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ENVIRONMENTAL ANALYSIS

FOR THE

MILLER CREEK TIMBER SALE

PREPARED BY

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Plains Unit, Northwestern Lands Office

Montana Department of Natural Resources and
Conservation

December 2002

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CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name: Miller Creek Timber Sale

Proposed Implementation Date: April 2003

Proponent: Department Of Natural Resources and Conservation, Northwestern Lands Office, Plains Unit.

Type and Purpose of Action: The Department of Natural Resources and Conservation Proposes to sell an estimated 19,500 tons of timber in the Miller Creek Drainage. This action would produce revenue for the Common School (C. S.) Trust Grant. Activities proposed would maintain and improve forest health, reduce fuel loadings, and increase forest productivity beneficial to future Trust actions. No reasonable alternative actions were identified or proposed during project scoping; therefore only forest product removal and sale are analyzed in this EA checklist. Issues and concerns identified by DNRC specialists in relation to water quality and wildlife habitat were addressed through project design or specific mitigation measures.

This proposal contains two alternatives for consideration: an Action and a No Action alternative. The Action Alternative proposes nine harvest units totaling 453 acres and would result in 378 acres being converted to the appropriate historic cover type. An estimated 19,500 tons of timber would be harvested. The Action Alternative would require 5 miles new road construction. Existing roads totaling 5¼ miles would be upgraded to meet Montana Best Management Practices. Also under the Action Alternative, 3¾ miles of existing road would be abandoned and permanently closed, 4¾ miles of substandard existing cost share road would be eliminated from State responsibility and be replaced by 1¼ miles of newly constructed road which meets all Best Management Practices. An additional ¼ mile of existing road would be returned to original contour, and channel repair to an ephemeral stream would take place at three locations. Income to the Trust from this project is estimated at \$ 500,000. Under the No Action alternative no activity would be undertaken. Vegetative conditions that now exist would progressively move toward shade tolerant cover types, with dominant shade intolerant species and cover types being replaced by shade tolerant species and cover types. Insect and disease infestations would be expected to increase as well as an increase in wildfire hazard. Existing roads within SMZ's, blocked culverts, and other conditions threatening water quality of Miller Creek would continue as is. The No Action Alternative would create zero revenue to the Trust at this time.

Lands involved in this proposed project are held by the State of Montana in trust for the support of the specific beneficiary institutions such as the public buildings trust, public schools, state colleges and universities, and other specific State institutions such as the School for the Deaf and Blind (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article 1 Section 11). The board of Land Commissioners and the Department of Natural Resources and Conservation 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). On May 30, 1996, The Department of Natural Resources and Conservation (DNRC) released the Record of Decision for the State Forest Land Management Plan (SFLMP). The Land Board approved the SFLMP 's implementation on June 17, 1996. The SFLMP outlines the management philosophy of the DNRC in the management of state forested lands, as well as sets out the specific Resource Management Standards for ten resource categories.

The DNRC will manage the lands involved in this project according to the approved philosophy and standards in the SFLMP, which states:

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

Location: Section 16 Township 19N, Range 26W

County: Sanders

I. PROJECT DEVELOPMENT

<p>1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED: Provide a brief chronology of the scoping and ongoing involvement for this project.</p>	<p>Public involvement has been solicited through newspaper advertisements plus letters sent to adjacent landowners and other known interested parties and organizations. Public response was received and used to assist in defining issues surrounding the proposed project. Management issues were identified by DNRC specialist and field foresters. Concerns identified for analysis in the project area include increases in water yield, fine sediment delivery, soil displacement, potential for erosion, location of existing roads, habitat conditions for wildlife, and the effects of no action. Issues and concerns have been resolved and/or mitigated through project design, or would be included as specific contractual requirements of the project (see Attachment 4 Mitigation Measures)</p>
<p>2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:</p>	<p>Montana Fish, Wildlife, and Parks for a Stream Preservation Act 124 Permit. Application has been made and final permit will be in hand prior to submitting this project to the Land Board for approval. The existing Reciprocal Access Agreement with Plum Creek Timber would be modified, and FRTA agreement with the USFS would be finalized prior to beginning this project.</p>
<p>3. ALTERNATIVES CONSIDERED:</p>	<p>No Action: This alternative would not produce revenue for the Common School (C.S.) Trust Grant. Increased losses due to insect and disease activities could be expected. Fuel loadings available for wildland fires would be expected to increase putting at risk the existing timber stands in these sections and adjacent properties. Gradual conversion to shade tolerant mixed conifer cover types would continue.</p> <p>Action: The Action Alternative would harvest 19,500tons (3MMBF) from 453 acres, generating approximately \$ 500,000.00 of income to the Common School (C.S.) Trust Grant. The Action Alternative proposes to construct 3¼ miles of new road, upgrade 5¼ miles of existing road, obliterate ¼ miles of existing road, permanently close ¾ miles of existing road, and eliminate cost share responsibility on 4¼ miles of substandard existing road, replacing it with 1¼ miles of newly constructed road. Treatments prescribed would convert 378 acres to appropriate historic cover types. Maps detailing harvest units and road construction are found in Attachment 1, Project Area Maps.</p>

II. IMPACTS ON THE PHYSICAL ENVIRONMENT

RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES N = Not present or No Impact will occur. Y = Impacts may occur (explain below)
<p>4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE: Are fragile, compactable or unstable soils present? Are there unusual geologic features? Are there special reclamation considerations? Are cumulative impacts likely to occur as a result of this proposed action?</p>	<p>[Y] Measures to minimize impacts as recommended by a DNRC specialist have been included in the project design (See Attachment 2, Soil/Hydrology Analysis; and Attachment 5, Mitigation Measures).</p>
<p>5. WATER QUALITY, QUANTITY AND DISTRIBUTION: Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality? Are cumulative impacts likely to occur as a result of this proposed action?</p>	<p>[Y] The project area, transportation system, and harvest plan have been reviewed by a DNRC hydrologist. Recommendations to minimize impacts have been incorporated into the project design (See Attachment 2, Specialist Reports, and Attachment 5, Mitigation Measures). Roads currently existing within SMZ's would be abandoned. Blocked culverts would be eliminated and an ephemeral stream returned to natural channel. Several segments of existing road will be obliterated or closed to lessen possible erosion and threats to water quality (see Road system Maps, Attachment 1, Project Area Maps; and Attachment 5, Mitigation Measures).</p>
<p>6. AIR QUALITY: Will pollutants or particulate be produced? Will the project be influenced by air quality regulations or zones (Class I air shed)? Are cumulative impacts likely to occur as a result of this proposed action?</p>	<p>[Y] The project area is located in Montana State Air shed 2; it is not within a Class I Air shed. Some particulate matter will be introduced into the Air shed from the burning of logging slash. All burning will be conducted during times of adequate ventilation within the existing rules and regulations.</p>
<p>7. VEGETATION COVER, QUANTITY AND QUALITY: Will vegetative communities be permanently altered? Are any rare plants or cover types present? Are cumulative impacts likely to occur as a result of this proposed action?</p>	<p>[Y] Tree removal will create temporary but not permanent changes in the vegetative structure of the project area. Silvicultural prescriptions have been developed to enhance existing appropriate cover types on 75 stand acres. A total of 378 acres will be converted to historic appropriate cover types. No old growth as defined by "Greene et al" has been identified on this section (See Attachment 3 Stand Prescriptions and Attachment 4, Cover Type Comparative Tables). Sensitive plants listed by the Montana Natural Heritage Program have not been identified within the project area. Measures to minimize impacts of noxious weeds and insects and disease are included in project design (see Attachment 5, Mitigation Measures).</p>

RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES
8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS: Is there substantial use of the area by important wildlife, birds or fish? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] The Miller Creek sale area is in big game habitat. The proposed activities are designed to limit impacts to wildlife habitat with special emphasis directed toward big game. Road management is expected to increase security. Treatments will also help improve available forage for big game. By avoiding activities in the Streamside Management Zones, corridors will remain in place and provide dense cover for wildlife species (see Wildlife Analysis Creek in Attachment 2 Specialist Reports). Miller Creek has been identified as having a population of West slope Cutthroat Trout and Bull Trout. The cumulative watershed effects boundary incorporates the Miller Creek drainage. Due to unit prescription design and location it is unlikely that any effects for the proposed activities would be detectable down stream of the Project Area. (See Hydrologist Report found in Attachment 2, Specialist Reports).
9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES: Are any federally listed threatened or endangered species or identified habitat present? Any wetlands? Sensitive Species or Species of special concern? Are cumulative impacts likely to occur as a result of this proposed action?	[N] Direct use by Threatened and Endangered species has not been indicated in the wildlife biologist reports. No adverse cumulative impacts to sensitive species were identified. Miller Creek has been identified as a westslope cutthroat trout and Bull Trout stream. Harvest activities would not occur within the Miller Creek Streamside Management Zone. Use of temporary bridge to cross Miller Creek and the use of Best Management Practices during the project implementation would mitigate impacts. (See Attachment 2, Specialist Reports; Attachment 5, Mitigation Measures).
10. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or pale ontological resources present?	[N] This project has been reviewed by DRNC archeologist. Significant sites or artifacts were not identified during these reviews (See Archaeology Report, Attachment 2, Specialist Reports).
11. AESTHETICS: Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] Topography blocks most of this section from view from populated areas. Visible impacts will be noticeable minimally in the short term, and are not likely to have a cumulative impact.
12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project? Are cumulative impacts likely to occur as a result of this proposed action?	[N]
13. OTIHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA: Are there other studies, plans or projects on this tract? Are cumulative impacts likely to occur as a result of other private, state or federal current actions w/n the analysis area, or from future proposed state actions that are under MEPA review (scoping) or permitting review by any state agency w/n the analysis area?	[N] No other feasible projects have been identified.

III. IMPACTS ON THE HUMAN POPULATION

RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES
14. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?	[Y] Risks will increase along public roads adjacent to harvest units for a short period. Cumulative impacts are not likely to occur.
15. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?	[Y] Timber harvest will provide continuing industrial production in the Plains area. Improvements to big game habitat should provide increased recreational opportunities.
16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so estimated number. Are cumulative impacts likely to occur as a result of this proposed action?	[N] 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 cumulative impact from this proposed action on employment
17. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue? Are cumulative impacts likely to occur as a result of this proposed action?	[N]
18. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc) be needed? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] Log trucks hauling to the purchasing mill will result in temporary increases in traffic on the Combest Creek road system and Montana Highway 200. This increase is a normal contributor to the activities of the local community and industrial base and cannot be considered a new or increased source. Cumulative impacts are not likely to occur.

<p>19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?</p>	<p>[Y] In June 1996, DNRC began a phased-in implementation of the State Forest Land Management Plan (The Plan). The management direction provided in the Plan comprises the framework within which specific project planning and activities take place. The Plan philosophy and appropriate Resource Management Standards have been incorporated into the design of the proposed action.</p>
<p>20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract? Are cumulative impacts likely to occur as a result of this proposed action?</p>	<p>[Y] No increase in recreational use is expected following the project. This area is with a closed road system, with yearlong closure remaining in place following the project period. There would be no change regarding cumulative impact.</p>
<p>21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing? Are cumulative impacts likely to occur as a result of this proposed action?</p>	<p>[N]</p>
<p>22. SOCIAL STRUCTURES AND MORES: Is some disruption of native or traditional lifestyles or communities' possible?</p>	<p>[N]</p>
<p>23. CULTURAL UNIQUENESS AND DIVERSITY: Will the action cause a shift in some unique quality of the area?</p>	<p>[N]</p>
<p>24. OTIHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES: Is there a potential for other future uses for easement area other than for timber management? Is future use hypothetical? What is the estimated return to the trust. Are cumulative impacts likely to occur as a result of this proposed action?</p>	<p>[Y] 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 sale 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 buyers willingness to pay for stumpage. The project would harvest approximately 19,500 tons of timber returning approximately \$500,000.00 to the Common School (C.S.) Trust Grant. Development costs borne by the purchaser have been included when determining the projected income to the Trust.</p>

EA Checklist Prepared By: Larry Ballantyne, Forest Management Supervisor, Plains Unit, Northwestern Land Office, Montana Department of Natural Resources and Conservation, December 17, 2002.

Signature: _____ Date: _____

Miller Creek Timber Sale Vicinity Map

Plains Montana

N



Township 19 N
Range 26 W
Section 16

Legend

- Haul Roads
- Bridge

Ownership

- State Trust Lands
- Plum Creek
- Forest Service
- Private

Sale Units

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9



Miller Creek Timber Sale Sale Area and Travel Plan



Township 19 N
Range 26 W
Section 16

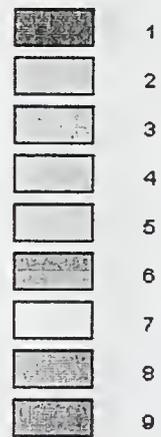
Legernd

Haul Roads

— Haul Roads

☆ Bridge

Sale Units



F O R E S T

3000 0 3000 Feet

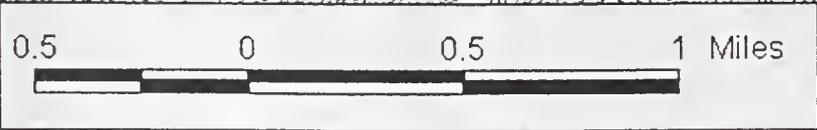
Existing Roads

Current Conditions

— Current Roads

Ownership

- Montana DNRC Trust Lands
- ▨ Plum Creek Timber Company
- ▩ US Forest Service
- Private Lands



Township 19 N
Range 26 W
Section 16

Miller Creek Timber Sale Current Plum Creek Roads Cost Share

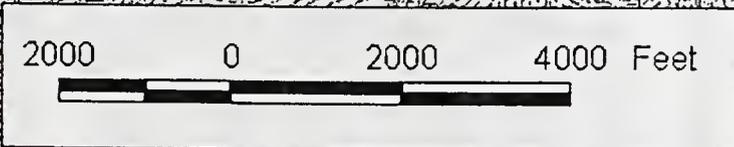
Legend

— Current Plum Creek Cost Share

Ownership

-  Montana DNRC Trust Lands
-  Plum Creek Timber Company
-  US Forest Service
-  Private Lands

Township 19 N
Range 26 W
Section 16



Miller Creek Timber Sale Action Alternative Cost Share

Legend

— Action Alternative Cost Share

Ownership

-  Montana DNRC Trust Lands
-  Plum Creek Timber Company
-  US Forest Service
-  Private Lands

Township 19 N
Range 26 W
Section 16



2000 0 2000 4000 Feet



From: Rennie, Patrick

Sent: Monday, July 22, 2002 2:59 PM

To: Ballantyne, Larry

Subject: Miller Creek Timber Sale: T19N R26W Section 16

I have consulted with the SHPO per the mandates of the Montana State Antiquities Act. No cultural resource sites are known to exist within the proposed project area. No additional archaeological investigative work is recommended in order for the proposed Miller Creek Timber Sale to proceed.

Patrick Rennie
DNRC Archaeologist

HYDROLOGY ANALYSIS

Analysis Area

The proposed Miller Creek Timber Sale is located approximately four air miles southwest of Plains, Montana (T19N, R26W, Section 16). The majority of the section is within the immediate Miller Creek drainage with the remaining portion drained by Combest Creek. Miller Creek is a tributary to Combest Creek.

Elevations in the Miller Creek watershed range from 2640 feet at the confluence with Combest Creek to 5720 feet at the watershed divide. Precipitation varies from less than 20 inches per year at the lowest point to 50 inches at the higher elevations.

Water Uses and Regulatory Framework

This portion of the Clark Fork River basin, including the Miller Creek watershed is classified as B-1 by the State of Montana Department of Environmental Quality (DEQ), as stated in the Administrative Rules of Montana (ARM 17.30.607). The water quality standards for protecting beneficial uses in B-1 classified watersheds are located in ARM 17.30.623. Water in B-1 classified waterways is suitable for drinking, culinary and food processing purposes after conventional treatment, bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply.

State water quality regulations prohibit any increase in sediment above naturally occurring concentration in water classified B-1. Naturally occurring means condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable land, soil and water conservation practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The State of Montana has adopted Best Management Practices (BMPs) through its non-point source management plan as the principle means of meeting the Water Quality Standards.

All rules and regulations pertaining to the Streamside Management Zone (SMZ) Law will be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater than 35%. An SMZ width of 50 feet is required when the slope is less than 35%.

Water Rights and Beneficial Uses

Water rights for surface water exist on Miller Creek for stock watering and on Combest Creek for stock watering, irrigation and domestic use.

Water Resource Measure Indicators and Methodology

The methods applied to the project area to evaluate potential cumulative effects include the Rosgen Stream Classification (Rosgen, 1996) and the R-1 Channel Stability Rating (Pfankuch, 1975). The tools were deemed the most appropriate to provide information on stream channel form, function and resistance to change.

Water yield thresholds were established based on evaluating acceptable risk level, resource value and watershed sensitivity. Watershed sensitivity is based upon the condition of the channel, beneficial uses and potential for adverse impacts. Cumulative water yield increase percentage was calculated using the Equivalent Clearcut Acres (ECA) method outlined in Forest Hydrology Part II (Haupt et al. 1974).

Cumulative Watershed Effects

Cumulative watershed impacts are defined as impacts that result from combined past activities in the watershed. Timber harvest and associated activities affect the timing, distribution and amount of water yield in a watershed. Water yields increase in proportion to the percentage of canopy removed because removal of live trees reduces the amount of water transpired, leaving more available for soil saturation and runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt which leads to further water yield increases. Higher water yields may lead to increases in peak flow and peak flow duration, which could result in accelerated streambank erosion and deposition of fine sediment.

The cumulative effects boundary for this proposal is the Miller Creek watershed, which is a 5160-acre watershed. This is an appropriate scale of analysis due to the size of the project versus the watershed size and the low potential for impacts. The next scale of analysis is the entire Combest Creek watershed, which is approximately 12,340 acres. This size watershed when coupled with limited DNRC managed land within the watershed and a small project area would likely dilute potential impacts.

Existing Condition

The Miller Creek is a 5160-acre Class I fish bearing tributary to Combest Creek. Management of the drainage is mixed between Plum Creek Timber Company (2163 acres), US Forest Service (2331 acres), State of Montana (494 acres) and the remaining acreage owned by private non-industrial entities.

Miller Creek at the confluence with Combest Creek generally flows less than two months each year. Duration of flows is closely related to snowmelt. The dewatered nature of Miller Creek continues upstream from the confluence with Combest Creek to a short distance below the state land boundary. Throughout the state owned parcel, Miller Creek is intermittently dry. However, westslope cutthroat trout were observed in the stream and therefore the stream is considered to be a Class I stream per the Streamside Management Zone rules (ARM 36.11.301).

Miller Creek is a flashy system, meaning that the stream transports nearly all of its' volume of water during a short period of time. Due to the flashiness of the system and the substrate composition of material cobble size and smaller, the channel material is relatively easily moved in the upper two-thirds of the state section during the spring flows. Stability ratings for Miller Creek are fair. The Pfankuch methodology evaluates the channel bottom for mobility and the banks for resistance to erosion. Due to the flashiness described earlier, the stream rated as fair stability with some areas being poor due to the bedload movement.

In addition to Miller Creek proper, surface water inventories of the section identified three tributaries to Miller Creek. One of the tributaries is a perennial stream that disperses before it reaches Miller Creek during most of the year. During the spring, however, this stream reaches Miller Creek and thus is considered a Class I stream. This stream flows south-to-north into Miller Creek. Roads constructed on the section during the 1940 have disrupted the channel, which forced the stream to find a new route to Miller Creek. As a result, the stream is dispersing prior to entering Miller Creek.

The second tributary to Miller Creek enters the section on the western boundary and flows for approximately 300 yards before entering Miller Creek. This stream is a class II stream because it flows less than six months of the year but does contribute flow to another body of water. As described earlier, this stream is a flashy system as well. Although it flows for less than two months per year, it has scoured a channel up to five feet wide and three feet deep. This stream crosses a road constructed during the 1940's but washed the road out and traveled down the road prism for approximately 100 yards. The fine material has been washed out of the road prism, so that a cobble bed exists now.

The third tributary to Miller Creek is a small intermittent stream that flows only during the snowmelt period. Approximately, the first 200 yards of this stream is considered a class II stream, and the remainder of the stream is a class III stream. This stream is crossed by two existing roads that were build in the same era as the roads described above. The lower road is approximately 50 feet from Miller Creek, and this small tributary has scoured a channel across the road. Rock has been placed in the scoured channel to eliminate the headcut that would have resulted.

Adjacent to the Miller Creek are two roads constructed during the 1940's. These roads are connected via a ford on the north end of the section. Although the roads are covered with grass, the use of this existing ford facilitates sediment introduction into the stream from mud and debris on vehicles.

Combest Creek is approximately twenty feet wide as it flows through the southeast corner of the state parcel. This is a class I stream as it contains westslope cutthroat trout according to the MRIS website. This stream flows for less than six months of the year in the vicinity of the state parcel.

Cumulative Effects

Water yield in Miller Creek was modeled using the Equivalent Clearcut Acre (ECA) method as described in Haupt et al. Cumulative equivalent clearcut acres treated in the watershed are 1638. Allowable ECA for the watershed is

1934. Vegetative recovery has reduced the current ECA acreage to approximately 1238 in 2002. This equates to an annual water yield increase of 11.1% over pre-disturbance levels. The threshold of concern for this watershed was set at 15% after considering the acceptable risk level, channel condition, beneficial uses present and potential for adverse impacts.

Environmental Effects

This section discloses the anticipated indirect, direct and cumulative effects to water resources within the affected environment from proposed actions. Past, current, and future planned activities on all ownerships within the Miller Creek watershed have been taken into account for the cumulative effects analysis.

The primary concerns relating to aquatic resources within the affected environment are potential impacts to water quality from sources outside the channel as well as inside the channel. In order to address these issues the following parameters are analyzed by alternative:

- Miles of new road construction and road improvements
- Increases in ECA and annual water yield

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would take place under this alternative.

Action Alternative

Approximately 362 acres of timber harvest would be implemented in the Miller Creek watershed and 92 acres of harvest would occur directly in the Combest Creek watershed for total harvest acreage of 454 acres. Associated activities include approximately five miles of road construction, three miles of road abandonment/obliteration, which includes one unimproved ford and two stream crossings. The road construction would include the placement of one bridge to take the place of the ford, and two culvert stream crossings.

Effects of Activities on Water Quality

Land management activities such as road construction, timber harvest and grazing can potentially increase fine sediment production and delivery to waterbodies if not properly designed. Increases in suspended sediment levels may decrease salmonid reproductive success and reduce the abundance of food organisms.

No Action Alternative

No timber harvest or road construction is associated with this alternative. Existing unimproved stream crossing would continue to contribute sediment at the existing level.

Action Alternative

Approximately 454 acres of the state section would be treated with a silviculture prescription in the Miller Creek and Combest Creek watersheds. In addition, approximately ten acres of would be disturbed for road construction.

No SMZ harvest is proposed along Miller Creek; however the SMZ harvest is planned for the Class II/Class III stream that enters Miller Creek. The proposed SMZ harvest would be conducted using full suspension cable yarding and hand falling of trees within the SMZ. Implementation of the SMZ rules and all applicable Forestry BMPs would result in a low risk for sediment introduction into Miller Creek from harvest practices. Other proposed activities that would occur near streams are associated with the road construction.

By installing stream crossings during the late summer, all of the crossings would be completed during periods when the streams were dry with the exception of the crossing on the perennial stream that disperses prior to entering Miller Creek. Installation of stream crossings during the low flow/no flow period and implementation of all applicable BMPs during road construction minimizes the risk of sediment introduction into Miller Creek.

As described earlier, approximately three miles of road would be abandoned and/or obliterated under the Action Alternative. The abandonment of these roads may include water barring, recontouring, and/or grass seeding. Although the work would be completed using all applicable BMPs and during periods when no water would be flowing in the streams, a short-term increase in turbidity may result during the subsequent spring runoff.

By implementing BMPs and completing the proposed work as described in this analysis, it is unlikely that adverse impacts to beneficial uses would result from selecting this alternative.

Cumulative Watershed Effects

A Level 2 analysis as described in the SFLMP Record of Decision (page 22) was completed for this project. Due to the scale of the project, beneficial uses and low potential for impact, no further analysis was deemed appropriate. Past, ongoing and planned future activities were considered during the cumulative effects analysis.

Water Yield

No Action Alternative

No timber harvest or road construction activities are proposed under this alternative; therefore no water yield increase would result from implementation of this alternative. Water yield would continue at or near the current level and would decline as past harvest units within the watershed regenerate and move closer to pre-disturbance levels.

Action Alternative

Approximately 454 acres of timber harvest would be implemented under this alternative. The timber harvest and road construction combined results 293 ECA in Miller Creek and an additional 81 ECA in Combest Creek. Therefore, the cumulative annual water yield increase from this alternative would be about 11.9% over modeled pre-disturbance levels. With a threshold of concern set at 15% annual water yield increase; this alternative would be within the recommended threshold.

Water yield increase from this project for the Combest Creek is expected to be less than 0.5%. Due to the limited increase expected, no further cumulative effects analysis on water yield was deemed appropriate.

By keeping the annual water yield increases below the recommended threshold; it is unlikely that adverse impacts to beneficial uses would result from the implementation of this alternative.

Water Quality

No Action Alternative

No timber harvest or road construction is associated with this alternative. Existing unimproved stream crossing would continue to contribute sediment at the existing level.

Action Alternative

Due to the proposed relocation of roads away from streams and the harvest methods that would be employed on harvest units this alternative would not likely result in adverse impacts to water quality. By implementing BMPs on all new and existing roads and harvest units, sediment introduction into surface waterbodies is not like to result in adverse cumulative effects to water quality.

FISHERIES ANALYSIS

Analysis Area

The proposed Miller Creek Timber Sale is located approximately four air miles southwest of Plains, Montana (T19N, R26W, Section 16). The majority of the section is within the immediate Miller Creek drainage with the remaining portion drained by Combest Creek. Miller Creek is a tributary to Combest Creek.

Existing Conditions

Information regarding existing fish populations on Miller and Combest Creek are limited at best. According to the Montana Rivers Information System, Miller Creek contains a resident population of westslope cutthroat trout.

Records indicate no evidence of contaminating species, meaning that the population could be genetically pure. However, after consulting with the Montana Fish, Wildlife and Parks fisheries biologist, I was informed that this means no genetic sampling has occurred.

Fisheries habitat in Miller Creek is limited. As described in the *Hydrology* section of this report, Miller Creek is intermittently dry most of the year. The MRIS database confirms that Miller Creek is a perennial stream with limited habitat value. Due to the intermittent nature of the channel, fish must survive the dry summer months in deep pools. Pools are generally created as a result of large woody debris. Observations during spring of 2001 and 2002 indicate that woody debris is common in parts of the state parcel. Shade is also important in regulating water temperature in streams with limited flow. Although no temperature data has been collected in Miller or Combest Creek, the presence of fish during field reconnaissance indicate that temperatures are acceptable.

Combest Creek is approximately twenty feet wide as it flows through the southeast corner of the state parcel. This is a class I stream as it contains westslope cutthroat trout and northern pike according to the MRIS website. This stream flows for less than six months of the year in the vicinity of the state parcel.

Environmental Effects

Combest Creek is approximately twenty feet wide as it flows through the southeast corner of the state parcel. This is a class I stream as it contains westslope cutthroat trout according to the MRIS website. This stream flows for less than six months of the year in the vicinity of the state parcel.

Effects of Activities on Fisheries

No Action Alternative

No timber harvest or associated activities would be implemented if this alternative were selected.

Action Alternative

Under this alternative, no harvest would occur in the SMZ of fish bearing stream, namely Miller Creek and Combest Creek. Therefore, there would be no adverse affects to woody debris recruitment or pool habitat from the implementation of this alternative. By maintaining the canopy along the riparian corridor, it is unlikely that temperature increases would occur as a result of this alternative and thus would not adversely impact fish survival.

Timber harvest and road construction would be conducted using all applicable BMPs to limit the potential for sediment introduction. No timber harvest in the SMZ of fish bearing streams would result in no adverse affects to fish habitat.

Fisheries Cumulative Effects

No Action Alternative

Current fisheries habitat and populations would change in response to natural events.

Action Alternative

Current fisheries habitat and populations would not likely be adversely affected with the implementation of this alternative due to the low water yield increase and low potential for sediment introduction from harvest units and roads. In order to ensure a low potential for impacts, all applicable BMPs and mitigation measures would be implemented as described in the *Hydrology* and *Soil* analysis.

SOILS ANALYSIS

Analysis Area

The analysis area for soils is the state parcel (Section 16, T19N, R26W). This analysis area will adequately allow for disclosure of existing conditions, direct, indirect and cumulative impacts.

Existing Conditions

Geology/Soils

This parcel has one basic type of soil unit with varying vegetation characteristics dependent upon slope, aspect and elevation. The map unit consists of deep gravelly soils forming in colluvium and residium. Slope shape is concave

vertically on the lower one-third of slope and mid slope grading to convex near the ridgeline. This terrain is moderately dissected by ephemeral drainages that typically flow only during runoff periods. Wave sorting of gravel by glacial lake Missoula is apparent on protected slopes below 4200 feet. Soils are deep and well drained. Typical soils range from 5 to 20 inches deep underlying organic layers no less than ½ inch deep, but generally more than one inch deep. Volcanic ash influence is intermittent throughout the section.

Management Implications

Timber productivity is wide ranging on this soil type. Locations containing ash are more productive than areas without an ash cap. Due to the droughtiness of the soils in this parcel, especially soils without an ash cap, regeneration is a concern as is competition with grasses. Due the rapid infiltration capacity of the soils the season of use is long and equipment operations are limited for only the short wet period during spring runoff.

Material is well suited to road construction. Rocky outcrops are generally limited to ridge locations. Road cut and fillslopes are difficult to revegetate due to the droughty soils. Reseeding immediately following construction activities can mitigate revegetation difficulty. Providing proper road drainage can mitigate moderate erosion and sediment delivery hazards.

Cumulative Effects

Past harvesting in this section employed conventional ground based equipment for harvest activities. Skid trail spacing used during the past entry ranged from 60 to more than 100 feet apart. All skid trail observed during field reconnaissance were vegetated with the same species as surrounding areas. Productivity of the skid trails was slightly reduced compared to adjacent areas. This was alleviated as the freeze-cycle obliterated the impacts of ground based skidding.

Environmental Effects

Description of Alternatives

No Action Alternative

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

Action Alternative

Approximately 454 acres of timber would be harvested and five miles of road constructed under this alternative. The method of harvest for the 454 acres includes 138 acres of ground based activities and 316 acres of cable yarding.

Effects of Activities on Soil Productivity

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Therefore, no effects to soil productivity would occur.

Action Alternative

The majority of the area proposed for harvest under this alternative have been harvested in the past using ground based harvest methods. In order to limit cumulative impacts, existing skid trails would be used if they are properly located and adequately spaced. By reusing existing skid trails and mitigating the direct and indirect effects with soils moisture restrictions, season of use and method of harvest, the risk of detrimental long-term impacts to soil productivity would be low.

Under the action alternative cable yarding is required on 316 acres of the 454 total harvest areas. The remaining 138 acres would be harvested using conventional ground based yarding systems. Table SS exhibits the expected impacts to soil from compaction and displacement if:

- 1) Season of operation is during the summer and fall.
- 2) Trafficked areas of skid trails and landings are restricted to 20% of the harvest units
- 3) Summer harvest restricts harvest equipment operation to periods of 20% or less soil moisture at 6 inches below the soil surface.

Table SS: Expected acres of impact to soil from compaction and displacement

Harvest Method and Season	No Action Alternative	Action Alternative
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Ground Based ¹	0	21
Cable ²	0	32
Total (acres)	0	53
Total Harvest Acres	0	454
Percent Area Impacted	0	11.6%

¹ 75 percent of the summer ground-based skid trails may exhibit moderate impacts

² 10 percent of the cable ground may exhibit impacts

In addition to the potential impacts from harvesting, approximately 10 acres would be removed from production and converted to roads. Concurrently, three miles of road (about 5 acres) would be converted into timber production, although it would likely require several years before the compaction is reduced enough for typical production rates to occur. The roads to be abandoned or obliterated are poorly located and therefore have a higher potential of erosion. By obliterating or abandoning the three miles of road, the potential for erosion would be reduced and thus soil productivity impacts reduced.

Due to the compaction and displacement impacts to the soil as show in Table SS, DNRC expects short-term reduction in soil productivity from the action alternative on the displayed acres. As vegetation begins to establish on the impacted areas, and freeze-thaw cycles occur, the area of reduced productivity would decrease. Therefore, direct effects to long-term soil productivity in the project area are unlikely as a result of implementing the action alternative. Additional mitigation measures to maintain long-term soil productivity can be found at the end of this document.

Indirect Effects

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Therefore, no indirect impacts to soil productivity were identified.

Action Alternative

No indirect impacts to soil productivity were identified.

Cumulative Soil Effects

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

GENERAL MITIGATION MEASURES:

*Limit equipment operations to periods when soils are relatively dry, (less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.

*On ground skidding units, the logger and sale administrator will agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use, and what additional trails are needed. Trails that do not comply with BMPs (i.e. draw bottom trails) would not be used and may be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.

*Tractor skidding should be limited to slopes less than 40%. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 40%.

* Slash Disposal- Limit disturbance and scarification to 30-40% of harvest units. No dozer piling on slopes over 35%; no excavator piling on slopes over 40% unless the operation can be completed without causing excessive erosion. Consider lop and scatter or jackpot burning on steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.

* Retain 10 to 15 tons large woody debris and all fine litter feasible following harvest. On commercial thin units where whole tree harvesting is used implement one of the following mitigations for nutrient cycling; 1) use in woods processing equipment that leaves slash on site, 2) for whole tree harvest, return skid slash and evenly distribute within the harvest area, or 3) cut off tops from every third bundle of logs so that tops are dispersed as skidding progresses.

LITERATURE CITED

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

Haupt, H.F., et al. 1974. Forest Hydrology Part II: Hydrologic Effects of Vegetation Manipulation. USDA Forest Service, Region 1. Missoula, MT.

MSU Extension Service. 2001. Water Quality BMPs for Montana Forests. Montana State University Extension Service. Bozeman, MT.

Pfankuch, D.J. 1975. Stream Reach Inventory and Channel Stability Evaluation. USDA Forest Service, R1-75-002. Government Printing Office #696-260/200, Washington, DC.

Rosgen, 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.

MILLER CREEK – WILDLIFE ASSESSMENT

INTRODUCTION

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

METHODS

To assess the existing condition of the proposed project area and the 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. For this analysis, the eight sections of land surrounding the proposed project area were considered as the cumulative effects analysis area for the majority of effects determinations for wildlife species of concern. If divergence from this analysis area was deemed appropriate for a particular species or concern it was described in the existing condition narrative for that issue.

COARSE FILTER

Existing Environment

Historically, wildfire was the primary disturbance factor shaping the stands in the proposed project area and substantial portions of the forested communities in this area (Losensky 1997). Forested patches on the landscape were likely a mosaic of stands that established following a number of disturbances of varied type, intensity, and magnitude. Frequent fire return intervals (5-25 years) eliminated encroaching Douglas-fir and maintained ponderosa pine stands in more open, park-like conditions with fire-resistant mature trees and small patches of even-aged regeneration. Reduction in natural fire frequency and severity through fire suppression in the last 100 years has led to denser stands with a higher proportion of stagnated shade-intolerant tree species, like Douglas-fir and grand fir. This encroachment by shade-tolerant tree species has led to more extensive and continuous patches of forests. Through this process, patch size has likely increased and the small openings on the landscape generated by the small fire

disturbances have been largely eliminated. Not only does habitat patch size influence use by various wildlife species, but also the arrangement and juxtaposition can influence habitat quality for some wildlife. Some species benefit from the transitional edge created between 2 or more habitat types, while others are adversely affected by these edges or the species that frequently use these edges. Modern fire suppression has eliminated the small disturbances that once frequented the landscape, thereby also reducing the edge habitats that were a by-product of these disturbances. Fire suppression has also increased the potential for large stand-replacing fires that could propagate larger patch sizes than found under historically frequent, low intensity fire regimes.

Connectivity of forested habitats types between patches is important for facilitating movement of several wildlife species that do not cross large, non-forested areas. Several forest carnivores, like fisher and Canada lynx, rely on closed canopy forested stands for travel corridors. Connectivity under historical fire regimes likely remained relatively high as fire differentially burned various habitats across the landscape. Today, the mosaic of ownership and diversity of past management within the general vicinity of the proposed project area have compromised connectivity to a degree. Along Miller and Combest Creeks, connectivity has largely been maintained through SMZ buffers within stands recently harvested. These corridors connect larger patches of habitats that have suitable canopy closure and other forested attributes for species requiring these movement areas. Within the state section, an open road running along Miller Creek might be compromising the quality of this riparian area. Upstream there is also a break within this riparian habitat where a forest road bisects the riparian area.

The majority of the species of wildlife present on the state parcel prior to European settlement are thought to still occupy the parcel. Fire-associated species, such as the black-backed woodpecker (*Picoides arcticus*) are probably less abundant than would have been expected under natural fire regimes. Likewise, negative consequences to species associated with the more open conditions, like flammulated owls (*Otus flammeolus*) are believed to have occurred with the departure from the natural fire cycle. Conversely, species preferring dense stands of shade-intolerant tree species with a mature canopy have likely benefited.

Direct and Indirect Effects of the No Action Alternative - Coarse Filter

Under current fire suppression methods, forest conditions will continue to move toward denser stands of shade-tolerant tree species with high canopy cover. Compared to perceived historical conditions, this change in stand structure, composition, and dominant disturbance regime has resulted in larger patch sizes, fewer small openings, and less edge habitats. Over time, shade-intolerant species on the state section would die, and dense Douglas-fir in the midstory would prevent replacement of shade-intolerant species. A stagnated, dense stand of Douglas-fir would likely result, which would be more susceptible to stand replacing fires and insect/disease outbreaks. Wildlife favoring dense stands of shade-tolerant tree species would benefit, while those requiring conditions likely found in the state section under natural disturbance regimes would continue to be underrepresented.

Direct and Indirect Effects of the Action Alternative - Coarse Filter

Under the Action Alternative, approximately 454 acres of forest canopy would be opened up to varying degrees. Additionally, shade-intolerant trees would be retained, while shade-tolerant Douglas-fir would be removed. These conditions would lead to more open stands of mature ponderosa pine and western larch. In proposed seed tree harvests (358 acres), regeneration of shade-intolerant trees is expected. Patch sizes within the state section would decrease, and the existing stands would become more fragmented. The resultant stand structure and composition, being more open than the current stands and dominated by ponderosa pine and western larch, would be more sustainable while being less susceptible to stand replacing fires. These conditions would favor species requiring more open habitats as likely existed under natural disturbance regimes, while negatively impacting those species that use denser stands of multi-layered forests.

Cumulative Effects

Under the No Action Alternative, the existing habitats within the state parcel would continue to provide habitat for wildlife requiring denser stands with a more closed canopy. Surrounding lands are a mosaic of age classes, representing young stands that have been recently harvested to mature stands. Adjacent harvested stands have emulated medium and high intensity fire regimes. Edge habitats between these earlier harvested stands and the state parcel would develop. Planned state actions would cause neither changes in the amount of fragmentation nor changes in patch size and configuration.

Under the Action Alternative, stands would be opened up, decreasing the amount of interior habitat, while slightly increasing edge. Harvest units on the state section would blend with several recent harvest units on adjacent parcels (particularly to the south and west of the state section), increasing patch size. The resultant decrease in edge habitats from this blending would offset much of the edge habitat that would be created along the riparian area on Miller Creek, leading to only a negligible increase in total edge habitats within the analysis area. Some wildlife species benefit from this increase in edge and juxtaposition of different cover types, while to others fragmentation limits available habitat.

The open stand of mature ponderosa pine and western larch on the state parcel coupled with the open conditions on adjacent parcels could provide larger blocks of more historical conditions into the future. Thus those species of wildlife requiring larger blocks of either more open, early successional conditions (near term) or those requiring larger areas of open, shade-intolerant forests (longer term) would likely benefit. Managing stands on the state parcel to include large ponderosa pine and western larch would benefit those wildlife species that use these features on the landscape because recruitment on adjacent parcels is limited.

FINE FILTER

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

Threatened and endangered species

Four species indigenous to Montana area classified as "Threatened" or "Endangered" under the Endangered Species Act of 1973. The bald eagle, grizzly bear, and Canada lynx are listed as "Threatened", while the gray wolf is listed as "Endangered".

Bald eagle (*Haliaeetus leucocephalus*)

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

Existing Environment

Strategies to protect the bald eagle are outlined in the Pacific States Bald Eagle Recovery Plan (USFWS 1986) and the Montana Bald Eagle Management Plan (Montana Bald Eagle Working Group 1994). Management direction involves identifying and protecting nesting, feeding, perching, roosting, and wintering/migration areas (USFWS 1986, Montana Bald Eagle Working Group 1994). No eagle nests are located in the proposed project area. The nearest bald eagle nests occur within 3-4 air miles north east of the proposed project area along the Clark Fork River. Occasional use of the proposed project area by foraging bald eagles might occur during the winter when eagles are more dependent upon big game carrion. Overall, habitats found within the state parcel and surrounding vicinity have low inherent value for bald eagles. No cumulative or localized effects that would positively or negatively influence bald eagles would be expected to occur as a result of this proposed project. Therefore, this species will not be considered further in this analysis.

Mitigations Included in Proposed Activity: Cease all operations and consult with a DNRC biologist for further mitigations should a nesting pair of eagles is observed within one mile of any project-related activities.

Grizzly bear (*Ursus arctos*)

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

Existing Environment

Grizzly bears are wide-ranging mammals that use forested upland habitats. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The proposed project area is 10 miles southeast of the Cabinet/Yaak Recovery Zone (USFWS 1993), and there have been no documented observations of grizzly bears in the general vicinity of the proposed project area (D. Wroblewski, USFS, pers. comm. September 2002). Grizzly bears could, however, show up in the proposed project area at any time. Since this proposed project is not expected to affect grizzly bears, this species will not be considered further in this analysis.

Mitigations Included in Proposed Activity: 1) minimize number of roads (open and closed), and slashing old roads and skid trails to reduce the potential for foot and unauthorized motor vehicle traffic.

Gray Wolf (*Canus lupus*)

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

Existing Environment

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

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

Wolves choose elevated areas in gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas for dens and rendezvous sites. The state parcel contains a small water source and is within documented big game winter ranges. Wolves might pass through the area sporadically. Nearest documented wolf activity is in the Thompson River drainage 20-22 air miles north and west of the proposed project area, and no wolf activity has been documented south of US Route 200 in the area (T. Meier, USFWS, pers. comm. August 2002). Since this proposed project is not expected to affect wolves, this species will not be considered further in this analysis.

Mitigations Included in Proposed Activity: 1) suspension of operations and temporary restriction of use of roads within a 1 mile radius of any known active wolf den; 2) suspend operations and consult a DNRC Biologist if a suspected rendezvous site is observed within 0.5 miles of any ongoing project activities; 3) retain connective corridors of heavy forest cover when possible to maintain travel routes, visual screening and partial security for elk and deer; 4) minimize number of roads (open and closed), and slash old

roads and skid trails to reduce the potential for foot and unauthorized motor vehicle traffic.

Canada Lynx (*Felis lynx*)

Issue: There is concern that timber harvesting could alter habitat or create disturbance that would be detrimental to lynx.

Existing Environment

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 2,800 to 3,960 feet and is dominated by ponderosa pine, Douglas-fir, and western larch. Typical lynx denning habitat consists of mature spruce-fir with abundant coarse woody debris; typical lynx foraging habitat consists of younger coniferous forests with an abundance of snowshoe hares. The proposed project area contains neither subalpine fir nor younger areas for foraging, so this species will not be considered further in this analysis.

Sensitive species

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

A search of the Montana Natural Heritage Database documented no sensitive species occurrence records in the proposed project area or within 1 mile. Eleven of the 14 species DNRC has identified as sensitive in northwestern Montana (Table W-1) would not be affected by the proposed project because suitable habitat does not exist in the state parcel or proposed activities would not affect their required habitat components. Fishers, flammulated owls and pileated woodpeckers could be affected and are discussed below.

Fisher (*Martes pennanti*)

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

Existing Environment

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

travel corridors. Fishers are generalist predators and use a variety of habitat types, but are disproportionately found in stands with dense canopies. In the Rocky Mountains, fishers appear to prefer late-successional coniferous forests for resting sites and tend to use areas within 155 feet of water more than their availability on the landscape. Such areas typically contain large live trees, snags, and logs, which are used for resting and denning sites and dense canopy cover, which is important for snow intercept (Jones 1991). Modeling the above conditions using SLI data generated an estimate of fisher resting and denning habitat.

The proposed project area ranges from 2,800 to 3,960 feet in elevation with a perennial stream running through the middle of the parcel. Twenty-seven acres of mesic mixed conifer stands along approximately 1 mile of riparian bottom could provide resting and denning habitat as well as a travel corridor for fishers. Potential fisher habitat in the riparian area along Miller Creek is connected upstream to the Lolo National Forest through private timberlands. Habitats along this private section appear to be more limited, but landscape level connectivity is largely retained.

Trapping is a significant source of fisher mortality. Fishers are easily caught in traps set for marten, bobcat, and coyote (Powell and Zielinski 1994), and trapping density is generally tied to road density. Currently there is approximately 1 mile of road in the 27 acres of denning and resting habitat within the state parcel. This open road likely reduces habitat quality within affected riparian areas while potentially increasing access for trapping.

Direct and Indirect Effects of the No Action Alternative

On much of the proposed project area, drier stands of ponderosa pine and Douglas-fir types dominate, which are not preferred fisher habitat, and would continue to provide little fisher habitat under the No Action Alternative. Within the 27 acres of potential fisher resting and denning habitat along Miller Creek, little change would occur in terms of quality of fisher habitat. Continued disturbance and displacement along the open road would affect fisher use along Miller Creek.

Direct and Indirect Effects of the Action Alternative

Under the Action Alternative, 8 acres (1 acre along Miller Creek, 0 acres along Combest Creek, and 7 acres along the unnamed Miller Creek tributary from the southwest) of low quality fisher habitat would be harvested within 165 feet of perennial streams, representing a 13% reduction of the forested habitat within this zone on the state parcel. Otherwise all proposed harvest would avoid any potential fisher denning and resting habitat. Fisher resting habitat might also be slightly reduced due to the proposed overstory removal on the uplands adjacent to the riparian area and in some of the intermittent tributaries to Miller Creek, but again most of the harvesting would avoid habitats typically preferred by fishers. Proposed closing of the road running along Miller Creek from the north of the proposed project area would enhance the riparian buffer along Miller Creek. Restricted access would limit human disturbance, resulting in less

opportunity for trapping and snag loss due to firewood cutting. The reduced disturbance could possibly improve potential habitat quality for fishers should they use the area. Future fisher habitat value would continue to increase as the stands age and accumulate snags and downed logs that would provide denning and resting sites for fishers

Cumulative Effects

Under the No Action Alternative, fisher denning and resting habitat would be retained. Suitable fisher habitat appears limiting on the surrounding private parcels. Uplands within the analysis area are largely ponderosa pine, western larch, Douglas-fir, and grand-fir, and it is believed that stands within the recently harvested areas on adjacent parcels were likely similar. These drier types are not typical fisher habitats. Fisher habitat within the 8 adjacent sections is largely limited to the riparian areas, which within the harvested areas has been partially retained through SMZ buffers. Connectivity upstream is limited, but exists within this narrow SMZ buffer along Miller Creek. This limited connectivity is probably affecting habitat quality and subsequent use. Open roads running through the riparian area within the state parcel reduce the habitat quality for fisher while exposing them to human disturbance and potential trapping pressure (intentional and unintentional). Under the Action Alternative, proposed harvest would avoid the riparian areas typically used by fisher, resulting in negligible overall effects. Potential fisher habitat on the state parcel, retained by avoiding this riparian zone, coupled with the limited habitat retained within the SMZ buffers on the private timberlands upstream might enable some movement along this corridor. The proposed road closure might also benefit fisher should they use this drainage by reducing potential disturbance.

Mitigations Included in Proposed Activity: 1) restrict public access to reduce potential trapping pressure and loss of existing snags to firewood gathering.

Flammulated Owl (Otus flammeolus)

Issue: There is concern that timber harvesting could alter habitat or create disturbance that would be detrimental to the flammulated owl.

Existing Environment

Flammulated owls are listed by DNRC as a sensitive species due to their use of old, open stands of ponderosa pine and Douglas-fir (DNRC 1996). They usually nest in cavities excavated by pileated woodpeckers or northern flickers in 12-25" dbh aspen, ponderosa pine, or Douglas-fir (DNRC 1996).

Much of the proposed project area consists of ponderosa pine, Douglas-fir, and western larch. Sizeable snags (>14" dbh) occur throughout the state parcel at densities of 1-5 snags/acre. Presently, suitable nesting trees occur in the state parcel, however due to fire suppression, the stands have become denser, thus reducing habitat quality for

flammulated owls. Trees infected by mistletoe and denser stands of regenerating ponderosa pine and Douglas-fir could serve as roost sites for flammulated owls.

Direct and Indirect Effects of the No Action Alternative

Under the No Action Alternative existing conditions would not be changed on DNRC ownership over the short term. In the long term, stands once dominated by ponderosa pine would continue to be converted to Douglas-fir stands through succession, become densely stocked, and exist at high risk to insects, disease and stand-replacement fire. Thus, habitat sustainability and quality for flammulated owls would continue to decline

Direct and Indirect Effects of the Action Alternative

Flammulated owls are tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with proposed road building and harvesting could negatively impact flammulated owls should they be using existing habitat during the nesting period. Proposed timber harvest would open the canopy while favoring large, dominant ponderosa pine and western larch on 96 acres in Units 1,3,4, and 5. Proposed treatments would retain all snags exceeding 14" dbh that are not safety or operations concerns. The more open stand conditions, the retention of fire adapted tree species, and the maintenance of snags would move the proposed project area toward historical conditions, which is preferred flammulated owl habitat. Therefore, the proposed project is expected to result in moderate positive benefits to flammulated owls.

Cumulative Effects

Under the No Action Alternative, flammulated owl habitat would continue to decline in quality within the state parcel over the long term. Commercial timber harvesting has occurred in recent years on adjacent parcels, largely limiting potential habitat. Some open ponderosa pine and Douglas-fir stands exist in adjacent parcels, however these trees will not likely attain a size suitable for use by flammulated owls prior to being harvested. Conversely, stands on the adjacent state and USFS parcels have not recently been managed and habitats are likely too dense for flammulated owl use because of the Douglas-fir encroachment caused by modern fire-suppression. Under the Action Alternative, habitat would be enhanced, however, the enhanced habitat would not likely affect flammulated owl populations appreciably as habitat is somewhat limited throughout the larger area.

Mitigations Included in Proposed Activity: 1) favor ponderosa pine in retention and regeneration decisions, and 2) restrict public access to reduce potential loss of existing snags to firewood gathering.

Pileated Woodpecker (Dryocopus pileatus)

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

Existing Environment

The pileated woodpecker is listed by DNRC as a sensitive species because of the important ecological niche it occupies (DNRC 1996). Pileated woodpeckers excavate the largest cavities of any living woodpecker. These cavities are frequently used in subsequent years by many other species of birds (including flammulated owls) and mammals. Preferred nest trees are western larch, ponderosa pine, cottonwood, and aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat insects, mainly carpenter ants, inhabiting large downed logs, stumps, and snags. Nesting habitat for pileated woodpeckers consists of mature stands below 5,000 feet in elevation with 100-125 ft²/ac basal area and a relatively closed canopy (Aney and McClelland 1985). The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and large downed wood for feeding, closely tie these woodpeckers to mature forests. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979). Modeling the above conditions using SLI data generated an estimate of pileated woodpecker habitat.

In the proposed project area, potential pileated woodpecker nesting habitat exists on approximately 31 acres. Much of this habitat is concentrated along Miller Creek, with a limited amount along Combest Creek. Younger-aged stands might provide feeding or lower quality nesting habitat. During field visits many snags and feeding sites were observed in the state parcel.

Direct and Indirect Effects of the No Action Alternative

No direct impacts are anticipated under the No Action Alternative. Shade-intolerant trees would continue to grow and die over time, providing nesting and foraging habitat. As these trees die, replacement shade-intolerant trees would not be present in the stand unless other disturbance influences the stands, allowing for their regeneration. Therefore, a reduction in suitable nesting trees is likely over time. Pileated woodpeckers typically do not nest in Douglas-fir; however they will forage on the boles of Douglas-fir. Under the No Action Alternative, stands once dominated by ponderosa pine would continue to be converted to Douglas-fir stands through succession, become densely stocked, and exist at high risk to insects, disease and stand-replacement fire. Thus, habitat sustainability and quality for pileated woodpeckers would gradually increase through time, and then decline.

Direct and Indirect Effects of the Action Alternative

Pileated woodpeckers tend to be tolerant of human activities (Bull and Jackson 1995), but might be displaced by proposed harvesting and road building, especially during the nesting period. Elements of forest structure important for nesting pileated woodpeckers would be retained, including snags, coarse woody debris, numerous leave trees, and snag recruits. Of the 31 acres of pileated woodpecker nesting habitat on the state parcel, only 1 acre is proposed for treatment. Within this 1 acre, trees in the midstory canopy would

be removed and the overstory canopy would be reduced by 50%. This might reduce pileated nesting use in this limited area. The removal of Douglas-fir across the proposed project would reduce canopy closure and eliminate some foraging substrate for pileated woodpeckers. After the proposed harvest, 454 acres of more open and mature stands would initially be too open to be considered preferred pileated habitat, but as a more uneven-aged stand develops quality of foraging habitat for pileated woodpeckers is expected to improve over the next several decades. This more open stand should also lead to the recruitment of new, shade-intolerant species that could benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging substrates. Despite suitable nesting habitat being retained, use in the near-term is likely limited due to the limited size of the nesting habitat patch, and openness of the stands surrounding these nesting habitats. Short term habitat suitability would be reduced while the stand is more open, but long-term use is more probable given the silvicultural prescriptions improving habitat sustainability through time.

Cumulative Effects

Under the No Action Alternative, habitats on the state parcel would continue to grow and die over time, providing nesting and foraging habitats. Through time, conversion of stands to Douglas-fir would reduce nesting substrates for pileated woodpeckers. Habitats on adjacent state and USFS parcels would also likely continue along this path of aging and cover type conversion. The remaining adjacent parcels are managed timberlands, and retention of larger trees and standing snags is less probable. Portions of adjacent parcels (mostly within the Miller Creek drainage) have been recently harvested, removing many of the larger trees. Individual trees left for seed trees in some of these units could provide nesting substrates in the long term (70+ years). Regeneration on adjacent commercial timberlands will dictate future stand composition, and ultimately suitability to pileated woodpeckers. In the Combest Creek drainage, less harvesting has occurred, and currently there appears to be more suitable pileated nesting and foraging habitats than in the Miller Creek drainage. The proposed project area is not large enough to support a pair of pileated woodpeckers alone, but in conjunction with habitat on surrounding parcels, a pair might have adequate nesting and foraging habitats.

Under the Action Alternative, reductions in pileated woodpecker habitat are expected. Existing snags, coarse woody debris, and suitable nesting trees would be retained within the proposed project area; however, the canopy on 454 acres within the state section would likely be too open for appreciable pileated woodpecker use. Habitats on adjacent state and USFS parcels would likely continue aging, die, and be replaced by Douglas-fir as described above. Management actions on adjacent private parcels have reduced some of the pileated woodpecker habitats, and retention of larger trees and standing snags is less probable. Stand development within recently harvested areas on adjacent parcels will dictate future habitat quality for pileated woodpeckers. Individual trees left for seed trees in some of these units could provide nesting substrates in the long term. After the proposed harvest, the analysis area, would likely be insufficient to support a pair of birds, however suitable patches across the analysis area might benefit pileated woodpeckers existing outside of the analysis area. In the distant future (70+ years), the nesting habitats

in conjunction with anticipated regeneration should provide a suitable habitat for pileated woodpeckers after the stands mature on the state parcel and surrounding parcels.

Mitigations Included in Proposed Activity: 1) favor ponderosa pine and western larch in retention and regeneration decisions, and 2) restrict public access to reduce potential loss of existing snags to firewood gathering.

Big Game Winter Range

Issue: There is concern that timber harvesting activities associated with this proposed project could reduce cover important for the survival of wintering elk, white-tailed deer, and mule deer.

Existing Environment

The proposed project area provides winter habitat for white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), and elk (*Cervus elaphus*). The proposed project area also lies within a documented migratory corridor for elk (Henderson et. al 1993), and it is suspected that white-tailed deer and mule deer also use this corridor. Montana Fish, Wildlife, and Parks (DFWP) delineated winter habitat along Miller Creek, which is a large complex that covers portions of the Combest Creek, Miller Creek, West Fork Combest Creek, and Clark Fork drainages (Figure W-1). Approximately 183 acres of the 7,007 acre winter range fall within the state section. The winter range on the state section ranges from 2,800 to 3,200 feet in elevation, which are middle elevation ranges within the entire winter range. Generally this area receives lower amounts of snowfall than winter ranges in other areas. Evidence of summer use by moose, white-tailed deer, and elk was noted throughout the proposed project area during field visits.

The entire 7,007-acre winter range was used to assess cumulative effects.

Direct and Indirect Effects of the No Action Alternative

Under this alternative, big game thermal cover in the state parcel would not be altered over the short term. Existing stands would continue to provide thermal cover for big game. In the longer-term, continued succession would reduce forage production while increasing thermal cover. Potential human use of the open road along Miller Creek in the winter could stress wintering big game.

Direct and Indirect Effects of the Action Alternative

No displacement from winter ranges is expected as a result of the proposed harvesting operations. Thermal cover within the winter range would be reduced, and some increased forage potential within the adjacent harvested stands would be produced by the proposed project. Canopy cover would be reduced within 84 acres of the 7,007-acre winter range documented by DFWP (i.e., 46% of the winter range occurring on the state parcel, and 1% of the total 7,007-acre winter range). On 79 acres (within units 1,3,4, and

5) much of the midstory and 40-50% of the overstory would be removed. Through a combination of commercial thinning, salvage, and sanitation cuttings favoring mature trees, thermal cover and snow intercept would be reduced, but the resulting stand would still provide some limited thermal cover and snow intercept properties. Proposed seed tree treatments would remove the canopy cover/snow intercept capacity on the other 5 acres of winter range within prescription boundaries. Since this is not a heavy snow area, the importance of snow intercept and thermal cover in years of normal snowfall is reduced. However, during more severe winters, the importance of snow intercept and thermal cover is much greater to the survival of ungulates using these areas. Timber harvests would not prevent big game movement through the area.

Cumulative Effects

Under the No Action Alternative, no changes are anticipated in thermal cover and snow intercept. Stands exist on adjacent parcels that are still providing thermal cover and snow intercept for big game. Combined with the state section, a contiguous patch of winter range would exist. Under the Action Alternative, thermal cover would be largely removed on 84 acres. Harvesting has occurred elsewhere in the winter range, and the proposed reduction in thermal cover would be additive to these other reductions in thermal cover and snow intercept. Although the proposed harvesting would only effect 1% of the larger winter range, the localized impacts within the Miller Creek drainage are expected to be more severe when combined with these other harvests. Should cover important for winter survival of big game be reduced below a minimum threshold over time across all ownerships, a reduction in winter carrying capacity, and subsequent reduction in big game numbers could occur.

Mitigations Included in Proposed Activity: 1) in harvest units within winter range, retain patches of dense vegetation when possible to provide some thermal cover/snow intercept capacity, 2) minimize number of roads (open and closed), and slash old roads and skid trails to reduce the potential for disturbance from foot and unauthorized motor vehicle traffic.

Elk Security

Issue: There is concern that timber harvesting activities associated with this proposed project could have adverse effects on elk and other big game security.

Existing Environment

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

hunting season reduces the odds of any given hunter to see or harvest such an animal throughout the remainder of the season.

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

Direct and Indirect Effects of the No Action Alternative

Under this alternative, no changes in elk security cover are expected. Existing cover would continue to provide intact blocks of security habitat. Timber stands would continue advancing to climax plant species. No alterations in cover would occur that would increase elk vulnerability during the elk hunting season. Disturbance and potential hunter mortality levels are anticipated to remain constant with the open road along Miller Creek.

Direct and Indirect Effects of the Action Alternative

Under the Action Alternative, security cover would be reduced in the short term. As regeneration advances hiding and security cover would be greater than current conditions. Closing the road along Miller Creek would reduce accessibility for hunters within this area during the hunting season, improving elk and deer security. Retention of cover and structure along the ridge would allow continued use of the ridge as a travel corridor by big game.

Cumulative Effects

Under the No Action Alternative, no changes are anticipated in elk security cover. Over time habitats on the state parcel would become denser, offering greater security, which would provide a net positive benefit to elk and deer that spend portions of hunting season in the vicinity of the proposed project area. Future harvest that could occur across other ownerships within the analysis area would not be expected to improve elk security. Recently harvested stands on adjacent parcels would likely provide additional security habitat in 20-40 years.

Under the Action Alternative, negligible impacts to big game survival are anticipated. A reduction in hiding and security cover caused by the proposed harvest will be additive to the harvest that has occurred in the past, and that could occur in the near future on adjacent ownerships. The effects of these reductions in security cover are not as great as anticipated on other parcels because of the relatively inaccessible nature of this parcel. By closing the open road along Miller Creek, further reductions in human disturbance and hunting pressure are anticipated for the larger area, offsetting the reduction in elk and deer hiding cover on the state parcel. Surrounding lands are largely private timberlands, which limit vehicular access, and thus hunter access. Recently harvested stands and the

proposed stands on the state parcel would likely provide larger blocks of security habitat in 20-40 years.

Mitigations Included in Proposed Activity: 1) retain connective corridors of heavy forest cover along riparian areas and on the ridge line when possible to maintain travel routes, visual screening and security for elk and deer; 2) minimize number of roads (open and closed), and slash old roads and skid trails to reduce the potential for foot and unauthorized motor vehicle traffic.

Literature Cited:

- Aney, W. and R. McClelland. 1985. Pileated woodpecker habitat relationships (revised). Pages 10-17 *in* Warren, N. eds. 1990. Old growth habitats and associated wildlife species in the Northern Rocky Mountains. USFS, Northern Region, Wildlife Habitat Relationships Program R1-90-42. 47pp.
- Bull, E. L. and J. A. Jackson. 1995. Pileated woodpecker: *Dryocopus pileatus*. American Ornithologists' Union. Washington DC. 24pp.
- DNRC. 1996. State Forest Land Management Plan. Montana Department of Natural Resources and Conservation, Missoula MT.
- Henderson, R. E., B. A. Sterling, and T. O. Lemke. 1993. The lower Clark Fork elk study, Final Report 1985-1990. Montana Department of Fish, Wildlife, and Parks, Missoula, MT. 142pp.
- Hillis, J.M., and M.J. Thompson, J.E. Canfield, L.J. Lyon, C.L. Marcum, P.M. Dolan, and D.W. McCleerey. 1991. Defining elk security: the Hillis paradigm. Pages 38-43 *in* A.G. Christensen, L.J. Lyon, and T.N. Lonner, comps., Proc. Elk Vulnerability Symp., Mont. State Univ., Bozeman, MT. 330pp.
- Jones, J.L. 1991. Habitat use of fisher in north-central Idaho. M.S. Thesis, University of Idaho, Moscow, Idaho. 147 pp.
- Losensky, B. J. 1997. Historical vegetation of Montana. DNRC Report, Missoula MT. 100pp.
- Montana Bald Eagle Working Group. 1994. Montana Bald Eagle management plan. USDI Bureau of Land Management. Billings, MT. 61pp.
- McCallum, D. A. 1994. Review of technical knowledge: flammulated owls. Pages 14-46 *in* G. D. Hayward and J. Verner, tech eds. Flammulated, boreal, and great gray owls in the United States: a technical conservation assessment. USDA Forest Service Gen. Tech. Rep. RM-253. Fort Collins CO.

- McClelland, B.R. 1979. The pileated woodpecker in forests of the northern Rocky Mountains. Pages 283-299 *in* J. G. Dickson, R. N. Conner, R. R. Fleet, J C. Kroll, and J. A. Jackson, editors. The role of insectivorous birds in forest ecosystems. Academic Press, New York, New York.
- Powell, R. A. and W. J. Zielinski. 1994. Fisher. Pages 38-73 *in* Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski, tech eds. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. USDA Forest Service Gen. Tech. Rep. RM-254. Fort Collins CO.
- Ruediger, B., J. Claar, S. Mighton, B. Nanaey, T. Tinaldi, F. Wahl, N. Warren, D. Wenger, A. Williamson, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, S. Gniadek, 2000. Canada Lynx Conservation Assessment (2nd Edition). USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, MT. 122 pp
- USFWS. 1986. Recovery Plan for the Pacific Bald Eagle. USFWS. Portland OR. 160pp.
- USFWS. 1987. Northern Rocky Mountain Wolf Recovery Plan. USFWS. Denver, CO. 119pp.
- USFWS. 1993. Grizzly Bear Recovery Plan. Missoula MT. 181pp.

Table W-1 – Listed Sensitive Species for the Northwestern Land Office showing the status of these species in relation to this proposed project.

Species	Determination – Basis
Black-backed woodpecker	Dismissed – No recently (less than 5 years) burned areas are in the project area.
Boreal Owl	Dismissed – No units above 5,200 feet are in the project area.
Coeur d'Alene Salamander	Dismissed – No moist talus or streamside talus habitat occurs in the project area.
Columbian sharp-tailed grouse	Dismissed – No suitable grassland communities occur in the project area.
Common loon	Dismissed – No suitable lakes occur within the project area.
Ferruginous hawk	Dismissed – No suitable grassland communities occur in the project area.
Fisher	Included – Potential fisher habitat occurs along Miller Creek.
Flammulated Owl	Included – Suitable dry ponderosa pine habitats occur within the project area.
Harlequin duck	Dismissed – No suitable habitat occurs in the project area.
Mountain plover	Dismissed – No suitable grassland communities occur in the project area.
Northern Bog Lemming	Dismissed – No suitable bogs or fens occur in the project area.
Peregrine Falcon	Dismissed – No suitable cliffs/rock outcrops occur in the project area.
Pileated woodpecker	Included – Ponderosa pine, Douglas-fir/western larch, and mixed conifer habitats occur in the project area.
Townsend's big-eared bat	Dismissed – No caves or mine tunnels occur in the project area.

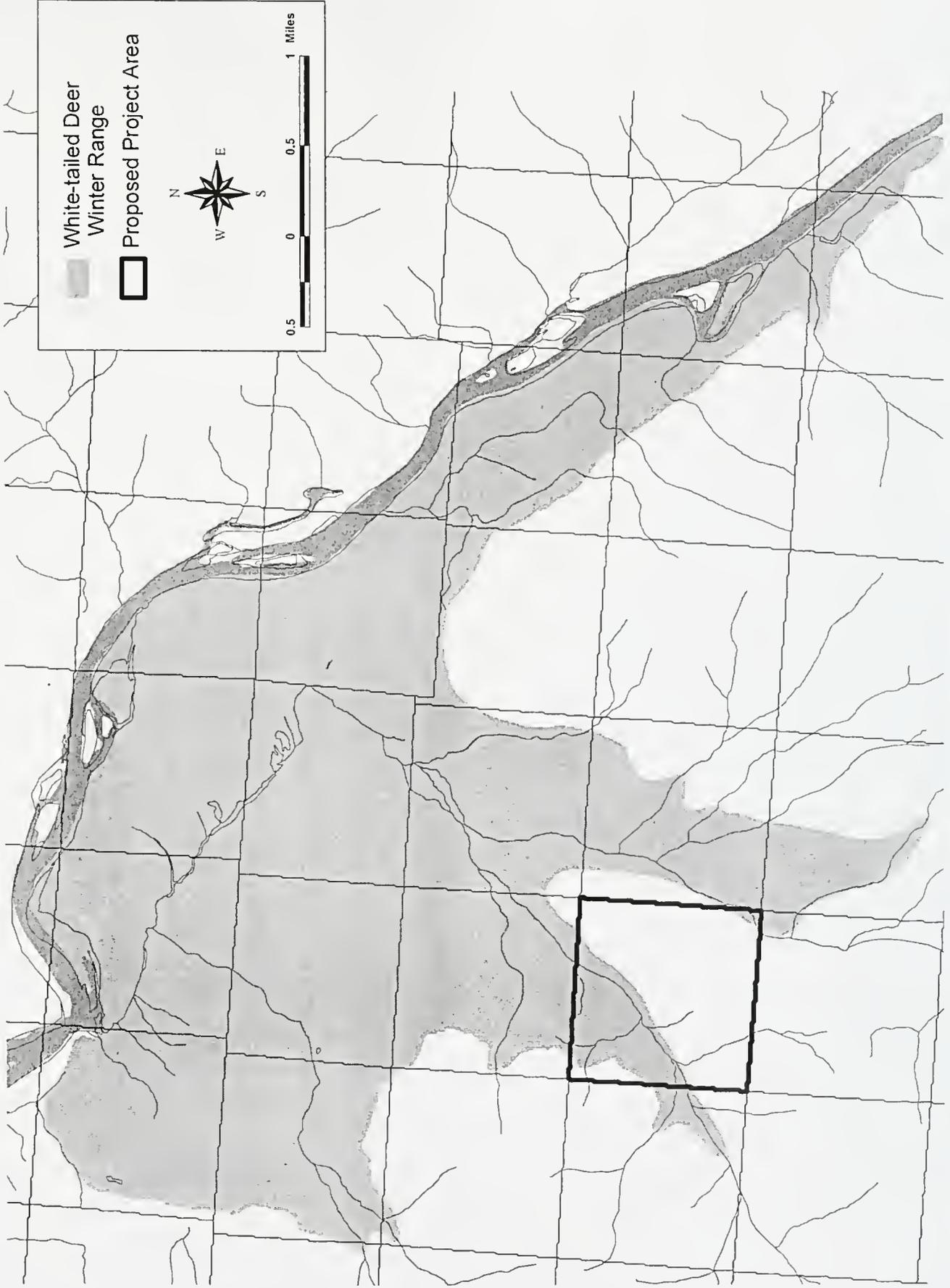


Figure W-1. Map of big game winter range cumulative effects analysis area for the proposed Miller Creek timber sale.

**PROPOSED MILLER CREEK TIMBER SALE
HARVEST UNIT PRESCRIPTIONS**

Harvest Unit: 1

Harvest Unit Acres: 14

Elevation: 3200'

Slope: 5% ↔ 30%

Aspect: East ↔ South ↔ West

Habitat Types: PIPO/PUTR; PSME/PHMA (CARU Phase)

Current Cover Type: Ponderosa Pine

Appropriate Cover Type: Ponderosa Pine

Soil Type: Deep, well drained, non-calcareous. Gravelly cobbly loam, covered by a duff layer of litter and organic matter 1 to 3 inches deep.

Description of Existing Stand: This unit is located near the top of a south facing ridge, with boundaries at mid slope on both the east and west aspects. The overstory consists of Ponderosa pine (80%), and Douglas-fir (20%). Overstory age averages 90 years, ranging from 80 to 120 years. Trees exceeding 120 years of age are present in trace amount only, less than 1 tree per acre. Overstory DBH averages 12", with a range of 8" to 18" in all species. Average overstory height is 75', with a range of 55' to 95'. Crown ratios average 50% but vary widely, from 10% to 90%, generally dependant upon spacing and stocking level. Overstory trees are evenly distributed and form a partially closed upper canopy layer, with a few interspersed openings at the upper ridgeline. A well defined intermediate canopy layer is present, composed of Ponderosa pine (85%) and Douglas-fir (15%). Average age of this intermediate layer is 60 years, ranging from 20 to 80 years. Average DBH is 6", with a range of 2" to 8". Height averages 50', with a range of 35' to 60'. Much of this intermediate layer is overstocked and suppressed. Intermediate layer crown rations average 30%, with a range of 10% to 60%. Regeneration is generally not present, but some is found in and bordering openings in the stand, and is composed of Ponderosa pine (50%) and Douglas-fir (50%). Merchantable basal area averages 120 ft²/acre. Insect and disease activity is light at this time, but evidence of heavy mortality (10-20 years past) in Ponderosa pine is present, with the most likely explanation being a heavy bark beetle attack. Western pine beetle (*Dendroctonus brevicomis*) is present in Ponderosa pine at this time, but only in light occurrence. Large snags (> 14" DBH) are present at 4 to 6 per acre. Surface fuel loading of down material averages 8 tons per acre.

Treatment Objectives:

- Reduce overstory stocking to a basal area of 60-ft²/ acre.
- Promote productive growth in the stand configuration associated with the appropriate cover type.

Prescribed Treatment:

- Thin from below to reduce overstocking with Ponderosa pine as the preferred species.
- Remove trees affected by insects and/or disease.
- Retain all snags > 14" DBH. All obvious large diameter cull trees will be retained as snag recruits.

Harvest Method:

- Tractor skidding is applicable for this unit. Either conventional or mechanized systems are acceptable.
- Individual tree selection with trees marked to cut.

Hazard Reduction:

- Lop and scatter slash within the harvest unit.
- Burn landing piles following harvest activity.

Regeneration/Site Preparation:

- Regeneration is not a primary objective for this unit.
- Spatial openings and soil disturbance created by the proposed treatments will provide opportunities for establishment of natural regeneration. No additional site preparation is necessary to meet stand objectives.

Anticipated Future Treatments:

- The proposed treatment maintains this area in the appropriate cover type. No future commercial treatment is planned at this time.
- Stand conditions will be monitored at regular intervals following the project period. Salvage or sanitation operations associated with insect or disease outbreaks, extreme weather events, fire, or other unexpected circumstances will be evaluated for action on a case-by-case basis.
- Evaluations for non-commercial thinning will be made at regular intervals following the project period.

Harvest Unit: 2

Harvest Unit Acres: 5

Elevation: 3100'

Slope: 10% ↔ 45%

Aspect: Southeast

Habitat Type: PSME/PHMA (CARU Phase)

Current Cover Type: Douglas-fir

Appropriate Cover Type: Ponderosa Pine

Soil Type: Deep, well drained, non-calcareous; gravelly cobbly loam covered by a duff layer of litter and organic matter 2" to 6" in depth.

Description of Existing Stand: This unit lies midslope with a southeast aspect. The overstory consists of Douglas-fir (90%), Ponderosa pine (10%), and western larch (T). Overstory age averages 100 years, ranging from 90 to 170 years. Trees exceeding 110 years are presenting in trace amount only, less than 1 TPA. Overstory DBH averages 12", with a range of 8" to 20". Trees exceeding 16" DBH are present at an average of 2 TPA. Average overstory height is 75' with a range of 55' to 110'. Crown ratios are generally poor, averaging 35%, ranging from 10% to 65%. Overstory trees are regularly distributed and form a well closed upper canopy layer. A defined intermediate canopy is not present, but scattered suppressed, poorly formed Douglas-fir (50%) and Ponderosa pine (50%) is present, averaging 4" DBH, 40' in height, and 60 years in age. Crown ratios in this group averages 20% with a range of 10% to 50%. Regeneration is generally not present, but some scattered groups of Douglas-fir are present in the lower elevations of the unit. Merchantable basal area averages 90 ft²/acre. Insects are not active at noticeable levels at this time, but dwarf mistletoe (*Arcuthobium* spp.) is present in a large percentage of the mature Douglas-fir. Large snags > 14" DBH are found at 1 to 2 per acre. Surface fuel loading of down material averages 8 tons per acre.

Treatment Objectives:

- Create a regenerating stand of the appropriate cover type.
- Eliminate the suppressed and poorly formed intermediate aged trees.
- Reduce the level of dwarf mistletoe affecting Douglas-fir in this area

Prescribed Treatment:

- Regeneration harvest, leaving an average of 6 Ponderosa pine and/or western larch seed trees per acre (average spacing 85').
- Slash all suppressed, poorly formed, non-merchantable trees.

- Retain all snags > 14" DBH. All large diameter obvious cull trees will be retained as snag recruits.

Harvest Method:

- Tractor skidding is applicable for this unit. Either conventional or mechanized systems are acceptable.
- Seed trees marked to leave.

Hazard Reduction:

- Excavator pile all slash in excess of retention requirements.
- Burn excavator piles and landing piles following harvest activity.

Regeneration/Site Preparation:

- Soil scarification for natural regeneration would be obtained in conjunction with excavator slash piling following harvest operations.
- Success of natural regeneration will be monitored and the stand planted if required.

Anticipated Future Treatments:

- The proposed treatment would reestablish this stand in the appropriate cover type. No future commercial activity is planned at this time.
- Stand conditions and progress of regeneration will be monitored at regular intervals following the project period. Opportunities for thinning will be considered as the stand progresses in age. Salvage and/or sanitation operations associated with insect or disease outbreaks, extreme weather events, fire, or other unexpected circumstances will be evaluated for action on a case-by-case basis.

Harvest Unit: 3

Harvest Unit Acres: 44

Elevation: 3200'

Slope: 15% ↔ 30%

Aspect: East ↔ Southeast

Habitat Type: PSME/CARU (AGSP Phase)

Current Cover Type:

Ponderosa Pine

Appropriate Cover Type: Ponderosa Pine

Soil Type: Deep, well drained, non-calcareous. Gravelly cobbly loam, covered by a duff layer of litter and organic matter 1 to 3 inches deep.

Description of Existing Stand: This unit lies mid slope on an east/southeast oriented ridgeline, bordered by ephemeral draws to the north, east, and south, also bordering Miller Creek on the southeast. The overstory is composed of Douglas-fir (60%) and Ponderosa pine (40%). Overstory age averages 110 years, but scattered older trees reaching 150 to 170 years are present, but at levels far below 1 tree per acre. Overstory DBH averages 16" and ranges from 9" to 18" in Douglas-fir, and 8" to 35" in Ponderosa pine, but exceeding 21" occur only rarely, at levels far below 1 tree per acre. Average overstory height is 90' with the occasional large diameter trees ranging 120' to 148'. Crown ratios average 35%, ranging from 15% to 50%. Overstory trees are evenly distributed and form a well defined moderately closed canopy layer which is overtopped only occasionally by older taller trees. A scattered, broken, and inconsistent intermediate canopy layer is present, composed of Douglas-fir (70%) and Ponderosa pine (30%). Average age of this intermediate layer is 45 years. DBH averages 4" to 6", height averages 40' with a range of 30' to 55'. Intermediate layer crown ratios average 25%. Distribution varies greatly, but generally this layer is found to be overstocked, suppressed, and poorly formed. New or advanced regeneration is not commonly present, but in scattered areas Douglas-fir (90%) and Ponderosa pine (10%) can be found. Merchantable basal area averages 100 ft²/acre. Insect and disease activity is light at this time, but western pine beetle (*Dendroctonus brevicomis*) is active in one area of the stand. Large snags (> 14" DBH) are present at 1 to 2 per acre. Surface fuel loading of down material averages 8 to 10 tons per acre.

Treatment Objectives:

- Reduce overstory stocking to 60 ft²/acre.
- Promote productive growth and stand configuration associated with the appropriate cover type.

Prescribed Treatment:

- Retain Ponderosa pine as preferred species, removing primarily Douglas-fir to achieve basal area goal.
- Retain all snags > 14" DBH. All obvious large diameter cull trees will be retained as snag recruits.
- Remove trees affected by insects and/or disease.

Harvest Method:

- Tractor skidding is applicable for this unit. Either conventional or mechanical systems are acceptable.
- Individual tree selection with trees marked to cut.

Hazard Reduction:

- Lop and scatter slash within the harvest unit.
- Burn landing piles following harvest activity.

Regeneration/Site Preparation:

- Regeneration is not a primary objective for this unit and stand.
- Spatial openings and soil disturbance created by the proposed treatments will provide opportunities for establishment of natural regeneration. No additional site preparation is necessary to meet stand objectives.

Anticipated Future Treatments:

- The proposed treatment maintains this area in the appropriate cover type. No further commercial treatment is planned at this time.
- Stand conditions will be monitored and evaluated at regular intervals following the project period. Salvage or sanitation operations associated with insect or disease outbreaks, extreme weather events, fire, or other unexpected circumstances will be evaluated on a case by case basis.

Harvest Unit: 4

Harvest Unit Acres: 17

Elevation: 3200' ↔ 2800'

Slope: 45%

Aspect: Northeast & Southwest

Habitat Type: ABGR/LIBO; PSME/PHMA; PSME/CARU

Current Cover Type: Mixed Conifer

Appropriate Cover Type: Mixed Conifer

Soil Type: Deep, well drained, non-calcareous. Gravelly cobbly loam, covered by a duff layer of litter and organic material 3" to 6" deep.

Description of Existing Stand: This unit lies across an ephemeral draw and contains equal portions of timber stands described in Units 1 and 3 prescriptions. Stand composition and detail are consistent with the descriptions detailed in the Unit 1 and Unit 3 prescriptions with the following exceptions: In the very lowest elevation near the ephemeral stream (approx 2 acres total area), in the class 3 SMZ, western larch is present in the overstory, averaging 18" in DBH, 120' in height, and average 4 trees per acre. Age of western larch overstory averages 120 years. Grand fir is present in the intermediate layer, averaging 6 inches to 8 inches DBH, height of 50 feet, forty years in age, and less than 10 trees per acre. Grand fir regeneration is also present in this area. Both height and diameter growth of all species is greater within the SMZ, with age remaining consistent with the adjoining stands. Insect and disease activity is increased in the SMZ area, most notably in Douglas-fir, which is affected by Douglas-fir beetle (*dendroctonus pseudotsugae*) and a variety of root and bole rots.

Treatment Objectives:

- Reduce overstocking and promote productive growth in the residual stand.
- Reduce the threat of increased insect and disease activity in this and adjacent areas.
- Promote productive growth in the stand configuration associated with the appropriate cover type.

Prescribed Treatment:

- Thin Ponderosa pine (east portion of unit) from below with Ponderosa pine as the preferred species. Reduce stocking (west portion of unit) favoring Ponderosa pine and removing approximately 50% of the Douglas-fir. Target basal area in the residual stand is 60 ft²/acre.
- Remove trees affected by insects and diseases.
- Retain all snags > 14" DBH. Retain large diameter obvious cull trees as snag recruits.

Harvest Method:

- Cable yarding, fully suspending logs crossing the SMZ, is required for this unit. Whole tree yarding of any/all trees cut within the SMZ is required.
- Individual tree selection with trees marked to cut.

Hazard Reduction:

- Lop and scatter slash created within the unit.
- All slash must be removed from the SMZ. Any/all trees cut within the SMZ must be whole tree yarded to a landing.
- Burn landing piles following harvest operations.

Regeneration/Site Preparation:

- Regeneration is not a primary objective for this unit.
- Spatial openings created by proposed treatments will provide opportunities for natural regeneration of all tree species present in this stand.

Anticipated Future Treatment:

- The proposed treatment maintains this area in its appropriate cover type. No future treatment is anticipated at this time.
- Stand conditions will be monitored at regular intervals following the project period. Salvage or sanitation operations following insect or disease outbreaks, extreme weather events, fire, or other unexpected circumstances would be evaluated on a case by case basis.

Harvest Unit: 5

Harvest Unit Acres: 21

Elevation: 3200' ↔ 2700'

Slope: 40%

Aspect: East

Habitat Type: PSME/PHMA and ABGR/LIBO

Current Cover Type: Mixed Conifer

Appropriate Cover Type: Ponderosa Pine

Soil Type: Deep, well drained, non-calcareous. Gravelly, cobbly loam, covered by a duff layer of litter and organic matter 1 to 3 inches deep.

Description of Existing Stand: This unit lies from the SMZ of Miller Creek to near the ridgeline west of the creek. The overstory consists of Ponderosa pine (75%), Douglas-fir (25%), western larch (T), and Grand fir (T). Overstory age averages 110 years in Ponderosa pine and western larch, 90 years in Douglas-fir, and 70 years in Grand fir. Trees older than 110 years are found rarely, < 1 tree per acre. DBH averages 16" in Ponderosa pine and western larch, 12" in Douglas-fir, and 14" in grand fir. Height of all

overstory tree species averages 90', with a range of 65 to 120'. Crown ratios vary greatly, being highly dependant on stocking levels and spacing. Areas of high stocking show Ponderosa pine crowns of 10% to 15%, while more open areas average 50%. Douglas-fir also varies widely for the same reasons, with overstocked areas having 20% to 25% crowns, and more open areas 70% to 80%. Overstory trees vary in distribution, generally denser near the lower elevation and Miller Creek SMZ, and patchier with open areas in the higher elevation. An intermediate canopy layer of suppressed Douglas-fir (90%) and Ponderosa pine (10%) is present in some areas, but not consistently found across the unit. Intermediate grand-fir is found in trace amounts in the area of the SMZ. Insect and disease activity is present in somewhat significant levels at this time, with Ponderosa pine showing many areas of western pine beetle (*Dendroctonus brevicomis*) infestation. Douglas-fir and grand fir are heavily affected by a variety of root diseases, primarily in the lower, moister areas of the unit. Douglas-fir beetle (*Dendroctonus pseudotsugae*) is moderately active in the Douglas-fir, again in the lower, moister area of the unit. Large snags (>14" DBH) are present at 4 to 6 per acre. Surface fuel loading of down material ranges from 10 to 65 tons per acre, with the higher levels also associated with the lower moist area adjacent to Miller Creek.

Treatment Objectives:

- Reduce overstory stocking to a basal area of 60 ft²/acre.
- Promote productive growth in a stand configuration associated with the appropriate cover type.
- Reduce insect and disease activity and the potential for this activity to expand into surrounding stands.

Prescribed Treatment:

- Thin from below with Ponderosa pine as the preferred species.
- Remove trees affected by insects or diseases.
- Retain all snags > 14" DBH.

Harvest Method:

- Cable (skyline) logging required for this unit.
- Individual tree selection with trees marked to cut.

Hazard Reduction:

- Excavator pile slash following harvest activity. Whole tree yarding is allowed, but slash retention requirements leaving 30% of material 3" and less in diameter on the unit must be met.
- Burn excavator piles and landing piles following harvest activity.

Regeneration/Site Preparation:

- Spatial openings created by the proposed treatments will provide opportunities for natural regeneration of preferred tree species retained in this unit.
- Slash piling operation will provide adequate scarification for establishment natural regeneration of preferred species.

Anticipated Future Treatments:

- The proposed treatment will convert this area to the appropriate cover type and provides for natural regeneration of preferred species.
- This unit will be evaluated for possible commercial or non-commercial thinning after 15 to 20 years of growth.
- Stand conditions will be monitored and evaluated at regular intervals following the proposed project activity. Salvage or sanitation operations following insect or disease outbreaks, extreme weather events, fire, or other unexpected circumstances will be evaluated on a case-by-case basis.

Harvest Unit: 6

Harvest Unit Acres: 41

Elevation: 3800 ↔ 2800 **Slope:** 55% ↔ 70% **Aspect:** North ↔ Northeast

Habitat Type: ABGR/LIBO, ABGR/XETE, PSME/LIBO, PSME/SYAL

Current Cover Type: Mixed Conifer

Appropriate Cover Type: Western Larch/Douglas-fir

Soil Type: Deep, gravelly and well drained, non-calcareous residual rock material mixed with colluvial gravels and cobbles derived from argillites and quartzites. Duff layers of litter and organic material 1 to 2 inches deep are generally present.

Description of Existing Stand: This unit is located at the lower and mid slope areas of a north facing ridge above the Miller Creek drainage. The overstory consists of Douglas-fir (60%), Western Larch (20%), Grand-fir (10%), and Ponderosa pine (10%). Overstory age

averages 90 years, ranging from 70 to 110 years. Trees exceeding 110 years of age are present in trace amounts only, less than 1 tree per acre. Overstory DBH averages 12" with a range of 8" to 18" in all species. Trees exceeding 18" DBH are found only rarely, less than 1 tree per acre. Average height is 80' with a range of 55' to 100'. Crown ratios average 50% but vary widely with species and stocking level. Overstory trees are evenly distributed and form a well closed upper canopy layer. A poorly formed, suppressed, and unevenly distributed intermediate canopy layer is present, composed primarily of Douglas-fir (80%) and grand fir (20%). Average age of this intermediate layer is 40 years, ranging from 20 to 60 years. Average intermediate layer DBH is 5", with a range of 2" to 6". Intermediate layer height averages 40', with a range of 20' to 50'. Intermediate crown ratios average 25% with a range of 10% to 75%. Regeneration is scattered throughout the stand and is composed of Douglas-fir (80%) and grand-fir (20%). Merchantable basal area averages 140-ft²/ acre. Insects and diseases are somewhat active at this time but not in epidemic levels. Large snags (> 14" DBH) are present at 1 - 2 per acre. Surface fuel loading averages 30 to 40 tons/acre.

Treatment Objectives:

- Create a regenerating stand of the appropriate cover type.
- Reduce insect and disease activity and the potential for this activity to expand into surrounding stands.
- Reduce fuel accumulations and associated risk of wildfire.

Prescribed Treatment:

- Retain 10 to 12 seed trees per acre (average spacing 60'), order of preferred species being Ponderosa pine, western larch, and Douglas-fir.
- Retain all snags > 14" DBH.
- Cut all sub-merchantable trees.

Harvest Method:

- Cable (skyline) logging required for this unit.
- Seed trees marked to leave.

Hazard Reduction:

- Broadcast burn unit following harvest activity.
- Burn landing piles following harvest activity.

Regeneration/Site Preparation:

- Broadcast burning will provide adequate site preparation for regeneration.
- Leave trees will provide a seed source for natural regeneration of preferred species. Unit will be monitored for regeneration success and will be planted if natural regeneration is not successful.

Anticipated Future Treatments:

- The unit will be monitored for progress of natural or planted regeneration. Evaluation for non-commercial thinning will take place in 20 years, No future commercial activity is planned at this time.
- Stand conditions will be monitored and evaluated at regular intervals following the project period. Salvage and sanitation operations associated with insect or disease outbreaks, severe weather events, fire, or other unexpected circumstances will be evaluated on a case by case basis.

Harvest Unit : 7

Harvest Unit Acres: 74

Elevation: 3800' ↔ 2900'

Slope: 15% ↔ 40%

Aspect: Northwest

Habitat Type: PSME/PHMA

Current Cover Type: Douglas-fir

Appropriate Cover Type: Ponderosa Pine

Soil Type: Deep, well drained, gravelly loam to clay loam. Intermittent volcanic ash influence to surface soils.

Description of Existing Stand: This unit occupies the ridge east of Miller creek, ranging from approximately 200 feet above the draw bottom to the ridgetop. The overstory consists of Douglas-fir (80%), Ponderosa pine (15%), and western larch (5%). Overstory age averages 90 years, but scattered older trees between 120 and 140 years remain as remnants of previous stands. These older trees occur at less than 1 per acre. Overstory DBH averages 14" in all species, ranging from 8" to 28",. Trees exceeding 20" DBH are found only rarely, at less than 1 tree per acre. Height of all tree species averages 75' with a range of 65' to 110'. Crown ratios average 35 % but range from 5% to 85% generally depending on spacing and stocking levels. In Douglas-fir, poor crowns are more commonly present than healthy vigorous crowns. Ponderosa pine is generally in good health and exhibiting vigorous growth in all age classes. Overstory trees are evenly distributed and form a well closed upper canopy layer. A suppressed, poorly formed

intermediate canopy layer of Douglas-fir (90%) and Ponderosa pine (10%) is present. Regeneration is generally not present, but occasional pockets of Douglas-fir can be found. Insect and disease activity is present in all species. Douglas-fir is affected by a variety of root diseases and Douglas-fir beetle, dwarf mistletoe (*Arcuthobium* spp.) and Douglas-fir beetle (*Dendroctonus pseudotsugae*). Dwarf mistletoe (*Arcuthobium* spp.) is extremely active in western larch. Western pine beetle is somewhat active in Ponderosa pine. Merchantable basal area averages 120 ft²/acre. Large snags (> 14" DBH) are found at an average of 4 to 6 per acre. Surface fuel loading of down material averages 20 ton per acre with some concentrations exceeding 40 tons per acre.

Treatment Objectives:

- Create a productive, regenerating stand of the appropriate cover type.
- Reduce insect and disease activity and the potential for this activity to expand into surrounding stands.

Prescribed Treatment:

- Remove all merchantable Douglas-fir.
- Remove merchantable trees of other species to an average 40-ft²/acre basal area.
- Retain all snags > 14" DBH.
- Cut sub-merchantable trees of all species.

Harvest Method:

- Tractor logging is applicable for this unit. Conventional or mechanized systems are acceptable.
- All Douglas-fir to be cut and are not marked. Other species marked to cut.

Hazard Reduction:

- Excavator pile unit following harvest operations.
- Burn excavator piles and landing piles following harvest and piling operations.

Regeneration/Site Preparation:

- Piling operation will provide scarification for regeneration of preferred species.

- Leave trees will provide seed source for natural regeneration of Ponderosa pine and western larch. Unit will be monitored for success of regeneration and will be planted if natural regeneration is not successful.

Anticipated Future Treatments:

- Unit will be monitored for progress of natural or planted regeneration. Evaluation for non-commercial thinning will take place in 20 years. No future commercial activity is planned at this time.
- Stand conditions will be monitored and evaluated at regular intervals following the project period. Salvage or sanitation operations following insect or disease outbreak, extreme weather events, fire, or other unexpected circumstances will be evaluated on a case-by-case basis.

Harvest Unit: 8

Harvest Unit Acres: 145

Elevation: 3800' ↔ 2800'

Slope: 55%

Aspect: West ↔ Southwest

Habitat Type: PSME/PHMA

Current Cover Type: Douglas-fir

Appropriate Cover Type: Ponderosa Pine

Soil Type: Deep, well drained, gravelly loam to clay loam; intermittent volcanic ash influence in surface soils.

Description of Existing Stand: This unit occupies the ridge east of Miller Creek, ranging from approximately 200' above the draw bottom to the ridgetop. The overstory consists of Douglas-fir (85%), Ponderosa pine (10%), and western larch (5%). Overstory age averages 90 years, but scattered older trees between 120 and 140 years remain as remnants of previous stands. These older trees are found at less than 1 tree per acre. Overstory DBH averages 14" in all species, ranging from 8" to 20". Trees exceeding 20" DBH are found only rarely, less than 1 tree per acre. Height of all tree species averages 75' with a range of 65' to 110'. Crown ratios average 35%, but range from 5% to 80% generally depending on spacing and stocking levels. In Douglas-fir, poor crowns are more commonly present than healthy vigorous crowns. Ponderosa pine is generally in good health and exhibiting vigorous growth in all age classes. Excepting areas of slide rock and scree, overstory trees are evenly distributed and form a well closed upper canopy layer. A suppressed, poorly formed intermediate layer of Douglas-fir (90%) and

Ponderosa pine (10%) is present. Regeneration is generally not present, but occasional pockets of regenerating Douglas-fir can be found. Insect and disease activity is present in all species. Douglas-fir is affected by a variety of root diseases, dwarf mistletoe (*arecuthobium* spp.), and Douglas-fir beetle (*Dendroctonus pseudotsugae*). Dwarf mistletoe (*Arecuthobium* spp.) is extremely active in western larch. Western pine beetle (*Dendroctonus brevicomis*) is somewhat active in Ponderosa pine. Merchantable basal area averages 120 ft²/acre. Large snags (>14" DBH) are found at 4 to 6 per acre. Surface fuel loading of down material averages 20 tons per acre with some concentrations of 40 tons per acre.

Treatment Objectives:

- Create a productive, regenerating stand of the appropriate cover type.
- Reduce insect and disease activity and the potential for this activity to expand into surrounding stands.

Prescribed Treatment:

- Remove all merchantable Douglas-fir
- Remove merchantable trees of other species to an average 40-ft²/acre basal area.
- Retain all snags > 14" DBH
- Remove sub-merchantable trees of all species.

Harvest Method:

- Cable (skyline) logging required for this unit.
- All merchantable Douglas-fir to be cut and is not marked. Other species marked to cut.

Hazard Reduction:

- Lop and scatter slash created within unit.
- Whole tree yarding is acceptable, but slash retention requirements of 30% of all material < 3" in diameter must be met.
- Burn landing piles following harvest activity.

Regeneration/Site Preparation:

- Logging operations will provide openings for establishment of natural regeneration.
- Leave trees will provide seed source for natural regeneration of Ponderosa pine and western larch.
- Unit will be monitored for success of regeneration and will be planted if natural regeneration is not successful.

Anticipated Future Treatments:

- The unit will be monitored for progress of natural or planted regeneration. Evaluation for non-commercial thinning will take place in 20 years. No future commercial activity is planned at this time.
- Stand conditions will be monitored and evaluated at regular intervals following the project period. Salvage and sanitation operations associated with insect or disease outbreaks, severe weather events, fire, or other unexpected circumstances will be evaluated on a case by case basis.

Harvest Unit: 9

Harvest Unit Acres: 92

Elevation: 3800' ↔ 3100'

Slope: 55%

Aspect: East

Habitat Type: PIPO/PUTR/AGSP, PSME/LIBO, PSME/CARU

Current Cover Type: Mixed Conifer

Appropriate Cover Type: Ponderosa Pine

Soil Type: Moderately deep, well drained, gravelly, with volcanic ash influence in surface soil.

Description of Existing Stand: This unit is located on an east facing ridge and occupies an area from the lower slope to near ridgetop. The overstory consists of Douglas-fir (70%) and Ponderosa pine (30%), and grand-fir (t). Overstory age averages 100 years, ranging from 80 to 140 years. Trees older than 140 years are present at approximately 1 per acre and are found scattered throughout the stand, generally found in open areas near the ridgetop and meadows at the northern extremity of the unit. Overstory DBH averages 15", with a range of 8" to 20". Trees exceeding 20" DBH are present at approximately 1 per acre, consistent with the older age scattered trees. Average overstory height is 80', with a range of 65' to 110'. Overstory crown ratios average 50%, varying from 30% to

80%, generally dependant on spacing and stocking level. Overstory trees are fairly well distributed and form a partially closed upper canopy, with areas that are heavily stocked forming patches of tightly closed upper canopy. An intermediate canopy layer is generally not present, but can be found in some areas, and is composed of Douglas-fir (95%), Grand-fir (5%), and Ponderosa pine (t). Average age of this intermediate layer is 50 years, ranging from 30 to 60 years. Where present, average intermediate DBH is 6" and average height is 50'. Regeneration is generally not present, but where found is composed of Douglas-fir (90%), Ponderosa pine (5%), and grand-fir (5%). Merchantable basal area averages 120 ft²/acre with great variation, ranging from lows of 40 ft²/acre to 240 ft²/acre. Insect and disease activity is somewhat active at this time, but an earlier outbreak of western pine beetle (*Dendroctonus brevicomis*) in 1994 and 1995 has left moderate levels of mortality in Ponderosa pine. Dwarf mistletoe (*Arcuthobium* spp.) is present in Douglas-fir, Douglas-fir Beetle (*Dendroctonus pseudotsugae*) is active in Douglas-fir, and western pine beetle (*Dendroctonus brevicomis*) is somewhat active in Ponderosa pine, but not at epidemic levels. Large snags (> 14" DBH) are present at an average of 2 per acre, but some areas of prior and current concentrated beetle activity has left larger numbers of snags in groups scattered throughout the unit. Surface fuel loading of down material averages 20 tons per acre.

Treatment Objectives:

- Create a regenerating stand of the appropriate cover type.
- Reduce the threat of insects and diseases increasing in activity and affecting this and surrounding timber stands.

Prescribed Treatment:

- Retain 10 to 12 seed trees per acre (average spacing 60'), preferring retention of Ponderosa pine over Douglas-fir.
- Retain all snags > 14" DBH.
- Cut all sub-merchantable trees.

Harvest Method:

- Cable (skyline) logging required for this unit.
- Seed trees marked to leave.

Hazard Reduction:

- Broadcast burn unit following harvest activity.
- Burn landing piles following harvest activity.

Regeneration/Site Preparation:

- Broadcast burning will provide adequate site preparation for regeneration.
- Leave trees will provide a seed source for natural regeneration of preferred species. Unit will be monitored for regeneration success and will be planted if natural regeneration is not successful.

Anticipated Future Treatments:

- The unit will be monitored for progress of natural or planted regeneration. Evaluation for non-commercial thinning will take place in 20 years. No future commercial activity is planned at this time.
- Stand conditions will be monitored and evaluated at regular intervals following the project period. Salvage and sanitation operations associated with insect or disease outbreaks, severe weather events, fire, or other unexpected circumstances will be evaluated on a case by case basis.

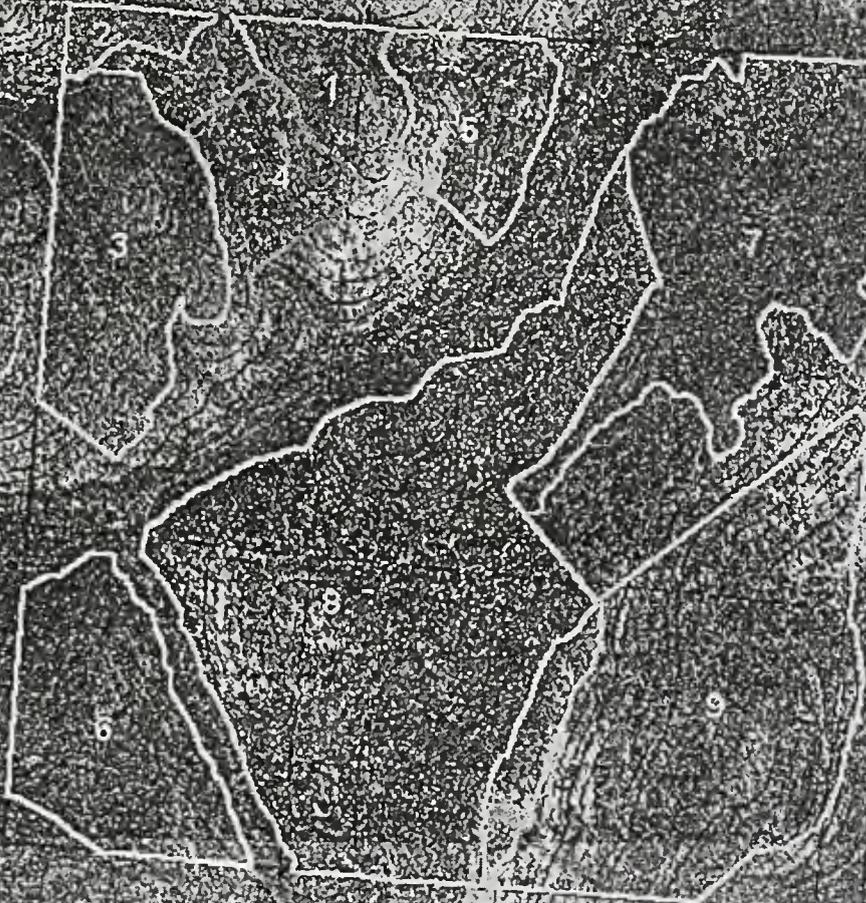
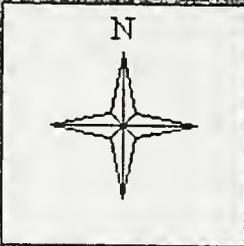
PLAINS UNIT COVER TYPE COMPARATIVE TABLE				
Cover Type	Current Acres	Estimated Historic Appropriate Acres	Post Project Acres	Net Change
ALP	692.8	179.6	692.8	0
DF	2,089.8	2,261.2	1,865.8	- 224
HW	110.9	110.9	110.9	0
LPP	3,578.7	2,763.5	3,578.7	0
MC	8,583.9	1,479.6	8,429.9	- 154
PP	27,901.8	27,948.8	28,238.8	+ 337
WL/DF	9,137.4	17,686.2	9178.4	+ 41
WWP	306.8	366.1	306.8	0
NSTKD	393.8	Evenly distributed by type	393.8	0
TOTAL	52,795.9	52,795.9	52,795.9	

PROJECT AREA COVER TYPE COMPARATIVE TABLE				
Cover Type	Current Acres	Estimated Historic Appropriate Acres	Post Project Acres	Net Change
ALP	0	0	0	0
DF	265	0	41	- 224
HW	0	0	0	0
LPP	0	0	0	0
MC	181.9	32.1	27.9	- 154
PP	179.4	554.4	516.4	+ 337
WL/DF	0	39.8	41	+ 41
WWP	0	0	0	0
NSTKD	13.7	13.7	13.7	0
TOTAL	640	640	640	

HARVEST UNIT COVER TYPE /AGE CONVERSION SUMMARY			
Unit	Cover Type/Age	Acres	Converted To
1	Ponderosa Pine 40-99	14	No Conversion
2	Douglas-fir 100-OG	5	Ponderosa Pine 0-39
3	Ponderosa Pine 100-OG	44	No Conversion
4	Mixed Conifer 100-OG	17	No Conversion
5	Mixed Conifer 40-99	21	Ponderosa Pine 100-OG
6	Mixed Conifer 40-99	41	Western Larch/Douglas-fir 0-39
7	Douglas-fir 40-99	74	Ponderosa Pine 100-OG
8	Douglas-fir 40-99	145	Ponderosa Pine 100-OG
9	Mixed Conifer 100-OG	92	Ponderosa Pine 0-39

* Ground Truth Verification of SLI data is reflected in all above tables

Current Cover Types of Proposed Units



Township 19 N
Range 26 W
Section 16



Current Cover Types of Units

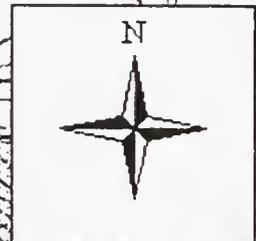
Current Cover Types of Units

-  DF
-  DFWL
-  MC
-  PP

1000 0 1000 2000 Feet



Miller Creek Timber Sale Post Project Cover Types



Township 19 N
Range 26 W
Section 16

Post Project Cover Types

Haul Roads

— Haul Roads

☆ Bridge

Post Action Cover Types of Units

DF

DF/WL

MC

PP



O R E S T

MITIGATION MEASURES

Roads: A transportation system minimizing road miles and meeting all Montana Best Management Practices (BMP's) has been designed by the DNRC. This system proposes the construction of 5 miles of new road, which will remain in place following project activity. Included in this new construction is a crossing of Miller Creek utilizing a 48' steel temporary bridge placed on permanent abutments, allowing for removal and/or re-installation at a future date. There would be no disturbance to the Miller Creek channel. Slash filters will be installed for sediment control in the stream crossing area. Existing road totaling 3¾ miles would be abandoned and permanently closed to motorized use. An additional ¼ mile of existing road would be mechanically obliterated and returned to natural contour. Existing road incorporated into the transportation plan totals 5¼ miles, all of which would be upgraded to meet BMP's. The reciprocal access agreement now in place with Plum Creek Timber would be modified to eliminate 3¾ miles of existing road which cannot be physically improved to meet BMP's, replacing it with 1¼ miles of newly constructed road which does meet all BMP requirements.

Wildlife: The following issues have been identified, with mitigation measures (italicized) incorporated into the proposed project:

Bald Eagle: Cease all operations and consult with a DNRC biologist for further mitigations should a nesting pair of eagles is observed within one mile of any project related activity. *This measure will be specified within the Timber Sale Contract and would be monitored by the Timber Sale Administrator.*

Grizzly Bear: Minimize number of roads (open and closed), and slashing old roads and skid trails to reduce the potential for foot and unauthorized motor vehicle traffic. *Open road mileage in the area is minimized both through system design and the closure of existing roads. All roads on this and surrounding Plum Creek sections are closed to motorized use year round. Contract specifications will require the placement of slash on skid trails at the completion of use. Spacing of skid trails and line corridors will be minimized and approved by DNRC Sale Administrator prior to construction and use. Skid trail location and treatment will be monitored by the Timber Sale Administrator. Abandoned roads will be allowed to re-vegetate naturally.*

Gray Wolf: 1) Suspension of operations and temporary restriction of use of roads within a 1 mile radius of any known wolf den; 2) suspend operations and consult a DNRC biologist if a suspected rendezvous site is observed within ½ mile of any ongoing project activities. *These items will be specified in the Timber Sale Contract and monitored by the Timber Sale Administrator.* 3) Retain connective corridors of heavy forest cover when possible to minimize travel routes, visual screening, and partial security for elk and deer. *Unit location and harvest unit design has provided for these items.* 4) Minimize number of roads (open and closed), and slash old roads and skid trails to reduce the potential for foot and unauthorized motor vehicle traffic. *This item is identical in mitigation as listed under Grizzly Bear in the preceding paragraph.*

Fisher: Restrict public access to reduce potential for trapping pressure and loss of existing snags to firewood gathering. *All roads located on this section, as well as all roads accessing the area, are under yearlong closure to motorized use.*

Flammulated Owl: Favor Ponderosa pine retention and regeneration decisions and restrict public access to reduce potential loss of existing snags to firewood gathering. *Harvest Unit and Timber stand prescriptions favor the retention of Ponderosa pine and would convert 378 acres to appropriate historic cover types, of which 337 acres are Ponderosa pine type. Year round road closure of the area will control losses of snags to firewood gatherers.*

Pileated Woodpecker: Favor Ponderosa pine and western larch in retention and regeneration decisions, and restrict public access to reduce potential loss of existing snags to firewood gathering. *Mitigations identical with those listed under flammulated owl in preceding paragraph.*

Big Game Winter Range: In harvest units within winter range, retain patches of dense vegetation when possible to provide some thermal cover/snow intercept capacity, and 2) minimize number of roads (open and closed), and slash old roads and skid trails to reduce the potential for disturbance from foot and unauthorized motor vehicle traffic. *Naturally occurring patches of dense vegetation, varying in size and species composition, are found in all areas of this section. Marking guidelines have been designed to retain patches within units. Unit design and location has provided for retention of corridors and patches between units. Road and skid trail mitigation is identical with that listed under grizzly bear mitigation.*

Elk Security: 1) Retain connective corridors of heavy forest cover along riparian areas and on the ridge line when possible to maintain travel routes, visual screening, and security for elk and deer, and 2) minimize number of roads (open and closed) and slash old roads and skid trails to reduce the potential for foot and unauthorized motor vehicle traffic. *Other than one short ephemeral segment, riparian areas are not included in harvest activity. One SMZ will be crossed by bridge, otherwise all existing SMZ vegetative conditions will continue as is without interruption. Ridgeline to the east has been left out of harvest units, by design, to retain vegetation as it now exists. Road and skid trail mitigation is identical with those listed under grizzly bear mitigation.*

Soils: Equipment operations would be limited to periods when soils are relatively dry (less than 20% moisture content), frozen, or snow covered to minimize soil compaction and rutting, and to maintain drainage features. Soils moisture conditions would be measured prior to start up and during operations when deemed necessary by DNRC. All skid trails and line corridors would be identified and approved by DNRC prior to construction or use of said trails or corridors. Tractor skidding would be limited to slopes 40% or less. Slash retention would be contract specified to retain 10 to 15 tons of large woody debris and 30% of small diameter (<3") material. The Timber Sale Administrator would monitor all soil mitigation measures.

Hydrology: Implementation of the SMZ rules and Forestry BMP's would result in low risk of sediment introduction into Miller Creek. Full cable suspension logging and hand falling will be specified for Unit 4, which crosses an ephemeral type 3 SMZ. The bridge crossing Miller Creek will be installed during late summer at the low flow/no flow period. All applicable BMP's will be followed to minimize the risk of sediment introduction to Miller Creek. All operations to repair ephemeral channels will also be done in the late summer season, in the no flow period. Location of new roads away from streams and SMZ's reduces the risk of sediment introduction.

Noxious Weeds: Measures to control the introduction or increases to infestations of noxious weeds will be implemented through the Timber Sale Contract. Control measures include the washing of all equipment prior to entering the project area and seeding all areas of disturbed soil associated with road construction or upgrades. Roads will again be seeded at the close of project activity. Measures to control any unforeseen outbreak will be implemented as needed through and beyond the project operational period.

Insects and Diseases: Selective cutting and promoting open healthy timber stands will assist in controlling insect and disease activity in the project area. Trees showing signs of insect infestations, dwarf mistletoes, root rots, and other maladies will be marked to cut in all selective units. Seed tree regeneration units will not retain trees affected by insects or diseases as leave trees.

PROPOSED MILLER CREEK TIMBER SALE
CONSULTANTS AND REFERENCES

Individuals Consulted

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Everett Young, MT DNRC, Plains Unit, Plains, MT

Special Reference

Forestry Best Management Practices, Montana Department of Natural Resources and Conservation
Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old Growth Forest Types of the Northern Region. USDA Forest Service, Northern Region, Missoula, Montana.
Losensky, B. John. 1997. Historical Vegetation of Montana.. Montana Department of Natural Resources and Conservation
State Forest Land Management Plan, Montana Department of Natural Resources and Conservation, 1996

