags have been retained during some of the past harvesting in the cumulative effects analysis area. Portions of the cumulative effects analysis area would continue to have minor amounts snags and coarse woody debris. Wildlife species in the cumulative effects analysis area that rely on snags and coarse woody debris would be expected to persist. Thus, since 1) no further harvesting would occur, 2) negligible changes in the numbers of snags, and 3) no change in the level of firewood gathering, no cumulative effects to snags and coarse woody debris quality would be anticipated.

Cumulative Effects of the Action Alternative on Snags and Coarse Woody Debris
Some snags and coarse woody debris could be removed from the project area, while others may be recruited. Conditions within the stand post treatment would reduce the risk of the loss of snag recruitment trees due to fire. While the proposed harvest may reduce density of snags and their recruits in the near future the sustainability of snags in the area would increase. The losses of snags and coarse woody debris associated with this alternative would be additive to the losses associated with past and ongoing harvesting in the cumulative effects analysis area. However, the project requirements to retain a minimum of 2 large snags per acre (>21 in. dbh where they exist, otherwise the next largest size class), 2 large snag recruits per acre (> 21 in. dbh where they exist, otherwise the next largest size class), and 5-10 tons of coarse woody debris per acre would partially mitigate additional cumulative effects associated with this project. Wildlife species that rely on snags and coarse woody debris in the cumulative effects analysis area would be expected to persist at similar levels, albeit slightly lower numbers on proposed harvest sites following treatment. Thus, since: 1) a slight but cumulative amount of the cumulative effects analysis area would be harvested reducing snags and snag recruit trees while increasing sustainability and maintaining or increasing coarse woody debris levels, 2) no change in access for the general public and associated firewood gathering would be anticipated, and 3) there would be slightly increased representation of shade-intolerant species that could become snags in the long term, minor adverse effects to the quality of habitat for wildlife requiring snags and coarse woody debris would be anticipated that would affect these species in the cumulative effects analysis area.

FINE-FILTER ANALYSIS

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and species managed as big game by the Department of Fish, Wildlife, and Parks. ***TABLE W-1 – STATUS OF SPECIES CONSIDERED IN THE FINE FILTER ANALYSIS FOR THIS PROPOSED PROJECT*** summarizes how each species considered was included in the following analysis or removed from further analysis because

suitable habitat does not occur within the project area or proposed activities would not affect their required habitat components.

TABLE W-1 –STATUS OF SPECIES CONSIDERD IN THE FINE FILTER ANALYSIS FOR THIS PROPOSED PROJECT

SPECIES		DETERMINATION - BASIS
Threatened and Endangered Species	Grizzly Bear	***Included*** – The project area is within the mapped "occupied habitat" area (Wittinger,2002). Thus, grizzly bears may potentially occur in the project area.
	Canada Lynx	***Included*** – Potential lynx habitats occur within the project area.
	Gray Wolf	The project area is approximately six miles from the Meadow Peak wolf pack's annual home range. Little or no use of the project area would be anticipated. Thus, no direct, indirect, or cumulative effects to gray wolves would be expected to occur as a result of either alternative.
Sensitive Species	Bald Eagle	The project area is approximately nine air miles from the nearest known bald eagle nest site. Little or no use of the project area would be anticipated. Thus, no direct, indirect, or cumulative effects to bald eagles would be expected to occur as a result of either alternative.
	Black-backed Woodpecker	No recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
	Coeur d'Alene Salamander	No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
	Columbian Sharp-tailed Grouse	No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
	Common Loon	There are no suitable loon habitats within the project area. Thus, no direct, indirect or cumulative effects to common loons would be expected to occur as a result of either alternative.
	Fisher	***Included*** – Potential fisher habitats occur within the project area.
	Flammulated Owl	No flammulated owl habitats occur within the project area. Thus, no direct, indirect or cumulative effects to flammulated owls would be expected to occur as a result of either alternative.
	Harlequin Duck	No suitable high-gradient streams occur within the project area. Thus, no direct, indirect, or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
	Northern Bog Lemming	No suitable sphagnum bogs or fens occur in the project area. Northern bog lemmings are known to occupy bogs within the cumulative effects analysis area. Although occupied bogs are approximately two and five air miles from the project area. As a result these populations would not be expected to be affected by either alternative. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
	Peregrine Falcon	No suitable cliffs/rock outcrops occur within the project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
	Pileated Woodpecker	***Included*** – Potential pileated woodpecker habitats occur within the project area.
	Townsend's Big-eared Bat	No caves or mine tunnels occur in the project area. Townsend's big-eared bats actively roost within the cumulative effects area approximately two air miles from

		the project area. As a result this colony would not be expected to be affected by either alternative. Thus, no direct, indirect, or cumulative effects to Townsend's big-eared bats would be anticipated as a result of either alternative.
Big Game Species	Big Game Winter Range	The project area does not include big game winter range habitats as mapped by MDFWP. Thus, no direct, indirect, or cumulative effects to elk security habitat would be anticipated as a result of either alternative.
	Elk Security Habitat	The project area does not include habitats that are greater than 0.5 miles from an open road or are in patches of dense cover greater than 250 acres size and therefore does not include elk security habitat characteristics (Hillis et al.). Thus, no direct, indirect, or cumulative effects to elk security habitat would be anticipated as a result of either alternative.

THREATENED AND ENDANGERED SPECIES

GRIZZLY BEAR

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

INTRODUCTION

Grizzly bears are native generalist omnivores that use a diversity of habitats found in western Montana and are currently listed as "threatened" under the Endangered Species Act. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. Within the project area, primary habitat components include meadows, riparian areas, and big game winter ranges. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (Mace and Waller 1997). Forest-management activities may affect grizzly bears by altering cover and/or by increasing access to humans into secure areas by creating roads (Mace et al. 1997). These actions could lead to the displacement of grizzly bears from preferred areas and/or result in an increased risk of human-caused mortality by bringing humans and bears closer together and/or making bears more detectable, which can increase their risk of being shot illegally. Displacing bears from preferred areas may increase their energetic costs, which, may in turn, lower their ability to survive and/or reproduce successfully.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the project area. Cumulative effects were analyzed on a 36,282 acre area centered on the project area; this area approximates the home range size of a female grizzly bear.

Analysis Methods

Field evaluations, aerial photograph interpretation, and GIS analysis were the basis for this analysis. Within the cumulative effects analysis area, open road densities were calculated using a simple linear calculation method. Factors considered within this cumulative effects analysis area include level of human disturbance, availability of timbered stands for hiding cover, and miles of open roads.

EXISTING ENVIRONMENT

The proposed project is located approximately two miles east of the Cabinet-Yaak Ecosystem Grizzly Bear Recovery Zone (USFWS 1993) and is included in "occupied habitat" as mapped by grizzly bear researchers and managers to address increased sightings and encounters of grizzly bears in habitats outside of recovery zones (Wittinger, 2002). Therefore, grizzly bears could show up in the proposed project area at any time.

Managing human access is a major factor in management for grizzly bear habitats. Presently, open road densities in the project area (approx. 0.4 miles per square mile; simple linear calculations) are below one mile per square mile.

Although grizzly bears could use the project area at any time, extensive use is unlikely given the moderate levels of human disturbance.

The majority of the cumulative effects analysis area receives moderate levels of human use, while areas closer to the city limits of Libby and private lands experience relatively high levels of human use and associated disturbance. Habitats across the cumulative effects analysis area are a combination of age classes, ranging from recently harvested stands to mature stands. Some agricultural areas and areas of human disturbance occur in the areas closer to Libby on private ownerships. Portions of the cumulative effects analysis area have been harvested recently, while others have seen limited or no harvest in the past. Ongoing harvesting associated with the Six Hills Timber Sale Project on DNRC-managed lands is altering grizzly bear habitats while introducing short-0term disturbance to bears. Human disturbance levels and level of forest harvesting are both closely tied to road access. Motorized access on open roads is relatively high in the cumulative effects analysis area, with an estimated 5.04 miles per square mile (simple linear calculation). No security habitat exists in the project area, and no security habitat exists in the cumulative effects analysis area due to the existing network of open roads. Considerable hiding cover exists within both the project area and cumulative effects analysis area.

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

No direct effects to grizzly bears would be expected. No changes to the level of disturbance to grizzly bears would be anticipated. Foraging opportunities might decline due to the lack of diversity in habitat such as forest edge and younger age-class stands. No changes in open-road densities or hiding cover would be anticipated. Thus, since no changes in available habitats or level of human disturbance would be anticipated, no direct or indirect effects to grizzly bears would be anticipated.

Direct and Indirect Effects of the Action Alternative on Grizzly Bears

This alternative might affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources, should bears occur in the area. Activities in grizzly bear habitats reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area. These disturbances would only be present during harvesting operations. Portions of some units could be harvested from along open roads where disturbance from the open road has already reduced habitat quality. All roads opened under this alternative would be subsequently closed following harvest activities. Overall, the proposed activities would occur in areas where low levels of grizzly bear use would be anticipated and would occur during a limited time frame, leading to negligible disturbance and displacement of grizzly bears.

Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced on much of the 20 acres in the proposed harvest units in the short-term, however it would improve with time as shrub and tree regeneration proceeds. Hiding cover is especially important along open roads and in areas that receive human disturbance. Hiding cover in the form of brush, shrubs, and sub-merchantable trees would be retained along open roads where feasible, and hiding cover throughout the harvested units would be expected to regenerate in 5 to 10 years. Thus, since 1) negligible disturbance and displacement would be anticipated, 2) hiding cover would be lost in the short-term, but would be expected to recovery fairly rapidly, and 3) long-term open road densities would not be altered; minor adverse direct or indirect effects to grizzly bears in the local area would be expected in the short-term.

Cumulative Effects of the No-Action Alternative on Grizzly Bears

Motorized access to the area and open road densities would remain unchanged. Existing forested stands throughout the cumulative effects analysis area would be expected to persist in to the future; regenerating stands are either presently providing hiding cover and forage resources, or would be expected to do so in the near future. Human development and associated disturbance in the portions of the cumulative effects analysis area limits the likelihood of grizzly bear use in those areas; continued moderately high levels of human disturbance in the cumulative effects analysis area would be anticipated. Thus, since 1) no changes in human disturbance levels would be expected, 2) no changes to open road densities would occur, and 3) no further losses of hiding cover would occur, no further adverse cumulative effects would be expected to affect grizzly bears in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative on Grizzly Bears

The increased use of road systems during the proposed project would temporarily increase human disturbance to grizzly bears within a portion of the cumulative effects analysis area, should they occur there. Proposed activities would occur in the portion of the cumulative effects analysis area already experiencing moderate levels of human disturbance, largely associated with open roads and private ownerships, and would be away from the more remote portions of the cumulative effects analysis area that are more likely to be used by grizzly bears. Collectively, minor short-term (2-4years) increases in human disturbance would be anticipated in the cumulative effects analysis area. Continued use of the cumulative effects analysis area by grizzly bears would be anticipated. Reductions in hiding cover (approximately 4%) would be additive to the reductions from past timber harvesting as well as more permanent land-cover changes in the cumulative effects analysis area; however, appreciable amounts of the cumulative effects analysis area are currently providing hiding cover. Early successional stages of vegetation occurring in harvest units could provide foraging opportunities that do not exist in some mature stands. No changes in long-term open-road densities would be expected; a fairly extensive road system would persist and would continue to facilitate human access within the cumulative effects analysis area. Thus, since 1) minor increases in human disturbance levels would be expected within the cumulative effects analysis area, 2) hiding cover would be lost in the short-term on a small portion of the cumulative effects analysis area,but would be expected to recovery fairly rapidly, and 3) no changes in long-term open road densities would occur; minor adverse cumulative effects to grizzly bears would be expected in the short-term (2-4years) and minimal adverse cumulative effects would be anticipated in the long term.

CANADA LYNX

Issue: Timber harvesting and associated activities could remove canopy closure or alter stand conditions, which could result in the reduction or modification of habitat components, leading to a decreased ability for the area to support lynx.

INTRODUCTION

Canada lynx are listed as “threatened” under the Endangered Species Act. Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al. 2000). The proposed project area ranges from approximately 3,680 to 4,720 feet in elevation and is dominated by Douglas-fir, western larch, and mixed conifers. Lynx habitat in western Montana consists primarily of stands that provide habitat for snowshoe hares, either dense, young coniferous stands or dense, mature forested stands. Mature subalpine fir stands with abundant coarse woody debris also provide structure important for denning and cover for kittens, and dense cover used for travel and security. These conditions are found in a variety of habitat types, particularly within the subalpine fir series (Pfister et al. 1977). Historically, high intensity, stand-replacing fires of long fire intervals (150 to 300 years) within continuous dense forests of lodgepole pine, subalpine fir, and Engelmann spruce created extensive even-aged patches of regenerating forest intermixed with old stands that maintained a mosaic of snowshoe hare and lynx habitat.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the project area. Cumulative effects were analyzed on a 36,282 acre cumulative effects analysis area described above. This scale of analysis is sufficient to include the home range of several lynx (Ruediger et al. 2000).

Analysis Methods

To assess lynx habitat, DNRC SLI data were used to map specific habitat classes used by lynx. Lynx habitat (ARM 36.11.403(40)) was assigned to a stand if the SLI data indicated habitat types (Pfister et al. 1977) that are consistent with those reportedly used by lynx (Ruediger et al. 2000). Other parameters (stand age, canopy cover, and amount of coarse woody debris) were used in modeling the availability of the following 5 specific lynx habitat elements:

1) denning,
2) young foraging,
3) mature foraging,
4) forested travel/other habitat, and
5) temporary non-lynx habitats.

Denning habitat provides important vegetative and woody structure needed to provide denning sites and security for juvenile lynx, however, it is not considered limiting for lynx in most forested landscapes in western Montana (USFS Northern Rockies Lynx Amendment ROD 2007). Foraging habitat is important for the survival of both adult and juvenile lynx. "Forested travel/other habitat" is a general habitat category that provides for secondary prey items and contains modest levels of forest structure usable by lynx. Temporary non-lynx habitat consists of non-forest and open forested stands that are not expected to be used by lynx until adequate horizontal cover reestablishes. Factors considered in the analysis include landscape connectivity and the amount DNRC-owned lands within the cumulative effects analysis area in denning, foraging, and unsuitable habitats.

EXISTING ENVIRONMENT

Approximately 633 acres of lynx habitat (*TABLE W-2 – LYNX HABITATS*) occur in the 640 acre project area. Much of this habitat was identified as denning, with lesser amounts of mature foraging and temporary non-lynx habitats.

DNRC-owned habitats make up a small portion (less than one percent) of the cumulative effects analysis area and are dominated by mature foraging habitats with lesser amounts of denning and temporary non-lynx habitats (*TABLE W-2 – LYNX HABITATS*). The lack of fire, including the effects of fire suppression has led to the development and maintenance of mature foraging, and forested travel/other habitats on DNRC lands. Administrative rules of Montana (ARM 36.11.435 (8)(a) & (b)(i)) require a minimum of 5 acres of denning habitats and 10 percent of the lynx habitats on DNRC-managed lands to be in foraging habitats. Currently, DNRC lands within the cumulative effects analysis area are exceed the minimum threshold for both habitat requirements (*TABLE W-2 – LYNX HABITATS*). Ongoing harvesting associated with the Six Hills Timber Sale Project is altering 81 acres of foraging habitats in the cumulative effects analysis area.

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

In the short-term, no changes in lynx habitat elements would be expected in the project area. Forested travel/other habitats within the project area would be expected to remain at similar levels or move into mature foraging or denning habitats in the future as shade-tolerant trees develop in the understory and coarse woody debris accumulates through time due to natural events. Mature foraging habitats would also be expected to remain at similar levels, increase, or move into denning habitat in the future as shade-tolerant trees develop in the understory and coarse woody debris accumulates. Temporary non-lynx habitats would be expected to remain at similar levels or potentially move in to young foraging or forested travel/other habitats in the future depending on natural events. Therefore, in the short term, no effects to lynx would be expected. In the longer-term, without disturbance, mature foraging and denning habitats may increase. Landscape connectivity would not be altered. Thus, since: 1) denning habitat would not be altered, 2) sufficient mature foraging habitat would exist, 3) most of the lynx habitats would be in a usable state for lynx, and 4) landscape connectivity would not be altered, minor beneficial indirect effects to lynx habitats would be expected to occur in the project area .

Direct and Indirect Effects of the Action Alternative on Canada Lynx

Approximately 20 acres of lynx habitats would be harvested with this alternative (TABLE W-3 –CHANGES IN LYNX HABITATS). Within units proposed to receive regeneration type canopy cover and horizontal cover would be removed. These prescriptions would convert available lynx habitat elements into the temporary non-habitat class. Of these acres, the majority of the lynx habitats are denning, with lesser amounts of forested travel/other and temporary non-habitat; after the proposed harvesting, these habitats would either move into or remain as temporary non-lynx habitat. In the proposed units, 5 to 10 tons of coarse woody debris per acre would be retained to provide some horizontal cover and security structure for lynx. In the short-term (approximately two years), lynx would likely avoid proposed harvest units that would be converted to forested travel/other habitats due to timber harvest disturbance. Overall forest connectivity would be reduced; however current landscape connectivity in the area has been compromised through past harvesting activities. Collectively, since: 1) denning habitats would not be altered, 2) sufficient mature foraging habitats would exist, 3) moderate amounts (approximately 30 percent) of lynx habitats would be in the temporary non-lynx habitat category meaning most of the lynx habitats would be in a usable state for lynx, and 4) some further reduction in landscape connectivity would be anticipated, minor adverse direct and indirect effects to lynx habitats that would be expected to affect Canada lynx in the project area for about 20 years following successful regeneration and forest ingrowth into harvest units.

Cumulative Effects of the No-Action Alternative on Canada Lynx
No appreciable change in lynx habitats would occur under this alternative (Table W-4 –CHANGES IN LYNX HABITATS IN THE CUMULATIVE EFFECTS ANALYSIS AREA) except the continued maturation of stands. Some modifications of lynx habitats could be possible with any management that may occur on industrial timberlands and other private lands. Across all ownerships, continued stand maturation, in the absence of other disturbance, would move temporary non-lynx habitat towards young foraging habitat or forested travel/other habitat. No further changes in landscape connectivity would be anticipated due to DNRC activities at this time. Thus, since: 1) denning habitats would not be altered, 2) sufficient mature foraging habitats would exist, 3) young foraging habitats would continue to provide habitat for snowshoe hares outside of DNRC ownership, 4) longer term availability of young foraging habitats would likely decline without disturbance, 5) temporary non-lynx habitats will continue to mature and move into habitats suitable for lynx use, and 6) landscape connectivity would persist, minor beneficial cumulative effects to lynx habitats would be expected to affect Canada lynx in the cumulative effects analysis area for 20-40 years.

Cumulative Effects of the Action Alternative on Canada Lynx
Within the cumulative effects analysis area, lynx habitats would continue to persist (TABLE W-4 –CHANGES IN LYNX HABITATS IN THE CUMULATIVE EFFECTS ANALYSIS AREA). Reductions in denning and mature foraging habitats in the proposed units would not be expected to appreciably alter lynx use of the cumulative effects analysis area. These reductions and the subsequent increase in temporary non-lynx habitats would be additive to existing temporary non-lynx habitats that exist in the cumulative effects analysis area. Following the proposed harvesting, sufficient foraging habitats would be retained (TABLE W-4 –CHANGES IN LYNX HABITATS IN THE CUMULATIVE EFFECTS ANALYSIS AREA) to satisfy DNRC's commitment (ARM 36.11.435) of retaining 10 percent mature foraging or young foraging and 5 acres of denning habitats in the cumulative effects analysis area. Additionally some modifications of lynx habitats could be possible with any management that may occur on other ownerships in the cumulative effects analysis area. Across all ownerships, continued stand maturation would move habitats towards forested travel/other, mature foraging, and denning habitats and away from the young foraging stage, which would decrease habitat quality for snowshoe hares, thereby possibly reducing the availability of prey for lynx in the long-term. Landscape connectivity would be further reduced with the proposed activities (see WILDLIFE- LANDSCAPE CONNECTIVITY). Thus, since: 1) minor amounts of denning habitats would be affected, 2) sufficient mature foraging habitats would exist, 3) young foraging habitats would continue developing for the next 20-50 years across the cumulative effects analysis area, and 4) there may be some reductions in landscape connectivity, minor adverse cumulative effects to lynx habitats would be expected to affect Canada lynx in the cumulative effects analysis area.

TABLE W-2 – LYNX HABITATS. Existing acres and proportions of lynx habitat elements on DNRC lands in the project area, and cumulative effects analysis area.

	PROJECT AREA		CUMULATIVE EFFECTS ANALYSIS AREA	
LYNX HABITAT ELEMENT	ACRES	PERCENT OF LYNX HABITATS	ACRES	PERCENT OF LYNX HABITATS
Denning	222	35	222	22
Mature foraging	153	24	680	30
Forested travel/other	88	14	549	24
Young foraging	0	0	19	1
Temporary non-habitat	170	27	765	34
Grand Total-Lynx Habitats	633	100	2,235	100
Permanently	7		7,231	

Unsuitable				
Total Acres	**Total Acres**	640		9,466

TABLE W-3 –CHANGES IN LYNX HABITATS-Acreage changes in lynx habitat elements following implementation of the alternatives considered.

CHANGES TO LYNX HABITATS	**ALTERNATIVES**	
	A	**B**
Denning habitat converted to temporary non-habitat	0	12
Mature foraging habitat converted to temporary non-habitat	0	1
Forested travel/other habitat converted to temporary non-habitat	0	7
Total increase in temporary non-habitat	0	20
Total lynx habitat affected	0	20

TABLE W-4 –CHANGES IN LYNX HABITATS IN THE CUMULATIVE EFFECTS ANALYSIS AREA. Acres of lynx habitats after each alternative and proportion each suitable habitat represents out of all suitable lynx habitats on DNRC managed lands in the cumulative effects analysis area.

		Alternative A	Alternative B
Lynx Habitat		Cumulative Effects Analysis Area	Cumulative Effects Analysis Area
Denning	Acres post-treatment	222	210
	percent of lynx habitats	**22%**	**21%**
Foraging	Acres post-treatment	680	679
	percent of lynx habitats	**30%**	**30%**
Forested Travel	Acres post-treatment	549	542
	percent of lynx habitats	**24%**	**24%**
Temporary Non-Lynx Habitats	Acres post-treatment	765	785
	percent of lynx habitats	**34%**	**35%**
Total Lynx Habitats	Acres post-treatment	2,235	2,235
Permanently Unsuitable		7,231	7,231
Total Analysis Area		9,466	9,466

SENSITIVE SPECIES

When conducting forest-management activities, the SFLMP directs DNRC to give special consideration to sensitive species. These species may be sensitive to human activities, have special habitat requirements, are associated with habitats that may be altered by timber management, and/or may, if management activities result in continued adverse impacts, become listed under the federal Endangered Species Act. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful “fine filter” for ensuring that the

primary goal of maintaining healthy and diverse forests is met. As shown in ***TABLE W-1 - STATUS OF SPECIES CONSIDERD IN THE FINE FILTER ANALYSIS FOR THIS PROPOSED PROJECT***, the sensitive species portion of this analysis will focus on fishers and, pileated woodpeckers.

FISHER

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

INTRODUCTION

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

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the project area. Cumulative effects were analyzed on the 36,282 acre cumulative effects analysis area described above. This scale includes enough area to approximate overlapping home ranges of male and female fishers (Heinemeyer and Jones 1994).

Analysis Methods

To assess potential fisher habitat and travel cover on DNRC managed lands in the cumulative effects analysis area, sawtimber stands within preferred fisher cover types (ARM 36.11.403(60)) below 6,000 feet in elevation with 40 percent or greater canopy closure were considered potential fisher habitat. DNRC manages preferred fisher cover types within 100 feet of Class 1 and 50 feet of Class 2 streams, so that 75 percent of the acreage (trust lands only) would be in the sawtimber size class in moderate to well-stocked density (ARM 36.11.440(1)(b)(i)). Direct and indirect effects were analyzed using field evaluations and GIS analysis of potential habitat. Cumulative effects were analyzed using field evaluations and GIS analysis of potential habitat and aerial photograph interpretation of potential habitat on all other lands within the cumulative effects analysis area. Factors considered include amount of suitable fisher habitats, landscape connectivity, and human access. Snags and coarse woody debris were visually assessed during site visits and reviewing past DNRC harvesting information. Factors considered within the analysis include the level of harvesting, number of snags, relative amounts of coarse woody debris, and risk level of firewood harvesting.

EXISTING ENVIRONMENT

The project area ranges from 2,840 to 3,840 feet in elevation, with approximately 0.5 miles of perennial streams and at least another 1.0 miles of intermittent streams. DNRC manages preferred fisher cover types within 100 feet of Class 1 and 50 feet of Class 2 streams, so that 75 percent of the acreage (trust lands only) would be in the saw-timber size class in moderate to well-stocked density (ARM 36.11.440(1)(b)(i)). Approximately 25 acres are in these riparian areas in the project area along the 1.5 miles of Class 1 and 2 streams. Modeling fisher habitats using SLI data generated an estimate of 374 acres of fisher foraging, resting, denning, and travel habitats (349 upland acres and 25 riparian acres) in the project area (Heinemeyer and Jones 1994). Within the riparian areas, a large portion of the preferred fisher cover types (21 acres, or 84 percent) are moderately or well-stocked and likely support the structural features necessary for use as fisher resting and denning habitats in addition to serving as travel habitats and maintaining landscape connectivity. This exceeds the threshold of 75 percent as established by ARM 36.11.440. During field visits, approximately 0 to 6 variably spaced snags per acre and approximately 30-40 tons of coarse woody debris per acre were observed in the project area.

Within the cumulative effects analysis area there are roughly 1,472 acres within 100 feet of the 61 miles of perennial streams and 50 feet of the 111 miles of intermittent streams. Within the riparian habitats on DNRC-managed lands in the cumulative effects analysis area, roughly 85.5 percent (105 of 123 acres) of the area in preferred fisher covertypes presently provides structural features necessary for use as fisher resting and denning habitats, which exceeds the required threshold of 75 percent. Additionally, roughly 3,154 acres of upland fisher habitats exist on DNRC-managed lands in the cumulative effects analysis area. Preferred fisher covertypes occur across portions of the cumulative effects analysis area; suitable habitats likely occur on a smaller subset of those lands. The network of open roads in the cumulative effects analysis area coupled with timber management in the past 40 years has reduced landscape-level connectivity. The Six Hills Timber Sale Project on DNRC-managed lands is altering approximately 63 acres of upland fisher habitats in the cumulative effects analysis areas; timber harvesting could continue on other lands within the cumulative effects analysis area. Across the cumulative effects analysis area, landscape connectivity has been compromised, but some connectivity, particularly along streams and riparian features has been partially retained.

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

No effects to fishers would be expected under this alternative. Little change to the stands providing fisher denning and foraging habitats would be expected. Human disturbance and potential trapping mortality would expect to remain similar to current levels. No changes in landscape connectivity would occur. Thus, since: 1) no changes to existing habitats would be anticipated, 2) landscape connectivity would not be altered, 3) no appreciable changes to snags, snag recruits, and coarse woody debris levels would be anticipated, and 4) no changes to human access or potential for trapping mortality would be anticipated, no direct and indirect effects would affect fishers in the project area.

Direct and Indirect Effects of the Action Alternative on Fishers

None of the riparian habitats within the project area would be included in the proposed units. Approximately 11of the 349 acres (3percent) of upland fisher habitats in the project area would receive treatments that would likely yield stands too open for appreciable fisher use. Following harvest, motorized human access would be expected to return to pre-harvest levels. Minor reductions in connectivity would be expected (see WILDLIFE- MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY). Approximately, 5-10 tons of coarse woody debris per acre would be retained in the proposed units. Thus, since: 1) harvesting would reduce or remove some) upland fisher habitats, 2) minor reductions in landscape connectivity would occur, 4) harvesting would reduce snag and coarse woody debris levels, however some of these resources would be retained, and 5) motorized human access levels would remain unchanged, minor adverse direct and indirect effects would be anticipated that would affect fisher in the project area.

Cumulative Effects of the No-Action Alternative on Fishers

Fisher denning and resting habitats would be retained. Suitable fisher foraging, denning, and resting habitats occur across the cumulative effects analysis area. No changes in forest connectivity would be anticipated; however current landscape connectivity in the area has been compromised through past harvesting activities. Road access within the cumulative effects analysis area would not appreciably change; therefore, fisher vulnerability to trapping would remain unchanged. Thus, since: 1) no changes to existing habitats on DNRC ownership would occur, 2) landscape connectivity afforded by the stands on DNRC ownership would not appreciably change, 3) no changes to snags, snag recruits, or coarse woody debris levels would be expected, and 4) no changes to human access or potential for trapping mortality would be anticipated, no further cumulative effects to fishers would be anticipated in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative on Fishers

Potential riparian fisher habitats in the cumulative effects analysis area would not be harvested under this alternative. Thus, no change from the 100% of riparian habitats on DNRC-managed parcels in the cumulative effects analysis area would be anticipated. Roughly 11 acres of the 3,152 acres (less than 1 percent) of potential fisher foraging and travel habitats in the uplands would be harvested. These reductions would be additive to the losses associated with past timber harvesting in the cumulative effects analysis area, including the 63 acres of upland fisher habitats that are being removed with the Six Hills Timber Sale Project as well as any ongoing harvesting on other ownerships. Overall forest connectivity would be reduced; however current landscape connectivity in the area has been compromised through past harvesting activities. Once the proposed harvesting is

completed human disturbance would be expected to return to pre-harvest levels. Thus, since: 1) harvesting would remove upland fisher habitats, but considerable upland habitats would persist, 2) no changes to preferred cover types or fisher habitats associated with the riparian areas in the cumulative effects analysis area would be anticipated, 3) negligible reductions in landscape connectivity would be anticipated, 4) harvesting would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces, 5) no changes to motorized human access would occur, minor adverse cumulative effects would be anticipated that would affect fisher in the cumulative effects analysis area.

PILEATED WOODPECKER

Issue: Timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers.

INTRODUCTION

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

Analysis Area

Direct and indirect effects were analyzed for activities conducted within the project area. Cumulative effects were analyzed on the on the 9 surrounding sections and the project area (approx 5,760 acres). This scale includes enough area to support multiple pairs of pileated woodpeckers if enough suitable habitat is present (Bull and Jackson 1995).

Analysis Methods

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

EXISTING ENVIRONMENT

In the project area, potential pileated woodpecker nesting habitat exists on approximately 222 acres that are dominated by mixed conifers. Large live and dead trees are fairly common within the project area. Large (>21 inch dbh) western larch and ponderosa pine, which could become suitable nesting sites, exist within the project area, and existing Douglas-fir/western larch stands are likely providing foraging habitats.

Similar to the project area, nesting habitats within the cumulative effects analysis area are dominated by mixed conifer cover types. Within the cumulative effects analysis area, extensive harvesting has occurred in the past, which has fragmented the contiguous forest to a degree. However in the more recent past, stands have been managed for mature western larch and western white pine, snags, and snag-recruit trees, which benefit pileated woodpeckers in the long-term.

<u>Direct and Indirect Effects of the No-Action Alternative on Pileated Woodpeckers</u>

No disturbance to pileated woodpeckers would occur that might impact nesting pileated woodpeckers. Forest succession and natural disturbance agents would continue to bring about changes in existing stands. Trees would continue to grow, mature, and die, thus providing potential nesting and foraging structure for pileated

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

Direct and Indirect Effects of the Action Alternative on Pileated Woodpeckers

Pileated woodpeckers tend to be tolerant of human activities (Bull and Jackson 1995), but might be temporarily displaced by the proposed harvesting. Under this alternative 10 acres of pileated woodpecker habitat would be harvested. Harvesting these 10 acres would reduce the continuously forested habitats available for pileated woodpeckers. Elements of the forest structure important for nesting pileated woodpeckers, including snags (a minimum of 2 snags > 21 inch dbh per acre where they exist and would be expected to persist), coarse woody debris (5 to 10 tons per acre), numerous large trees, and snag recruits (a minimum of 2 trees per acre >21 inch dbh where they exist) would be retained in the proposed units. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979), near-term habitat quality in the project area would be expected to be reduced on 20 acres. Thus, since: 1) harvesting would reduce the amount of continuous forested habitats available, 2) potential nesting and foraging habitats would be reduced, 3) several snags and snag recruits per acre would be removed; however mitigation measures to retain a minimum of 2 snags per acre and 2 snag recruits per acre would be included, and 4) harvest prescriptions would promote seral species in the proposed units, minor adverse direct and indirect effects would be anticipated that would affect pileated woodpeckers in the project area.

Cumulative Effects of the No-Action Alternative on Pileated Woodpeckers

No disturbance to pileated woodpeckers would occur. Trees would continue to grow, mature, and die, thus providing potential nesting and foraging structure for pileated woodpeckers. Individuals utilizing the cumulative effects analysis area would be expected to continue to do so. Any ongoing harvesting would continue to remove potential pileated woodpecker habitats while reducing the amount of the cumulative effects analysis area that would be in mature, forested cover types. Thus, since: 1) no further changes to existing habitats would occur, 2) no further changes to the amount of continuously forested habitats available for pileated woodpeckers would be anticipated, and 3) long-term, succession-related declines in the abundance of shade-intolerant tree species would occur, which are valuable to pileated woodpeckers, no cumulative impacts to pileated woodpeckers would be anticipated in the short-term (0-20 years), but slight adverse cumulative to pileated woodpeckers in the cumulative effects analysis area would be expected over the longer term (>50 years).

Cumulative Effects of the Action Alternative on Pileated Woodpeckers

Pileated woodpecker habitat would be temporarily removed on 10 acres, while future development on the other 10 acres would be further postponed. Snags, coarse woody debris, and some potential nesting trees would be retained within the project area and, future recruitment of these attributes would be enhanced through the retention of some large snag recruits. Recently harvested stands within the cumulative effects analysis area have reduced pileated woodpecker habitats as well. The loss of pileated woodpecker habitats under this alternative would be additive to habitat losses associated with past harvesting on the cumulative effects analysis area; continued widespread use would be expected. Additionally, continued maturation of stands across the analysis area is increasing suitable pileated woodpecker habitats. Thus, since: 1) harvesting would reduce the amount of continuous forested habitats available in the cumulative effects analysis area, but forested habitats would persist; 2) in the short-term (20-50 years), habitat quality of potential nesting and foraging habitats would be reduced, but habitats would persist in the cumulative effects analysis area; 3) several snags and snag recruits per acre would be removed in the proposed units, however, mitigation measures would retain some of these attributes in several of the units; and 4) harvest prescriptions would promote seral species in the proposed units, overall minor adverse cumulative effects would be anticipated that would affect pileated woodpeckers in the cumulative effects analysis area.

Wildlife Mitigations

- Consult a DNRC biologist if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing Threatened and Endangered Species (ARM 36.11.428 through 36.11.435) are needed.
- Manage for snags, snag recruits, and coarse woody debris according to ARM 36.11.411 through 36.11.414, particularly favoring western larch, ponderosa pine, Douglas-fir, and western white pine.
- Favor western larch and ponderosa pine in retention and regeneration decisions for pileated woodpecker and nesting and foraging habitats.
- Effectively close roads after the proposed activities to reduce the potential for unauthorized motor vehicle use and/or loss of snags to firewood gathering and use temporary roads wherever possible.
- Use a combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while operating on restricted roads.

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VEGETATIVE ANALYSIS
FOR THE
CRAZYMAN TIMBER SALE

INTRODUCTION

This analysis is designed to disclose the existing condition of the vegetative resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, the following vegetative issues were identified from internal and external comments regarding the effects of proposed timber harvesting:

- Timber harvesting could rectify the imbalance of species composition, age distribution and stand health.
- Timber harvesting could affect any identified sensitive, threatened, or endangered species.
- Timber harvesting and associated activities could cause the spread of noxious weeds.

The following sections disclose the anticipated indirect, direct and cumulative effects to these vegetative resources in the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships within each analysis area have been taken into account for the cumulative effects analysis.

ANALYSIS AREA

In this section the discussions will focus on 2 areas of different scale. The first will be the "project area", which consists of the state managed portion of section 36 in T29N R31W. The parcel ranges from 2,800 to 3,840 feet elevation and is largely on a northeastern aspect with slopes of varying steepness to flat. The parcel is dominated by Douglas-fir/western larch and mixed Ponderosa pine habitats with lesser amounts cottonwood and Western white pine. The second scale or the "analysis area" relates to the surrounding landscape of the Libby Unit for assessing cumulative effects.

ANALYSIS METHODS

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

To assess the existing condition of the proposed project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, Stand Level Inventory (SLI)

data, aerial photographs, Montana Natural Heritage Program data, and consultations with other professionals provided information for the following discussion and effects analysis.

A. Existing Forest Conditions

The State Forest Land Management Plan (SFLMP) directs DNRC to promote biodiversity by taking a coarse filter approach thereby favoring an appropriate mix of stand structures and compositions on State land. Components used to describe an appropriate mix of stand conditions at the landscape level include cover type proportions, age class distributions, stand structural characteristics, and the spatial relationships of stands- i.e. size and location on the landscape.

1. Libby Unit (landscape level) Cover Types

Estimate of current and desired future conditions were determined at the Landscape level for the entire Libby Unit in 2009. Desired future conditions are based on the historically occurring cover types in Montana described by Losensky (1997) and are determined for each stand identified in the DNRC's SLI by the site-specific model described in ARM 36.11.405. The Libby Unit's Inventory (SLI) was used to compare present (current) conditions to desired future conditions for this landscape in regards to amount and distribution of cover types. Table 1 displays this information:

Table 1: Current and Desired Future Conditions for the Libby Unit

Cover Type	Current Cover Type (Acres)	Desired Future Conditions (Acres)	Current Type Minus (–) Desired Future Cond.
DF	1,358	260	1,098 acre surplus
HW	228	211	17 acre surplus
LP	686	182	504 acre surplus
MC	3,984	370	3,614 acre surplus
PP	13,675	18,874	5,199 acre deficit
SUBALP	472	52	420 acre surplus
WL/DF	9,117	8,848	269 acre surplus
WWP	604	1,693	1,089 acre deficit
OTHER	695	329	366 acre surplus
TOTAL	30,819	30,819	

DF=Douglas-fir, HW=hardwood, LP=Lodgepole, MC=Mixed conifer, PP=Ponderosa pine, WL/DF=Western larch/Douglas-fir, WWP=Western white pine, SUB/ALP=subalpine fir, Other=nonstocked. The Current Type minus Desired Future Conditions above lists the excess and deficit (-) acres for each cover type.

The PP and WWP cover types are not as well represented within the Libby Landscape compared to desired future conditions. Most notable, is the conversion of over 5,199 acres from the PP cover type, over the last 100 years, to the present over abundance of the MC, LP, WL/DF and DF cover types.

This cover type shift is typical for Northwest Montana and it does represent a change in stand conditions. Active fire suppression initiated in the early 1900's has interrupted wildfire frequencies and intensities in conjunction with 50 years or more of logging practices that favored the removal of commercially valuable western larch (*Larix occidentalis*), ponderosa pine (*Pinus ponderosa*), western white pine (*Pinus monticola*) and Douglas-fir (*Pseudotsuga menziesii*) for railroad ties, mining timbers, and construction lumber. Many open, mature stands dominated by western larch and other seral species with even-aged patches of immature seral trees in the understory have been replaced with more densely stocked stands in both the overstory and understory that includes a higher percentage of more shade tolerant trees such as, grand fir (*Abies grandis*), Engelmann spruce (*Picea engelmannii*) and western hemlock (*Tsuga heterophylla*).

2. Crazyman Timber Sale (project area) Cover Types

The Crazyman Timber Sale project area comprises 640 acres (~2%) of the Libby Unit landscape. Stand level inventory (SLI) data specific to project area in Section 36, T29N, R31W is summarized below for cover types and age class distribution. Site review observations and stand measurements were used to update, confirm or refine the SLI data for this section.

Table 2 displays current and appropriate cover types for the CrazymanTimber Sale project area. The project area reflects the forest cover type shift similar to the landscape level, as species compositions are trending towards shade tolerant species dominating the composition of theses timber stands.

Table 2: Current and Desired Future Conditions for the Crazyman Timber Sale Project Area (Section 36, T29N, R31W)

Cover Type	Current Cover Type (Acres)	Desired Future Conditions (Acres)	Current – DFC (Acres)
DF			
HW	104	32	72 acre surplus
LP	45	0	45 acre surplus
MC	38	0	38 acre surplus
PP	126	27	99 acre surplus
SUB/ALP			
WL/DF	222	56	166 acre surplus
WWP	98	518	420 acre deficit
OTHER			
TOTAL	633	633	

DF=Douglas-fir, HW=hardwood, LP=Lodgepole, MC=Mixed conifer, PP=Ponderosa pine, WL/DF=Western larch/Douglas-fir, WWP=Western white pine, SUB/ALP=subalpine fir, Other=nonstocked. The Current Type minus Desired Future Conditions above lists the excess and deficit (-) acres for each cover type.

3. Crazyman Timber Sale Stand History

Records show that there have been various timber sales from 1922 to 1997 in various portions of the project area. The stand cover in the early 1900's was generally WL/DF and PP. Over time, stands have gradually converted to a MC type. With this gradual conversion to MC, the stand health has deteriorated significantly over the last 30 years due to insects and disease, causing a high rate of mortality in the grand fir and Douglas-fir. The most recent timber sale treatments have begun to move some stands closer to the PP and WWP cover types.

4. Libby Unit (landscape level) Age Class Distribution

The Libby Unit's Stand Level Inventory (SLI) 2009 version was used to summarize the estimated age class distribution for current cover types. Table 3 displays this information.

Table 3: Libby Unit Age Class Distribution by Current Cover Type

Sum of Acres in Age Class Groups (years):								
	No Age Data	Non Forested	00 - 39	40 - 99	100 – 149	150 +	Old Growth	**Total**
DF				59	269	1,012	19	**1,358**
HW			72	115	41			**228**
LP			385	279			22	**686**
MC			199	769	1,515	929	572	**3,984**
NonFor		246						**246**
NonStkd			364					**364**
PP			3,156	2,910	3,720	3,345	544	**13,675**
PP-NC						13		**13**
SUBALP			103		134	181	54	**472**
WL/DF			397	1,794	2,757	2,726	1,442	**9,117**
WWP			417		50	137		**604**
Total		**246**	**5,093**	**5,926**	**8,486**	**8,343**	**2,653**	**30,747**

5. Crazyman Timber Sale (project area) Age Classification Distribution

Table 4: Displays the estimated age class distribution for the Flower Creek project area from SLI observations.

Table 4: Crazyman Timber Sale Age Class Distribution by Current Cover Type

	00 - 39	40 – 99	100 – 149	150 +	**Total**
HW	72	32			**104**
LP		45			**45**
MC		11		27	**38**
PP				126	**126**

WL/DF				222	**222**
WWP	98				**98**
Total	**170**	**88**		**375**	**633**

6. Old Growth

In Historical Vegetation of Montana under Age Structure of Natural Stands it is noted that, "The final category (150+ years) represents a pool of acres of old aged trees, a portion of which may be considered old growth stands. The actual acres which may be considered old growth are somewhat elusive in that our understanding of the concept of old growth is limited and not rigidly defined by nature." It is recognized that stand age is an important criteria for determining old growth but would not realistically determine old growth acreage if used as the sole parameter. The Northern Region USFS publicized their effort to characterize old growth forest communities by cover type in a 1992 Internal Report: *Old-Growth forest Types of the Northern Region,* by P. Green, J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann.

As per the State Land Board's decision in February, 2001, the DNRC adopted definitions for old growth by cover types, based on minimum number and size of large trees per acre and age of those trees as noted in *Old-Growth Forest Types Of The Northern Region.* Older stands within proposed project areas would be assessed for determining actual acreage that meet DNRC's old growth definitions. Old growth will be managed to meet biodiversity and fiduciary objectives in the SFLMP, pursuant to state law and the Forest Management rules, ARM 36.11.401 through 36.11.450.

No stands within the project area met the criteria for DNRC's old growth definitions.

7. Crazyman Timber Sale Stand Characteristics

Stand characteristics helpful in describing existing stand conditions are summarized below in Table 6.

Table 6: General Stand Characteristics for the Crazyman Timber Sale Project Area.

Stand #	Acres	Current – Desired FC	Habitat Type	Stocking BFBA	Structure	Species Composition
1	205.7	WL/DF	THSE/CLUN	170	Multi	D4,L3,WH2,C0
2	114.9	PP	THPL/CLUN	140	Multi	D4,L3,P2,GF0
3	15.8	WL/DF - WP	TSHE/CLUN	90	Multi	L4,D3,GF2,P0
4	31.6	HW	PICEA-EQAR	120	Multi	CO4,A4,C0
5	44.5	LP	ABGR/XETE	10	Two	LP6,L2,D0,GF0
6	11.4	MC	ABGR/LIBO	10	Multi	LP4,D2,GF2,C1
7	72.4	HW	TSHE/CLUN	0	Two	CO4,L2,WP1,GF1
8	58.3	WWP	THPL/CLUN	0	Two	P6,L2,WP1,D0
9	39.6	WWP	THPL/CLUN	0	Two	P2,WP2,L2,LP2

10	10.8	PP	THSE/CLUN	100	Multi	D4,GF2,P2,L1
11	26.9	MC	THPL/CLUN	140	Multi	C5,GF2,D2,WH0

Harvest activities will be taking place in stands that are shade in the table. Current – Desired FC: this column shows current and appropriate cover types are the same if followed by = sign. Stocking: BFBA = board foot per acre divided by the square feet of basal area per acre in trees 9" or greater in diameter at breast height. Structure: single represents even-aged, single storied stands; Multi represents 2 or 3 storied stands with even aged patches of various age classes. Species composition: A=subalpine fir, BP=immature ponderosa pine, C=western redcedar, D=Douglas-fir, GF=grand fir, L=western larch, LP=lodgepole pine, WP=white pine. Following numbers estimate percent of species compositions in the overstory, where 0 is less that 10% and 8 would represent 80 to 89%

8. Crazyman Timber Sale stand health and vigor

Overall stand vigor is rated as "poor" for the stands and acreage that have not been recently harvested in this section. Salvage efforts have been made to capture the value of dead and dying grand fir, Douglas-fir, and western larch. Outbreaks of the Douglas-fir beetle (*Dendroctunus pseudotsugae*), Fir Engraver beetle (*Scolytus ventralis*), Dwarf mistletoe *(Arceuthobium laricis*), and root rots have and continue to negatively affect stand health and vigor.

9. Adjacent Lands' general forest conditions

Private industrial timberlands border this section to the South. US Forest Service lands border this land also to the south, as well as West and Northeast. Small private ownership borders this section's north and east sides. The private industrial land south of the project area was likely logged in within the last 10 years, the USFS has had little management activity history. The small private ownership has been harvested, and is currently grazed, or is being converted to residential dwellings.

B. Sensitive, Threatened, and Endangered Plants – existing condition

A review of the records from the Montana Natural Heritage Program indicated no plant species of special concern identified with the project area.

C. Noxious Weeds – existing condition

Lincoln County and DNRC have a "Cooperative Integrated Noxious Weed Management Agreement" in compliance with the state law known as the County Weed Control Act (Section 7-22-2151, MCA). An annual coordination meeting between the county Weed Control District and DNRC allows for identification of weed problems; and determines an integrated approach at managing and treating priority areas as related to county and DNRC weed control goals.

At the landscape level, past activities have had a big impact on noxious weed populations. Land use activities such as logging, road building, livestock grazing, wildfires, and recreation have led to increases in the amount and distribution of noxious weeds on the Libby Unit. This has occurred at the project area level as well. In the county, tansy ragwort and rush skeletonweed

have been identified as a target control species. These species have not been observed within the project area. Spotted knapweed and hawkweed have been observed along road edges of the project area.

D. Effects Project Actions:

1. Proposed Project Actions:

a.) Harvest/Logging:
Unit 1: 20 acres of seedtree harvest with ground base logging equipment

b.) Roads:
~0.25 mile of new, temporary road construction

c.) After harvest treatments:
Unit 1: Slash would be treated to compliance with the Montana State Hazard Reduction Law.

d.) Silvicultural treatment requirements for implementation:
Unit 1: Leave 5-10 trees per acre, favoring PP, WL, WWP & DF

2. Effects on Cover Type and Age Class Distribution:

a.) Direct and Indirect Effects

1. *NO ACTION:* Short term effects are not anticipated with the no action alternative. In the long term, the general trend of increasing percentages of shade tolerant species in stand species composition would continue without disturbance, increasing the acreage of Mixed Conifer and Douglas-fir cover types and moving the project area further away from desired future condition cover types. Fuel loading would be expected to increase and stands would become more susceptible to a stand replacement fire.

2. *ACTION ALTERNATIVE:* Harvesting according to the silvicultural prescriptions would result in the conversion of approximately 20 acres of the Mixed Conifer cover type to the Western white pine cover type (refer to Tables 1 & 2), moving the distribution of cover types in the project area closer toward desired future conditions. Approximately 20 acres would be shifted from older age classer to the 0-39 year age class as a result of timber harvesting.

b.) Cumulative Effects:

1. *NO ACTION ALTERNATIVE*: Without disturbance, the no action alternative would allow the trend of increasing acreages and densities of shade tolerant species to continue. The number of acres with desirable seral species would continue to decline.

2. *ACTION ALTERNATIVE*: Since the project area comprises approximately 2% of the Libby Unit landscape the magnitude of effects would be minimal. The action alternative would contribute to moving stand conditions towards more historical condition by decreasing the excess of MC cover type acres by ~20 acres and returning those acres to the historical PP, or WWP cover types. The action alternative would increase the proportion of forested acres in the 0-39 year age class on state lands with the conversion of approximately 20 acres from older age classes.

3. Effects on other forest stand characteristics, health and vigor

a.) Direct and Indirect Effects:

1. *NO ACTION ALTERNATIVE*: Forest stands would continue to grow and develop without disturbance. Growth rates are likely to decline or become static without density control, and stand susceptibility to insects and disease would increase. Defect from stem decays in grand fir and western larch would slowly affect currently infected trees and spread to other trees, decreasing timber yield potential. Overall stand vigor would decline slowly as trees age and mature. Tree regeneration in canopy gaps or under poorly stocked upper canopies would be dominated by shade tolerant species, further diminishing the proportion of ponderosa pine in stand compositions

2. *ACTION ALTERNATIVE*: Under this alternative 20 acres would be harvested, leaving seed trees and snags. This harvest would be a stand replacing treatment where PP and WWP would be naturally regenerated or planted. The action would result in an improved health and vigor of the stand and a reduction of fuels. The less desirable climax species that currently occupy the site would be replaced with more desirable seral species, thus promoting more historic species compositions. The remaining 620 acres would not be managed.

b.) Cumulative Effects:

1. *NO ACTION ALTERNATIVE*: Forest stands within this section would continue to develop, retaining a larger proportion of the surrounding landscape in older, denser forest stands.

2. *ACTION ALTERNATIVE*: 20 acres would receive silvicultural treatments, increasing the acreage of open canopied forest and young, newly established forest in the surrounding landscape. On the remaining 620 acres, stands would continue to grow and develop with the benefit of a decrease in the prevalence of insects and disease within the project area, resulting from management in the 20 acre stand.

4. Effects on Noxious Weeds:

a.) Direct and Indirect Effects:

1. *NO ACTION ALTERNATIVE:* Ground disturbing activities associated with timber harvesting and road maintenance or construction would not occur. Populations of spotted knapweed and Hawkweed would increase in size and distribution along roads. As weed control priorities and funding allows under County Cooperative Weed Control Agreements, spaying along roads may occur within the next 5 years to contain or decrease existing weed populations.

2. *ACTION ALTERNATIVE:* Timber harvesting and road construction activities would expose mineral soil and could promote encroachment and spread of noxious weeds into the forest stands. In order to control and minimize the risk of increasing noxious weed populations, contract clauses would require the timber sale purchaser to: 1.) apply grass seed on areas with soil exposed from road construction or maintenance activities, 2.) wash and clean off-road equipment so it is free of weed parts and have it inspected prior to moving onto site; and 3.) incorporate slash into skid trails or apply grass seed to heavily used trails that have soil exposed. The proposed harvest area and project area roads would be monitored for noxious weed activity. If necessary, treatments including herbicide and, or biological control methods would be implemented for appropriate noxious weed control.

b.) Cumulative Effects:

1. *NO ACTION ALTERNATIVE:* Current noxious weed populations would continue to spread or new weed populations would invade the general area at the current rate given continuance of road and land uses.

2. *ACTION ALTERNATIVE:* The risk of additional noxious weed encroachment or invasion is higher under the alternative. Mitigations discussed above have been effective in containing or controlling noxious weed populations.

SUMMARY OF MITIGATIONS INCORPORATED IN TO THE CRAZYMAN TIMBER SALE

Soil Resource Mitigations:

1. Ground based logging equipment would be restricted to periods when soil moisture is dry, or the ground is frozen or snow covered to minimize compaction, displacement, and erosion.
2. Slash would be retained and distributed on site to contribute nutrients to the soil.
3. Coarse woody debris would be retained on site for maintaining soil productivity.
4. Slash would be trampled and incorporated into skid trails for erosion control.

Water Resource Mitigations:

1. Streamside Management Zones (SMZs) 50 to 100 feet in width (dependant on slope and benches) would be marked along all streams. Harvesting would be minimal within the SMZs.
2. Road surface drainage and erosion control features would be added or improved on existing roads and installed as part of the road construction to reduce erosion rates and reduce the risk of sediment delivery.
3. Grass seed and fertilizer would be applied to newly disturbed culvert installation sites and road cuts and fills to stabilize erodable slopes and minimize sediment production.
4. Temporary roads would be reclaimed after harvest activities are complete.

Vegetation Resource Mitigations:

1. Larger diameter snags will be protected as needed to assure retention of 2 snags per acre on average in all units where available.
2. Ponderosa pine, western larch, western white pine and Douglas-fir would be favored leave trees.
3. To deter further establishment of noxious weeds along roads, grass seed and fertilizer would be applied to areas with soil exposed during road construction and maintenance activities.
4. To minimize noxious weed invasion away from roads, “off road” logging equipment would be inspected and required to be free of weed parts prior to moving onto the site.
5. Grass seed would be applied or slash incorporated into heavily used trails with bare soil exposed to limit establishment of noxious weeds.

Wildlife Resource Mitigations:

- Consult a DNRC biologist if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing Threatened and Endangered Species (ARM 36.11.428 through 36.11.435) are needed.
- Manage for snags, snag recruits, and coarse woody debris according to ARM 36.11.411 through 36.11.414, particularly favoring western larch, ponderosa pine, Douglas-fir, and western white pine.
- Favor western larch and ponderosa pine in retention and regeneration decisions for pileated woodpecker and nesting and foraging habitats.
- Effectively close roads after the proposed activities to reduce the potential for unauthorized motor vehicle use and/or loss of snags to firewood gathering and use temporary roads wherever possible.
- Use a combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while operating on restricted roads.