CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Lost Creek Salvage
Proposed Implementation Date:	July 23, 2012
Proponent:	Montana Department of Natural Resources (DNRC), Northwestern Land Office
Location:	Swan River State Forest - Section 1, T24N, R17W
County:	Lake

I. TYPE AND PURPOSE OF ACTION

DNRC, as manager of Swan River State Forest, proposes to harvest an estimated 61 thousand board feet (Mbf) of dead and dying salvage timber on 25 acres located in Section 1, T24N, R17W. The proposed activities would remove trees from a previously harvested, non-old-growth stand that have died or are dying because of fire damage caused by the South Fork of Lost Creek Fire in the summer/fall of 2011. Western larch, western red cedar, and Douglas-fir are the majority of the species being salvaged. A minor component of Engelmann spruce, grand fir, and western white pine are also selected for salvage. Harvesting these dead and dying trees as quickly as possible ensures that the most value will be captured for state trust lands. This project would produce an estimated $6,992.28 in revenue for the Common Schools Trust.

PROJECT AREA

The proposed salvage is located in the southeast quarter of Section 1, T24N, R17W. The unit is 25 acres and is accessed by the South Fork of Lost Creek Road (an open road) through the unit and a restricted road at the bottom of the unit. The elevation is 4,200 feet. This proposed salvage is located in part of Three Creeks 2 Timber Sale (Unit 1-03). The United States Forest Service (USFS) is the only adjacent landowner.

The lands involved in the proposed project are held in trust by the State of Montana for the support of specific beneficiary institutions (*Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11*). The *Montana State Board of Land Commissioners* (Land Board) and DNRC are legally required to administer these trust lands to produce the largest measure of reasonable and legitimate long-term return for the trust beneficiaries (*Montana Code Annotated [*MCA*], Section77-1-202*). The State is required by law to establish a salvage timber program that provides for the timely harvesting of dead and dying timber that has been threatened by insects, diseases, wildfires, or wind on State forests. Under this requirement, DNRC shall, to the extent practicable, harvest dead and dying timber before there is substantial wood decay and value loss (*Section 77-5-207, MCA*).

This project was developed in compliance with the *State Forest Land Management Plan* (SFLMP), the *Administrative Rules for Forest Management* (Forest Management Rules; *ARM 36.11.401* through *471*), and conservation commitments contained in the selected alternative in the Final Environmental Impact Statement (FEIS) of the Montana DNRC *Forested State Trust Lands Habitat Conservation Plan* (HCP) and associated *Record of Decision* (ROD), as well as other applicable state and federal laws.

II. PROJECT DEVELOPMENT

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

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

DNRC solicited public participation on the Lost Creek Salvage project through an initial scoping which included the project information sheet, cover letter, and maps signed by Caitlin Parke, Management Forester. The packet was mailed December 2, 2011 to neighboring landowners, individuals, agency and industry representatives, and other organizations that have expressed interest in DNRC's management activities. The mailing list of parties receiving the *Initial Proposal*, and the comments received, are located in the project file at the Swan River State Forest headquarters. DNRC received 3 comments from 1) Neil Meyer, Swan Valley Ad Hoc Committee; 2) E.T. 'Bud' Moran, CSKT Council Chairman; and 3) Jane Ingebretson, USFS biologist. One comment was in favor of the project, one comment expressed minor concerns relating to the project area regarding the potential of undocumented cultural resources, and the final comment questioned implementation of the *Swan Valley Grizzly Bear Conservation Agreement* (SVGBCA) in the closed subunit. This document will address those concerns.

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

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

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS (DFWP)

DFWP has jurisdiction over the management of fisheries and wildlife populations in the project area. DFWP is on the mailing list and was sent the scoping letter.

MONTANA/IDAHO AIRSHED GROUP

DNRC is a member of the Montana/Idaho Airshed Group, which regulates slash burning through air-quality and weather monitoring for all members of the group. DNRC receives an air-quality permit for burning slash through participation in this group.

SWAN VALLEY GRIZZLY BEAR CONSERVATION AGREEMENT

TheSVGBCA, a cooperative agreement between DNRC, Plum Creek Timber Company (Plum Creek), United States Fish and Wildlife Service (USFWS), and the USFS, is currently in effect. The Nature Conservancy has acquired ownership of Plum Creek lands within Swan River State Forest and The Nature Conservancy has agreed to follow the intent of the SVGBCA. This project will define mitigation measures for operating within the SVGBCA timber-harvesting parameters.

U.S. FISH AND WILDLIFE SERVICE

In December 2011, the USFWS issued DNRC an *Incidental Take Permit* (Permit) under Section 10 of the *Endangered Species Act*. The Permit applies to select forest-management activities affecting the habitat of grizzly bear, Canada lynx, and 3 fish species (bull trout, westslope cutthroat trout, and Columbia redband trout) on project area lands covered under the HCP. DNRC and the USFWS will coordinate monitoring of certain aspects of the conservation commitments to ensure program compliance with the HCP.

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

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

Alternatives Considered

- ***No Action Alternative***

  The No-Action Alternative is used as a baseline for comparing the effects that the Action Alternative would have on the environment and is considered a possible alternative for selection. Under this alternative, the proposed salvage would not take place and, therefore, no revenue would be generated for the Common Schools Trust. Firewood permits, recreational use, fire suppression, noxious-weed control, and other management activities may still occur. Natural events, such as windthrow and down fuel accumulation would continue to occur.

- ***Action Alternative***

  Under the Action Alternative, the proposed salvage would take place as described in this document. Approximately 61 Mbf of dead and dying timber would be harvested. An appropriate amount of snags and down woody debris would be maintained for wildlife needs.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

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

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:
Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify direct, indirect, and cumulative effects to soils.

The potential impacts to geology and soil quality in the project area are addressed in *APPENDIX A - HYDROLOGICAL ANALYSIS* at the end of the document.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:
Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify direct, indirect, and cumulative effects to water resources.

The potential impacts to water and fisheries resources in the project area are addressed in *APPENDIX A - HYDROLOGICAL ANALYSIS* at the end of the document.

6. AIR QUALITY:

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

BACKGROUND

The project is within Montana Airshed 2 and is not within a Class 1 Airshed. Air quality within this airshed is considered good. Temporary, local restrictions in air quality currently occur from wildfires, prescribed broadcast burning, slash burning, and road dust.

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

- ***No Action Alternative***

  The existing condition would not change.

- ***Action Alternative***

  Post-harvest burning would produce smoke emissions. Due to the relatively small size of the project, no increases are expected to exceed standards or impact local population centers if burning is completed within the requirements imposed by the Montana/Idaho Airshed Group.

  Additional smoke produced from prescribed burning on adjacent USFS, The Nature Conservancy, private, and state trust forestland would remain within the standards for air quality, but cumulative effects during peak burning periods could affect individuals at local population centers with respiratory illnesses for short durations. All known major burners operate under the requirements of the Montana/Idaho Airshed Group, which regulates the amount of emissions produced cumulatively by major burners.

7. VEGETATION COVER, QUANTITY AND QUALITY:

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

The direct and indirect analysis area is approximately 25 acres in size and is located in the southeast quarter of Section 1, T24N, R17W.

BACKGROUND

The location of the salvage is within burned portions of the Three Creeks 2 Timber Sale (Unit 1-03). This unit was a seedtree harvest that was implemented in August/September 2009 during which the older age class and those infected with insects and disease were removed to improve the overall vigor of the stand. A mixed-conifer covertype remained post harvest. Species retained consisted of western red cedar, grand fir, Douglas-fir, western larch, western white pine, and Engelmann spruce.

DNRC is required by law to establish a timber program that provides for the timely salvage of dead and dying timber that is threatened by insects, diseases, wildfires, or windthrow on state trust lands. Under this requirement, DNRC shall, to the extent practicable, harvest dead and dying timber before wood decay and value loss are substantial (*Section 77-5-207, MCA)*.

EXISTING ENVIRONMENT

This stand consists of a mature, dominant overstory of western red cedar, western larch, Douglas-fir, Engelmann spruce, grand fir, and western white pine. Conifer regeneration within the understory is limited; the unit was planted with western larch and western white pine in the spring of 2011. However, the majority of the seedlings did not survive the fire. The current age class for the retained overstory of the stand within the proposed salvage unit is 100 to 149 years. There is limited vegetation growing as the stand is still in early successional development following the fire. Condition of the trees in the project area was assessed this spring to determine the level of survival after the fire. Approximately 35 percent of the western larch, 50 percent of the Douglas-fir, and 90 percent of the western red cedar succumbed to the fire and is either dead or dying. The crowns are red and dead or faded, bark is sloughing off, and /or the root collars were severely scorched. No sensitive, threatened, or endangered plant species have been documented within the project area.

CURRENT HABITAT TYPES AND FOREST PRODUCTIVITY WITHIN THE PROJECT AREA

The majority of stands surrounding the project area is western red cedar habitat types and in the warm and moist, low elevation habitat group. Forest productivity (growth) is rated high to very high. These stands typically contain varying populations of Douglas-fir, subalpine fir, grand fir, Engelmann spruce, and western larch. Forage potential in these stands is best in early successional stages, such as, the burned area.

DIRECT AND INDIRECT EFFECTS

- ***No-Action Alternative***

  Timber harvesting would not occur at this time. The project area has moderate to severe damage and mortality is scattered throughout. The shade-tolerant, deciduous shrubs would continue to regenerate, potentially changing the dominant vegetation within the stand from timber to shrubs. Thus, the long-term covertype may change from a mixed-conifer covertype to a non-forested covertype. Age class for the stand would continue to decrease as the older trees die from the effects of insect and disease attacks and as seedlings establish from natural regeneration where not impeded by brush competition. Snags within reach of the road would most likely be cut for firewood. Those snags not removed would increase the overall fuel loading as they remain and ultimately fall on-site.

- ***Action Alternative***

  Harvesting would focus on dead and dying western red cedar, western larch, and Douglas-fir as well as a minor component of grand fir, Engelmann spruce, and western white pine. Harvesting all or most of the dead, and/or dying timber with a diameter at breast height (dbh) greater than 7.5 inches would result in scattered and grouped trees being removed from the mixed-conifer stand either singly or in groups that could create up to 1/4- to 1/2-acre sized openings. The spacing would be increased from the current spacing. However, there would be adequate snags retained for wildlife and down woody debris purposes. The stand would retain the characteristics of a seedtree stand. Scarification during harvesting as well as the scarification caused by the fire may encourage early seral species development which may slightly decrease the overall age class. The stand is expected to remain a mixed-conifer

covertype upon harvest and remain so if regeneration occurs. Minor decreases in the insect activity within the area may occur with the removal of potential brood trees and the overall future fuel loading within the stand would decrease as the dead and dying are removed rather than falling on-site.

CUMULATIVE EFFECTS

Due to the relatively small size of the proposed project, cumulative effects to covertype, age class, and other vegetation-related topics are expected to be negligible.

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

Impacts to fisheries resources are addressed in *APPENDIX A - HYDROLOGICAL ANALYSIS* at the end of the document.

Impacts to terrestrial wildlife resources are addressed in *APPENDIX B– TERRESTRIAL WILDLIFE RESOURCES* at the end of the document.

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

Potential impacts to aquatic species of concern are addressed in *APPENDIX A - HYDROLOGICAL ANALYSIS* at the end of the document.

Impacts to terrestrial threatened and endangered species are addressed in *APPENDIX B – TERRESTRIAL WILDLIFE RESOURCES* at the end of the document.

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

DNRC has no record of cultural resources within the project's area of potential effect. However, a professional inventory of cultural resources has not been conducted. If previously unknown, cultural or paleontological materials are identified during project related activities, all work will cease until a professional assessment of such resources can be made.

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

EXISTING ENVIRONMENT

Generally, foreground views are those associated with and connected to open roads. South Fork Lost Creek Road is an open road that goes through the project area. The burn area both inside and outside the proposed harvest unit consists of varying levels of mortality which has opened up the foreground views. Middleground views usually consist of hillsides or drainages. The area contains mid- to high-elevation steep ridges, avalanche shoots, and rock bluffs with both natural and man-made openings dispersed throughout. Due to topography and existing vegetation, these

types of views are limited within the project area. Background views consist of a collection of drainages and ridges that make up a portion of the central Swan Range. The most prominent viewshed is the foreground view since most views within the project area are from this vantage point, typically from the South Fork Lost Creek Road.

DIRECT AND INDIRECT EFFECTS

- ***No-Action Alternative***

  Current conditions would not change.

- ***Action Alternative***

  Views of the stand in Section 1, T24N, R17W would be seen along approximately 2,000 feet on both sides of South Fork Lost Creek Road. Due to the closeness of the site to the open road and the lack of vegetation screens resulting from the burn, effects to aesthetics would be moderate in the foreground. Dead and dying trees would be removed resulting in a mosaic of open areas, remaining live trees and snags, and ultimately, seedlings and shrubs. Limited to no portions of the middle ground or background viewsheds would be visible due to topography, additional vegetation outside the project area, and the location of the project area.

CUMULATIVE EFFECTS

Natural processes on the landscape, such as wildfires, windthrow, insect infestations, and disease infections, would continue to alter the view over time. Current salvage and proposed timber sale harvesting projects on all ownerships would alter the aesthetics of all viewsheds.

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

None

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

Other environmental documents that pertain to the project area include:

- Swan Valley Grizzly Bear Conservation Agreement
- The Habitat Conservation Plan
- Three Creeks Timber Sale FEIS
- Scout Lake Multiple Timber Sale Final Environmental Impact Statement though not directly within the project area; it is included within the cumulative-effects area.

IV. IMPACTS ON THE HUMAN POPULATION

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

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

None

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

Approximately 61 Mbf of sawlog timber would be made available to the wood products industry.

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

Due to the relatively small size of this project, the proposed action would result in no measurable impact on quantity of employment.

In accordance with the SVGBCA salvage projects in closed subunits during non-denning periods can only be worked for 30 aggregate days, 14 consecutive days.

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

Due to the relatively small size of this salvage project, the proposed action would result in no measurable cumulative impact 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 direct, indirect, and cumulative effects of this and other projects on government services

The demand for government services would not be cumulatively impacted as a result of this proposal.

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.

In March 2003, DNRC adopted *Administrative Rules for Forest Management* (*ARM 36.11.401* through *450*). DNRC would manage lands involved in this project in accordance with the Forest Management Rules.

The project would adhere to the agreements made in the SVGBCA and the HCP.

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:

Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify direct, indirect, and cumulative effects to recreational and wilderness activities.

EXISTING CONDITIONS

The Lost Creek Salvage project area, primarily used for hunting, snowmobiling, and access to the South Fork of Lost Creek Trailhead, receives recreational use throughout the year.

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS

- ***No-Action Alternative***

  Recreational use is not expected to change.

- ***Action Alternative***

  The haul routes would include South Fork of Lost Creek and Lost Creek road. Short delays due to log hauling and harvesting along the open road may inconvenience recreationists; however, recreational use in the project area is not expected to change with the implementation of this project. Only traffic related to logging and administrative use would be allowed on any restricted access roads needed during the period of harvest operations.

  The status of the closed roads used to access this project would not change with project implementation.

  Harvesting activities may occur on adjacent ownerships as well, exact details are not known at this time. All levels of existing recreational use on Swan River State Forest and adjacent ownerships are expected to continue.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

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

Due to the relatively small size of this project and the fact that people are already employed in the region, no measurable cumulative impacts related to population and housing would be expected.

22. SOCIAL STRUCTURES AND MORES:

Identify potential disruption of native or traditional lifestyles or communities.

None

23. CULTURAL UNIQUENESS AND DIVERSITY:

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

None

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

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

The proposed salvage project would create jobs in the private sector. Harvest would provide a monetary return to the Montana School Trust Fund.

EA Checklist Prepared By:	**Name:** Caitlin Parke	**Date:** June 27, 2012
	Title: Management Forester	

V. FINDING

25. ALTERNATIVE SELECTED:

Two alternatives are present and fully analyzed in the CEA:

- The No-Action Alternative includes existing activities, but does not include a 61 Mbf sawlog salvage sale permit.
- In addition to existing activities, the Action Alternative proposes attaching a total of 61 Mbf of salvage sawlog timber from approximately 25 acres of a previously harvested, non-old-growth stand that has died or is dying due to fire damage caused by the South Fork of Lost Creek Fire.

I have reviewed the correspondence from the public and information presented in the CEA. I have selected the Action Alternative without additional modifications. I feel the Action Alternative best meets the purpose and need for action based on the following reasons:

- The selected Action Alternative meets the goals and objectives listed in this CEA.
- The analysis of identified issues did not reveal information to persuade DNRC or myself to choose the No-Action Alternative.
- The project area is located on State-managed lands that are principally valuable for the timber that is on them (*77-1-402 MCA*). DNRC manages these lands according to the standards adopted by the Administrative Rules for Forest Management (*ARM 36.11.401* through *450*) and the philosophy within the SFLMP, which states:

  Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biologically diverse forests…in the future; timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives.

- The Action Alternative for this project meets all requirements of the Administrative Rules for Forest Management (*ARM 36.11.401* through *450*), the Montana DNRC Forested State Trust Lands Habitat Conservation Plan, and the SVGBCA, in that impacts are minimal and minor in scope.
- The proposal provides an important mechanism to manage intensively for a healthy and biologically diverse forest in a way that harvests dead, dying, or damaged timber before a substantial value loss occurs, while limiting environmental impacts.

As mandated by State statute (*77-5-222 MCA*), the proposed sale will contribute to DNRC's sustained yield.

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

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

- The proposed salvage project conforms to the management philosophies of DNRC and is in compliance with existing laws, rules, policies, and standards applicable to this type of proposed action.
- The Action Alternative will not preclude analysis of future actions on State trust lands.
- The proposed activities are similar to past projects on State trust lands using common practices in the industry and are not being conducted on unique or fragile sites.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

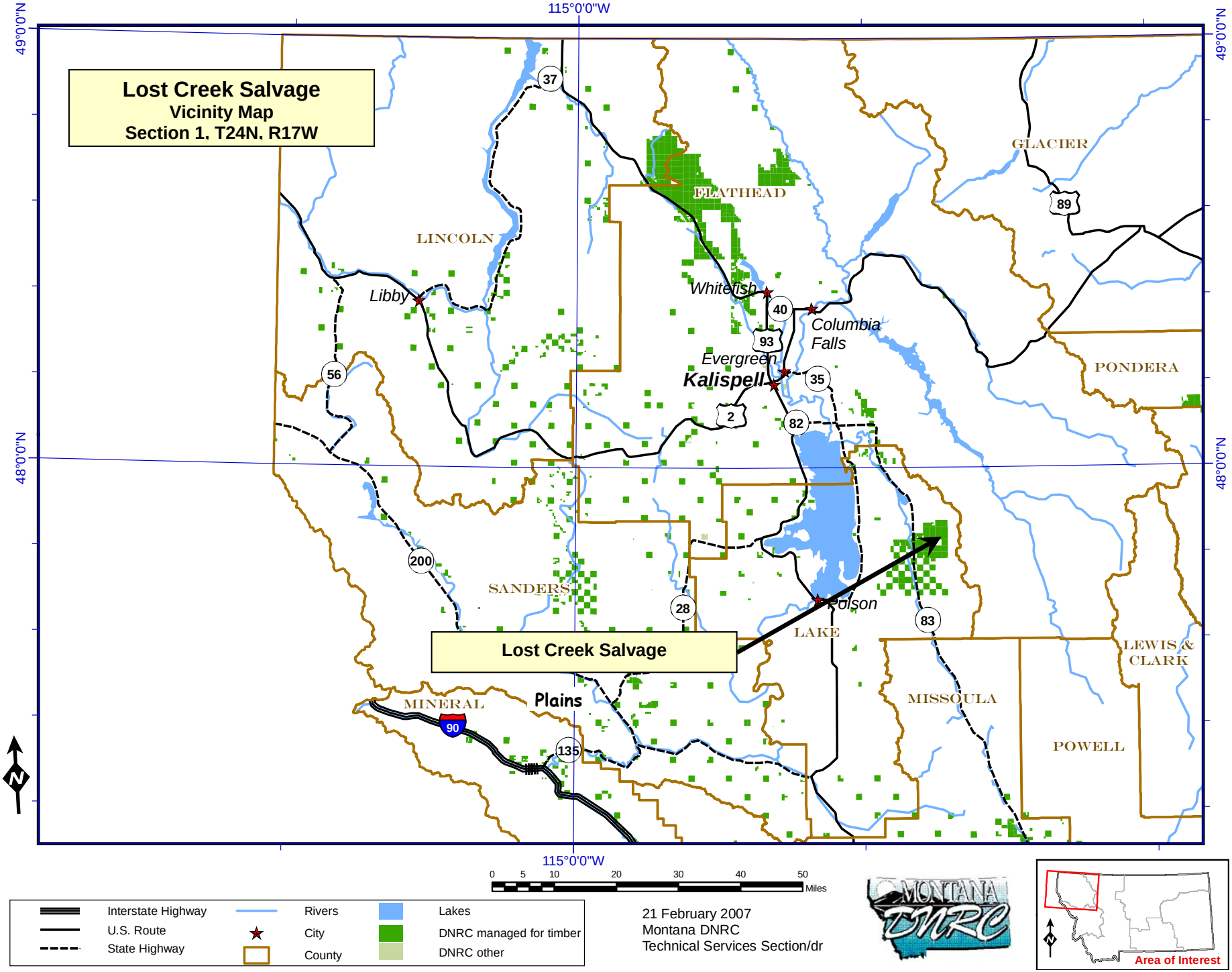
Based on the following, I find that a more detailed EA or an EIS does not need to be prepared:

- The CEA adequately addressed the issues identified during project development and displayed the information needed to make decisions.
- Evaluation of the potential impacts of the proposed Lost Creek Salvage indicates that no significant impacts would occur.

The ID Team provided adequate opportunities for public review and comment. Public concerns were incorporated into the project design and the analysis of impacts as displayed on page 2: *Public Involvement, Agencies, Groups or Individuals Contacted.*

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

EA Checklist Approved By:	**Name:** Dan Roberson **Title:** Swan Unit Manager		
Signature: /s/Kristen Baker FOR Dan Roberson		**Date**: July 12, 2012	


Lost Creek Salvage
Vicinity Map
Section 1, T24N, R17W
115°0'0"W
49°0'0"N
48°0'0"N
LINCOLN
FLATHEAD
GLACIER
PONDERA
SANDERS
LAKE
MINERAL
MISSOULA
POWELL
LEWIS & CLARK
Libby
Whitefish
Columbia Falls
Evergreen
Kalispell
Polson
Plains
Lost Creek Salvage
37
89
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2
82
56
200
28
83
135
90
N
0 5 10 20 30 40 50 Miles
Interstate Highway
U.S. Route
State Highway
Rivers
City
County
Lakes
DNRC managed for timber
DNRC other
21 February 2007
Montana DNRC
Technical Services Section/dr
MONTANA DNRC
Area of Interest

Lost Creek Salvage
Sale Unit Map
Section 1, T24N, R17W

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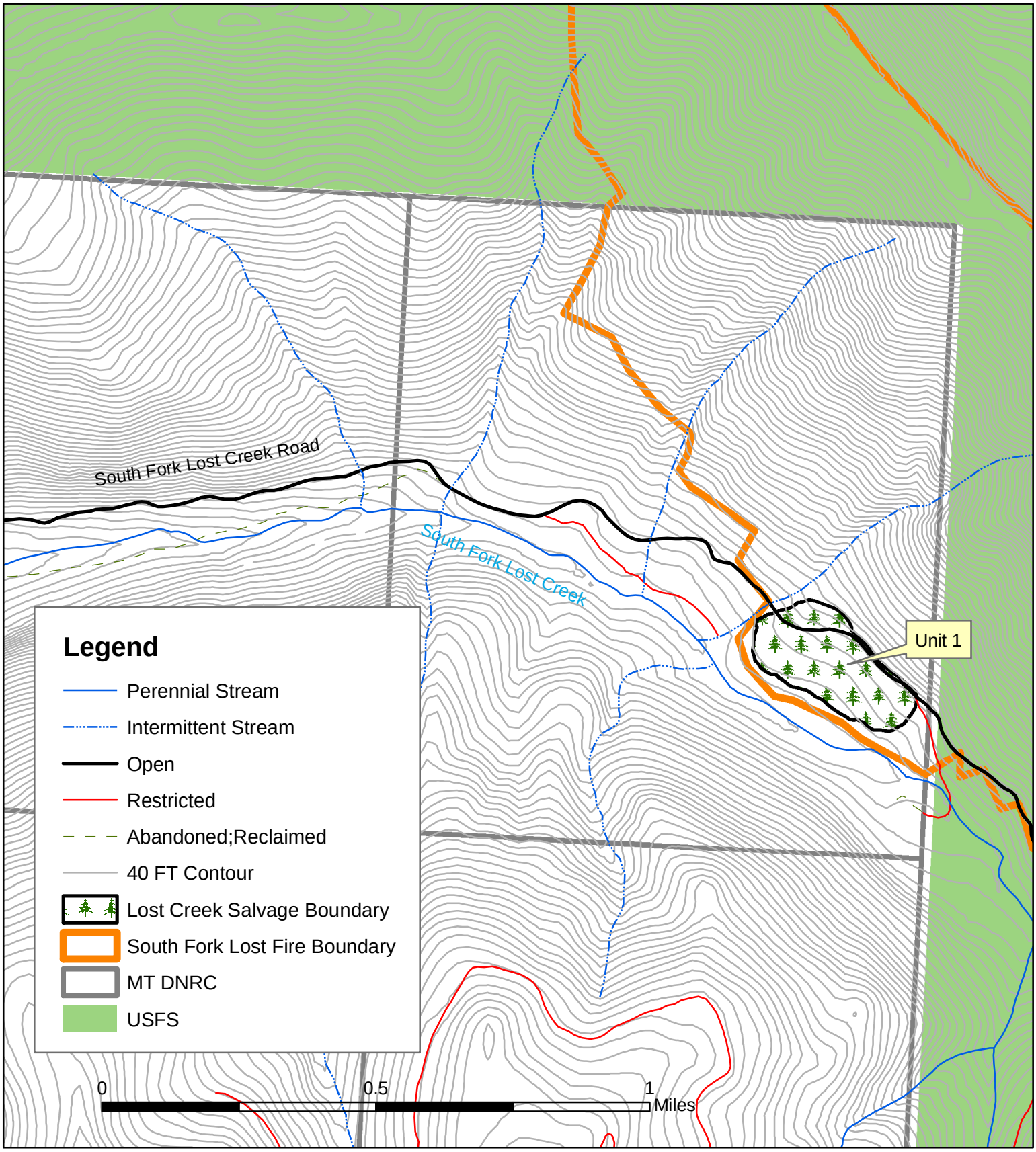
Montana DNRC
Swan Unit
CP 11/16/11



APPENDIX A

HYDROLOGICAL ANALYSIS

INTRODUCTION

PROJECT AREA AND PROJECT ACTIVITIES

The gross project area includes 25 acres within Swan River State Forest. Affected watershed is the South Fork Lost Creek in the Swan River Drainage. This watershed includes land managed by the Flathead National Forest (FNF) and DNRC. The proposed action alternative would include ground-based yarding methods to harvest timber on approximately 25 acres in the project area. No new road construction would be needed to access proposed salvage areas.

ISSUES AND MEASUREMENT CRITERIA

The following issues encompass the specific issues and concerns raised through public comment and scoping of the proposed project. For a specific list of individual comments and concerns, please refer to the project file.

Sediment Delivery

Timber harvesting and related activities, such as road construction, can lead to water-quality impacts by increasing the production and delivery of fine sediment to streams. Construction of roads, skid trails, and landings can generate and transfer substantial amounts of sediment through the removal of vegetation and exposure of bare soil. In addition, removal of vegetation near stream channels reduces the sediment-filtering capacity and may reduce channel stability and the amounts of large woody material. Large woody debris is a very important component of stream dynamics, creating natural sediment traps and energy dissipaters to reduce the velocity and erosive power of stream flows.

Sediment Delivery will not be analyzed further in this document since none of the proposed salvage harvesting or any of the proposed haul routes is within 200 feet of a live stream. This proximity to streams means there is a very low risk of sediment delivery from salvage activities and no delivery from road runoff.

Fish Habitat

Fish habitat has been identified in South Fork Lost Creek. According to the *Montana Fisheries Information System* (*FWP, 2012*), a population of bull trout and westslope cutthroat trout exists in South Fork Lost Creek near the proposed project area.

Fish habitat will not be analyzed further in this document since none of the proposed salvage harvesting or any of the proposed haul routes is within 200 feet of a live stream. This proximity to streams means there is a very low risk of sediment delivery from salvage activities, and no delivery from road runoff. In addition, all proposed activities are located on the north side of the South Fork Lost Creek, and well outside of the range

to provide shade or large woody debris recruitment. As a result, impacts to fish habitat are not expected from this project.

Water Yield

Timber harvesting and associated activities can affect the timing, distribution, and amount of water yield in a harvested watershed. Water yields increase proportionately to the percentage of canopy removal (*Haupt 1976*), because removal of live trees reduces the amount of water transpired, leaving more water available for soil saturation and runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt, which lead to further water-yield increases. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition. Vegetation removal can also reduce peak flows by changing the timing of snowmelt. Openings will melt earlier in the spring with solar radiation and have less snow available in late spring when temperatures are warm. This effect can reduce the synchronization of snowmelt runoff and lower peak flows.

Measurement criteria: Annual water yield and peak flow duration and timing will be addressed qualitatively.

ANALYSIS AREA

Water Yield

Direct, indirect, and cumulative effects to water yield will be reviewed in the South Fork Lost Creek Watershed. All existing activities on all ownership and proposed activities related to the Lost Creek Salvage project were analyzed using the *Equivalent Clearcut Acres* (ECA) method to estimate the water-yield changes that may occur as a result of the proposed project. This watershed was chosen as an appropriate scale of analysis for the ECA method, and will effectively display the estimated impacts of proposed activities.

ANALYSIS METHODS

The analysis below was conducted on a watershed basis, and included activities on all roads and acres, regardless of ownership. For cumulative-effects analysis, all proposed DNRC activities and proposed actions on other ownership were considered. Potential future management on other ownerships was not considered due to the speculative nature of predicting the intentions of other landowners.

Water Yield

The water-yield increase for the watershed in the project area was determined using the ECA method as outlined in *Forest Hydrology Part II* (*Haupt 1976*). ECA is a function of total area roaded and harvested, percent of crown removal in harvesting, and amount of vegetative recovery that has occurred in harvest areas. This method equates area harvested and percent of crown removed with an equivalent amount of clearcut area. For example, if 100 acres had 60-percent crown removed, ECA would be approximately 60, or equivalent to a 60-acre clearcut. The relationship between crown removal and ECA is not a 1-to-1 ratio, so the percent ECA is not always the same as the percent

canopy removal. As live trees are removed, the water they would have evaporated and transpired either saturates the soil, or is translated to runoff. This method also calculates the recovery of these increases as new trees begin to grow and move toward preharvest water use.

In order to evaluate the watershed risk of potential water-yield increase effectively, a threshold of concern must be established. In order to determine a threshold of concern, acceptable risk level, resource value, and watershed sensitivity are evaluated according to *Young (1989)*. The watershed sensitivity is evaluated using qualitative assessments, as well as procedures outlined in *Forest Hydrology Part II* (*Haupt 1976*). The stability of a stream channel is an important indicator of where a threshold of concern should be set. As water yields increase as a result of canopy removal, the amount of water flowing in a creek gradually increases. When these increases reach a certain level, the bed and banks may begin to erode. More stable streams will be able to handle larger increases in water yield before they begin to erode, while less stable streams will experience erosion at more moderate water-yield increases (*Rosgen 1996*).

Risk Assessment Criteria

Where risk is assessed in both sediment-delivery and water-yield analyses, the following definitions apply to the level of risk reported:

- low risk means that impacts are unlikely to result from proposed activities,
- moderate risk means that there is approximately a 50-percent chance of impacts resulting from proposed activities, and
- high risk means that impacts are likely to result from proposed activities.

Where levels or degrees of impacts are assessed in this analysis, the following definitions apply to the degree of impacts reported:

- Very low impact means that impacts from proposed activities are unlikely to be measurable or detectable and are not likely to be detrimental to the water resource;
- Low impact means that impacts from proposed activities would likely be measurable or detectable, but are not likely to be detrimental to the water resource.
- Moderate impact means that impacts from proposed activities would likely be measurable or detectable, and may or may not be detrimental to the water resource.
- High impact means that impacts from proposed activities would likely be measurable or detectable, and are likely to have detrimental impacts to the water resource.

RELEVANT AGREEMENTS, LAWS, PLANS, RULES, AND REGULATIONS

Montana Surface Water-Quality Standards

None of the streams in the proposed project area are currently listed as water-quality-limited waterbodies in the *2006 Montana 303*(*d*) list. Swan Lake is currently listed on the *2006 Montana 303(d)* list. Each of the project area watersheds is a tributary to Swan River, which is the primary inflow to Swan Lake. The 303(d) list is compiled by the *Montana Department of Environmental Quality* (DEQ) as required by *Section 303*(*d*) of the

Federal Clean Water Act and the *Environmental Protection Agency* (*EPA*) *Water Quality Planning and Management Regulations* (*40 CFR, Part 130*). Under these laws, DEQ is required to identify waterbodies that do not fully meet water-quality standards, or where beneficial uses are threatened or impaired. These waterbodies are then characterized as 'water quality limited' and thus targeted for *Total Maximum Daily Load* (TMDL) development. The TMDL process is used to determine the total allowable amount of pollutants in a waterbody of a watershed. Each contributing source is allocated a portion of the allowable limit. These allocations are designed to achieve water-quality standards.

The *Montana Water Quality Act* (*MCA 75-5-701* through *705*) also directs DEQ to assess the quality of State waters, ensure that sufficient and credible data exists to support a 303(d) listing, and develop TMDL for those waters identified as threatened or impaired. Under the Montana TMDL law, new or expanded nonpoint source activities affecting a listed waterbody may commence and continue provided they are conducted in accordance with all reasonable land, soil, and water conservation practices. DNRC will comply with the TMDL law and interim guidance developed by DEQ through implementation of all reasonable soil and water conservation practices, including *Best Management Practices* (BMPs) and *Forest Management Rules* (*ARM 36.11.401* through *450*).

Swan Lake is currently listed as threatened for aquatic life support and for cold-water fisheries. The current listed cause of impairment in Swan Lake is sedimentation/siltation; the probable sources include forest roads (road construction and use), highways, roads, bridges, infrastructure (new construction). Through the *Swan Lake Watershed Group* and its associated *Swan Lake Technical Advisory Group*, a water-quality restoration plan was developed for Swan Lake in June 2004. The *Swan Lake Watershed Group* and *Technical Advisory Group* are comprised of local stakeholders and include:

- the Swan Ecosystem Center, Flathead Lake Biological Station at Yellow Bay, and Friends of the Wild Swan;
- landowners, including the USDA Forest Service, Montana DNRC, Plum Creek; and
- regulatory agencies, including DEQ and EPA.

The *Water Quality Restoration Plan* was approved by EPA in August 2004, and activities are ongoing to correct current sources and causes of sediment to Swan Lake and its tributaries. DNRC is an active partner and participant in this process. All proposed activities in the project area would implement activities to alleviate identified sources of sediment and comply fully with all TMDL requirements.

Montana SMZ Law

There are no features in the proposed salvage area that meet the definition in *ARM 36.11.312* of a stream. South Fork Lost Creek is approximately 200 feet from the proposed project area, and is a Class 1 stream (flows more than 6 months per year, contributes to another body of water, and contains fish).

Forest Management Rules

In 2003, DNRC drafted *Administrative Rules for Forest Management*. The portion of those rules applicable to watershed and hydrology resources include *ARM 36.11.422* through *426*. All applicable rules will be implemented if they are relevant to activities proposed with this project.

EXISTING ENVIRONMENT

Introduction

The proposed project lies entirely within the South Fork Lost Creek watershed. Precipitation ranges from approximately 20 inches annually in the valley bottom to approximately 70 inches near ridge tops.

Water Yield

Water yield was assessed for the South Fork Lost Creek watershed in 2005 with the Three Creeks Timber Sale FEIS. According to *ARM 36.11.423*, allowable water-yield increase values were set at levels to ensure compliance with all water-quality standards, protect beneficial uses, and exhibit a low degree of risk. This means that the allowable level is a point below which water yields are unlikely to cause any measurable or detectable changes in channel stability. The allowable water-yield increase for the South Fork Lost Creek watershed has been set at 10 percent based on channel-stability evaluations, watershed sensitivity, and acceptable risk. This water-yield increase would be reached approximately when the ECA level in South Lost Creek reaches the estimated level of 2,626 acres. Based on review of aerial photography and DNRC section records in the project area, timber-harvesting and associated road-construction activities have taken place in the South Lost Creek watershed since the 1960s. In addition, an assessment of past-timber management on FNF land in the South Lost Creek watershed was conducted using FNF harvest history data. These activities, combined with the vegetative recovery that has occurred, have led to an estimated 1.7 percent water-yield increase over a fully forested condition in the South Lost Creek watershed. *TABLE H-1-CURRENT WATER YIELD* summarizes the existing conditions for water yield and the associated ECA levels in the South Fork Lost Creek watershed. Estimated water yield and ECA levels are well below the established threshold. The South Lost Fire burned nearly 2,000 acres within the South Fork Lost Creek watershed, with varying burn intensity. These burned acres will also contribute to the water yield increase values.

TABLE H-1 – CURRENT WATER YIELD. *Water yield and ECA increases in South Fork Lost Creek watershed.*

	SOUTH FORK LOST CREEK
Existing percentage water-yield increase	1.7
Allowable percentage water-yield increase	10
Existing ECA	533
Allowable ECA	2,626

ENVIRONMENTAL EFFECTS

Water Yield

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

  Water quantity and peak flows would not be changed from present levels, which include the effects from the South Lost Fire. Past harvest units and burned areas would continue to return to fully forested conditions as areas of historic timber-harvests regenerate.

- ***Direct and Indirect Effects of Action Alternative to Water Yield***

  The proposed salvage of 25 acres of burned timber from the South Lost Fire would have no direct or indirect effects on water yield or peak flows beyond those currently occurring. None of the proposed salvage would affect water yield since only trees killed by the South Lost Fire would be removed. Since these trees were already killed by the South Lost Fire, they are already contributing to water-yield increases whether they are salvaged or not.

- ***Cumulative Effects of No-Action Alternative to Water Yield***

  No cumulative effects on water yield or peak flows are expected as a result of this project. Existing timber-harvest units and burned areas would continue to revegetate and move closer to pre-management levels of water use and snowpack distribution.

- ***Cumulative Effects of Action Alternative to Water Yield***

  The proposed salvage of 25 acres of burned timber from the South Lost Fire would have no cumulative effects on water yield or peak flows beyond those currently occurring. None of the proposed salvage would affect water yield since only trees killed by the South Lost Fire would be removed. Since these trees were already killed by the South Lost Fire, they are already contributing to water-yield increases whether they are salvaged or not.

  The proposed project is expected to have a low risk of cumulative impacts to water yield and peak flows as a result of the proposed timber harvesting.

APPENDIX B

TERRESTRIAL WILDLIFE RESOURCES

INTRODUCTION

The wildlife analysis is designed to disclose the existing condition of wildlife resources and the anticipated direct, indirect, and cumulative effects that may result from implementing the No-Action and Action alternatives. The following issue statements were developed from concerns raised by DNRC specialists and public comments received during scoping and will be addressed in detail in the following analysis:

- **Snags and coarse woody debris.** The proposed activities could reduce the availability of snags and coarse woody debris and increase human access for firewood harvesting, which could adversely affect the quality of wildlife habitat.
- **Grizzly bears.** The proposed activities could alter grizzly bear cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats and/or increasing risk of human-caused bear mortality.
- **Black-backed woodpeckers.** The proposed activities could disturb birds during the nesting season and reduce black-backed woodpecker habitat suitability by removing snags used for foraging and nesting.

RELEVANT AGREEMENTS, LAWS, PLANS, RULES, AND REGULATIONS

Various legal documents dictate management criteria for the management of wildlife and their habitat on state lands. The documents most pertinent to this project include: the *Bald and Golden Eagle Protection Act*, *DNRC Forest Management Rule*s, *DNRC Forested Trust Lands Final Environmental Impact Statement and Habitat Conservation Plan*, the *Endangered Species Act*, the *Migratory Bird Treaty Act*, and the *Swan Valley Grizzly Bear Conservation Agreement*.

ANALYSIS AREAS

Direct and Indirect Effects

The direct and indirect effects of the proposed activities on all species/issues were analyzed within the project area (*FIGURE W-1 – ANALYSIS AREAS*), which consists of 739 acres of DNRC-managed lands in Section 1, T24N, R17W.

Cumulative Effects

The cumulative effects of the proposed activities on all species/issues were analyzed at a surrounding landscape scale that varies according to the issue or wildlife species being discussed. Cumulative-effects-analysis areas are named according to the species that is being analyzed or the size of the area and are summarized in *TABLE W-1 – ANALYSIS AREAS* and *FIGURE W-1 – ANALYSIS AREAS*. Cumulative-effects-analysis areas include the project area as well as lands managed by other agencies and private landowners. Detailed descriptions of each

analysis area are located in the *EXISTING CONDITION* section for each issue or species evaluated (e.g., snags and coarse woody debris, grizzly bears etc.).

TABLE W-1. ANALYSIS AREAS. *Descriptions of the direct and indirect effects analysis area and cumulative effects analysis areas.*

ANALYSIS AREA NAME	DESCRIPTION	TOTAL ACRES	ISSUE(S)/SPECIES ANALYZED
Project area	Section 1, T24N, R17W	739	direct and indirect effects for all issues/species
Medium cumulative-effects-analysis area	The South Fork Lost Fire perimeter buffered by 1 km and including the project area	7,596	black-backed woodpeckers, snags and coarse woody debris
Large cumulative-effects-analysis area	The South Fork Lost Soup Grizzly Bear Subunit	29,883	grizzly bears

ANALYSIS METHODS

Analysis methods are based on DNRC Forest Management Rules, which are designed to promote biodiversity. The primary basis for this analysis included information obtained by: field visits, scientific literature consultation, *Montana Natural Heritage Program* (MNHP) data queries, DNRC *Stand Level Inventory* (SLI) data analysis, aerial-photograph analysis, consultation with professionals, and studies of the Three Creeks Timber Sale Project FEIS and the Goat Squeezer Timber Sale Project FEIS wildlife analyses. The coarse-filter wildlife analysis section includes analyses of the direct, indirect, and cumulative effects of the proposed alternatives on old-growth forest, connectivity of mature forest habitats, and snags and coarse woody debris. The fine-filter analysis section includes analyses of the direct, indirect, and cumulative effects of the proposed alternatives on individual species of concern. These species include wildlife species federally listed under the *Endangered Species Act*, species listed as sensitive by DNRC, and species managed as big game by DFWP.

Cumulative-effects analyses account for known past and current activities, as well as planned future agency actions. No additional salvage of the South Fork Lost Creek Fire is planned at this time (*J. Ingebretson, Biologist, USDA Forest Service, pers. comm, March 8, 2012*) and DNRC is currently unaware of any additional proposed timber harvests in the vicinity of the project area. Recent past projects (≤20 years) that could contribute to cumulative effects include:

- DNRC Three Creeks Timber Sale Project FEIS (2007, 2008) – Seed tree and seed tree with reserves harvest occurred on approximately 43 acres within the project area and the black-backed woodpecker analysis area. Approximately 1,260 harvested acres occur in the large cumulative-effects analysis area including commercial thin, shelterwood, seed tree with reserves, and seed tree prescriptions. Thirteen miles of new road was constructed for administrative and logging purposes.

- DNRC Goat Squeezer 1 Timber Sale (2005) – Seed tree and individual tree selection harvest occurred on 163 acres within the large cumulative-effects-analysis area. No additional permanent road construction occurred in the analysis area.

The effect of these activities on forest structure has been accounted for in DNRC SLI data.

COARSE-FILTER WILDLIFE ANALYSIS

The coarse-filter wildlife analysis discloses the existing conditions of wildlife habitat and the anticipated direct, indirect, and cumulative effects that may result from implementing the No-Action and Action alternatives.

TABLE W-2 – COARSE-FILTER. *Analysis of the anticipated effects for coarse-filter resource topics on the Lost Creek Salvage.*

COARSE-FILTER RESOURCE TOPIC	COARSE-FILTER ANALYSIS
Old-growth forest	Old-growth forest does not occur in the project area; thus, no direct, indirect, or cumulative effects would be anticipated.
Connectivity of mature forest habitat	The proposed harvest would occur in burned timber stands containing 10 to 15 percent mature-canopy cover and would focus on removing trees that are likely to die due to extensive burning around the bole. Thus, negligible adverse direct, indirect, or cumulative effects on species sensitive to removal of mature forest cover would be anticipated.
Snags and coarse woody debris	***Detailed Analysis Provided Below*** – The proposed activities could affect the availability of snags and coarse-woody debris.

SNAGS AND COARSE WOODY DEBRIS

Issue - The proposed activities could reduce the availability of snags and coarse woody debris and increase human access for firewood harvesting, which could adversely affect the quality of wildlife habitat.

Introduction

Snags and coarse woody debris are important components of forest ecosystems that provide the following functions: 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4) provide important habitat substrates for wildlife, and 5) act as storehouses for nutrient and organic matter recycling agents (*Parks and Shaw 1996*). Snags and defective trees (i.e., partially dead, spike top, broken top) are used by a wide variety of wildlife species for nesting, roosting, and cover. Primary cavity users (i.e., woodpeckers) excavate nesting and roosting cavities in snags. These cavities are used as nesting, roosting, and resting sites by a variety of secondary cavity users, such as small mammals and birds, which are unable to excavate their own cavities. Snags also provide foraging opportunities for insectivorous wildlife species. Habitat value of snags for wildlife varies according to tree species, diameter, and snag density. Thick-barked species (e.g., western larch and ponderosa pine) tend to provide high quality snag habitat. Snag diameter is important because many species that nest in smaller diameter snags will also use large snags; however, the opposite is not true.

Coarse woody debris is used by a variety of wildlife species for foraging, shelter, lookout sites, and food storage. Additionally, coarse woody debris provides forest-dwelling amphibians and reptiles with a stable environment (i.e., moisture and temperature). Coarse woody debris habitat value varies according to size, length, decay, and distribution. Single, scattered downed trees may provide access under the snow for small mammals and weasels, while log piles may provide secure areas for snowshoe hares. Timber harvest may affect the abundance and spatial distribution of snags and coarse woody debris by direct removal for commercial value or for human safety purposes, or indirectly by increasing human access for firewood harvesting.

Analysis Area

The analysis area for direct and indirect effects is the 739-acre project area (*FIGURE W-1 – ANALYSIS AREAS*). The analysis area for cumulative effects is the large, 7,596-acre cumulative-effects-analysis area described in *TABLE W-1 – ANALYSIS AREAS* and depicted in *FIGURE W-1 - ANALYSIS AREAS*. The large cumulative-effects-analysis area represents an area large enough to support a diversity of species that use coarse woody debris and snags.

Analysis Methods

The abundance of snags was estimated in the project area during visits to the site. Factors considered in the analysis include: 1) the level of harvesting, 2) availability of snags and coarse woody debris, and 3) risk of firewood harvesting.

Existing Conditions

Snags and Coarse Woody Debris

During field visits, 4 to 12 snags/acre ≥8 inches dbh were observed within the burned area proposed for harvest. The majority of these snags were new snags created in the South Fork Lost Fire. Birds were observed foraging on these snags, but new nest cavities were not observed. The majority of these snags were western red cedar snags with some western larch snags. Coarse woody debris levels varied across the project area, but on average were 1 to 5 tons/acre in the area affected by the fire. Coarse woody debris will likely increase in this area over time as snags fall. In the portion of the project area not affected by the South Lost Fork Fire, snag density ranges from approximately 2 to 12 snags/acre and coarse woody debris is on average 10 to 20 tons/acre. Firewood harvesting risk is moderate due to the presence of the South Fork Lost Creek Road, which is open to the public. Open-road density in the project area is 1.0 miles/square mile and the density of open and restricted roads combined is 1.4 miles/square mile, and provides limited accessibility for firewood cutting. Firewood harvesting is currently prohibited in the vicinity of the proposed harvest unit.

In the medium cumulative-effects-analysis area, snag and coarse woody debris levels on surrounding parcels vary widely depending on ownership, motorized access, harvest history, and natural disturbance history. Snags and coarse woody debris are collected for firewood in the large cumulative-effects-analysis area, especially near open roads. However, the majority of the medium cumulative-effects-analysis area is not accessible by road and likely contains moderate to high levels of snags and coarse-woody debris. Open-road density in the medium

cumulative-effects-analysis area is 0.2 miles/square mile and the density of open and restricted roads combined is 0.4 miles/square mile, and provides limited accessibility for firewood cutting.

Environmental Effects

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

  None of the proposed forest-management activities would occur. Existing snags would continue to provide wildlife habitats, and new snags would be recruited as trees die. Thus, since: 1) no timber harvesting would alter present or future snag or coarse woody debris abundance, and 2) no changes to human access for firewood harvesting would occur, no direct or indirect effects to snags and coarse woody debris availability associated with wildlife habitat quality would be anticipated as a result of the No-Action Alternative.

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

  Approximately 50 to 60 percent of existing snags and burned trees > 8 inches dbh would be removed from 25 acres (3.4 percent) of the 739-acre project area due to timber-felling operations. Additional recruitment trees and snags may also be lost following timber harvest due to windthrow. Given operability and human-safety constraints, existing non-merchantable snags would be left standing where possible on DNRC-managed lands. Across the project area, at least 2 large snags and 2 large recruitment tree (>21 inches dbh) per acre would be retained in the harvest unit (*ARM 36.11.411*). If such large trees and snags are absent, the largest available snags and/or recruitment trees would be retained. Additionally, coarse woody debris would be retained according to *DNRC Forest Management Rules* (*ARM 26.11.414*) and would likely increase post-harvest. Firewood cutting risk in the project area would not change following the proposed harvest. No roads are proposed for construction and accessibility to the area for firewood cutting would not change. Thus, since: 1) the proposed action would remove approximately 50 to 60 percent of existing snags and burned trees, 2) accessibility for firewood harvesting would not change, and 3) snags and coarse woody debris would be retained in amounts required to meet *DNRC Forest Management Rules* (*ARM 36.11.411, ARM 26.11.414*), minor adverse direct and indirect effects to snags and coarse woody debris availability associated with wildlife habitat quality would be anticipated as a result of the Action Alternative.

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

  None of the proposed forest-management activities would occur. No changes in the availability of snags and coarse woody debris would be expected. Existing snags would continue to provide habitat attributes, and new snags would be recruited as trees die. Any proposed and ongoing activities on other ownerships may affect the availability of snags and coarse woody debris. Thus, since: 1) no timber harvesting on DNRC lands would alter present or future snag or coarse woody debris abundance, and 2) no changes to human access for firewood harvesting would occur on DNRC-managed lands, no cumulative effects to snags and coarse woody debris availability associated with wildlife habitat quality would be anticipated as a result of the No-Action Alternative.

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

  Approximately 50 to 60 percent of existing snags and burned trees would be removed from the 25 acres (0.3 percent) proposed for harvest within 7,596-acre cumulative-effects-analysis area, but retention measures would apply (*ARM 36.11.411, ARM 26.11.414*). Reductions in the availability of coarse woody debris and snags would be additive to any proposed or ongoing actions in the cumulative-effects-analysis area, although DNRC is unaware any such activities at this time. Firewood cutting risk in the medium cumulative-effects-analysis area would not change due to DNRC activities under the Action Alternative because no additional roads are proposed for construction. Thus, since: 1) proposed actions would be additive to any ongoing and proposed activities that would remove some snags, snag recruits, and coarse woody debris; 2) accessibility for firewood harvesting would not change; and 3) snags and coarse woody debris would be reduced, but would be retained in amounts required to meet *DNRC Forest Management Rules* (*ARM 36.11.411, ARM 26.11.414*); minor cumulative effects to snags and coarse woody debris availability associated with wildlife habitat quality would be anticipated as a result of the Action Alternative.

FINE-FILTER WILDLIFE ANALYSIS

TABLE W-3 - FINE FILTER. *Status of species considered in the fine-filter wildlife analysis and basis for inclusion or exclusion from further analysis for the Lost Creek Salvage.*

SPECIES/HABITAT	DETERMINATION – BASIS
THREATENED AND ENDANGERED SPECIES	
Canada lynx (*Felis lynx*) Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zones	The project area contains 433 acres of suitable habitat. However, the proposed activities would only occur in 25 acres of temporary non-suitable lynx habitat that was affected by the South Fork Lost Fire. This habitat is not expected to be used by lynx until suitable horizontal cover develops which may occur in 15 to 20 years if suitable stocking densities of saplings or pole-timber stands develop. Thus, since the proposed activities would not affect lynx suitable habitat, negligible direct, indirect, or cumulative effects to Canada lynx would be expected to occur as a result of either alternative.
Grizzly bear (*Ursus arctos*) Habitat: Recovery areas, security from human activity	***Detailed analysis provided below*** – The project area occurs within the South Fork Lost Soup Grizzly Bear Subunit located within the *Northern Continental Divide Ecosystem* (*USFWS, 1993*).

SENSITIVE SPECIES	
Bald eagles (*Haliaeetus leucocephalus*) Habitat: Late-successional forest less than 1 mile from open water	No bald eagle nests occur in the vicinity of the project area and no large water bodies occur within 1 mile of the project area. Thus, no direct, indirect, or cumulative effects to bald eagles would be expected to occur as a result of either alternative.
Black-backed woodpeckers (*Picoides arcticus*) Habitat: Mature to old burned or beetle-infested forest	***Detailed analysis provided below*** – The project area contains 281 acres of recently (<5 years) burned areas associated with the South Fork Lost Fire that occurred in the summer of 2011.
Coeur d'Alene salamanders (*Plethodon idahoensis*) Habitat: Waterfall spray zones, talus near cascading streams	No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
Columbian sharp-tailed grouse (*Tympanuchus Phasianellus columbianus*) Habitat: Grassland, shrubland, riparian, agriculture	No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
Common loons (*Gavia immer*) Habitat: Cold mountain lakes, nest in emergent vegetation	No suitable lake habitats occur within the project area. Thus, no direct, indirect, or cumulative effects to common loons would be expected to occur as a result of either alternative.
Fishers (*Martes pennanti*) Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	The project area contains 370 acres of suitable fisher habitat in the south and west portions. The 25 acres that would be harvested under the proposed alternative do not occur in suitable fisher habitat. However, motorized access associated with logging activities could disturb fishers for up to 2 months should they be present in adjacent or nearby stands that currently provide suitable habitat conditions. Due to the size and duration of the project and associated disturbance, minor direct, indirect, and cumulative effects to fishers would be anticipated.
Flammulated owls (*Otus flammeolus*) Habitat: Late-successional ponderosa pine and Douglas-fir forest	No suitable flammulated owl habitat occurs within the project area. Thus, no direct, indirect, or cumulative effects to flammulated owls would be expected to occur as a result of either alternative.

Gray wolves (*Canis lupus*) Habitat: Ample big game populations, security from human activities	The 2010 home range of the Cilly Pack and Quintonkon Pack are located within 5 miles of the project area. However, the harvest of dead and dying timber is unlikely to adversely affect big game and the project area does not overlap the estimated home range of these packs. Additionally, no rendezvous sites or den sites are located in the vicinity of the project area; and harvest activities would take place for ≤30 days between June 16th and August 31st. Thus, negligible direct, indirect, or cumulative effects to gray wolves would be expected to occur as a result of either alternative.
Harlequin ducks (*Histrionicus histrionicus*) Habitat: White-water streams, boulder and cobble substrates	Harlequin ducks have not been observed in the vicinity of the project area (*MNHP data,* 2012) and no suitable high-gradient stream or river habitats occur in the project area. Thus, no direct, indirect, or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
Northern bog lemmings (*Synaptomys borealis*) Habitat: Sphagnum meadows, bogs, fens with thick moss mats	No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
Peregrine falcons (*Falco peregrinus*) Habitat: Cliff features near open foraging areas and/or wetlands	Potentially suitable cliffs for nest sites occur within 0.5 miles of the project area; however no known nest sites are present. If a nest is documented in the project area, mechanized activities would be restricted from March 1 through August 1. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
Pileated woodpeckers (*Dryocopus pileatus*) Habitat: Late-successional ponderosa pine and larch-fir forest	Approximately 162 acres of suitable pileated woodpecker habitat occur in the project area. However, the proposed activities would not affect these acres. Timber harvest would focus on the salvage of trees that are dead and dying as a result of the South Fork Lost Fire. Snags would be removed from the proposed harvest units adjacent to suitable pileated woodpecker habitat. However, snags and coarse woody debris would be retained in amounts required to meet *DNRC Forest Management Rules* (*ARM 36.11.411, ARM 26.11.414*) and retention of western larch would be emphasized. Thus, negligible direct, indirect, or cumulative effects to pileated woodpeckers would be expected to occur as a result of either alternative.
Townsend's big-eared bats (*Plecotus townsendii*) Habitat: Caves, caverns, old mines	No suitable caves or mine tunnels are known to occur in the project area. Thus, no direct, indirect, or cumulative effects to Townsend's big-eared bats would be expected to occur as a result of either alternative.

BIG GAME SPECIES	
Elk (*Cervus canadensis*)	The project area does not contain big game winter range habitat as identified by DFWP (*DFWP 2008*). The South Fork Lost Fire removed thermal cover and hiding cover and the salvage of additional trees would slightly increase sight distances and the vulnerability of big game on 25 acres. However, remaining live trees and shrubs would be retained where feasible, especially near roads, and suitable hiding cover would be expected to develop over time. Thus, negligible direct, indirect, or cumulative effects to big game would be expected to occur as a result of either alternative.
Mule deer (*Odocoileus hemionus*)	
White-tailed deer (*Odocoileus virginianus*)	

THREATENED AND ENDANGERED SPECIES

- ***Grizzly Bear***

Issue - The proposed activities could alter grizzly bear cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats, and/or by increasing risk of human-caused bear mortality.

Introduction

Grizzly bears are opportunistic omnivores that inhabit a diversity of habitats in western Montana and are currently listed as '*threatened*' under the *Endangered Species Act*. Preferred grizzly bear habitats include avalanche chutes, fire-mediated shrub fields, and riparian areas, all of which provide seasonal food sources (*Servheen 1983, McLellan and Hovey 2001*). Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (*Mace and Waller 1997*). Forest-management considerations for grizzly bears include providing visual screening along open roads, minimizing access and the construction of new roads, and reducing disturbance levels during the non-denning season, especially in the spring period when grizzly bears are nutritionally stressed.

In the Swan Valley, DNRC, USFS, Plum Creek, and USFWS collaborated to cooperatively manage grizzly bear habitat, linkage, and human access under the SVGBCA (*SVGBCA 1997*). Under this agreement, a rotation of active and inactive subunits was devised. The rotation schedule allows for active subunits where bears may be displaced by harvesting activities and inactive subunits where commercial activities are prohibited to provide undisturbed habitat for bears. These rotations occur on a 3-year-active and 6-year-inactive basis. Harvesting activities are prohibited during the spring period (April 1through June 15) in spring habitat (areas in designated linkage zones below 5,200 feet) in all subunits.

Analysis Area

The analysis area for direct and indirect effects is the 739-acre project area (*FIGURE W-1 – ANALYSIS AREAS*). The analysis area for cumulative effects is the 29,883-acre large cumulative effects analysis area, which is the South Fork Lost Soup Grizzly Bear Subunit as

described in *TABLE W-1 –ANALYSIS AREAS* and depicted in *FIGURE W-1 – ANALYSIS AREAS.* This area is approximately the size of a female grizzly bear home range (*Mace and Roberts 2011*).

Analysis Methods

Analysis methods included field evaluations, *Geographical Information System* (GIS) analysis of SLI data, and aerial-photograph interpretation. These methods were used to identify potential hiding cover as defined in the SVGBCA (*DNRC 2006*). Grizzly bear hiding cover is defined as vegetation that could hide 90 percent of a grizzly bear at a distance of 200 feet or less. Seedlings/sapling stands were included in estimates of hiding cover if they were >4 feet tall and contained ≥350 trees/acre. Secure habitat is defined as areas located greater than 0.3 miles from any open, restricted, or high-use roads and trails and at least 2,500 acres in size. Factors considered in the analysis included: 1) the degree of harvesting, 2) the availability of hiding cover, 3) risk of displacement from important grizzly bear habitat including spring habitat and riparian habitat, 4) availability of secure habitat, and 5) open and restricted road densities.

Existing Conditions

The project area occurs in the South Fork Lost Soup Grizzly Bear Subunit of the *Bunker Bear Management Unit* (BMU), which is scheduled to be inactive from 2010 through 2014. The project area does not contain spring habitat (*SVGBCA 1997*). Approximately 601 acres (81.4 percent) in the project area contains cover in amounts capable of providing hiding cover for grizzly bears. Hiding cover is not readily available within the area burned by the South Fork Lost Fire in 2011. However, some patches of regenerating conifers and shrubs are available north of the South Fork Lost Creek Road. Riparian habitat associated with South Fork Lost Creek, runs from east to west approximately 250 feet south of the proposed harvest unit. Other types of preferred grizzly bear habitat such as wetlands, fire-mediated shrub fields, and avalanche chutes are not present in the vicinity of the proposed harvest unit. The project area is likely high quality grizzly bear habitat due to the inaccessibility of the area and lack of human development.

The large cumulative-effects-analysis area is managed primarily by Montana DNRC (61.2 percent) and the USFS (36.9 percent) and contains preferred grizzly bear habitat including riparian habitat associated with Soup, Cilly, and South Fork Lost creeks. The South Fork Lost Fire burned 1,989 acres (6.7 percent) of the large cumulative-effects-analysis area in the summer of 2011. Due to the high intensity of the fire, hiding cover was removed, although some small patches remain in areas that were not burned as intensely. Spring habitat exists in the southern portion of the analysis area (*SVGBCA 1997*). Highway 83, located on the west side of the analysis area, is an important source of disturbance, but overall, the area likely provides high quality habitat based on the inaccessibility of the area and lack of human development.

Environmental Effects

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

  None of the proposed forest-management activities would occur. No changes to grizzly bear habitat would be expected. Hiding cover, existing secure areas, and open- and restricted-road density would remain the same. Thus, since: 1) no timber harvesting would alter existing hiding cover, 2) no existing secure areas or important habitats would be affected, and 3) no changes to open or restricted road density would occur, no direct or indirect effects associated with grizzly bear displacement or human-caused bear mortality risk would be anticipated as a result of the No-Action Alternative.

- ***Direct and Indirect Effects of Action Alternative to Grizzly Bears***

  Harvesting associated with the Action Alternative would slightly increase sight distances within proposed harvest units. Hiding cover does not occur in the proposed harvest unit and would not be affected by the proposed activities. Patches of regenerating conifers and shrubs are not large enough to hide a grizzly bear in the proposed harvest unit. However, some regenerating conifers and shrubs are present adjacent to the open road. This vegetation would be retained to provide visual screening for bears where possible. No additional roads are proposed for construction; thus, open- and total-road density would not be affected. Harvest would not occur within 200 feet of South Fork Lost Creek and secure areas would not be affected because the harvest would occur within 0.3 miles of an open road. The South Fork Lost Soup Grizzly Bear Subunit is currently closed and the proposed activities would occur between July 1 through August 31 for 30 days or less in aggregate in order to comply with the SVGBCA rules regarding salvage harvests. Traffic would temporarily increase on 1.2 miles of Lost Creek Road, increasing disturbance to bears. Thus, since: 1) the availability of hiding cover in the project area would not be affected; 2) grizzly bears could be displaced from riparian habitat associated with South Fork Lost Creek, an important grizzly bear habitat, for up to 30 days over a period 2 months; 3) grizzly bear security habitat would not be affected by the proposed activities; 4) grizzly bear spring habitat would not be affected; and 5) no new road construction would occur, minor adverse direct or indirect effects associated with grizzly bear displacement or human-caused bear mortality risk would be anticipated as a result of the Action Alternative.

- ***Cumulative Effects of No-Action Alternative to Grizzly Bears***

  None of the proposed forest-management activities would occur. Ongoing and proposed forest-management projects within the cumulative-effects-analysis area could affect hiding cover, secure areas, important habitats and open-road density. No additional cumulative effects to visual screening, secure areas, important habitats and open-road density are expected to result from the No-Action Alternative. Thus, since: 1) no timber harvesting would alter present visual screening, 2) no existing secure areas would be affected, and 3) no changes to restricted or open road density would occur, no cumulative effects associated with grizzly bear displacement or human-caused bear mortality risk would be anticipated as a result of the No-Action Alternative.

- ***Cumulative Effects of Action Alternative to Grizzly Bears***

  The proposed activities are would not affect grizzly bear hiding cover, secure areas, or grizzly bear spring habitat. Riparian harvest would not occur, but bears could be temporarily displaced from riparian habitat associated with South Fork Lost Creek for up to 30 days over a period 2 months by forest-management activities. No roads are proposed for construction, but traffic would temporarily increase on approximately 5.4 miles of South Fork Lost Creek Road, increasing disturbance to bears. Grizzly bear displacement from riparian habitat and increases in traffic would be additive to harvest activities that are proposed or ongoing in the large cumulative-effects-analysis area, although DNRC is unaware of any specific activities at this time. The South Fork Lost Soup Grizzly Bear Subunit is currently closed and the proposed activities would occur between July 1 through August 31 for 30 days or less in aggregate in order to comply with the SVGBCA. Thus, since: 1) the availability of hiding cover in the project area would not be affected; 2) grizzly bears could be displaced from riparian habitat associated with South Fork Lost Creek, a favored grizzly bear habitat, for up to 30 days over a period 2 months; 3) grizzly bear security habitat would not be affected by the proposed activities; 4) grizzly bear spring habitat would not be affected; and 5) no new road construction would occur, minor adverse cumulative effects associated with grizzly bear displacement or human-caused bear mortality risk would be anticipated as a result of the Action Alternative.

SENSITIVE SPECIES

➢ **Black-Backed Woodpecker**

Issue - The proposed activities could reduce black-backed woodpecker habitat suitability by removing snags used for foraging and nesting and disturb birds during the nesting season.

Introduction

Black-backed woodpeckers are a medium-sized woodpecker known to specialize in forests having undergone recent disturbance, such as wildfire or extensive insect outbreaks. Black-backed woodpeckers feed almost exclusively on wood-boring insects and bark beetles. Immediately after a moderate or stand-replacement wildfire, black-backed woodpecker numbers increase up to 4 years post-fire (usually peaking 2 to 3 years post-fire) and then decrease in subsequent years (*Bull et al. 1986, Murphy and Lehnhausen 1998, Dixon and Saab 2000*). Black-backed woodpeckers favor areas of higher snag densities for both nesting and foraging. Snags species preferred for nesting are western larch, ponderosa pine, Douglas-fir, and lodgepole pine, usually 9 to 16 inches dbh (*Harris 1982*). Nests are typically active from late April through early July. Past research suggests that postfire harvested forest patches contain lower black-backed woodpecker densities than comparable, unlogged burned forest (*Caton 1996, Hitchcox 1996, Hutto and Gallo 2006, Schwab et al. 2006, Koivula and Schmiegelow 2007, Saab et al. 2009*). Salvage logging can affect characteristics of standing snags (i.e., species composition, diameter, spatial distribution, and density) on the landscape, which may reduce habitat suitability for black-backed woodpeckers.

Analysis Area

The analysis area for direct and indirect effects is the 739-acre project area (*FIGURE W-1 – ANALYSIS AREAS*). The analysis area for cumulative effects is the 7,596-acre medium cumulative effects analysis area described in *TABLE W-I – ANALYSIS AREAS* and depicted in *FIGURE W-1 – ANALYSIS AREAS*. The cumulative-effects-analysis area includes the area burned in the South Fork Lost Fire of 2011 and is buffered by 1 km to incorporate areas most likely to be used by local black-backed woodpeckers. This scale includes sufficient area to support multiple pairs of black-backed woodpeckers.

Analysis Methods

Analysis methods include field evaluations, aerial-photograph interpretation, and GIS analysis of available habitat. GIS analysis of the fire boundaries was used to identify preferred black-backed woodpecker habitat greater than 40 acres in size (*ARM 36.11.438*). Factors considered in the analysis include: 1) the degree of harvesting and 2) the suitability of black-backed woodpecker habitat.

Existing Conditions

The project area contains 281 acres of mixed-conifer forest burned in the South Fork Lost Fire, which occurred in the summer of 2011. The species composition and severity of the burn is variable throughout the project area. In the vicinity of the area proposed for harvest, the species composition of both live and dead trees consists primarily of western red cedar and western larch. The later would be most likely to be used for nesting by black-backed woodpeckers, although both species could be used for foraging. Black-backed woodpeckers were not observed in the vicinity of the project area during a field visit in June. Approximately 4 to 12 snags >9 inches dbh occur in this area and the percentage of live mature canopy cover is 10 to 15 percent, although this percentage will likely decline over time due to some continued tree mortality expected for several years following the fire.

The medium cumulative-effects-analysis area contains approximately 2,154 acres of mixed conifers burned in the South Fork Lost Fire, which occurred in the summer of 2011. DNRC manages 281 acres (13 percent) of the burned area and the USFS manages the remaining 1,873 acres (87.0 percent). The species composition, snag density, and burn severity varies throughout the burn, but overall snag density is likely suitable for black-backed woodpecker use. The remaining 5,442 acres in the analysis area consist of unburned forested habitat adjacent to the burn (within 1 km) that may also be used by black-backed woodpeckers for nesting or foraging.

Environmental Effects

- ***Direct and Indirect Effects of No-Action Alternative to black-backed woodpeckers***

  None of the proposed forest-management activities would occur. Thus, since: 1) no changes to black-backed woodpecker habitat suitability would occur, and 2) no disturbance during the nesting season would occur, no direct or indirect effects to black-backed woodpeckers associated with habitat suitability or disturbance during the nesting season would be anticipated as a result of the No-Action Alternative.

- ***Direct and Indirect Effects of Action Alternative to black-backed woodpeckers***

  The proposed activities would affect 25 acres (8.9 percent) of the 281 acres of suitable burned habitat present in the project area. The proposed harvest would remove approximately 50 to 60 percent of the existing snags and burned trees, reducing the snag density and the suitability of the area for black-backed woodpeckers. However, across the project area, at least 2 large snags and 2 large recruitment tree (>21 inches dbh) per acre would be retained (*ARM 36.11.411*). The remaining contiguous 256 acres of DNRC-managed burned forest would not be harvested. Mechanized activities would be prohibited from April 1 through July 1 to reduce disturbance to nesting black-backed woodpeckers. If present in the vicinity of the project area, black-backed woodpeckers could be displaced for up to 2 months by the proposed activities. Thus, since: 1) snag density would be reduced on 25 acres (8.9 percent) of potential black-backed woodpecker habitat, but snags would be retained according to *ARM 36.11.411* and *ARM 26.11.414*; 2) mechanized activities would be prohibited from April 1 through July 1 to reduce disturbance to nesting birds; 3) the proposed activities would occur for a short time period; minor adverse direct and indirect effects to black-backed woodpeckers associated with habitat suitability or disturbance during the nesting season would be anticipated as a result of the Action Alternative.

- ***Cumulative Effects of the No-Action Alternative on black-backed woodpeckers***

  None of the proposed forest-management activities would occur. Ongoing and proposed forest-management projects within the cumulative-effects-analysis area could reduce black-backed woodpecker habitat suitability and could disturb black-backed woodpeckers. Thus, since: 1) no changes to black-backed woodpecker habitat availability or suitability would occur, and 2) no disturbance during the nesting season would occur, no cumulative effects to black-backed woodpeckers associated with habitat suitability or disturbance during the nesting season be anticipated as a result of the No-Action Alternative.

- ***Cumulative Effects of the Action Alternative on black-backed woodpeckers***

  The proposed activities would affect 25 acres (1.2 percent) of the 2,154 acres of burned habitat present in the medium cumulative-effects-analysis area. The proposed harvest would remove approximately 50 to 60 percent of the existing snags and burned trees, reducing the snag density and the suitability of the area for black-backed woodpeckers. Reductions in black-backed woodpecker habitat suitability would be additive to harvest activities that are proposed or ongoing in the medium cumulative-effects-analysis area, although DNRC is unaware of any specific activities at this time. Mechanized forest-management activities would be prohibited from April 1 through July 1 to reduce disturbance to breeding black-backed woodpeckers. Black-backed woodpeckers could be temporarily displaced by forest-management activities associated with the proposed South Fork Lost Salvage timber sale for up to 2 months. Thus, since: 1) snag density would be reduced on 25 acres (1.2 percent) of potential black-backed woodpecker habitat, but snags would be retained according to *ARM 36.11.411* and *ARM 26.11.414*; 2)

mechanized activities would be prohibited from April 1 through July 1 to reduce disturbance to nesting birds; 3) the proposed activities would occur for a short time period, minor adverse cumulative effects to black-backed woodpeckers associated with habitat suitability or disturbance during the nesting season would be anticipated as a result of the Action Alternative.

LIST OF MITIGATIONS

- If a threatened or endangered species is encountered, consult a DNRC biologist and develop additional mitigations that are consistent with the *Forest Management Rules* for managing threatened and endangered species (*ARM 36.11.428* through *36.11.435*).
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty.
- Conduct activities between July 1 through August 31 for 30 days or less in aggregate in order to comply with the SVGBCA and black-backed woodpecker timing restrictions (*ARM 36.11.438(1)(a)*).
- Manage for snags, snag recruits, and coarse woody debris, particularly favoring western larch > 9 inches dbh.

LITERATURE CITED

Bull, E. L., S. R. Peterson, and J. W. Thomas. 1986. Resource partitioning among woodpeckers in northeastern Oregon. U.S. Department of Agriculture Forest Service Research Note PNW-444, Portland, OR.

Caton, E. L. 1996. Effects of fire and salvage logging on the cavity-nesting bird community in northwestern Montana. Ph.D. diss. University of Montana, Missoula.

DFWP 2008. Maps of moose, elk, mule deer, and white-tailed deer distribution in Montana. Individual GIS data layers. August 12, 2008. Montana Fish, Wildlife and Parks. Helena, MT.
http://fwp.mt.gov/gisData/imageFiles/distributionElk.jpg.
http://fwp.mt.gov/gisData/imageFiles/distributionMoose.jpg.
http://fwp.mt.gov/gisData/imageFiles/distributionMuleDeer.jpg.
http://fwp.mt.gov/gisData/imageFiles/distributionWhiteTailedDeer.jpg

Dixon, R. D., and V. A. Saab. 2000. Black-backed woodpecker: Picoides arcticus.in A. Poole and F. Gill, editors. The Birds of North America. The Birds of North America, Inc., Philadelphia, PA.

DNRC. 2005. Goat Squeezer Timber Sale Project Final EIS. Project Final Envirionmental Impact Statement. Montana DNRC Swan Unit, Swan Lake, MT.

DNRC. 2006. Three Creeks Timber Sale Project Final EIS. Project Final Envirionmental Impact Statement. Montana DNRC Swan Unit, Swan Lake, MT.

Harris, M. A. 1982. Habitat use among woodpeckers in forest burns. M.S. thesis. University of Montana, Missoula, MT.

Hitchcox, S. M. 1996. Abundance and nesting success of cavity-nesting birds in unlogged and salvage-logged burned forest in northwestern Montana. M.S. thesis. University of Montana, Missoula.

Hutto, R. L., and S. M. Gallo. 2006. The effects of postfire salvage logging on cavity-nesting birds. Condor 108:817-831.

Koivula, M. J., and F. K. A. Schmiegelow. 2007. Boreal woodpecker assemblages in recently burned forested landscapes in Alberta, Canada: Effects of post-fire harvesting and burn severity. Forest Ecology and Management 242:606-618.

Mace, R.D., and J.S. Waller. 1997. Final report: grizzly bear ecology in the Swan Mountains, Montana. Montana Fish, Wildlife and Parks, Helena, MT. 191 pp.

McLellan, B.N. and F.W. Hovey. 2001. Habitats selected by grizzly bears in a multiple use landscape. Journal of Wildlife Management 65:92-99.

Murphy, E. C., and W. A. Lehnhausen. 1998. Density and foraging ecology of woodpeckers following a stand-replacement fire. Journal of Wildlife Management 62:1359-1372.

Parks, C.G. and D.C. Shaw. 1996. Death and decay: a vital part of living canopies. Northwest science 70:46-53.

Saab, V. A., R. E. Russell, and J. G. Dudley. 2009. Nest-site selection by cavity-nesting birds in relation to postfire salvage logging. Forest Ecology and Management 257:151-159.

Schwab, F. E., N. P. P. Simon, S. W. Stryde, and G. J. Forbes. 2006. Effects of postfire snag removal on breeding birds of western Labrador. Journal of Wildlife Management 70:1464-1469.

Servheen, C. 1983. Grizzly bear food habits, movements, and habitat selection in the Mission Mountains, Montana. Journal of Wildlife Management 47(4):1026-1035.

SVGBCA. 1997. Swan Valley grizzly bear conservation agreement. USFWS, Helena, MT. 37pp.

USFWS. 1993. Grizzly bear recovery plan. Missoula, Montana. 181 pp.

USFWS and DNRC. 2010. Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan, Final Environmental Impact Statement, Volumes I and II. U.S. Department of Interior, Fish and Wildlife Service, Region 6, Denver, Colorado, and Montana Department of Natural Resources and Conservation, Missoula, MT. September 2010.

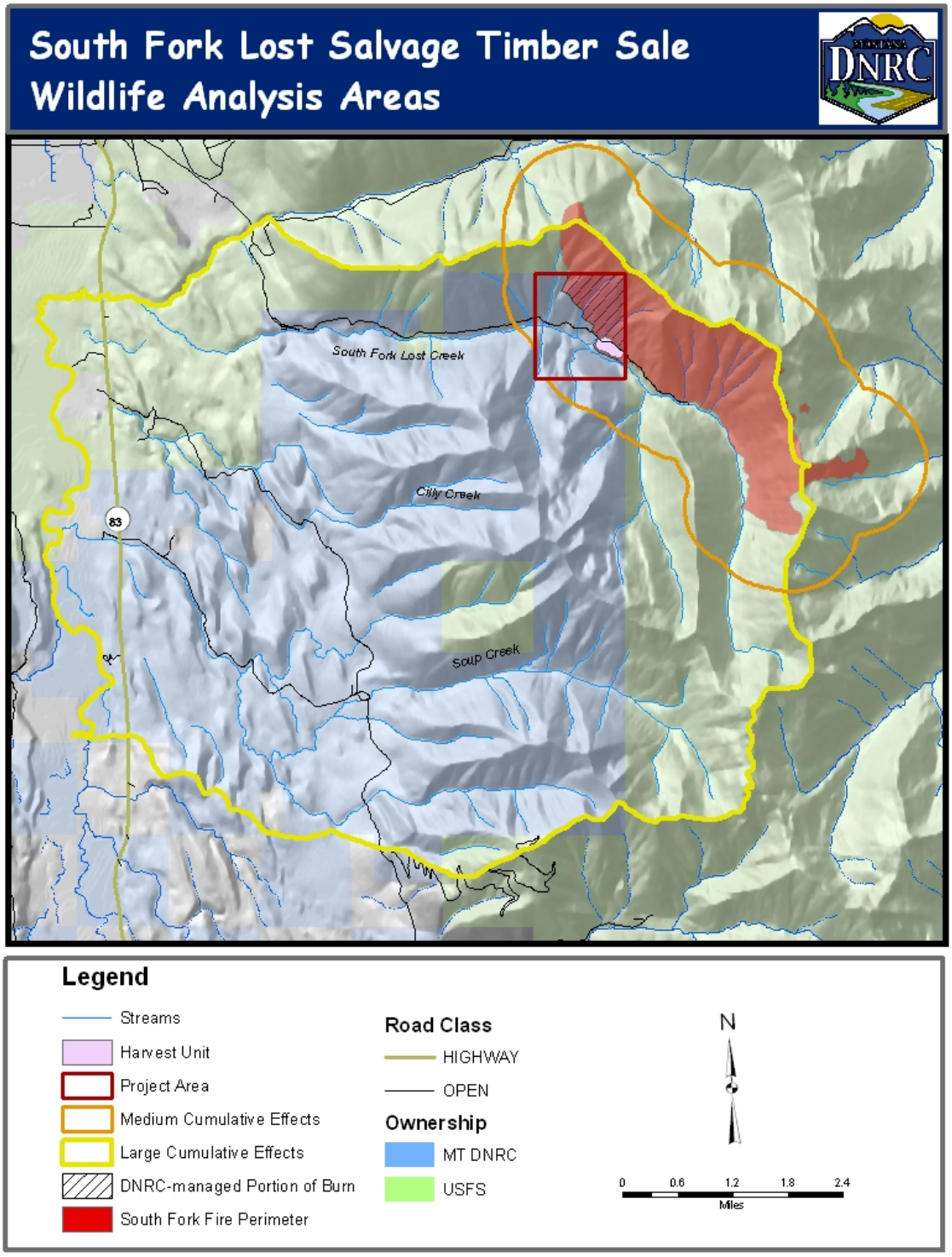



FIGURE W-1 – ANALYSIS AREAS. *Wildlife analysis areas for the proposed Lost Creek Salvage.*