EA-95-06

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Deer Creek Salvage Timber Sale
Proposed Implementation Date:	December 2006
Proponent:	Montana Department of Natural Resources and Conservation, Southern Land Office
Location:	Section 16, T2S-R15E
County:	Sweet Grass

I. TYPE AND PURPOSE OF ACTION

The Southern Land Office (SLO) of the Montana Department of Natural Resources and Conservation (DNRC) is proposing commercial timber harvest within the area burned in September 2006 by the Derby fire. The proposed harvest area is located approximately 9 miles southeast of Big Timber, in Section 16 of Township 2 South, Range 15 East (Attachment B, Vicinity Map). The DNRC has the opportunity to do this project through a limited access timber sale, working with the surrounding landowner to access and manage this section. Under the proposed action, DNRC would harvest up to approximately 1 million board feet of burned, partially burned, fire damaged and high risk scorched Douglas-fir and ponderosa pine from approximately 250 acres. In addition to timber harvest, road maintenance and approximately ¼ mile of temporary low standard road building would occur. If the Action Alternative is selected, activities could begin in December 2006. An estimated $100,000 in revenue to the Common Schools Trust would be generated through the implementation of the Action Alternative.

The lands involved in this proposed project are held by the State of Montana in trust for the Common Schools (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the DNRC are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for the beneficiary institutions (Section 77-1-202, MCA). Specific objectives of the project are to capture timber values at risk of loss and to mitigate adverse environmental impacts of recent fire in terms of restoring a healthy forest and promoting the forest's future income-generating potential.

II. PROJECT DEVELOPMENT

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

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

DNRC sent scoping letters on October 11, 2006 to lessees, adjacent landowners, and other interested parties. A public notice was run in the Billings Gazette, Bozeman Chronicle, Livingston Enterprise, and Carbon County News. One written comment letter was received and used to identify concerns and modify the proposed action. DNRC specialists were also consulted, including: Jeff Schmalenberg, Soil Scientist; Gary Frank, Hydrologist; Patrick Rennie, Archeologist; and Ross Baty, Wildlife Biologist.

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

A Stream Preservation Act Permit (124 Permit) would be required for use of existing fords located within the Cedar Creek drainage. The 124 permit had been applied for based on input received from DNRC Hydrologist and Soil Scientist.

Slash burning would be done in compliance with statewide cooperative agreements as well as any local restrictions.

3. ALTERNATIVES CONSIDERED:

No Action: None of the proposed harvest or roadwork would occur at this time. The current land use activity of grazing would continue.

Timber Harvest Alternative: Under this alternative, DNRC would continue current uses, and also harvest merchantable-size burned, partially burned, fire damaged and high risk scorched trees. The harvest would include individual and clump mosaic leave tree and group selection of severely burned areas. Live, healthy Douglas-fir and ponderosa pine would be retained in the areas burned at lower intensities. Up to 1 million board feet would be harvested from approximately 250 acres (Attachment A, Proposed Harvest Units and Roads Map). Timber would be harvested with ground-based methods. The harvest activity may require the construction of approximately ¼ mile of temporary low standard road and the maintenance and use of existing roads on both state and private land as designated haul routes.

No Harvest Alternative: During scoping for the proposed project, one commenter suggested an alternative to carry out only restoration activities, specified as an alternative to remove or fix roads with design flaws. This alternative would not meet the project objective of capturing timber values, and would not be economically feasible to carry out, so it was not studied in detail. However, DNRC shares the concerns about roads and did incorporate road improvements into the action alternative.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

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

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

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

The potential concerns regarding logging in a post-fire environment are the sites increased sensitivity to erosional processes and alterations to the physical soil properties such as hydrophobicity, increased bulk density, loss of macroporosity, and displacement of surface soils. All of the above mentioned concerns can individually and cumulatively affect both soil productivity and soil quality. The most detrimental cumulative effects associated with the proposed action would include decreased soil productivity and hydrologic function resulting from disturbances associated with ground based harvest techniques (compaction, erosion, and displacement).

With recommended mitigation measures, conclusions drawn about post-fire winter harvest ground disturbances from DNRC's previous monitoring efforts are applicable. Direct, indirect, and cumulative effects of the proposed action will have minimal effects on the soil resource in the project area. Minimal road construction would be required (up to ¼ mile) and would have detrimental effects to those locations but would be relatively small when compared to the scope of the spatial extent of project area.

For detailed analysis, please refer to Attachment C, Soils Report.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

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

No substantial direct, indirect or cumulative impacts to water quality, water quantity or downstream beneficial uses are expected to result from implementation of the proposed action alternative. Low levels of short-term on-site erosion of road surfaces, cut slopes and fill slopes during and shortly after road construction, abandonment, or obliteration can be expected. Levels of erosion from roads are expected to be low enough to present only low risk of delivery and subsequent impact to water quality. Potential risk of sediment delivery from proposed and existing roads will be inconsequential when compared to the background levels caused by the wildfire itself.

For detailed analysis, please refer to Attachment D, Watershed and Fisheries Report.

6. AIR QUALITY:

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

Under the action alternative, particulate would be released into the atmosphere when the slash piles are burned. Slash would only be ignited when ambient air conditions are suitable and air dispersal flows are adequate to lift the smoke into the winds aloft for rapid and thorough dispersal. Environmental conditions required prior to ignition must include adequate snow cover on the ground surface with a long-term forecast of continued low temperatures during daylight hours. There would likely be no cumulative impacts on air quality as a result of the proposed action.

7. VEGETATION COVER, QUANTITY AND QUALITY:

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

The project area consists of mixed grass, Douglas-fir, and ponderosa pine types. Prior to the fire, approximately 518 acres (80%) of the 640 acre project area was forested. While 426 of those acres had a sawtimber component, with at least 10% crown density of trees greater than 9 inches diameter at breast height (DBH), most (91%) of the stands have poor or medium total stocking. The project area burned as a mosaic of varying intensities, with high mortality in areas with understory and ladder fuels. Fire damage to vegetation ranged from areas where only grasses and shrubs were consumed to areas where all trees were burned. Within burned areas, effects to trees included varying levels of fire damage, bole scorch, and partial burning of some trees.

The Derby fire burned approximately 207,000 acres of private and public forest and rangeland, of which approximately 5,500 acres are DNRC school trust land. While most of the burn was a stand-replacement event, burn intensity varied throughout the fire area. Approximately 1,334 acres (72%) of the forested school trust land within the fire perimeter burned at moderate or high intensity (Shovic et al, 2006).

The project area falls within climatic section 331A, which was historically about 77% forested. Within the climatic section, most of the forest was comprised of spruce-fir and lodgepole pine, with relatively long fire-free periods (Losensky, 1997). At the larger scale, DNRC lands managed by the Southern Land Office are approximately 44% forested, mostly in the ponderosa pine cover type. Like the project area, most of these stands are fairly open with poor or medium stocking. The cover types on the Southern Land Office prior to the fire were 54% nonforested, 34% ponderosa pine, and small components of other species. The current cover types largely match the desired future condition for cover types at the scale of the Land Office.

DNRC has adopted old-growth definitions based on Green et al. (1992). Both prior to the fire and currently, none of the stands in the project area meet DNRC's definition of old-growth. No recorded threatened, endangered, or sensitive plant species were found in the analysis area (MNHP, 2006). A concern was raised that the area is susceptible to noxious weeds.

No Action: No harvest would occur at this time. Compared to the existing condition, no immediate changes would be expected. Burn severity-reviews of the fire suggest that grasses, forbs, and shrubs would revegetate the area over the next several years, depending on nutrient availability and moisture (Shovic et al, 2006). Over time, natural conifer regeneration would establish in areas with a seed source and favorable microclimate. Weed treatment could occur as funding allows.

Timber Harvest Alternative: DNRC would harvest merchantable-size burned, partially burned, fire damaged and high risk scorched trees on approximately 250 acres. Changes to the vegetation include an immediate reduction in numbers of Douglas-fir and ponderosa pine. Individual and clump mosaic leave tree and group selection of severely burned areas offers a design for natural regeneration in ponderosa pine and Douglas-fir regimes. Live, healthy Douglas-fir and ponderosa pine would be retained in the areas burned at lower intensities. The proposed harvest would reduce stems per acre in those units, on 48% of the forested portion of the project area. The cover types would remain the same. A minimum of two 15 inch DBH or greater snags or snag recruits per acre would be retained. Preferred diameter of snags is 21 inches or greater. Snags, snag recruits, and coarse woody debris would also provide some structural attributes. Grasses, forbs, and shrubs would develop over the next several years, depending on nutrient availability and moisture (Shovic et al, 2006). Douglas-fir and ponderosa pine would likely become established through natural regeneration in areas with a seed source and favorable conditions. At the larger scale, the proposed harvest in combination with other

potential salvage projects would reduce stand density on approximately 0.4% of the area managed by the Southern Land Office.

While the ground disturbing activities associated with the proposed harvest have the potential to introduce or spread noxious weeds, mitigations would be implemented to reduce current infestations and limit the spread of weeds. This would include requiring all road construction and harvest equipment to be cleaned and inspected prior to moving on site, revegetating all newly disturbed soils on road cuts and fills promptly with site adaptive grasses (including native species), and treating weeds along portions of project roads and accessible sites with priority on spot outbreaks of noxious weeds. The proposed action would be expected to result in minor direct, indirect, and cumulative impacts on forest vegetation.

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:
Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify cumulative effects to fish and wildlife.

The project area is currently used by a variety of species, including deer and elk. Silvicultural prescriptions would favor appropriate cover types. Big game may be temporarily displaced during harvest activities but their inherent mobility coupled with surrounding un-harvested areas should provide security and biological needs during the displacement period. A minimum of two 15 inch DBH or greater snags or snag recruits per acre would be retained. Preferred diameter of snags is 21 inches or greater. These snags and recruits would provide potential nesting and forage sites for birds. Due to the context and selective nature of the proposed harvest, minimal cumulative effects impacts on terrestrial, avian, and aquatic habitats would be expected as a result of the proposed action.

Please refer to Attachment D, Watershed and Fisheries Report, and Attachment E, Wildlife Report.

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

Lynx (*Lynx canadensis*) habitat was indicated as potentially present in the Montana Natural Heritage Program database (MNHP, 2006). However, the project area is all under 5,500 ft. elevation and does not contain vegetation types preferred by lynx. No dense sapling or old forest occurs in the project area. Surrounding ownerships are also at elevations less than 5,500 feet. Adverse direct, indirect or cumulative impacts to lynx as a result of this project are expected to be minimal.

Grizzly bears (*Ursus arctos*) can be adversely influenced by direct disturbance and road construction associated with salvage logging. The project area lies >20 miles northeast of the Yellowstone Grizzly Bear Recovery Area and is approximately 10 miles from known grizzly bear distribution (Wittinger 2002). Thus, it is unlikely for this area to receive appreciable use by grizzly bears. However, grizzlies could infrequently use, or wander through the project area and/or surrounding ownerships during the non-denning season (April 1-November 15). Proposed activities that could occur during the denning season (November 16 - March 31) would pose minimal direct, indirect or cumulative risk to bears. Short-term activities (likely 1 to 4 months) associated with proposed salvage operations that could occur during the non-denning season would result in minor increased risk to bears, should they occur in the area. Greatest risk would be for direct displacement of bears occurring in the project vicinity into surrounding areas of lesser disturbance. Risk of any additional indirect effects to bears would be minimal. Construction of ~1/4 mile of additional road would cumulatively increase existing road densities on the project area and surrounding ownerships in the vicinity. However, access to the project area is privately controlled and no additional public access or use would be expected. Thus, long-term security for bears would be minimally influenced.

Black-backed woodpeckers (*Picoides arcticus*) utilize recently burned areas. The Derby fire burned approximately 207,000 acres, including over 83,000 acres of forestland that burned at moderate to high intensity. The project area burned as a mosaic, with areas of low, moderate and high intensity. Of the 640-acre project area, approximately 250 acres are proposed for harvesting under the action alternative. Of burned, forested DNRC land within the project area, 211 acres (i.e., 46%) would remain unharvested, exceeding the 10% required under DNRC forest management rules. At the scale of the Southern Land Office, an additional 285 acres may be harvested within recently burned areas. However, DNRC would likely follow similar mitigations for black-backed woodpeckers as those that would be implemented for this project. To the south and west of the project area, approximately 39,400 burned forested acres occur on the Gallatin National Forest.

These acres should provide extensive habitat for black-backed woodpeckers as well, should they discover and colonize this geographic area. Habitat potentially usable by black-backed woodpeckers would be harvested under the proposed action alternative, however, risk of measurable direct and indirect effects to black-backed woodpeckers would be low due to the sizable amount of burned over area that would remain unharvested on DNRC lands and other nearby ownerships.

Habitat conditions in the reach of Lower Deer Creek flowing through the proposed project area are considered suitable to sustain healthy populations of both YCT and brown trout (DNRC 2000). Impacts to the Yellowstone cutthroat trout and other cold-water fish habitat in Lower Deer Creek are anticipated due to the effects of the recent wildfire. The recent wildfire is expected to dramatically increase sediment and water yields. Increased channel and bank erosion, debris flows and mass wasting and increased bedload deposition are all expected to impact fish habitat in Lower Deer Creek. Substantial levels of additional sediment delivery are not expected to result from the proposed fire salvage. Mitigation measures and ground based skidding restrictions implemented during the harvest operations are expected to reduce potential erosion and risk of sediment delivery and subsequent risk of additional impact to cold-water fish habitat (see discussion of water quality and quantity in Attachment D). No direct, indirect or cumulative impacts to Yellowstone cutthroat or other cold-water fish species habitat are expected to result from the proposed harvest. The lack of proposed activities in the immediate vicinity of Lower Deer Creek and the planned mitigation measures to be implemented in Cedar Creek, as well as any contributing ephemeral drainage areas, are expected to be effective in reducing potential erosion and sediment delivery associated with harvest operations.

There are no other known threatened, endangered, or sensitive species in this general area (MNHP, 2006). There are no limited environmental resources within this area. The timing, context, and selective nature of the sale would create minimal cumulative impacts as a result of the proposed activity.

Refer to Attachment E, Wildlife Report, and Attachment D, Watershed and Fisheries Report.

10. HISTORICAL AND ARCHAEOLOGICAL SITES:

Identify and determine effects to historical, archaeological or paleontological resources.

No known cultural resources are located on any of the state parcels in the project area. DRNC Archaeologist Patrick Rennie did not recommend additional investigative work; if any archaeological sites are found, they would be protected. No direct, indirect, or cumulative effects to cultural resources are expected as a result of the proposed action.

11. AESTHETICS:

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

The proposed sale area is not visible from any populated or scenic areas. About 10% of the sale area is visible from a point on a Forest Service road about two miles away. Within the project area, harvested stands would look more open with fewer trees per acre. The proposed project would be expected to have a low risk of negatively affecting the aesthetic quality of the area. Some noise from harvesting equipment and log hauling may be heard within the project area and on haul routes. This is expected to be short in duration and temporary. Due to the location, the relatively small area and the short duration of the proposed project, there would be no measurable cumulative effects on aesthetics.

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:

Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify cumulative effects to environmental resources.

No impacts are likely to occur under either alternative.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

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

Past forest management activity includes a 50-piece post and pole permit that was sold and harvested on this section in 2003. In 1999, DNRC planed the Deer-Susie Timber Sale, which included this project area. However, this section was subsequently dropped from the sale due to access issues. On the Southern Land

Office, two additional salvage sales totaling 285 acres have been scoped. Some private ownerships are currently salvaging timber in neighboring parcels. Montana Fish Wildlife and Parks are currently planning the "Yellowstone Cutthroat Trout Salvage from Upper and Lower Deer Creeks". Southeast of the project area, Upper and Lower Deer Creeks would serve as a donor source for Yellowstone cutthroat trout to be relocated to unburned habitat and transplanted back after habitat and water quality conditions have improved in the Deer Creeks (Montana FWP, 2006). The Bureau of Land Management and Gallatin National Forest do not have any ongoing forest management projects in the near vicinity. Due to these characteristics and the relatively small amount of past harvest on the DNRC parcel, no cumulative impacts would be likely.

IV. IMPACTS ON THE HUMAN POPULATION

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

14. HUMAN HEALTH AND SAFETY:

Identify any health and safety risks posed by the project.

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

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:

Identify how the project would add to or alter these activities.

The section is currently leased for grazing, and the recent fire temporarily reduced forage available. Over time, forage production would be expected to increase under either alternative.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:

Estimate the number of jobs the project would create, move or eliminate. Identify cumulative effects to the employment market.

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

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:

Estimate tax revenue the project would create or eliminate. Identify cumulative effects to taxes and revenue.

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

18. DEMAND FOR GOVERNMENT SERVICES:

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

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

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.

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

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

This section does not have public access. There are no wilderness areas in the vicinity. Due to the context and intensity of the proposed action, no measurable effects to access and recreation are expected.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:
Estimate population changes and additional housing the project would require. Identify cumulative effects to population and housing.

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

22. SOCIAL STRUCTURES AND MORES:
Identify potential disruption of native or traditional lifestyles or communities.

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

23. CULTURAL UNIQUENESS AND DIVERSITY:
How would the action affect any unique quality of the area?

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

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

No Action: Grazing on the DNRC parcel would continue to provide annual revenue of $775.89.

Timber Harvest Alternative: Revenue from grazing and recreation would continue. The timber harvest would generate additional revenue for the Common Schools Trust. The estimated return to the trust for the proposed harvest is $102,560 based on an estimated harvest of 1 million board feet and an overall stumpage value of $102.58 per thousand board feet (MBF) ($15.31 per ton, overall average for Douglas-fir and ponderosa pine). Costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. DNRC doesn't track project-level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated by land office and statewide. These revenue-to-cost ratios are a measure of economic efficiency. For the period from 2001 through 2005, the average revenue-to-cost ratio of the Southern Land Office was 2.85. This means that, on average, for every $1.00 spent in costs, $2.85 in revenue was generated. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return.

EA Checklist Prepared By:	**Name:**	Sarah Pierce	**Date:**	November 3, 2006
	Title:	Forest Planner, Forest Management Bureau		

V. FINDING

25. ALTERNATIVE SELECTED:

Based on the environmental assessment, I have selected the Timber Harvest Alternative. This alternative meets our goals of land stewardship and producing revenue for our trust beneficiaries. The No Action alternative would not have provided revenues to the trust for the available salvage timber resources. The environmental effects of the Timber Harvest Alternative are acceptable, no major losses in habitat or unacceptable effects to soil or water would occur. The Timber Harvest Alternative includes mitigations to address the environmental concerns expressed by DNRC staff and the public.

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

None of the potential impacts associated with the Deer Creek Salvage Timber Sale would be significant. The Action Alternative incorporates mitigations to minimize effects on wildlife, soil, and hydrology issues. The proposed timber sale is similar to past projects that have occurred in the area. Since the environmental assessment does not identify future actions that are new or unusual, the proposed timber sale is not setting a precedent for a future action with significant impacts. Taken individually and cumulatively, the identified impacts of the proposed timber sale are within threshold limits. Proposed timber sale activities are common practices and none of the project activities are being conducted on important fragile or unique sites. The proposed timber sale conforms to the management philosophy adopted by the DNRC in the SFLMP and Administrative Rules and is in compliance with existing laws, policies, guidelines, and standards applicable to this type of proposed action.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

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

EA Checklist Approved By:	**Name:**	Craig Campbell
	Title:	Bozeman Unit Manager
Signature:	Craig Campbell/es	**Date:** 11/09/2006

References

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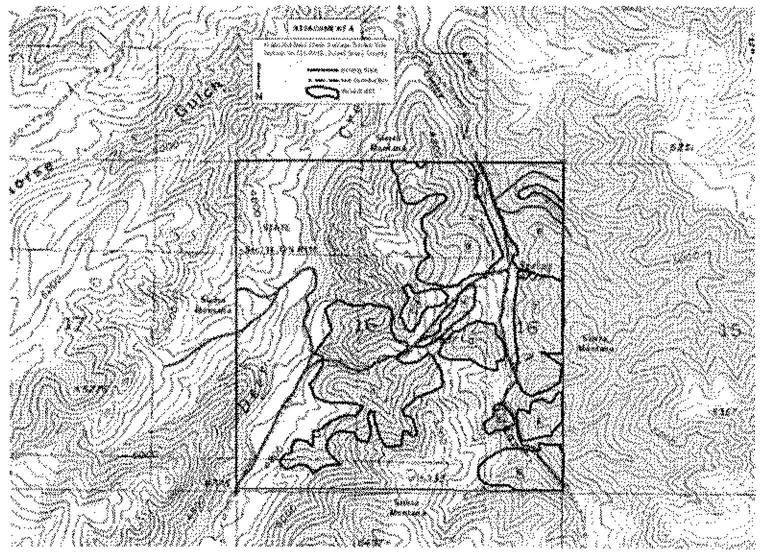
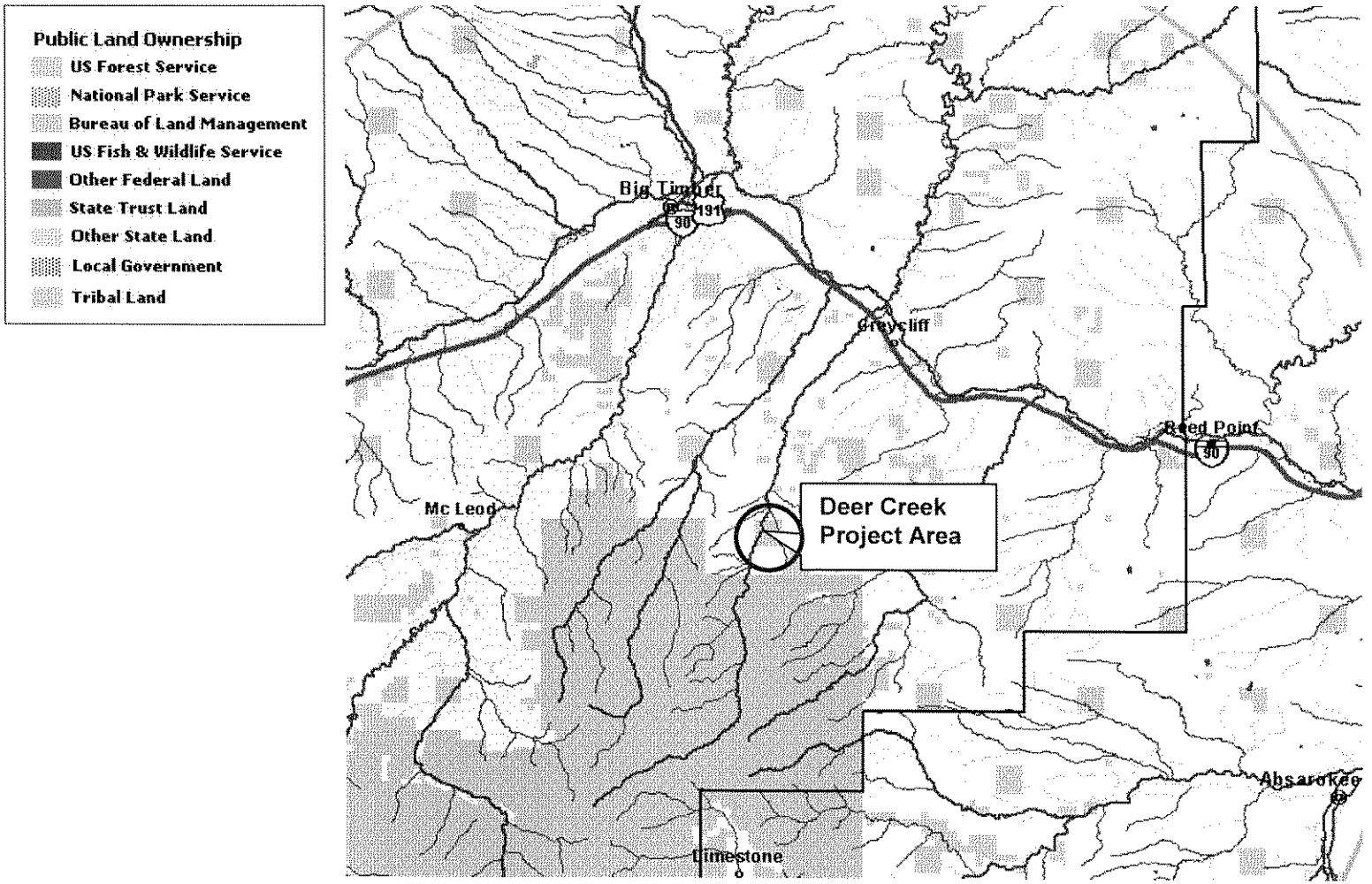

ATTACHMENT A

Attachment B

Deer Creek Salvage Timber Sale Vicinity Map



To: Sarah Pierce, Forest Planner, Forest Management Bureau

CC: Gary Frank, Hydrologist, Forest Management Bureau
Curt Tesmer, Forester, Southern Land Office

From: Jeff Schmalenberg, Soil Scientist, Forest Management Bureau

Subject: Lower Deer Creek Salvage Timber Sale, Soils Report

Date: November 3, 2006

Existing Conditions/Effects Analysis
Lower Deer Creek SalvageTimber Sale
T 2S R 15E Sec 36

Introduction

The Lower Deer Creek Salvage timber sale proposes to harvest approximately 1.5 MMBF of fire killed and minimal standing green timber from 270 acres within State owned Trust Lands located in section 36 T2S R15E. The objective of this timber sale is to generate income for the common school trust fund. Both existing soils conditions and potential environmental effects resulting from the proposed action will be addressed in this document. This analysis is based on course filter screening, information gathered in pervious site reports and an on-site evaluation of the project area in October of 2006 by DNRC soil scientist.

Potential Issues

Direct and Indirect

The potential concerns regarding logging in a post-fire environment are the sites increased sensitivity to erosional processes and alterations to the physical soil properties such as hydrophobicity, increased bulk density, loss of macroporosity, and displacement of surface soils. All of the above mentioned concerns can individually and cumulatively affect both soil productivity and soil quality. Soil productivity is defined here as the ability of a soil to produce biomass per unit area per unit time (Ford, 1983). Soil quality describes numerous other soil attribute functions and includes a measure of a soil's ability to produce plant biomass, maintain animal health and production, recycle nutrients, store carbon, partition rainfall, buffer anthropogenic acidity, remediate added animal waste and regulate energy transformations (Schoenholtz et al., 2000). The impacts described above can result from ground based harvest techniques and road construction associated with the harvest. These are the identified issues that will be addressed in this document.

Potential Issues

Cumulative Effects

To date only 21 studies worldwide have examined the environmental effects of postfire logging, of which only 14 had an unlogged control and of those 14, only seven were replicated experiments (McIver et al., 2001). This leaves resource managers little to draw from when considering cumulative effects from proposed actions in post fire landscapes. Rather, numerous experiments and monitoring data sets from green tree timber harvests can be used as surrogates to conclude about cumulative soils effects and then extrapolated to the postfire environment. It has been commonly accepted by resource manager, numerous state and federal agencies and the research community that beyond 20% disturbance of a harvest area by displacement and compaction is a set threshold for detrimental impacts. The most detrimental cumulative effects associated with the proposed action would include decreased soil productivity and hydrologic function resulting from disturbances associated with ground based harvest techniques (compaction, erosion, and displacement). Research has shown these impacts to effect biomass production and hydrologic function with varying degree of severity for highly variable temporal scales dependant on operator, harvest equipment used, soil type, climate and the extent of initial disturbance.

Affected Environment

The proposed project area is located approximately 12 air miles south of Big Timber, MT in the Lower Deer Creek watershed (34.4 mi^2) positioned in the foothills of the East Boulder Plateau. The elevation with the project area ranges from 4,660 ft in valley bottoms to 5,333 ft at ridge tops with an annual precipitation of 15-19 inches. The dominate landforms are mountain slopes ranging from 0.5% to 78% with a mean of 25%. The morphology of these landforms is typically straight to slightly concave hill-slopes. Two perennial streams dissect the project area, Cedar Creek and Lower Deer Creek, with the confluence being approximately 1,700 ft downstream from the northern section line. The dominant vegetation is Idaho fescue/pine grass grasslands and Douglas fir forests.

The soils within the project area are derived from Upper cretaceous volcanics of the Sliderock Mountain formation of the Livingston Group. This unit includes all of the rocks erupted from the Sliderock stratovolcano and includes andesite breccia with numerous dikes of andesite porphyry and diorite (Du Bray et al., 1993). Very resistant, this rock type forms numerous cliffs and rugged topography throughout the project area. No unique structural features were noted during field reconnaissance.

Three dominant soils types cover all of the harvest units within the project area. These soils types include the Ashborn-Winkler-Rock outcrop Complex (35-60%), Vision-Sweetweed-Whitlash Complex (25-60%) and the Ashborn-Winkler-Weedzunit complex (15-35%). All of these soil types can be described as gravelly to very gravelly loam to sandy loams that are well drained to excessively drained. These soils are shallow to moderately deep, typically 20-40 inches to lithic bedrock. All soil map units cited above have a severe hazard of off-road and off-trail erosion due to the erodibility classification and the slopes they are attributed to.

Existing Conditions

The project area was visited by DNRC resource specialist in October 2006 to evaluate resource conditions resulting from the Derby Mountain wildfire and operational logistics of the proposed action. The lighting ignited Derby Mountain fire burned 199,500 acres with a mosaic of fire intensity and soil burn severity. Fire Intensity is based on temperature, flame length, heat of combustion, and total amount and size of fuel consumed whereas soil burn severity accounts for soil temperature, moisture content of the duff and other surface fuels, heat of combustion, and total amount of duff and ground cover consumed. Generally speaking, severity is soils related and intensity is forest vegetation related.

In the Lower Deer Creek watershed in particular, 7% burned at a high *severity*, 41% at a moderate severity with 51% and 14% burning at high and moderate *intensities* respectively (Sirucek et al., 2006). The burn mosaic within the project area was also representative of the larger Lower Deer Creek Watershed. Both severity and intensity percentages were calculated using GIS and the BAER team's reconnaissance data. High burn intensity within forested areas on the state section was calculated to be 28% (179 acres), 22% was moderate burn intensity (140 acres) while 28% (179 acres) was unburned (Figure 2). The remaining acreage within the section was classified as burned or unburned rangeland by the BAER team.

Burn severity calculations within the project area mimicked ocular field assessments by DNRC specialists. Less then one percent of the section is classified as high severity (2.2 acres), 23% as moderate severity (147 acres) while the majority of the section had low severity or unburned conditions (41% and 36% respectively; Figure 1). This analysis supports the assumption that a very small portion of the project area experienced conditions that are optimal for the formation of hydrophobic conditions. Total duff consumption was only observed in small portions of the project area with minimal residual ash layers still present at the time of site evaluation.

During site reconnaissance, current and past signs of erosion from post-fire precipitation events were minimal to non existent. Rain splash particle displacement was noted on the most severely burnt areas, but transport processes were not evident. No gully or rill formation was observed and no large instabilities were noted during field observations. Ocular assessments of duff removal from the fire correlate well with the findings and calculations of the BAER team.

Past management activities within the project area include grazing, fire suppression and road construction for access to the private lands that surround the entire section. No documented DNRC timber harvest has occurred on this section, but historic illegal harvest is a possibility on remote sections with no legal access. Currently there is 3.1 miles of existing roads within the project area. Grazing impacts are focused in valley bottoms and around water resources. Trampling effects can result in significant soil compaction and are assumed here to be present within the project area but were not directly evaluated during the site reconnaissance. All of these actions have directly or indirectly affected the existing soils conditions.

Environmental Consequences

Direct and Indirect Effects

The environmental consequences of two alternatives will be analyzed in this environmental assessment. Under no action, soil erosion rates will rise significantly over the next 1 – 2 years until primary vegetation begins to provide cover to the soil surface from particle detachment and mobilization resulting from rain splash. Dependant upon summer convective thunderstorms, large erosive events are highly probable given the spatial extent of both burn intensity and severity in the headwaters of both Lower Deer and Cedar Creek watersheds. Steep slopes adjacent to Cedar Creek and at higher elevations dividing Cedar and Lower Deer Creek that experienced high burn intensities and have no canopy cover from the residual stand will most likely develop rill and sheet erosion. This type of erosion typically affects the most productive surface soils. Until the residual stand begins to fall over, no course woody debris will be available for nutrient inputs and natural erosion control barriers.

Under the proposed action, 270 acres of timber would be harvested exclusively using ground based equipment. From past post-fire salvage projects on DNRC lands on granitic soils (a much higher erosive soil type then the project area), it has been observed through monitoring that erosion was higher on harvested versus non-harvested sites, but was not statistically significant (p=0.05) (DNRC, 2002). It was also found that woody debris levels were significantly higher in harvested sites after the sale was completed, but the degree to which this aided as an erosion barrier can only be estimated (DNRC, 2002). Winter harvest in post-fire units also found no observable soil displacement (DNRC, 2002). This was largely attributed to restrictions placed on equipment operations during periods of frozen ground conditions. Using these data to estimate the direct and indirect effects of the proposed action is useful. Erosion rates will likely increase compared to the no action alternative but the effect on the soil resource when compared in spatial extent to the wildfire effects is minimal. The proposed harvest area represents 0.14% of the area burned by the Derby Mountain fire. If mitigation measures are administered, conclusions drawn about post-fire winter harvest ground disturbances from DNRC's previous monitoring efforts are applicable. Direct and indirect effects of the of the proposed action will have negligible effects on the soil resource in the project area.

Cumulative Soils Effects

Under the no action alternative, cumulative soils effects would be limited to sheet and rill erosion until vegetation was established. Erosion of the most productive surface soils would affect the long-term productivity of the site. Hydrophobic conditions, if present, have typically been shown to naturally ameliorate within one year of the fire. Nutrient inputs from the residual stand would be available when the snags became unstable and fell to the soil surface.

Under the proposed action, cumulative soils effects would include compaction and displacement resulting from ground based equipment operations. Through monitoring efforts of the DNRC, it has been shown that ground based tractor skidding

typically disturbs approximately 20% of the harvest unit (DNRC, 1999). Less disturbance is typically observed during winter operations with adequate snowpack or periods of frozen ground operation. In woods processing would negate the need to return skid slash and thus minimize soil disturbance. Downed woody material would be beneficial to the soil resource by providing shade and cover to the soil surface and provide a nutrient source for the recovering soil.

It has been commonly accepted by state and federal agencies and researchers that 20% disturbance by displacement and compaction is an acceptable threshold where detrimental effects to soil productive begin to be observed. If proper mitigation are met and administered correctly, disturbance within harvest units would be below this threshold and cumulative soil effects from ground based operation would be minimal.

Minimal road construction would be required (up to ¼ mile) and would have detrimental effects to those locations but would be relatively small when compared to the scope of the spatial extent of project area.

Recommended Harvest Mitigation Measures

Operations conducted in or near draw features and on steeper slopes have a higher risk of impacting soil resources. The following mitigation measures would minimize risk of impacts during the proposed harvest activities. The contract administrator would monitor conditions and recommend erosion control as needed.

Road Design Mitigations:

Limit road use and hauling to dry, frozen or snow covered conditions. Suspend operations when these conditions are not met and before rutting occurs.

Grass seed all burned road cuts and fillslopes where vegetation is not established, and any new areas of disturbance associated with construction.

Temporary and abandoned roads will have waterbars installed, grass seed and slash applied.

Monitor road drainage conditions as part of the on-going project operations and make repairs as needed, including culvert cleaning and revegetation. If cutslope or fillslope slumps occur on existing roads they will be stabilized to control erosion as part of the harvest project.

Harvest design Mitigation Measures:

Skidding Limitations: Ground-based logging equipment (tractors, skidders, and mechanical harvesters) would be limited to slopes less than 40% on ridges, convex slopes and less than 35% on concave slopes.

Skid Trail planning The logger and sale administrator would agree to a skidding plan prior to equipment operations. Skid trail planning would identify general spacing and location of trails and what additional trails or mitigation may be needed. Erosion control

would be installed on skid trails and or slashed where needed as directed by the forest officer.

Down Woody Material: During harvest operations, retain minimum five to ten tons per acre of woody material larger than 3 inches diameter to be left scattered throughout the sale units. A majority of slash should be left within the harvest units or return skidded as required by the Forest Officer. Slash should be returned from the landings, back onto skid trails and into the harvest unit as it is created and well distributed, evenly throughout the unit. Large amounts of slash shall not be allowed to accumulate at the landings before it is returned in the unit.

Erosion Control: On skid trails where excessive soil disturbance or rutting (i.e. ruts over 100ft) occurs, erosion control measures will be installed concurrent with use by the purchaser. Types of erosion control may include a combination of waterbars, slash or straw as required by the Forest officer in charge. Where slash is used, the slash must be in good contact (may require lopping) with the ground to be effective. Erosion control shall be completed prior to acceptance of skidding operations by the Forest Officer.

Season of Use/ Soil Compaction Restrictions: In order to prevent soil resource impacts, logging activities would be restricted to periods when one or more of the following conditions occurs, unless otherwise approved in writing by the Forest Officer.

a. Soil moisture content at 4" depth less than 20% oven dry weight.

b. Minimum frost depth of 3".

c. A minimum of 12" unpacked or 6" packed snow to adequately avoid soil displacement.

* All road construction and harvest equipment will be cleaned of plant parts, mud and weed seed to prevent the introduction of noxious weeds. Equipment will be subject to inspection by forest officer prior to moving on site.

*All newly disturbed soils on temporary road cuts and fills will be promptly reseeded to site adapted grasses to reduce weed encroachment and stabilize roads from erosion.

SMZ/RMZ Extension: DNRC acknowledges the soils increased erosion potential due to both the physical soil properties and fire effects and will extend RMZ and SMZ buffers to 50 and 150 feet dependant on slope per DNRC resource management rules.

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Appendix

Figure 1; Lower Deer Creek Burn Severity

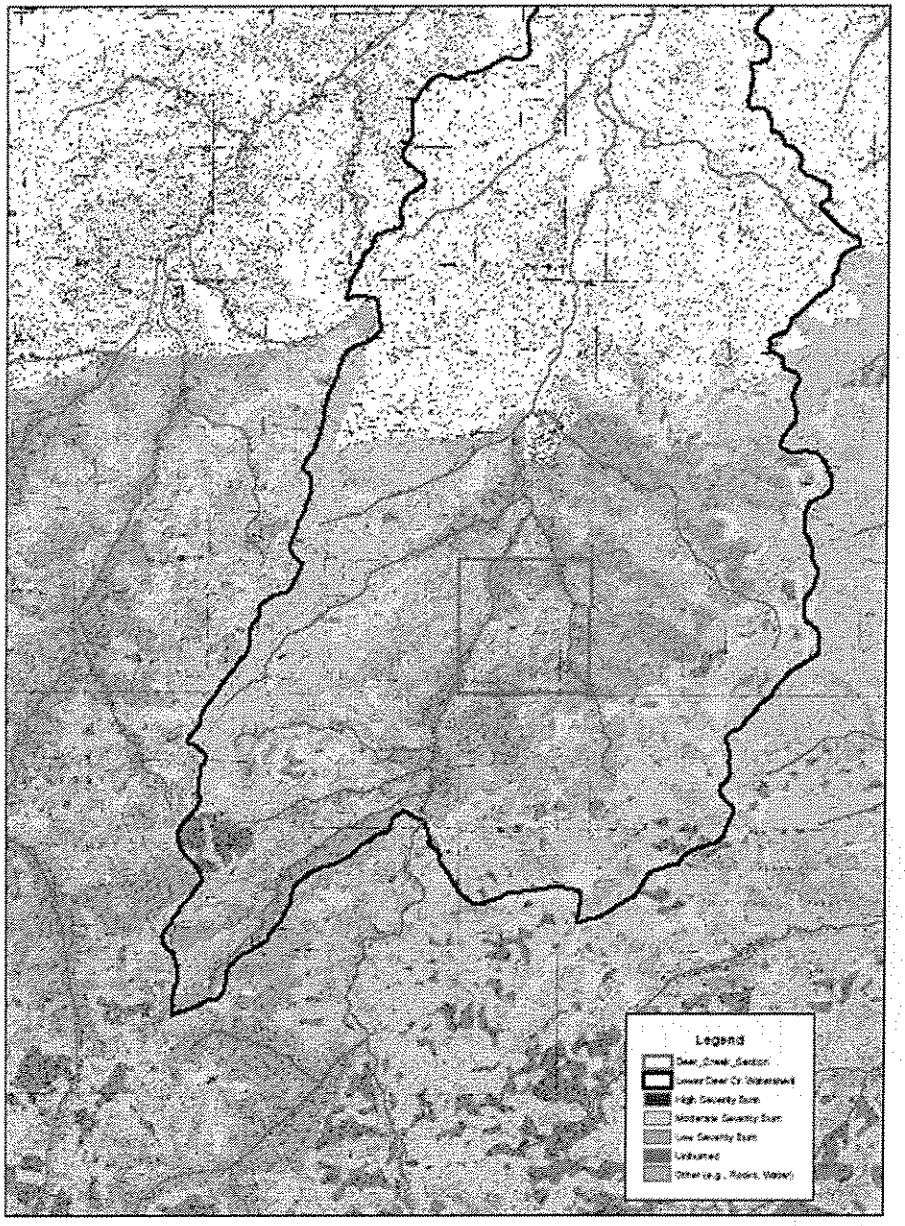
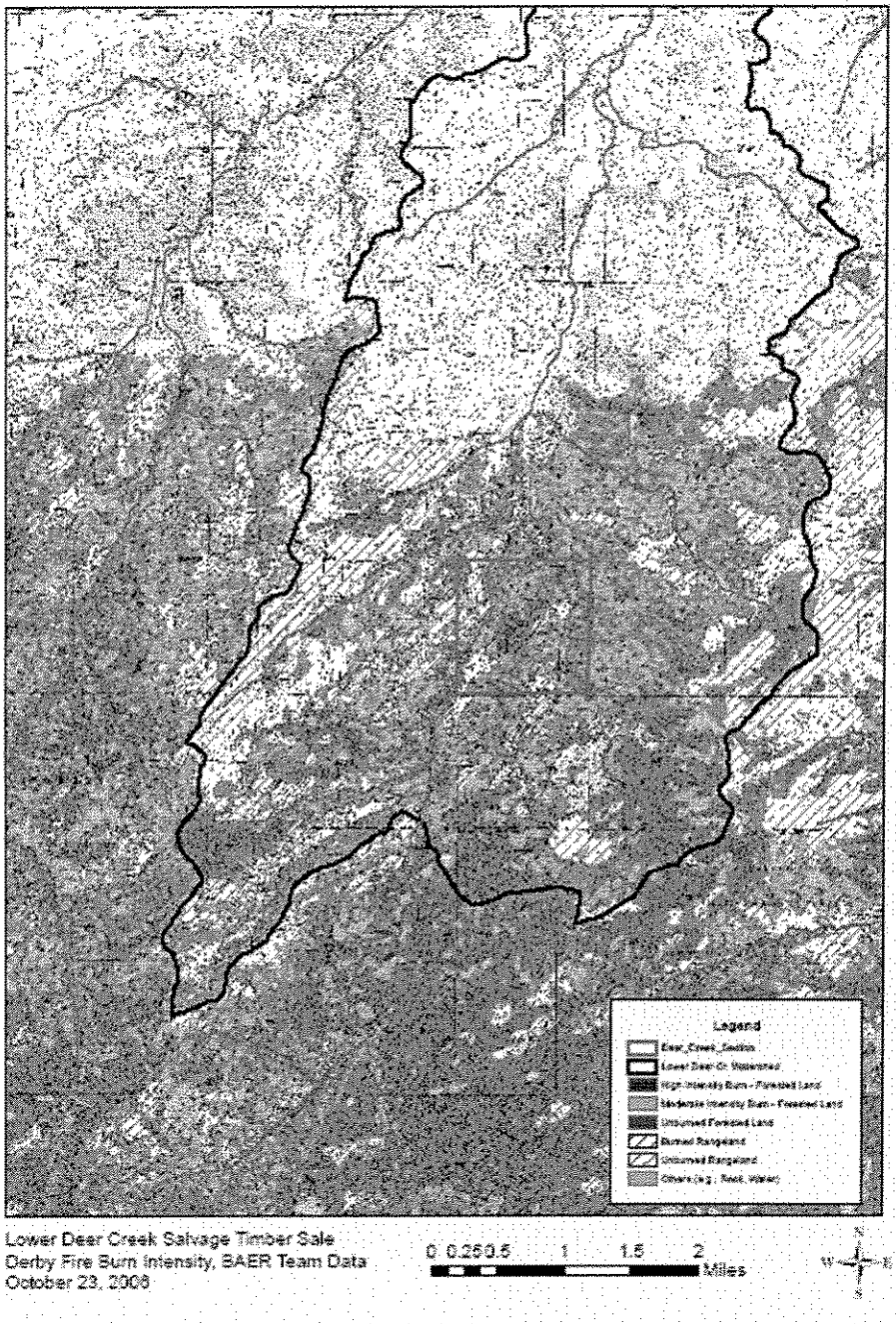


Figure 2; Lower Deer Creek Burn Intensity Map



Watershed and Fisheries Report
Proposed Lower Deer Creek Fire Salvage Timber Sale

G. Frank 11/3/06

AFFECTED ENVIRONMENT

Water Resources

The proposed fire salvage timber sale is located in a single section of state land that lies within the Lower Deer Creek watershed. Lower Deer Creek is a third order, Class 1, perennial tributary to the Yellowstone River that drains a watershed area of approximately 18,009 acres. The mainstem of Lower Deer Creek flows north out of the Beartooth Mountains to its confluence with the Yellowstone River located approximately eight miles southeast of Big Timber, Montana. Base flows of approximately 15 cubic feet per second (cfs) have been estimated by the USFS for a reach of Lower Deer Creek located just upstream of the proposed project area. Discharges associated with spring snowmelt runoff are estimated to exceed 140 cfs. The mainstem of Lower Deer Creek generally goes dry in the lower reaches, before its confluence with the Yellowstone River due to heavy dewatering for irrigation (USDA 2006).

The mainstem of Lower Deer Creek flows through the west ½ of the State section included in the proposed timber sale. The proposed harvest units in this portion of the State section contain several ephemeral drainage features that are tributary to the mainstem Lower Deer Creek. None of these ephemeral drainage features contain a discernable stream channel nor are they likely to contribute concentrated runoff directly to Lower Deer Creek. The east ½ of the State section is drained by Cedar Creek. The mainstem of Cedar Creek is a Class II, intermittent tributary to Lower Deer Creek that drains a watershed area of approximately 2,036 acres. The proposed harvest areas in the Cedar Creek watershed contain several ephemeral drainage features that are tributary to the Cedar Creek. One of these ephemeral drainage features located in the SE1/4 of the State section contains a discernable ephemeral stream channel.

Approximately 10 miles of county and 2 miles of private ranch road will provide access to the proposed timber sale area. These road systems are all located in the Lower Deer Creek Watershed.

This portion of the Yellowstone River Basin, including the Lower Deer Creek drainage, is classified as B-1 in the Montana Water Quality Standards. The B-1 classification is for multiple use waters suitable for domestic use after conventional treatment, growth and propagation of cold-water fisheries, associated aquatic life and wildlife, and agricultural and industrial uses. Among other criteria for B-1 waters, no increases are allowed above naturally occurring concentration of sediment, which will harm or prove detrimental to fish or wildlife. Naturally occurring includes conditions or materials present from runoff on developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable practices include methods, measures or practices that protect present

and reasonably anticipated beneficial uses. The State has adopted Forestry Best Management Practices through its Nonpoint Source Management Plan as the principle means of controlling nonpoint source pollution from silvicultural activities.

Existing beneficial uses in Lower Deer Creek immediately downstream of the proposed harvest area include water rights for livestock, irrigation, lawn and garden uses. Sensitive downstream beneficial uses in Lower Deer Creek include aquatic life support and cold-water fisheries.

Lower Deer Creek is listed as a water quality limited waterbody on the 1996 and 2006 versions of Montana's 303(d) list (MTDEQ 1996, 2006). The 303(d) list is compiled by the Montana Department of Environmental Quality (MTDEQ) as required by the Montana Water Quality Act (MCA 75-5-701 through 705) and Section 303(d) of the Federal Clean Water Act, and the Environment Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, the State is required to identify water bodies that do not fully meet water quality standards; or where beneficial uses are threatened or impaired.

Deer Creek is listed on the 303(d) list because it aquatic life, cold-water fisheries and recreation beneficial uses have been determined to be only partially supported. The probable cause of impairment has been identified as low flow alterations. The probable sources of this impairment are hydrostructures, and flow regulation and modification.

State and Federal laws also require that these listed water bodies be targeted for Total Maximum Daily Load (TMDL) development. The TMDL process is used to determine the total allowable amount of pollutants in a water body. Each contributing source is allocated a portion of the allowable limit. These allocations are designed to achieve water quality standards or to fully support all beneficial uses. A TMDL has been scheduled but still remains to be completed. Under Montana Law (MCA 75-5-703(10)(c)), new or expanded nonpoint source activities affecting a listed water body may commence and continue provided they are conducted in accordance with reasonable land, soil and water conservation practices.

Water Quality and Quantity- Existing Conditions

The reaches of Cedar Creek located within the project area are Rosgen B and G channel types (Rosgen 1996) that exhibits a moderately high degree of instability. The channel instability is associated with high levels of bedload deposition. The lower gradient reaches of the stream channel are braided and the stream banks are largely comprised of loosely consolidated depositional material with high erosion potential. A recent flood event that occurred within the last couple of year, but prior to the Derby wildfire, that left much of the steeper gradient stream channel scoured and left extensive bed load deposits in lower gradient reaches.

The reaches of Lower Deer Creek located within the project area are Rosgen B and C channel types (Rosgen 1996) with well-defined flood plains. The channel substrate is predominately cobble and gravel. The Lower Deer Creek stream channel is relatively stable on the State section.

Direct, indirect and cumulative watershed impacts to stream channel stability, water quality and downstream beneficial uses are anticipated in Lower Deer Creek and Cedar Creek due to the effects of the recent wildfire. Short to mid-term impacts will likely include increased peak flows, increased channel incision and bank erosion, debris torrents, extremely high levels of bed load transport and deposition, increased turbidity and increased suspended sediment yields.

Approximately 7303 acres or 41% of the 18,009 acre Lower Deer Creek watershed burned in the recent Derby Mountain wildfire. Much of the landscape burned at high intensity but low severity. Approximately 42% of the burned area experienced moderate-burn intensities and 18% of the burned area experienced high burn intensity (USDA 2006). However, only about 35% of the burned area experienced moderate burn severity and 4% experience high burn severity (see DNRC Soil Report). Regardless, many of the burned areas throughout Lower Deer Creek have a moderate to high potential for increased soil erosion and there is high potential for large runoff or flood events following high intensity or extended runoff events (USDA 2006). The potential for peak flow increase is greatest in smaller watersheds like Cedar Creek, where individual storm cells can impact a higher percentage of the watershed. Larger watersheds such as Lower Deer Creek have lower potential for extreme peak flow increases.

Most riparian areas within the proposed project area burned with low and mixed fire severity. Post-fire revegetation is expected to occur rapidly along the stream bottoms.

Cold Water Fisheries

Fisheries surveys completed by the Gallatin National Forest and MFWP found brown trout, brook trout and genetically pure Yellowstone cutthroat trout in a reach of Lower Deer Creek located 1-2 miles upstream of the proposed project area. Presence/absence surveys have not been completed for that segment of Lower Deer Creek flowing through the proposed project area. However, habitat conditions in the reach of Lower Deer Creek flowing through the proposed project area are considered suitable to sustain healthy populations of both YCT and brown trout (DNRC 2000). MFWP considers the Lower Deer Creek YCT population an indigenous population with little genetic influence from other YCT donor sources. The YCT population is considered to have significant core conservation values. Competition with brown trout has been identified as a concern to the long-term persistence of YCT.

Cold Water Fisheries - Existing Conditions

Impacts to the Yellowstone cutthroat trout and other cold-water fish habitat in Lower Deer Creek are anticipated due to the effects of the recent wildfire. The recent wildfire is

expected to dramatically increase sediment and water yields. Increased channel and bank erosion, debris flows and mass wasting and increased bedload deposition are all expected to impact fish habitat in Lower Deer Creek.

The magnitude and scale of anticipated impacts is largely related to burn intensity, burn severity, geology, topography, channel stability, and size and timing of post-fire precipitation events. Dramatic changes in aquatic habitat due to fire effects are likely to contribute to direct fish mortality and may even cause localized extinctions in the short to mid-term (BAER 2006). Based on anticipated hydrologic response and the relatively high potential for extreme increases in instream sediment and bedload transport and deposition, the YCT population in Lower Deer Creek is consider to be at high risk of extirpation. Short and mid-term impacts to habitat are expected to be severe. Long-term permanent impairment of ecosystem structure and function is not anticipated USDA, 2006).

ENVIRONMENTAL CONSEQUENCES

Water Quality and Quantity

No Action

Moderate to severe impacts to water quality are anticipated within the project area due to the effects of the recent Derby Mountain Wildfire (see description of Affected Environment for more details). Short to mid-term increases in erosion, and sediment and nutrient delivery to streams are expected in both Cedar Creek and Lower Deer Creek as a result of the fire. Increased sediment delivery and deposition will directly impact water quality and indirectly impact stream channel stability, fish habitat and other downstream beneficial uses.

The recent wildfires are also expected to contribute to direct impacts to water quality through increased levels of nutrients in streams. Concentrations of both phosphorus and nitrogen are expected to increase markedly in both Cedar Creek and Lower Deer Creek as a result of the fire. Increased sheet flow and erosion will likely mobilize and deliver large volumes of ash to these streams in the short-term.

Large increases in runoff, water yield are also anticipated as a result of the recent wildfires. The effects of increased runoff and stream flows are expected to have major short-term cumulative impacts on erosion, sediment delivery, channel stability and downstream beneficial uses. Higher gradient reaches of Cedar Creek and Lower Deer Creek, located upstream of the proposed project area, will likely experience increased channel incision, bank erosion and debris torrents during high flow events. Lower gradient reaches of Cedar Creek and Lower Deer Creek, like those occurring on the State section, are likely experience substantial amount of bed load deposition. Erosion and bedload deposition in Cedar Creek could be severe due to the high percentage of high burn severity occurring in the headwater portion of the watershed.

The cumulative impacts of increased sediment yield are expected to be high. Modeling completed by the Derby Mountain Fire BAER Team for Lower Deer Creek indicate the potential for a 100% increases in sediment yield due to wildfire effects.

Action Alternative

No substantial direct, indirect or cumulative impacts to water quality, water quantity or downstream beneficial uses are expected to result from implementation of the proposed action alternative.

Appreciable levels of additional sediment delivery are not expected to result from the post-fire salvage harvest operations. Mitigation measures planned for the proposed harvest operations have been demonstrated to be effective in reducing erosion and sediment delivery (Robicaud 2000, Klock 1975 and DNRC 2002). Proposed mitigation measures include special ground based skidding restrictions (enhanced slope restrictions and extended SMZ widths), installation of water bars on skid trails, grass seeding, and spreading of slash and logging residues on skid trails and disturbed areas. Ground based logging operations would be restricted to slopes less than 40% on ridges and convex slopes; and less than 35% on concave slopes and slope adjacent to SMZs. SMZ would be extended in recognition of the high erosion risk occurring in the post-fire conditions. The amount of additional equipment operation restrictions would vary between 50 and 150, dependant on the steepness of slope.

Existing roads on the State parcel were evaluated following the wildfire. Approximately 3.1 miles of existing road will be improved to meet minimum BMP standards. Up to ¼ mile of temporary low standard new road construction is also proposed. All new road construction will also comply with BMPs.

Several short segments of temporary new road may be necessary to locate several log landing areas out of and away from the SMZ of Cedar Creek. Short segments of several of these temporary roads may have to be actually located within the SMZ because the location of potential intersections with the existing SMZ road are limited and tightly controlled by the surrounding topography. These proposed actions will require an Alternative Practice under the Montana SMZ Law and Rules. The short segments of new road proposed within the SMZ are low risk for direct, indirect or cumulative impacts to water quality. The actual length of road built within the SMZ would be very short (25-100 feet) at each site. The slopes that the short road spurs would be constructed on are relatively gentle. The locations are actually buffered from the stream by the existing road and the sites are located in area of low to mixed burn severity. The only other alternatives would involve much more extensive mounts of new road construction to move road locations upslope and out of the SMZ or extensive decking of logs along the segments of the existing road located within the SMZ. Both of the alternative options likely pose greater overall risk of erosion and sediment delivery than use of the proposed SMZ Alternative Practices to build the proposed short segments of road within the SMZ.

The remainder of the proposed temporary road locations are situated upslope and well buffered from streams and ephemeral draw bottoms. Extended SMZ widths will be utilized to provide additional buffer than required under the SMZ law. This is in recognition of the higher erosion risk and decreased sediment filtration capabilities found in the post-fire conditions.

Low levels of short-term on-site erosion of road surfaces, cut slopes and fill slopes during and shortly after road construction, abandonment, or obliteration can be expected. Levels of erosion from roads are expected to be low enough to present only low risk of delivery and subsequent impact to water quality. Potential risk of sediment delivery from proposed and existing roads will be inconsequential when compared to the background levels caused by the wildfire itself.

Several existing drive through ford crossings of Cedar Creek would be utilized for access and log hauling. The ford crossing sites are well armored with cobble sized materials and use of the existing fords would be restricted to dry conditions. Rubber tire ford mats would be installed and utilized if wet conditions exist during log hauling. Even with the use of rubber tire ford mats, some low levels of short-term sediment delivery and localized increases in stream turbidity can be expected with use of fords during wet conditions. However, the use of the existing fords would be limited to a relatively small amount of harvest area and overall relatively small harvest volume. The number of log loads to be hauled over the fords is estimated at less than 25 loads per crossing site. The potential for sediment delivery is expected to be inconsequential when compared to background levels resulting from the wildfire.

The haul road also includes an existing crossing constructed with a culvert that has inadequate capacity to accommodate the anticipated post-fire increase in flows. Under the proposed action this culvert would be removed prior to runoff. Removal of this culvert would reduce the existing high risk of failure and sediment delivery to the stream.

The proposed salvage harvest are not expected to cause substantial increases in surface runoff, overall water yield, magnitude or duration of peak flows over those levels of increase expected due to the effects of the wildfire itself. The proposed harvest will target removal of primarily dead trees or trees highly susceptible to near-term mortality due to fire damage or secondary agents (insects and disease). The harvest of these trees is expected to have very little if any influence on the water balance of the affected watersheds. The harvest will consist of primarily dead trees that are no longer capable of removing water from the soil through the evapotranspiration process. These trees are also not providing a substantial amount of canopy for snow or rainfall interception.

Several researchers have suggested that ground disturbance produced by harvest operations on gentle to moderate slopes may disrupt water-repellent soil layers and increase infiltration (McIver 2000). Additional mitigation measure planned for the proposed harvest areas include scattering of logging debris over areas disturbed by skidding. It is therefore, possible that the proposed mitigation measures may even slightly decrease overland flow within the harvest areas.

Cold Water Fisheries

No Action Alternative

Large increases in sediment delivery, channel incision, bank erosion, and bed load deposition are expected within Lower Deer Creek. Localized debris torrents in the headwaters of Lower Deer Creek, and Cedar Creek, as well as ephemeral draws may contribute extreme levels of sediment loading to Lower Deer Creek. The potential direct, indirect and cumulative watershed effects that result from the fire are expected to have a severe impact on Yellowstone cutthroat and other cold water fish species found in the drainage. Based on the predicted soil and hydrologic response there is high potential for severe impacts to fish habitat quality throughout the entire distributional range of Yellowstone cutthroat in the Lower Deer Creek drainage. Over the short-term, fish mortality and possible extirpation of the fish population following a high intensity rainfall event is possible. Over the long-term, large woody debris frequency will increase and habitat diversity and complexity will increase.

Substantial increases in stream water temperature are likely to occur in the headwaters reaches of Lower Deer Creek. This portion of the watershed was subject to severe burn intensity. Increased summer maximum water temperatures are expected to occur until vegetative recovery provides adequate levels of shade. Yellowstone cutthroat and other cold-water fish species are likely to be adversely affected by increases in summer maximum water temperatures.

Action Alternative

Substantial levels of additional sediment delivery are not expected to result from the proposed fire salvage. Mitigation measures and ground based skidding restrictions implemented during the harvest operations are expected to reduce potential erosion and risk of sediment delivery and subsequent risk of additional impact to cold-water fish habitat (see discussion of water quality and quantity).

No timber harvests are planned from within the SMZ or even within the immediate vicinity of Lower Deer Creek. Lower Deer Creek is the only stream supporting a cold-water fishery within the project area. Therefore, no additional increases in stream water temperatures or other direct impacts to LWD or other fish habitat variable are expected to result form the proposed timber harvest.

No direct, indirect or cumulative impacts to Yellowstone cutthroat or other cold-water fish species habitat are expected to result from the proposed harvest. The lack of proposed activities in the immediate vicinity of Lower Deer Creek and the planned mitigation measures to be implemented in Cedar Creek, as well as any contributing ephemeral drainage areas, are expected to be effective in reducing potential erosion and sediment delivery associated with harvest operations.

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CHECKLIST FOR ENDANGERED, THREATENED AND SENSITIVE SPEICES
Pertains to Section II. 9. of the DS-252 DNRC Environmental Checklist
SOUTHERN LAND OFFICE

Threatened and Endangered Species	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Bald Eagle (*Haliaeetus leucocephalus*) Habitat: late-successional forest <1 mile from open water	[N] Bald Eagles have not been documented within the proposed project area (MNHP 2006). No large bodies of water or nesting habitat occur on, or within one mile of the proposed project area. No direct, indirect or cumulative effects to Bald Eagles associated with this project are anticipated.
Grizzly Bear (*Ursus arctos*) Habitat: recovery areas, security from human activity	[N] Grizzly bears can be adversely influenced by direct disturbance and road construction associated with salvage logging. The project area lies >20 miles northeast of the Yellowstone Grizzly Bear Recovery Area and is approximately 10 miles from known grizzly bear distribution (Wittinger 2002). Thus, it is unlikely for this area to receive appreciable use by grizzly bears. However, grizzlies could infrequently use, or wander through the project area and/or surrounding ownerships during the non-denning season (April 1-November 15). Proposed activities that could occur during the denning season (November 16 - March 31), would pose minimal direct, indirect or cumulative risk to bears. Short-term activities (likely 1 to 4 months) associated with proposed salvage operations that could occur during the non-denning season would result in minor increased risk to bears, should they occur in the area. Greatest risk would be for direct displacement of bears occurring in the project vicinity into surrounding areas of lesser disturbance. Risk of any additional indirect effects to bears would be minimal. Construction of ~1/4 mile of additional road would cumulatively increase existing road densities on the project area and surrounding ownerships in the vicinity. However, access to the project area is privately controlled and no additional public access or use would be expected. Thus, long-term security for bears would be minimally influenced.
Lynx (*Felis lynx*) Habitat: mosaics--dense sapling and old forest >5,500 ft. elev.	[N] Lynx habitat was indicated as potentially present in the Montana Natural Heritage Program database. However, the project area is all under 5,500 ft. elevation and does not contain vegetation types preferred by lynx. No dense sapling or old forest occurs in the project area. Adverse direct, indirect or cumulative impacts to lynx as a result of this project are expected to be minimal.
Gray Wolf (*Canis lupus*) Habitat: ample big game pops, security from human activity	[N] No wolves or wolf packs are known to occur within or near the project area. Activities associated with the proposal are not expected to effect wolves.

	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur

DNRC Sensitive Species	Y = Impacts May Occur (Explain Below)
Black-Backed Woodpecker (*Picoides arcticus*) Habitat: mature to old burned or beetle-infested forest	[Y] Black-backed woodpeckers (*Picoides arcticus*) utilize recently burned areas. The Derby fire burned approximately 207,000 acres, including over 83,000 acres of forestland that burned at moderate to high intensity. The project area burned as a mosaic, with areas of low, moderate and high intensity. Of the 640-acre project area, approximately 250 acres are proposed for harvesting under the action alternative. Of burned, forested DNRC land within the project area, 211 acres (i.e., 46%) would remain unharvested, exceeding the 10% required under DNRC forest management rules. At the scale of the Southern Land Office, an additional 285 acres may be harvested within recently burned areas. However, DNRC would likely follow similar mitigations for black-backed woodpeckers as those that would be implemented for this project. To the south and west of the project area, approximately 39,400 burned forested acres occur on the Gallatin National Forest. These acres should provide extensive habitat for black-backed woodpeckers as well, should they discover and colonize this geographic area. Habitat potentially usable by black-backed woodpeckers would be harvested under the proposed action alternative, however, risk of measurable direct and indirect effects to black-backed woodpeckers would be low due to the sizable amount of burned over area that would remain unharvested on DNRC lands and other nearby ownerships.
Greater Sage-grouse (*Hicus*) Habitat: sagebrush semi-desert	[N] No sage grouse are known to occur within the project area (MNHP 2006). Under the proposed action, preferred sagebrush habitat would not be altered, nor would important breeding sites be altered. Thus, no direct, indirect or cumulative effects to sage grouse would be anticipated.
Harlequin Duck (*Histrionicus histrionicus*) Habitat: white-water streams, boulder and cobble substrates	[N] No harlequin ducks have been documented within or near the project area (MNHP 2006). No high gradient streams suitable for use by harlequins occur within the project area or cumulative effects analysis area. No direct, indirect or cumulative effects to harlequin ducks would be expected to occur as a result of the proposed action.
Mountain Plover (*Charadrius montanus*) Habitat: short-grass prairie, alkaline flats, prairie dog towns	[N] Mountain plovers have not been documented within or near the project area (MNHP 2006). No short-grass prairie or prairie dog towns occur on, or within one mile of the project area. No direct, indirect or cumulative effects to mountain plovers are expected as a result of this project.
Spotted Bat (*Euderma maculatum*) Habitat: rock outcrops, cliffs, caves, old mines	[N] No potential habitat for the spotted bat occurs within the project area. No risk of direct, indirect, or cumulative effects to spotted bats is expected.
Townsend's Big-Eared Bat (*Plecotus townsendii*)	[N] DNRC is unaware of any mines or caves within the project area or close vicinity that would be

Habitat: caves, caverns, old mines	suitable for use by Townsend's big-eared bats. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats are anticipated as a result of this project.
White-tailed Prairie Dog (*Cynomys leucurus*) Habitat: mountain meadows, semi-desert grassland	[N] No white-tailed prairie dogs are known to occur within or near the project area. Thus, no direct, indirect or cumulative effects to prairie dogs are expected to occur as a result of this project.
Black-tailed Prairie Dog (*Cynomys ludoviscianus*) Habitat: grasslands, short-grass prairie, sagebrush semi-desert	[N] No black-tailed prairie dogs are known to occur within or near the project area. Thus, no direct, indirect or cumulative effects to prairie dogs are expected to occur as a result of this project.
Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*) Habitat: white-water streams, boulder and cobble substrates	[N] No streams occur in or near the project area. No direct, indirect or cumulative effects to westslope cutthroat trout would be expected to occur as a result of the proposed action.
Yellowstone Cutthroat Trout (*Oncorhynchus clarkii bouvieri*) Habitat: white-water streams, boulder and cobble substrates	[Y] No direct, indirect or cumulative impacts to Yellowstone cutthroat or other cold-water fish species habitat are expected to result from the proposed harvest. The lack of proposed activities in the immediate vicinity of Lower Deer Creek and the planned mitigation measures to be implemented in Cedar Creek, as well as any contributing ephemeral drainage areas, are expected to be effective in reducing potential erosion and sediment delivery associated with harvest operations. Please refer to Attachment D, Watershed and Fisheries Analysis, for details.