Project Record
Black Ant Salvage

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Appendicies

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**Those references marked with an asterisk (*) contain confidential information not subject to public disclosure under FOIA. They are therefore not included in the Administrative Record, but are held in the USDA Forest Service Heritage Program files. They are made available to qualified personnel.*

Appendix B

Water Quality Regulations And Best Management Practices

Water Quality Regulations and Beneficial Uses

The 2000 Montana 303(d) List (MT Department of Environmental Quality 2000) does not identify any streams within or immediately below the project area as being water quality limited. However, two stream segments far below the project area are listed: the North Fork Smith River and Musselshell River (refer to Table III-1). Water quality limited streams do not fully support their uses and therefore, do not fully meet water quality standards. Total Maximum Daily Load (TMDL) development in the Upper Smith River drainage is scheduled to be completed by 2004, while the Upper Musselshell drainage is scheduled to be completed in 2002.

Table III-1;
Water Quality Limited Streams

Stream Name	Impaired Use [1]	Cause of Impairment	Source of Impairment	Location
Smith River-North Fork	Agriculture (X) Recreation (P)	Nutrients, Phosphorus, Nitrogen, Pathogens, Algal growth/Chlorophyll a	Source Unknown	Lake Sutherlin to mouth
Musselshell River - mainstem	Aquatic Life (P) Cold Water Fishery- Trout (P) Drinking Water (X) Recreation (X)	Nutrients, Siltation, Other habitat alterations, Bank erosion	Irrigated crop production, Grazing related sources, Channelization, Agriculture, Crop related sources, Hydromodification	North and South Fork Confluence to Deadman Basin Diversion Canal

1 P = Partially Supporting, N = Not Supporting, X = Not Assessed

Montana has classified all waters within the project area as B-1 waters. The beneficial uses associated with this classification include; drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply (MT Department of Environmental Quality 1994).

The Montana Water Quality Act, Nondegradation Rules, and Surface Water Quality Standards require that land management activities must not generate pollutants in excess of those that are naturally occurring, regardless of the stream's classification.

Naturally occurring is defined as: "the water quality condition resulting from runoff or percolation over which man has no control or from developed lands where all reasonable land, soil and water conservation practices have been applied." Note: Reasonable land, soil, and water conservation practices are commonly called Best Management Practices (BMPs). BMPs are considered reasonable only if beneficial uses are protected. They are further described in the Forest Service Handbook - Soil and Water Conservation Practices (FSH 2509.22). Please refer to the next section for a list and description of the BMPs that will be implemented under the alternatives.

Best Management Practices

Best Management Practices (BMPs) are the primary mechanism to enable the achievement of water quality standards (Environmental Protection Agency 1987). This Appendix describes the Forest Service's BMP process in detail, lists the key Soil and Water Conservation Practices (comparable to BMPs) that have been selected to be used on this project, and describes each BMP that will be refined for site-specific conditions in order to arrive at the project level BMPs that protect beneficial uses and meet water quality objectives.

BMPs include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation). Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site specific conditions that reflect natural background conditions and political, social, economical, and technical feasibility.

The Lewis and Clark National Forest Plan (chapter II, page 50) states that the Forest will "utilize adequate soil and water conservation practices to protect soil productivity and to control nonpoint water pollution from project activities, using as a minimum, practices specified in any State developed Best Management Practices." A project which causes excessive water pollution, undesirable water yield, soil erosion, or site deterioration will be corrected where feasible, or the project will be reevaluated or terminated. Montana State Water Quality Standards require the use of reasonable land, soil, and water conservation practices (analogous to BMPs and Soil and Water Conservation Practices) as the controlling mechanism for nonpoint pollution. Use of BMPs is also required in the Memorandum of Understanding between the Forest Service and the State of Montana as part of the Forest's responsibility as the Designated Water Quality Management Agency on National Forest System (NFS) lands.

The practices described herein are tiered to the practices in FSH 2509.22. They were developed as part of the National Environmental Policy Act process, with interdisciplinary involvement, and meet Forest and State water quality objectives.

ABBREVIATIONS:

TSC = Timber Sale Contract
SAM = Sale Area Map
TSA = Timber Sale Administrator
COR = Contracting Officer Representative
PWC = Public Works Contract
SWCP = Soil and Water Conservation Practices
BMP = Best Management Practice
SMZ = Streamside Management Zone
SPS = Special Project Specification
EPA = Environmental Protection Agency
CFR = Code of Federal Regulations

Best Management Practice Implementation Process

In cooperation with the State, the USDA Forest Service's primary strategy for the control of nonpoint sources is based on the implementation of preventive practices (BMPs) determined necessary for the protection of the identified beneficial uses.

The Forest Service Nonpoint Source Management System consists of:

1. BMP selection and design based on site-specific conditions; technical, economical, and institutional feasibility; and the designated beneficial uses of the streams.

2. BMP Application.

3. BMP monitoring to ensure that they are being implemented and are effective in protecting designated beneficial uses.

4. Evaluation of BMP monitoring results from "steps" 2 and 3.

5. Feeding back the results into current/future activities and BMP design.

The District Ranger is responsible for ensuring that this BMP feedback loop is implemented on all projects.

1. BMP Selection and Design. Water quality goals are identified in Forest Plans. These goals meet or exceed applicable legal requirements, including State water quality regulations, the Clean Water Act, and the National Forest Management Act. Environmental assessments for projects are tiered to Forest Plans, using the NEPA process.

Appropriate BMPs are selected for each project by an interdisciplinary team. Each time BMPs are applied to a new location, there is flexibility to design different BMPs depending on the local conditions and values, and the downstream beneficial uses of water.

BMP selection and design are dictated by water quality objectives, soils, topography, geology, vegetation, and climate. Environmental impacts and water quality protection options are evaluated and alternative mixes of practices are considered. A final collection of practices are selected that not only protect water quality but meet other resource needs. These final selected practices constitute the BMPs.

2. BMP Application. The BMPs are translated into contract clauses, special use permit requirements, project plan specifications, and so forth. This ensures that the operator or person responsible for applying the BMP actually is required to apply it. The site-specific BMP prescriptions are taken from plan-to-ground by a combination of project layout and resource specialists (hydrology, fisheries, soil, geology, etc.). This is when final adjustments to fit the BMP prescriptions to the site are made before implementing the resource activity.

3. BMP Monitoring. When the resource activity (timber harvest or road construction) begins, timber sale administrators, engineering representatives, resource specialists, and others ensure that the BMPs are implemented according to plan. BMP implementation monitoring is done before, during, and after resource activity implementation.

This monitoring answers the question: Did the Forest do what it said it was going to do? Once BMPs have been implemented, further monitoring is done to evaluate if BMPs are effective in meeting management objectives and protecting beneficial uses of water. This is accomplished through BMP reviews. Monitoring is also conducted on streams, management activities, and BMPs outside the analysis area. This Forest-wide monitoring will aid in determining the effectiveness of BMPs.

4. BMP Monitoring Evaluation. The technical evaluation/monitoring described above will determine how effectively BMPs protect and/or improve water quality. Water quality standards and conditions of the beneficial uses of water will serve as one evaluation criteria. If the evaluation indicates that water quality standards are not being met and/or beneficial uses are not being protected, corrective action will consider the following three components:

a. Is the BMP technically sound? Is it really the best practice, or is there a better practice which is technically sound and feasible to implement?

b. The implementation program or processes: Was the BMP applied entirely as designed? Was it only partially implemented? Were personnel, equipment, funds, or training lacking with a result of inadequate or incomplete implementation?

c. The State water quality criteria: Do the parameters and criteria that constitute water quality standards adequately reflect human induced changes to water quality and beneficial uses?

5. Feedback. Feedback of the results of BMP evaluation is both short- and long-term in nature. Where corrective action is needed, immediate response will be undertaken. This action may include: modification of the BMP, modification of the activity, ceasing the activity or possibly modification of the State water quality standard. Cumulative effects over the long-term may also lead to the need for possible corrective actions.

Format Of The Best Management Practices

Each Soil and Water Conservation Practice (SWCP) is described as follows:

Title: Includes the sequential number of the SWCP and a brief title

Objective: Describes the SWCP objective(s) and the desired results for protecting water quality.

Effectiveness: Provides a qualitative assessment of expected effectiveness that the applied measure will have on preventing or reducing impacts on water quality. The SWCP effectiveness rating is based on literature and research, administrative studies, and professional experience. The SWCP is rated High, Moderate, or Low based on the following criteria:

1. Literature/Research (must be applicable to area)
2. Administrative studies (local or within similar ecosystem)
3. Experience (judgment of an expert by education and/or experience)
4. Fact (obvious by reasoned [logical] response)

Please see the section below on BMP monitoring results that have been documented for the Lewis and Clark National Forest.

Implementation: This section identifies: the range of site-specific water quality protection measures to be implemented, and how the practices are expected to be applied.

Best Management Practice Monitoring

BMP monitoring is an important component of the implementation process. Past BMP monitoring from 1995 to 2001 is as follows:

An administrative review was conducted on the Deadhorse-Bluff Timber Sale on September 26 to 28, 1995. Part of this review evaluated BMP implementation and effectiveness. Specific management practices discussed included slash filter windrows, road surfacing adjacent to stream crossings, revegetation of disturbed areas and equipment operation in moist soil types (Landtype 11). Observations indicate that BMPs were implemented as planned and were effective in reducing soil and water impacts. The only exception was one instance of improper discarding of waste oil. Recommendations include continue to use slash filter windrows, provide adequate cross drain spacing, and improve grass establishment by scarifying road surface and properly time seed applications. Additionally, moist soil conditions need to be adequately surveyed and documented through NFMA and NEPA analyses.

During the 1996 field season, 61 miles of road and 34 harvest units were monitored for soil and water impacts and BMP effectiveness. Portions of 10 road segments and 9 harvest units had potential for causing unacceptable soil and water impacts and were reviewed again with District personnel in 1997. Three of these road segments were addressed through the Dry Fork Vegetation Restoration EIS as road obliteration proposals. Except for two harvest units, all others appeared to provide adequate ground vegetation, slash, and filter distance and do not contribute significant sediment or overland flows to stream systems. Of the two units of concern, one was harvested just prior to the review, so revegetation had not yet begun. The other unit was revegetated, but harvested prior to establishment of State Streamside Management Zone (SMZ) guidelines and did not have adequate filtering capacity near two channels. This unit was incorporated into the Districts soil and water improvement program and addressed in 1998 by placing down woody debris on contour, upslope from the two channels.

During the 1998 field season, BMPs on six harvest units and adjacent road systems were evaluated by Forest personnel. Approximately 55 site-specific BMPs were evaluated in each unit. For the most part, BMPs were implemented as planned and effective in limiting soil and water impacts. The exceptions were as follows:

- Two temporary roads could have been built to a lower standard.

- Drainage from one road segment was not adequate and did not provide adequate filtration zones.

- One temporary road could have been better rehabilitated by providing more outsloping and slash scattered on the roadbase.

- The terminal point of one section of road reconstruction, including one reconstructed crossing, appeared to be unnecessary. Road drainage and sediment is routed to the stream, however streamflow subsurfaces and is blocked by a natural earthen dam downstream.

- Two landings were located on/near ephemeral draws.

- Minor deviations from required SMZ widths were noted in two units, although surface flows or sediment did not appear to be routed to streams.

These exceptions resulted in minor deviations from standard application procedures and/or minor and temporary impacts to soil and water resources.

During 1996, 1998, and 2000, BMPs were evaluated on the Forest as part of the State BMP Audit process. Approximately 55 site-specific BMPs were evaluated in each unit.

The 1996 audit was on unit 29 of the Deadhorse Bluff Timber Sale. Four BMPs had minor departures from standard applications, but still provided adequate protection for soil and water resources. Minor departures involved inadequate energy dissipaters at drainage structure outlets, equipment operation on steep slopes and inadequate streamside management zone (SMZ) width on slopes exceeding 35 percent. Two BMPs had minor departures from standard applications, and minor but temporary impacts to soil and water resources. One departure was on one road segment that intercepted subsurface flows which resulted in a soft roadbed requiring continual maintenance or improved drainage features. The other departure was that equipment operation during slash treatment and site preparation did not minimize soil compaction and displacement because activities were not limited to dry or frozen soil conditions.

The 1998 audit was on Unit 2 of the Moose Park Timber Sale. One BMP had a minor departure from standard applications, but still provided adequate protection for soil and water resources. This departure involved excess road surface material being placed in a ditch before a stream crossing and likely occurred as a result of snow plowing.

The 1998 State Audit also included a reaudit site on the Mill-Lion Timber Sale which was first audited in 1994. BMP departures noted in 1994 included minor sediment delivery to ephemeral streams from road surfaces and ditches and erosion resulting from poor stream crossing design and installation at one culvert. The 1998 reaudit identified that the road drainage problems had been fixed by maintenance actions, but the stream crossing problems were still evident. These problems could have been avoided by removing a large adjacent spruce tree during the initial construction activities. It was also noted that all six SMZ functions were preserved and no windthrow had occurred in the SMZ.

The 2000 audit was on Unit 36 of the Spring Basin Timber Sale and Unit 3 of the Tenderfoot Creek Experimental Forest Timber Sale. In Unit 36, four BMPs had minor departures from standard applications, but still provided effective protection for soil and water resources. Minor departures involved inadequate direction of road drainage away from stream crossing site, inadequate streamside management zone (SMZ) width on slopes exceeding 35 percent, inadequate retention tree requirements met, and inadequate exclusion of equipment operation in SMZ.

Two BMPs had minor departures from standard applications, and minor but prolonged effects to soil and water resources. This involved one existing road segment built prior to the sale that did

not provide adequate road surface drainage. The other departure was also related to road drainage by inadequate maintenance (grading).

In Unit 3, one BMP had a major departure from standard applications, but still provided effective protection for soil and water resources. This departures involved inadequate streamside management zone (SMZ). Two BMPs had minor departures from standard applications, and minor and temporary effects to soil and water resources. This involved inadequate direction of road drainage away from stream crossing site, and inadequate protection, stabilization or skewing of ditch and relief culverts.

According to The Montana 2000 Forestry BMP Audit Report (MT Department of Natural Resources and Conservation 2000), 97 percent of the BMP practices rated on Federal lands were effective in protecting soil and water resources, while 91 percent of the "high risk" BMP practices rated on Federal lands were effective. In comparison to past audit results, a steady and continual increase in BMP application and effectiveness has occurred for all practices and high-risk practices (total of all ownerships).

On October 31, 2001, field review was completed on two timber sales authorized under the salvage sale rider of the 1995 Recission Bill. These two sales were the Foothills Salvage Timber Sale and Dead Clyde Salvage Timber Sale.

The Foothills Salvage was comprised of 7 small units totaling 73 acres. Portions of four units were reviewed where Streamside Management Zones (SMZs) were identified. Two of the five SMZs were actually dry, vegetated swales and therefore posed no risk to water quality. Harvest activities along three other SMZs were determined to be in compliance with the Montana SMZ law. Although some harvest did occur within the SMZs, more than adequate leave tree requirements were met and there appeared to be no equipment operation within this zone. Due to aware sale administration, timber within the SMZ in one unit was dropped because yarding difficulties in terms of crossing the streambed were identified prior to cutting. Because of the relatively low volume harvested, soil disturbance from skid trails posed little risk of down slope impacts to water quality.

The Dead Clyde Salvage was comprised of eight units between 2 and 26 acres. Three units were reviewed, two of which were on flat ground where standing water and saturated soils were likely to occur during most years. Soils in both units were either dry or frozen as no rutting or other major soil displacement was observed. There were no intermittent or perennial streams in or adjacent to these units, so the risk of impacting water quality was basically non-existent.

The last unit reviewed in the Dead Clyde Salvage was the closest unit in the sale area to any streams. It was located about 400 feet from an intermittent channel to the south and about 150 feet from a perennial stream to the north. A temporary road skirted the perimeter of the unit between these two drainages. Except for a few low gradient segments, the road basically followed the contour around the unit. The road base was about 70 percent vegetated with forbs and grass and an occasional conifer seedling. The geology of the area produced very sandy soils that could be highly mobile.

However, due to the high infiltration capacity of the soil, the vegetated road base and the low gradient of the road, only very minimal and spotty surface erosion was observed on the road surface. Skid trails within the unit were basically no longer visible. There was no indication of water movement down slope to the temporary road.

A perennial stream on the north end was investigated. Except for the fine textured soil banks, it is a relatively stable channel controlled by woody debris and adjacent tree roots. The harvest unit boundary was about 150 feet from the channel at the closest point. There were no affects from the timber harvest or temporary road observed. The main impact to the channel was from livestock accessing the channel from the harvest unit.
The remainder of the stream adjacent to this unit is not affected by the harvest due to a 200 to 400 foot buffer zone.

In conclusion, given the high number of timber management activities, only a small percentage of BMPs are not implemented correctly and an even smaller percentage are occasionally not effective in protecting soil and water resources.

Key Soil And Water Conservation Practice List

The following table displays the Soil and Water Conservation Practices (SWCPs are comparable to BMPs) required in Forest Service Handbook 2509.22, along with each unit or road that would be affected by the SWCP. The chart also references the timber sale contract provision that would respond to the required SWCP. Note that not all the SWCPs are listed here, only those that require further specificity in the EA are listed. The Forest Service requires adherence to all practices outlined in the handbook. There are standard provisions for compliance in every timber sale contract for BMPs pertaining to timber harvesting (refer to FSM 2509.22 and Timber Sale Contract Provisions available in the Ranger District Office).

ID #	Soil and Water Conservation Practice's Title	Contract Provision
11 - WATERSHED MANAGEMENT		
11.05	Wetlands Analysis and Evaluation	none
11.07	Oil and Hazardous Substance Spill Contingency Planning	C6.341, C6.53
11.09	Management By Closure to Use	
13 - VEGETATION MANIPULATION		
13.02	Slope Limitations For Tractor Operations	B6.6
13.04	Revegetation of Surface Disturbed Areas	C6.601, C6.623
13.06	Soil Moisture Limitations for Tractor Operation	none
14 - TIMBER		
14.02	Timber Harvest Unit Design	none
14.03	Use of Sale Area Maps for Designating Soil and Water Protection Needs	B1.1, B6.5, C6.51
14.04	Limiting the Operating Period of Timber Sale Activities	SPS 204, B6.6
14.06	Riparian Area Designation	C6.5, C5.421
14.07	Determining Tractor Loggable Ground	C6.4
14.08	Tractor Skidding Design	B6.422
14.10	Log Landing Location and Design	B6.422
14.11	Log Landing Erosion Prevention and Control	B6.422, B6.64
14.12	Erosion Prevention and Control Measures During Timber Sale Operations	B6.6
14.14	Revegetation of Areas Disturbed by Harvest Activities	B6.6, C6.6, 6.601
14.15	Erosion Control on Skid Trails	B6.422, B6.6, B6.66, C6.601

ID #	Soil and Water Conservation Practice's Title	Contract Provision
14.16	Meadow Protection During Timber Harvesting	C6.61
14.17	Stream Channel Protection	B6.5, B6.6, C6.5, C6.6, C6.53
14.18	Erosion Control Structure Maintenance	B6.6, B6.66, 4.225
14.19	Acceptance of Timber Sale Erosion Control Measures Before Sale Closure	B6.6, B6.63, B6.64, B6.65, C6.6
14.20	Slash Treatment in Sensitive Areas	C6.7
14.22	Modification of Timber Sale Contract	B8.3, B8.33
14.23	Reforestation Requirement	none
15 – ROADS AND TRAILS		
15.02	General Guidelines for Road Location/Design	none
15.03	Road and Trail Erosion Control Plan	none
15.04	Timing of Construction Activities	C6.3, C6.36, B6.31
15.06	Mitigation of Surface Erosion and Stabilization of Slopes	B6.31, B6.6, B6.62, C5.2, C5.4, C6.36
15.07	Control of Permanent Road Drainage	B6.6, B6.66, C6.3, C6.6, C6.601
15.09	Timely Erosion Control Measures on Incomplete Road and Streamcrossing Projects	SPS 204, B6.31, B6.6, C6.6
15.10	Control of Road Construction Excavation and Sidecast Material	C6.221, C5.4
15.11	Servicing and Refueling of Equipment	C6.34, C6.341, C6.34
15.12	Control of Construction in Riparian Areas	B6.5, B6.61, C6.51, C6.52
15.13	Controlling In-Channel Excavation	B6.5, B6.422, C6.6, Std. Spec. 204.04
15.15	Streamcrossings on Temporary Roads	B6.5, B6.62, B6.65, C6.3, C6.51, C6.52, C6.6, C6.753
15.18	Disposal of Right-of-Way and Roadside Debris	
15.21	Maintenance of Roads	C5.4 4 d
15.22	Road Surface Treatment to Prevent Loss of Materials	FSH 2409.15
15.23	Traffic Control During Wet Periods	B5.12, B6.22, C.5.12
15.24	Snow Removal Controls	C5.46
15.25	Obliteration of Temporary Roads	B6.62, B6.5, C6.6, C6.601
18 - FIRE SUPPRESSION AND FUELS MANAGEMENT		
18.02	Formulation of Fire Prescriptions	none
18.03	Protection of Soil and Water From Prescribed Burning Effects	none

SOIL AND WATER CONSERVATION PRACTICE DESCRIPTIONS

PRACTICE 11.05 - Wetlands Analysis and Evaluation
PRACTICE 14.16 - Meadow Protection During Timber Harvesting

OBJECTIVE: To maintain wetland functions and avoid adverse soil and water resource impacts associated with any disturbance of wetlands, bogs, and wet meadows.

EFFECTIVENESS: High

IMPLEMENTATION: This is covered by standard TSC Provision B6.61 (Meadow Protection) which is a standard provision in all contracts. When it is necessary to identify these areas on the sale area map, direction to do so and protective requirements will be incorporated into C6.61

(Wetlands Protection). Vehicular or skidding equipment shall not be used on meadows except where roads, landings, and tractor roads are approved. Unless otherwise agreed, trees felled into meadows shall be removed by end-lining, and resulting logging slash shall also be removed. Damage to meadows, stream courses, and riparian areas caused by unauthorized purchaser's operations shall be repaired by the purchaser in a timely manner to restore and prevent further damage.

PRACTICE 11.07 - Oil and Hazardous Substance Spill Contingency Planning
PRACTICE 15.11 - Servicing and Refueling of Equipment

OBJECTIVE: To prevent contamination of waters from accidental spills of fuels, lubricants, bitumens, raw sewage, wash water, and other harmful materials by prior planning and development of Spill Prevention Control and Countermeasure (SPCC) Plans.

EFFECTIVENESS: Although SPCC Plans cannot eliminate the risk of materials being spilled and escaping into waters, they can be effective at reducing adverse effects to tolerable levels. Depending on the location and quantity of a spill, a properly implemented plan can provide for up to 100 percent containment of a spill.

IMPLEMENTATION: Timber Sale Contract (TSC) provision C6.341 holds the purchaser responsible for taking appropriate preventive measures to ensure that any spill of oil or oil products does not enter any stream or other waters of the United States. If the total oil or oil products storage exceeds 1,320 gallons or if any single container exceeds a capacity of 660 gallons, the purchaser will prepare a SPCC Plan. The plan shall meet EPA requirements including certification by a registered professional engineer. If necessary, specific requirements for transporting oil to be used in conjunction with the contract will be specified in TSC provision C6.53.

The Contracting Officer Representative will designate the location, size, and allowable uses of service and refueling areas. The criteria below will be followed at a minimum:

1. Petroleum product storage containers with capacities of more than 200 gallons, stationary or mobile, will be located no closer than 100 feet from stream, water course, or area of open water. Dikes, berms, or embankments will be constructed to contain the volume of petroleum products stored within the tanks. Diked areas will be sufficiently impervious and of adequate capacity to contain spilled petroleum products.

2. Transferring petroleum products: During fueling operations or petroleum product transfer to other containers, there shall be a person attending such operations at all times.

3. Equipment used for transportation or storage of petroleum products shall be maintained in a leakproof condition. If the Forest Service Representative determines there is evidence of petroleum product leakage or spillage the representative shall have the authority to suspend the further use of such equipment until the deficiency has been corrected.

4. For longer term storage, a sump pond lined with plastic will be constructed equal to the volume of fuel stored on the site.

In the event any leakage or spillage enters any stream, water course or area of open water, the operator will immediately notify the Contracting Officer Representative (COR) who will be required to follow the actions to be taken in case of hazardous spill, as outlined in the Forest Hazardous Substance Spill Contingency Plan.

PRACTICE 11.09 - Management by Closure to Use

OBJECTIVE: To exclude activities that could result in damages to facilities or degradation of soil and water resources.

EFFECTIVENESS: High

IMPLEMENTATION: Specific guidelines for closure of roads during the period of the contract and at the end of the purchasers operations will be spelled out in the TSC provision C5.51. Travel restrictions and area closures are spelled out under each alternative.

PRACTICE 13.02 - Slope Limitations for Tractor Operation
PRACTICE 14.07 - Determining Tractor Loggable Ground

OBJECTIVE: To reduce gully and sheet erosion and associated sediment production by restricting tractor operation to slopes where corrective measures for proper drainage are easily installed and effective.

EFFECTIVENESS: High. In general, the less the slope percentage, the less are the chances of rilling, gullying, and soil displacement as a consequence of tracked or wheeled skidding.

IMPLEMENTATION: Tracked or wheel skidding shall not be conducted on slopes greater than 45 percent. When slope exceeds 35 percent, a constructed skid trail should be used to concentrate traffic on one route with a pitch of less than 20 percent.

PRACTICE 13.04 - Revegetation of Surface Disturbed Areas
PRACTICE 14.14 - Revegetation of Areas Disturbed by Harvest Activities

OBJECTIVE: To protect soil productivity and water quality by minimizing soil erosion.

EFFECTIVENESS: Revegetation can be moderately effective at reducing surface erosion after one growing season following disturbance and highly effective in later years. Effectiveness has been shown to vary from 10 percent on ¾:1 slopes, to 36 percent on 1:1 slopes to 97 percent on 1:1 slopes in later years (King, John G. and E. Burroughs. Reduction of Soil Erosion on Forest Roads. Intermountain Research Station General Technical Report, 1988).

IMPLEMENTATION: All temporary roads, landings, and skid trails in the sale area will be seeded within one year after harvesting is completed. Approved seed mixes and fertilizer specifications will be incorporated into TSC provision C6.601# (Erosion Control Seeding). TSC provision C6.623# (Temporary Road, Skid Trail/Skid Road and Landing Scarification) will identify that scarification/ripping of compacted landings and closed roads will be a minimum of 6 inches, not to exceed 14 inches. This specification (C6.623#) will be applied according to the following guidelines:

PRACTICE 13.06 - Soil Moisture Limitations for Tractor Operation

OBJECTIVE: To minimize soil compaction, puddling, rutting, and gullying with resultant sediment production, and loss of soil productivity by ensuring that activities are done when ground conditions are such that erosion and sedimentation can be controlled.

EFFECTIVENESS: Responsible implementation and enforcement are required for high effectiveness.

IMPLEMENTATION: Tractor operations will be limited to periods when the soil moisture content is sufficiently so low that excessive rutting or other soil damage does not occur. In this project area, equipment operation (tracked or wheeled) will be restricted to the normally drier mid through late summer or winter period to avoid rutting and puddling in units that have wet areas. In addition, filter cloth and fill material should be used when crossing wet areas rather than cut and fill operations.

PRACTICE 14.02 - Timber Harvest Unit Design
PRACTICE 14.08 - Tractor Skidding Design
PRACTICE 14.10 - Log Landing Location and Design

OBJECTIVE: To ensure that timber harvest unit design will maintain water quality and soil productivity by locating/designing landings and skidding patterns to best fit the terrain and avoid soil erosion.

EFFECTIVENESS: Restricting tractor skidding to designated skid trails can reduce the aerial extent of soil disturbance from the typical 18 to 36 percent, to 10 percent or less. Properly located landings and skid trails produce similar results. Effectiveness is expected to be moderate

IMPLEMENTATION: TSC provision B6.422 (Landings and Skid Trails) requires that the location of all skid trails and landings must be agreed upon before construction. Specific criteria that will be addressed during sale layout and pre-work with the operator will include:

Skid Trails-

1. Locate skid trails and design skidding operations to minimize soil disturbance.

2. Locate skid trails to avoid concentrating runoff. Provide breaks in grade and effective waterbars.

3. Locate skid trails and landings away from natural drainage systems, and divert runoff to stable areas.

4. A minimum spacing of 80 feet is required between skid trails except where trails begin to merge near landings. Movement of yarding equipment to retrieve a turn of logs or mechanized felling equipment is permitted if only one or two passes are involved and sufficient ground debris exist to somewhat protect the soil.

5. Severely disturbed areas should be minimized to the extent practical. These areas include skid trails, heavily used landings, and excessive site preparation. Regional soil quality

guidelines require that at least 85 percent of the timber sale unit must have soil that is in satisfactory condition.

6. Slash will be retained over winter prior to treatment to allow nutrients to leach and return to the soil.

7. Approximately ⅓ to ¼ of the tops will be retained on site in whole tree yarding regeneration units for nutrient cycling and to provide a seed source.

8. Coarse woody debris will be retained in amounts recommended by Graham and others in INT-RP-477 "Managing Coarse Woody Debris in Forests of the Rocky Mountains."

Landings-

1. Landings and log decks will not be located on riparian or wet areas.

2. Landings and/or burn piles will be located a minimum of 100 feet from streams and/or riparian zones, far enough away that direct (unfiltered) entry of sediment, bark, or ash and burning products, will not occur. (C6.50)

PRACTICE 14.03 - Use of Sale Area Maps for Designating Soil & Water Protection Needs

OBJECTIVE: To delineate the location of protection areas and special treatment areas, to ensure their recognition, proper consideration, and protection on the ground.

EFFECTIVENESS: High

IMPLEMENTATION: The following features will be designated on the Sale Area Map (SAM):

1. Streamcourses (perennial and ephemeral) to be protected under B6.5. Streamside Management Zones (SMZs) will be marked on the ground as required in the Montana SMZ law. The following unit has identified four SMZs.

2. Wetlands and riparian areas (meadows, lakes, pot holes, etc.) to be protected per C6.61.

3. Special treatment areas, including riparian areas with planned harvest where logging and site prep will differ from adjoining units as identified in Timber Sale Contract (TSC) provision C6.50 (Riparian Areas).

These features will be reviewed on the ground by the Purchaser and the Sale Administrator prior to harvesting.

PRACTICE 14.04 - Limiting the Operating Period of Timber Sale Activities
PRACTICE 15.04 - Timing of Construction Activities

OBJECTIVE: To minimize soil erosion, sedimentation and soil productivity loss by ensuring activities, including erosion control work, road maintenance, etc., are done: (1) within the time period specified in the Timber Sale Contract (TSC); or (2) when ground conditions are such that erosion and sedimentation can be prevented.

EFFECTIVENESS: Moderate

IMPLEMENTATION: Within the sale area, the following specifications relating to operating periods have been identified and recommended:

1. Earthwork shall be postponed during wet periods if, as a result, erodible material would enter streams.

2. TSC provision B6.31 allows operations to occur outside Normal Operating Season subject to requirements in B6.6, B6.65, and C5.23. The following requirements apply to operations outside the Normal Operating Season:

a. Drain dips will be built into skid trails and temporary roads at the time of construction, where feasible. Where draindips are not feasible, or are not functioning, trails and temporary roads will be waterbarred and maintained as necessary and/or prior to any prolonged shutdown.

b. Temporary Roads will be seeded immediately following completion of use.

c. All surface erosion and stabilization activities will be placed prior to November 1 of each year.

3. The following requirements apply to winter operations:

a. Skid trails will be constructed with waterbars and/or draindips, and allowed to freeze prior to skidding operations.

b. Prior to spring shutdown, slash and/or cull logs will be placed into skid trails to approximate waterbars.

c. All streams and channels within harvest units will be flagged or otherwise identified. (Predesignated under C6.50#).

d. Operations will be discontinued if conditions change and activities are no longer operating on frozen or snow covered ground, the intent of winter logging.

PRACTICE 14.06 - Riparian Area Designation and Protection

OBJECTIVE: To minimize the adverse effects on riparian areas with prescriptions that manage nearby logging and related land disturbance activities.

EFFECTIVENESS: High

IMPLEMENTATION: Riparian areas will be clearly marked prior to ground disturbing activities. Riparian areas will be identified and located on the SAM. Requirements for protection of these areas will also be in TSC provision C6.6. The following practices in SMZs will be prohibited:

1. Broadcast burning.

2. The operation of wheeled or tracked vehicles will be prohibited except on established roads.

3. The forest practice of clearcutting.

4. The construction of roads except when necessary to cross a stream or wetland.

5. The handling, storage, application, or disposal of hazardous or toxic materials in a manner that pollutes streams, lakes, or wetlands or that may cause damage or injury to humans, land, animals, or plants.

6. The side-casting of road material into a stream, wetland, or watercourse.

7. The deposit of slash in streams or other water bodies.

8. Retention of trees in the SMZ will comply with the Montana SMZ law and rules.

The following units have identified SMZs: 413, 498, 521, 534, 548, 558, 572, 670, 672, 705, 738, 747, 1688, 1700, 1704, 1710, 1711 and 1712.

PRACTICE 14.11 - Log Landing Erosion Prevention and Control
PRACTICE 14.12 - Erosion Prevention and Control During Timber Sale Operations
PRACTICE 14.15 - Erosion Control on Skid Trails

OBJECTIVE: To protect water quality by minimizing erosion and subsequent sedimentation derived from log landings and skid trails.

EFFECTIVENESS: Moderate

IMPLEMENTATION: The following criteria will be used in controlling erosion and restoring landings and skid trails so as to minimize erosion:

General-

1. Deposit waste material from construction or maintenance of landings, skid and fire trails in geologically stabilized locations at least 100 feet outside of any SMZ.

2. Skid trails and landings will be seeded with a mix specified in C6.601#.

Landings-

1. During period of use, landings will be maintained in such a manner that debris and sediment are not delivered to any streams.

2. Landings shall be reshaped as needed to facilitate drainage prior to fall and spring runoff. Landings shall be stabilized by establishing ground cover or by some other means within one year after harvesting is completed.

3. Landings will drain in a direction and manner that will minimize erosion and will preclude sediment delivery to any stream.

4. After landings have served the Purchaser's purpose, the Purchaser shall ditch or slope them to permit the water to drain and disperse [TSC Provision B6.63 (Landings)].

Skid Trails-

1. Skid trails and fire trails shall be stabilized whenever they are subject to erosion, by waterbarring, cross draining, outsloping, scarifying, seeding, or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff.

2. Skid trails will be water-barred, using the cross-drain spacing guide from the R1-R4 Guide for Controlling Sediment From Secondary Logging Roads.

PRACTICE 14.17 - Stream Channel Protection (Implementation and Enforcement)

OBJECTIVES: (1) To protect the natural flow of streams; (2) to provide unobstructed passage of stormflows; (3) to reduce sediment and other pollutants from entering streams; and (4) to restore the natural course of any stream as soon as practicable if the stream is diverted as a result of timber management activities.

EFFECTIVENESS: High

IMPLEMENTATION: The following items will be incorporated into the Timber Sale Contract via the identified B and C provisions:

1. Location and method of stream crossings will be agreed upon prior to construction (B6.422 Skid Trails and Landings).

2. Purchaser shall repair all damage to a streamcourse if the purchaser is negligent in his operations, including damage to banks and channel, to an acceptable condition as agreed to by the certified sale administrator and purchaser's representative.

3. All project debris shall be removed from streamcourse in an agreed upon manner that will cause the least disturbance (B6.5 Streamcourse Protection).

4. Wheeled or tracked equipment shall not operate within 50 feet (100 feet where SMZ law requires it) slope distance of the apparent high water mark of streamcourses designated for protection on the Sale Area Map (C6.6 Erosion Prevention and Control).

5. When ground skidding systems are employed, logs will be end-lined out of streamside and Riparian Areas. Equipment is permitted to enter streamside areas only at locations and times agreed to by the certified sale administrator and the purchaser (C6.50#, SMZ and Riparian Area Protection) and only after Alternative Practice Approval is granted by the Montana Department of Natural Resources and Conservation, per the Montana SMZ law.

6. Material from temporary road and skid trail stream crossings will be removed and streambanks restored to an acceptable condition. (B6.62 Temporary Roads).

7. A Montana Stream Protection Act (SPA, FWP-124) permit will be obtained in advance where the bed or bank of the stream will be affected.

PRACTICE 14.18 - Erosion Control Structure Maintenance

OBJECTIVE: To ensure that constructed erosion control structures are stabilized and working effectively.

EFFECTIVENESS: High

IMPLEMENTATION: TSC provision B6.66 requires that during the period of the contract, the Purchaser shall provide maintenance of soil erosion control structures constructed by the Purchaser until they become stabilized, but not for more than one year after their construction. After 1 year, any erosion control work needed is accomplished through performance bond earmarked for that use. TSC provision C6.6(F) requires the Purchaser to maintain erosion control structures concurrently with his operations under the sale and in any case not later than 15 days after completion of skidding each unit.

PRACTICE 14.19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

OBJECTIVE: To assure the adequacy of required timber sale erosion control work.

EFFECTIVENESS: High

IMPLEMENTATION AND RESPONSIBILITY: TSC provision B6.35 requires that upon the Purchaser's written request and assurance that work has been completed the Forest Service shall perform an inspection. One area the Purchaser's might request acceptance for area specific requirements such as logging, slash disposal, erosion control, or snag felling. In evaluating acceptance the following definition will be used by the Forest Service: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. Certified Timber Sale Administrators will not accept as complete erosion control, measures which fail to meet this criteria.

PRACTICE 14.20 - Slash Treatment in Sensitive Areas

OBJECTIVE: To protect water quality by protecting sensitive tributary areas from degradation which would result from using mechanized equipment for slash disposal.

EFFECTIVENESS: Moderate

IMPLEMENTATION: All such sensitive areas, including riparian harvest areas, bogs and meadows will be identified on the sale area map, the slash treatment map, and in the contract. TSC Provision C6.7 will include the following:

1. Jackpot burning within Streamside Management Zones will be utilized rather than broadcast burning.

2. Grapple piling of slash will be used in all machine pile units.

PRACTICE 14.22 - Modification of the Timber Sale Contract

OBJECTIVE: To modify the Timber Sale Contract if new circumstances or conditions indicate that the timber sale will cause irreversible damage to soil, water, or watershed values.

EFFECTIVENESS: High

IMPLEMENTATION: Over time, the Forest Service adopts new policies and direction that amend how we address timber harvest operations. An example is the recent change in direction to leave some large organic debris in stream channels instead of removing it all. In cases such as this, modifications to the TSC would occur under provision B2.37 (Minor Changes).

If evidence indicates that unacceptable impacts would occur to soil and water resources, when the sale was harvested as planned, the Forest Service Representative will request the Contracting Officer to gain Regional Forester advice and approval to proceed with a resource environmental modification, mutual cancellation, or unilateral cancellation of the Timber Sale Contract as allowed by TSC Provision B8.3. If the decision is for a resource environmental modification, once the action is approved by the Regional Forester, the appropriate Line Officer will assign an interdisciplinary team to make recommendations for implementation.

PRACTICE 14.23 - Reforestation Requirement

OBJECTIVE: To promote prompt reforestation and to limit disturbance on areas with limited regeneration potential.

EFFECTIVENESS: High

IMPLEMENTATION: All areas projected for regeneration harvest have been reviewed for silvicultural opportunities and have been certified that regeneration with five years is achievable. Project KV Plans will include funding for surveys as well as planting and site prep if necessary.

PRACTICE 15.02 - General Guidelines for the Location and Design of Roads and Trails

OBJECTIVE: To locate and design roads and trails with minimal soil and water resource impact while considering all design criteria.

EFFECTIVENESS:

1. Route location ground-truths the results of transportation planning and provides site-specific information on possible problem areas (Gray and Megahan 1981; Megahan and Kidd 1972; King and Gonsior 1980).

2. Designed and controlled cut slopes, fill slopes, road width, and road grades effectively reduce sediment production by fitting the roads to the land (King 1979; Megahan 1978).

IMPLEMENTATION: The following listed items are incorporated in general road location and design guidelines for minimizing impacts on water quality:

Design-

1. Roads shall be planned no wider than necessary to safely accommodate the anticipated use and equipment needs. Cut and fill volumes shall be minimized by designing the road to fit natural terrain features as closely as possible. As much of the excavated material as possible shall be used in fill sections. Minimum cuts and fills shall be planned, particularly near stream channels.

Location-

1. Utilize natural benches, follow contours, avoid long, steep road grades. Balance cut/fill where possible to avoid waste areas.

2. Embankments and waste shall be designed so that excavated material may be disposed of on geologically stable sites.

3. Avoid slumps and slide-prone areas, and steep sidehills.

4. Road construction shall be minimized within stream protection zones. Areas of vegetation shall be left or reestablished between roads and streams [Standard Road Specifications-Special Project Specification 204.01].

5. Where possible, locate turn-outs and turn-arounds at least 200 feet from water bodies or riparian zones. Where placement within 200 feet is necessary due to safety considerations, emphasize erosion control measures to protect water quality; i.e., additional windrowing, seeding, etc.

Road Drainage-

1. Locate and design roads and trails to drain naturally by appropriate use of out-sloping, rolling dips, and grade changes, where possible. Dips, water bars, and/or cross drainage will be planned when necessary. Cross drains will be installed in ditched areas to 1) carry intercepted flow across constructed areas; 2) to relieve the length of undrained ditch; and 3) to reduce disruption of normal drainage patterns. Road and trail drainage should be channeled to effective buffer areas, either natural or manmade, to maximize sediment deposition prior to entry into live water.

2. Ditch lines and road grades will be designed to minimize unfiltered flow into streams. A rolling dip, relief culvert, or similar structure will be installed as close as practical to crossings to minimize direct sediment and/or water input directly into streams. Route the drainage through SMZ, buffer strips, or sediment settling structures where possible.

3. Relief culverts and roadside ditches shall be planned whenever reliance upon natural drainage would not protect the running surface, excavation, or embankment. Culvert installations shall be designed to prevent erosion of the fill. Drainage structures shall be planned to achieve minimum direct discharge of sediment into streams.

PRACTICE 15.03 - Road and Trail Erosion Control Plan

OBJECTIVE: To prevent, limit, and mitigate erosion, sedimentation, and resulting water quality degradation prior to the initiation of construction and maintenance activities through effective contract administration during construction and timely implementation of erosion control practices.

EFFECTIVENESS: Moderate

IMPLEMENTATION: The following erosion control objectives and mitigation measures have been developed by the interdisciplinary team and will be reflected in contract specifications and provisions. The Engineer will certify that the Contractors Erosion Control Plan meets the specifications of Std. FS Spec. Section 204:

1. Vegetation will be reestablished as soon as possible on exposed cut and fill slopes. Various operating seasons on varied units and sales within the analysis area will require seeding and fertilization specs to vary. Mulching will be required on erodible slopes where difficulty in reestablishing vegetation is anticipated.

2. Prompt attention to potential erosion problems, both anticipated and unanticipated, before they become a water quality issue, will be required. On-site stockpiling of straw bales for immediate availability and erosion cloth or a suitable substitute stored off-site, but available, will also be required.

3. Windrows will be used on all significant fill slopes where there is a possibility of erosion or sedimentation into a nearby stream or channel (Std. FS Spec. 201).

4. Cross drains and relief culverts will be installed so as to minimize effects from the intercepted water (see also Practice 15.02 f.(3)).

5. Equipment shall not be operated when ground conditions are such that excessive ground impacts will occur unless these impacts are documented and mitigated through other BMPs.

Prior to the start of construction, the Contractor shall submit a schedule for proposed erosion control work as required in the Standard Specifications. The schedule shall include all erosion control items identified in the specifications. Erosion control work to be done by the Contractor will be defined in Standard Specification 204 and/or in the Drawings. The schedule shall consider erosion control work necessary for all phases of the project. The Contractor's construction schedule and plan of operation will be reviewed in conjunction with the erosion control plan to ensure their compatibility before any schedules are approved.

PRACTICE 15.06 - Mitigation of Surface Erosion and Stabilization of Slopes

OBJECTIVE: To prevent, limit, and mitigate erosion, sedimentation, and resulting water quality degradation prior to the initiation of construction and to minimize erosion from road cutslopes, fillslopes, and travelways during and after construction.

EFFECTIVENESS: Seeding and fertilizing cut slopes, fill slopes, and other disturbed areas reduces erosion from these sources after one growing season. Effectiveness has been rated at 85 percent or better once the vegetation has become established (King and Burroughs 1989).

IMPLEMENTATION: Areas requiring mitigation of surface erosion will occur during the life of the contracts. When these are found, the following provisions will be implemented:

1. Where surface erosion is occurring because of inadequate vegetative cover, additional seeding and refertilization will occur using recommended seed and fertilizer mixes. A T108 spec covers reseeding of cutslopes, if bared by the purchaser's maintenance operation. If the purchaser has done his required seeding, or bare spots are not caused by the purchaser, revise the KV Plan to cover costs.

2. Where ditches are carrying sediment into stream channels, straw bale and/or erosion cloth ditch blocks will be installed to induce deposition. Seeding of the eroding surfaces, and

seeding of the stored sediment in the ditch will also be accomplished. If problem areas are known before contract award, add C6.602# to require cross ditching on segments of road.

3. Where straw bale/erosion cloth structures either fail or effectiveness is doubtful, additional relief culverts will be installed to drain the ditches out onto suitable ground to at least minimize delivery of erosion products to the stream. If problem areas are known before contract award, add C6.602# to require cross ditching on segments of road.

4. Slumping of cutslopes may require a combination of both mechanical and vegetative controls. If/when this problem is found, a solution will be determined in consultation with the engineers and the soil scientist.

Unless caused by the purchaser during his maintenance operations or known before sale award, or are part of a recurrent slide area these items will be beyond the scope of purchaser responsibility. Repair and/or improvement will be handled under reconstruction modified into the contract under C8.3 or KV Plan revision.

PRACTICE 15.07 - Control of Permanent Road Drainage

OBJECTIVE: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.

EFFECTIVENESS: Designed and controlled ditches, cross drain spacing, and culvert discharge prevent water from running long distances over exposed ground. Dewatered (dry) culvert installations and special drainage such as rock filter blankets and rock buttresses have been demonstrated to be effective. Moderate

IMPLEMENTATION: The following items will be included in the timber sale contract provisions or road contract special project specifications.

All roads-

1. Drainage ways shall be cleared of all debris generated during construction and/or maintenance which potentially interfere with drainage or water quality [Timber Sale Contract Clause C5.4, and Standard Road Specifications-Special Project Specification 204.04].

2. During and following operations on out-sloped roads, out-slope drainage shall be retained and berms shall be removed on the outside edge except those intentionally constructed for protection of road grade fills [Timber Sale Contract Clause C5.4].

3. Cross drains and relief culverts will be installed so as to minimize concentrations of intercepted water (see also Practice 15.02 f.(3)).

Existing Roads - At a minimum, the following items will be added to or improved in the existing road system that will be used for proposed timber haul:

1. Rock energy dissipators or downspouts will be placed below problem culvert outlets (Reconstruction Item).

2. In all areas where ditch erosion is significant at this time, relief culverts that drain onto suitable areas will be installed (Reconstruction Item).

3. Roads restricted after use will also have erosion control measures in place prior to final pull-out. (TSC B/C 6.6, B6.65).

4. For all native surface roads to be closed, the travelway will be scarified, seeded, and fertilized. (TSC C6.601).

PRACTICE 15.08 - Pioneer Road Construction

OBJECTIVE: To minimize sediment production and mass wasting associated with pioneer road construction.

EFFECTIVENESS: Moderate

IMPLEMENTATION: The following contract specifications will be required:

1. Construction of pioneer roads shall be confined to the roadway limits unless otherwise approved by the Contracting Officer (Std. FS Spec. 203.11).

2. Pioneering shall be conducted so as to prevent undercutting of the designated final cut slope, and to prevent avoidable deposition of materials outside the designated roadway limits (Std. FS Spec. 203).

3. Erosion control work will be completed concurrent with construction activity or prior to the wet season. During the wet and winter season, no more than 1,000 feet of road can be in the pioneer state without the required erosion control work at any time (Std. FS Spec. 204).

4. Permanent culverts will be installed during the pioneer phase unless positive control of sediment can be accomplished during installation, use, and removal of the temporary structure.

PRACTICE 15.09 - Timely Erosion Control Measures on Incomplete Road and Streamcrossing Projects

OBJECTIVE: To minimize erosion of and sedimentation from disturbed ground on incomplete projects.

EFFECTIVENESS: Moderate

IMPLEMENTATION: The following preventive measures will be implemented during projects:

1. The removal of temporary culverts, culvert plugs, diversion dams, or elevated streamcrossing causeways.

2. The installation of temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion.

3. The removal of debris, obstructions, and spoil material from channels and floodplains.

4. Grass seeding, planting deep rooted vegetation, and/or mulching.

Erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly "closed," if weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measures incomplete.

PRACTICE 15.10 - Control of Road Construction Excavation and Sidecast Material
PRACTICE 15.18 - Disposal of Right-of-Way and Roadside Debris

OBJECTIVE: To ensure that unconsolidated excavated and sidecast material, construction slash, and roadside debris, generated during road construction, is kept out of streams and to prevent slash and debris from subsequently obstructing channels.

EFFECTIVENESS: High

IMPLEMENTATION: Construction debris and other newly generated slash developed along roads near streams shall be disposed of by the following means as applicable (Std. FS Spec. 210, and SPS 201):

1. On-site by windrowing, scattering, burying, chipping, disposal in cutting units, piling and burning, or embankment placement.

2. Removal to agreed upon locations.

3. A combination of the above.

In the construction of road fills near streams, compact the material to reduce the entry of water and minimize the amount of snow, ice, or frozen soil buried in the embankment. No significant amount of woody material shall be incorporated into fills. Slash and debris may be windrowed along the toe of the fill, but in such a manner as to avoid entry into a stream and culvert blockage.

Where slash windrows are not desirable or practical, other methods of erosion control such as erosion matts, mulch, and straw bale or fabric sediment fences will be used.

Where exposed material (excavation, embankment, borrow pits, waste piles, etc.) is potentially erodible, and where sediments would enter streams, the material will be stabilized prior to fall or spring runoff by seeding, compacting, rip-rapping, benching, mulching or other suitable means. The following standard specs will be included in all road contracts which include clearing and excavation.

1. Standard Specification 201 (Slash Treatment)
2. Standard Specification 203 (Excavation and Embankments)

PRACTICE 15.12 - Control of Construction in Riparian Areas
PRACTICE 15.13 - Controlling In-Channel Excavation

OBJECTIVE: To minimize stream channel disturbances and related sediment production, and to make sure activities comply with the SPA (124) permit process as agreed upon between the Forest Service and the State of Montana.

EFFECTIVENESS: High

IMPLEMENTATION: Construction equipment may cross, operate in, or operate near streamcourses only where so designated by the Forest Service or as necessary in the construction or removal of culverts and bridges. This will be done in compliance with the specifications and mitigation required in the SPA (124) permit and included in the project specifications.

Unless otherwise approved, no in-channel excavation shall be made outside of de-watered areas, and the natural stream bed adjacent to the structure shall not be disturbed without approval of the Engineer. If any excavation or dredging is made at the site of the structure before caissons, cribs, or cofferdams are sunk in place, all such excavations will be restored to the original ground surface or the stream bed will be protected with suitable stable material. Material from foundation or other excavation shall not be discharged directly into live streams but shall be pumped to settling areas shown on the drawings or approved by the Engineer. If the channel is damaged during construction, it should be restored as nearly as possible to its original configuration without causing additional damage to the channel. Excavations for stream crossings will conform to the SPA (124) permit criteria, including timing restrictions (as well as Std. FS Spec 206, 206A, and applicable special project specifications).

PRACTICE 15.15 - Stream Crossings on Temporary Roads

OBJECTIVE: To keep temporary roads from unduly damaging streams, disturbing channels, or obstructing fish passage.

EFFECTIVENESS: Moderate

IMPLEMENTATION: Culverts, temporary bridges, low-water crossings, or log-fords will be required on all temporary roads and crossings. Streams that will have flowing water during the life of the temporary crossing will normally use culverts or a bridge. The number of temporary crossings will kept to the minimum needed for access.

1. Temporary crossings on temporary roads will be removed when no longer needed, and any fills will be removed and the channel restored to pre-project condition (TSC B5.2, B6.5, C5.2). An SPA (124) permit will also be required.

2. Temporary crossings on system roads will be removed following use but protected fills, including constructed abutments, may remain.

PRACTICE 15.21 - Maintenance of Roads

OBJECTIVE: To maintain all roads in a manner which provides for soil and water resource protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities.

EFFECTIVENESS: Moderate

IMPLEMENTATION: For roads in active timber sale areas standard TSC provision B5.4 (Road Maintenance) requires the purchaser to perform or pay for road maintenance work commensurate with the purchasers use. Road maintenance is the preservation of the road facility including surface, shoulders, miscellaneous structures, drainage, sight distance, and all such traffic control devices required to ensure safe and efficient use by established road users and adequately protect adjacent resources. Purchaser's maintenance responsibility shall cover the before, during, and after operation period during any year when operations and road use are performed under the terms of the timber sale contract.

Purchaser shall perform road maintenance work, commensurate with purchaser's use, on roads controlled by Forest Service and used by purchaser in connection with this sale except for those roads and/or maintenance activities which are identified for required deposits in C5.411# and C5.412#.

All maintenance work shall be done currently, as necessary, in accordance with T-specifications, except for agreed adjustments (TSC C5.4- T301, 310).

1. For roads not in an active timber sale area, road maintenance must still occur at sufficient frequency to protect the investment in the road as well prevent deterioration of the drainage structure function. This will be accomplished by scheduling periodic inspection and maintenance, including cleaning dips and cross drains, repairing ditches, marking culvert inlets to aid in location, and cleaning debris from ditches and culvert inlets to provide full function during peak runoff events (FSH 7709.15).

PRACTICE 15.22 - Road Surface Treatment to Prevent Loss of Materials

OBJECTIVE: To minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production.

EFFECTIVENESS: Stabilization of road surface and ditch lines over 6 percent with competent rock (rock that does not rapidly disintegrate) is often over 90 percent effective. High

IMPLEMENTATION: On timber sale roads, the Purchaser shall undertake measures to prevent excessive loss of road material if the need for such action has been identified. Road surface treatments may include: watering, applying magnesium chloride, or aggregate surfacing.

PRACTICE 15.23 - Traffic Control During Wet Periods

OBJECTIVE: To reduce the potential for road surface disturbance during wet weather and to reduce subsequent sediment delivery to streams.

EFFECTIVENESS: Moderate

IMPLEMENTATION: Haul restrictions are placed on asphalt-surfaced roads, based on interpretation of thermistor data. Restrictions are placed on native and aggregate-surfaced roads when a Forest Service representative feels that damage will occur with further use. Roads that are restricted are so indicated in Forest Supervisor Orders, posted at Forest Service Stations and in local media.

PRACTICE 15.24 - Snow Removal Controls

OBJECTIVE: To minimize the impact of snow melt on road surfaces and embankments and to reduce the probability of sediment production resulting from snow removal operations.

EFFECTIVENESS: Moderate

IMPLEMENTATION: For Forest roads that will be used throughout the winter, the following measures will be employed:

1. The Purchaser is responsible for snow removal in a manner which will protect roads and adjacent resources.

2. Rocking or other special surfacing and/or drainage measures may be necessary, before the operator is allowed to use the roads.

3. During snow removal operations, banks shall not be undercut nor shall gravel or other selected surfacing material be bladed off the roadway surface. Ditches and culverts shall be kept functional during and following roadway use. If the road surface is damaged, the Purchaser shall replace lost surface material with similar quality material and repair structures damaged in blading operations.

4. Snow berms shall not be left on the road surface or shall be placed to avoid channelization or concentration of melt water on the road or erosive slopes. Berms left on the shoulder of the road shall be removed and/or drainage holes opened at the end of winter operations and before the spring breakup. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills. On insloped roads, drainage holes shall also be provided on the ditch side, but care taken to ensure that culverts and culvert inlets are not damaged.

PRACTICE 15.25 - Obliteration of Temporary Roads

OBJECTIVE: To reduce sediment generated from temporary roads by obliterating them at the completion of their intended use.

EFFECTIVENESS: High

IMPLEMENTATION: Effective obliteration is generally achieved through a combination of the following measures (TSC B6.62, C6.622, C6.623):

1. Road effectively drained and blocked.

2. Temporary culverts and bridges removed and any modified channel slopes stabilized and revegetated.

3. Road returned to resource production through revegetation (grass, browse, or trees).

4. Sideslopes reshaped and stabilized.

PRACTICE 18.02 - Formulation of Fire Prescriptions

OBJECTIVE: To provide for soil and water resource protection while achieving the management objective through the use of prescribed fire.

EFFECTIVENESS: High

IMPLEMENTATION: The prescription elements are defined by the interdisciplinary team during the environmental analysis. Field investigations are conducted to identify site specific conditions which may affect the prescription. Both the optimum and tolerable limits for soil and water resource needs should be established. Prescription elements will include such factors as fire weather, slope aspect, soil moisture and fuel moisture which influence the fire intensity. These elements have a direct effect on whether or not a litter layer remains after burning and whether or not a water repellent layer is formed. The amount of remaining litter significantly affects erosion rates, water quality, and runoff volumes.

PRACTICE 18.03 - Protection of Soil and Water From Prescribed Burning

OBJECTIVE: To maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients, and debris from entering surface water.

EFFECTIVENESS: High

IMPLEMENTATION: Forest Service and/or other crews are used to prepare the units for burning. This includes water barring firelines and reducing fuel concentrations. The interdisciplinary team identifies Riparian Areas and soils with water repellant tendencies as part of the environmental analysis. Unit 731, a stand replacement burn in the Dry Fork headwaters has riparian areas of concern that will be incorporated into burn prescription plans. Some of the techniques used to prevent soil erosion and water quality degradation are: (1) construct water bars in firelines; (2) reduce fuel loadings in drainage channels; (3) maintain the integrity of the Riparian Area; (4) avoid intense fires, which may promote water repellency, nutrient leaching, and erosion; (5) retain or plan for sufficient ground cover to prevent erosion of the burned sites; and (6) removal of all debris added to stream channels as a result of prescribed burning, unless debris is prescribed to improve fisheries habitat.

Appendix C
Road Development and Management Plan

OBJECTIVE

This Road Development and Management Plan is intended to provide guidance for the implementation of the Forest Plan in the area of the Black Ant Salvage Sale. This plan is developed in accordance with Forest Service Manual direction, and is incorporated as part of the above noted environmental study.

No new classified (system) roads will be constructed to implement any action alternatives in the area of the salvage sale. Roads reconstruction will be a part of any action alternatives to recondition the roads damaged during fire activities or to make damage repair due to normal wear. Only areas identified as damaged or that are deficient of standards will be reconstructed. Additional temporary (non-system) roads may be needed to access the harvest areas, and are considered equal among any action alternatives. Following completion of the sale activities, they will be closed to highway vehicle traffic and made self-draining and revegetated. The system roads in the Black Ant Salvage Sale area are Service Level “C” and “D” as defined in FSH 7709.56, Chapter 4, Table 1.

GENERAL ROAD MANAGEMENT GUIDELINES

Constant service roads are operated as weather permits each year. A mixture of recreational, administrative, and logging traffic must be safely accommodated. During periods of high and conflicting use, i.e., hunting season and log haul, road management measures will be instituted as needed to maintain an acceptable level of safety.

Temporary roads opened or constructed to facilitate salvage operations will be closed to highway traffic following completion of the sale operations. Closure options are varied, and site-specific selection of the measures used will be necessary. Road closure devices or other means such as, removal of approaches, signing, or physical barriers of some kind may be employed to control road use. A closure device, such as a gate, will generally be used when the period of closure is for less than five years or periodic road use is required. In accordance with the Forest Plan’s prescription (LR2b), the goal for management areas within this drainage is discussed in Chapter 3 of this document. Resource management activities will not require the opening and closing of roads to meet the density constraints of LR2b of the Lewis and Clark National Forest Plan. While no new system roads will be constructed in this salvage sale, the following criteria listing is included to illustrate the character of the road system and its operation.

GENERAL ROAD DESIGN CRITERIA

A. Constant Service (Traffic Service Level "C")
Design Vehicle - Lowboy
Design Speed - 15 MPH

1. Width of Traveled Way:
   Templates with ditch - 12'
   Templates without ditch - 14'
2. Shoulders: None
3. Curve Widening: Lowboy (FSH 7709.56, Chapter 4.24 5.)
4. Slough Widening:

Fill Height	Widening (Feet)
0 - 5'	1
>5'	2

5. Slope Criteria:
   Cutslopes 1-1/2:1 under 3'
   1:1 over 3'
   Fillslopes 1-1/2:1
6. Turnouts:
   Dimensions
   50' minimum full width length
   25' minimum transitions, 10' wide.
   Spacing - Maximum 1000' –
   Use low impact opportunities
7. Clearing Limits:
   Cutslopes - 3'
   Fill Slope - 0'
   Minimum distance from centerline - 15'

Drainage:
Ditch required, use dips or culverts as appropriate.

9. Gradients:
   Maximum - 12% Minimum - 2%
10. Clearing Debris Disposal Method
    Pile and burn, bury or remove.
    Decking of firewood for public removal
11. Erosion Control:
    Cutslopes to be 1.0:1 or flatter, seeded, and fertilized.
12. Surfacing/Base Course:
    Spot locations to provide reasonable stability during wet weather and/or erosion control
13. Construction Tolerance Class "D":
    is generally considered appropriate.
    (see Specification 203.16 [1985] or Table 203-1 [1996])

a. Constant Service (Traffic Service Level "D")
Design Vehicle - log truck and or cable yarding systems; Design Speed - 5 to 10 MPH

1. Width of Traveled Way:
   Templates with ditch - 12'
   Templates without ditch - 14'
2. Curve Widening: for log truck (see FSH 7709.11, Chapter 24)
3. Slough Widening: same as for constant service
4. Turnouts
   Dimensions - Same as for constant service
   Spacing - maximum 1000'
5. Clearing Limits:
   Cutslopes - 0'
   Fill Slope - Can fill up to 1' on tree. Minimum distance from centerline = 13'
6. Drainage:
   Ditch only when needed for drainage. Use dips on gradients up to 8%. Dips should be located rather than designed.
7. Gradients:
   Maximum - 16%
   Minimum - 2%
8. Clearing Debris Disposal Methods: Esthetics is not a major consideration. Scattering permitted where practical.
9. Erosion Control: Revegetate all disturbed areas subject to erosion and where revegetation is practical.
10. Surfacing/Base Course: Generally not required. Where identified as needed for other resource protection, surface treatment consistent with the intended use and anticipated impacts will be employed.
11. Construction Tolerance Class: "E" is appropriate unless more precision is needed to ensure proper drainage.

Exhibit 1

Traffic Service Levels	A	B	C	D
Flow	Free flowing with adequate parking facilities.	Congested during heavy traffic such as during peak logging or recreation activities.	Interrupted by limited passing facilities, or slowed by the road condition.	Flow is slow or may be blocked by an activity. Two way traffic is difficult and may require backing to pass.
Volumes	Uncontrolled; will accommodate the expected traffic volumes.	Occasionally controlled during heavy use periods.	Erratic; frequently controlled as the capacity is reached.	Intermittent and usually controlled. Volume is limited to that associated with the single purpose.
Vehicle Types	Mixed; includes the critical vehicle and all vehicles normally found on public roads.	Mixed; includes the critical vehicle and all vehicles normally found on public roads.	Controlled mix; accommodates all vehicle types including the critical vehicle. Some use may be controlled to vehicle types.	Single use; not designed for mixed traffic. Some vehicles may not be able to negotiate. Concurrent use traffic is restricted.
Critical Vehicle	Clearances are adequate to allow free travel. Overload permits are required.	Traffic controls needed where clearances are marginal. Overload permits are required.	Special provisions may be needed. Some vehicles will have difficulty negotiating some segments.	Some vehicles may not be able to negotiate. Loads may have to be off-loaded and walked in.
Safety	Safety features are a part of the design.	High priority in design. Some protection is accomplished by traffic management.	Most protection is provided by management.	The need for protection is minimized by low speeds and strict traffic controls.

Traffic Service Levels	A	B	C	D
Traffic Management	Normally limited to regulatory, warning, and guide signs and permits.	Employed to reduce traffic volume and conflicts.	Traffic controls are frequently needed during periods of high use by the dominant resource activity.	Used to discourage or prohibit traffic other than that associated with the single purpose.
User Costs	Minimize; transportation efficiency is important.	Generally higher than "A" because of slower speeds and increased delays.	Not important; efficiency of travel may be traded for lower construction costs.	Not considered.
Alignment	Design speeds is the predominant factor within feasible topographic limitations.	Influenced more strongly by topography than by speed and efficiency.	Generally dictated by topographic features and environmental factors. Design speeds are generally low.	Dictated by topography, environmental factors, and the design and critical vehicle limitations. Speed is not important.
Road Surface	Stable and smooth with little or no dust, considering the normal season of use.	Stable for the predominant traffic for the normal use season. Periodic dust control for heavy use or environmental reasons. Smoothness is commensurate with the design speed.	May not be stable under all traffic or weather conditions during the normal use season. Surface rutting, roughness, and dust may be present, but controlled for environmental or investment protection.	Rough and irregular. Travel with low clearance vehicles is difficult. Stable during dry conditions. Rutting and dusting controlled only for soil and water protection.

FSH 7709.56 Chap. 4.24 5.

5. Curve Widening. Widening of the traveled way is required on some curves to provide for the offtracking of tractor-trailer vehicles and for some light vehicle-trailer combinations. Curve widening to accommodate the design vehicle is considered a part of the traveled way.

In most cases, the design should consider several types of vehicles, of which the following are most common.

a. Tractor-trailer combinations where the fifth wheel is located directly over the drive wheels, such as a lowboy or a gravel truck.

b. Tractor-trailer combinations with towing pivot point offset to the rear of the drive wheels, such as logging trucks with "stingers" to facilitate making short radius turns.

c. Tractor-trailer combinations that have two fifth wheels and accessory axles.

d. Yarders arranged in operational mode or travel configuration.

Curve widening is affected by the type of vehicle, radius of curvature, and the central or delta angle.

Generally, the need for curve widening increases as the radius decreases. Shorter curves require less curve widening than longer curves.

The following discussion outlines the relationship of curve widening to Traffic Service levels (ex. 1).

Traffic Service Level	**Curve Widening**
A	Design curve widening to accommodate the design vehicle (normally lowboy) at the design speed for each curve. Curve widening for critical vehicles should be provided by the use of other road elements, if planned, such as turnouts and shoulders. Provide widening if the needed width is not available. The critical vehicle should be accommodated in its normal traveling configuration. Curve widening should be provided in each lane of double-lane roads.
B	Same as A.
C	Same as A, except the critical vehicle configuration may have to be altered.
D	Design should provide curve widening only for the design vehicle. Loads carried by the critical vehicle should be offloaded and walked to the project or transferred to vehicles capable of traversing the road. Temporary widening to permit the

passage of larger vehicles may be accomplished by methods such as temporary filling of the ditch at narrow sections. These constraints should be reflected in the design criteria and in road management objectives.

On Traffic Service Level C and D roads, it may be desirable to provide curve widening for occasional critical vehicle traffic by designing turnouts where significant curve widening would otherwise be required, such as on short-radius curves. Where this is done, the minimum lane width should be the greater of the following:

1. Single lane width plus log truck curve widening plus turnout width.

2. Single lane width plus critical vehicle curve widening.

The turnout should extend from Point of Curvature (PC) to Point of Tangency (PT) with additional tapers appropriate to the using vehicle.

Use the following equations or exhibits 8, 9, 10, and 11 to determine curve widening. The equations were developed by combining the central or delta angle variation characteristics of Trailer Tractrix Equations with the offtracking equations commonly used. Exhibits 8 through 11 can be used for the common lowboy and logging truck configurations described.

It is not necessary to add curve widening to all curves. If the minimum width as determined by the following equation is equal to or less than the basic traveled-way width, no curve widening is required.

The following field-checked equation, which is reasonably accurate for a radius of 50 feet or greater, gives the minimum lane width (MLW), which includes 2 feet for tracking corrections.

MLW = 12 ft + curve widening (CW) except that on Traffic Service Level D roads, this may be reduced to MLW = 10 ft + CW but not less than 12 feet for roads open to commercial hauling or commercial passenger vehicles (see exhibit 2) where analysis indicates that adequate user safety and utility can be maintained at the reduced width.

$$CW = \left[\left(R - \sqrt{R^2 - L^2} \right) \left(1 - e^{\left[\frac{-.015 \Delta R}{L} + .216 \right]} \right) \right]$$

Where:

R = Centerline radius (feet).
e = Base for natural logarithms.
□ = Central angle (degrees).

For a lowboy or standard tractor trailer:

$$L = \sqrt{L_1^2 + L_2^2 + L_3^2}$$

Where:

L_1 = Wheel base of the tractor (feet).
L_2 = Distance from the fifth wheel to the middle of the rear duals for the first trailer (feet).
L_3 = Distance from the fifth wheel to the middle of the rear duals for the second trailer (feet).

For a stinger type log truck:

$$L = \sqrt{L_1^2 - L_2^2 + L_3^2}$$

Where:

L_1 = Wheel base of the tractor (feet).
L_2 = Length of the stinger measured from the middle of the tractor rear duals to the end of the stinger (feet).
L_3 = Bunk to bunk distance minus the length of the stinger (feet).

Curve widening tapers should be straight lined before the point of curvature (PC) and after the point of tangency (PT) for the following lengths:

Radius (R)(feet)	Taper Length (feet)
Less than 70	60
70-85	50
86-100	40
Greater than 100	30

When designing roads with reverse or compound curves or curves separated by short tangents (tangents shorter than the curve widening transition length), give particular attention to ensuring that adequate curve widening is provided.

Based on limited initial studies on reverse curves, minimum lane width at the point of reverse curvature should be:

12 feet (optional 10 feet for TSL “D” roads)
+ 2/3 (curve widening for the first curve)
+ 2/3 (curve widening for the second curve)

For compound curves, curve widening should be calculated using the total of the deflection angles of both curves. The curve widening at the point of compound curvature (PCC) should be the greater of the indicated curve widening for the two adjacent curves.

Appendix D

Biological Assesment And USFWS Concurrence

BIOLOGICAL ASSESSMENT

For

THREATENED, ENDANGERED, AND PROPOSED SPECIES

Black Ant Salvage

Lewis & Clark National Forest

Prepared by:

Gary Hanvey, Project Wildlife Biologist — 7/29/02 Date

Reviewed by:

Don Godtel, Forest Biologist — 8/02/2002 Date

BIOLOGICAL ASSESSMENT

BLACK ANT SALVAGE

LEWIS & CLARK NATIONAL FOREST

SUMMARY OF FINDINGS

Threatened, Endangered, and Proposed Species

Implementation of the proposed federal action will have **no effect** on the **endangered gray wolf, threatened bald eagle, threatened Water Howellia, threatened Spalding's catchfly, or proposed mountain plover** since these species or habitat for these species does not occur within the influence zones of proposed activities.

Based on the analysis conducted in this Biological Assessment, implementation of the proposed federal action **may affect, but would not be likely to adversely affect the threatened Canada lynx** or its habitat.

Consultation Requirements for Threatened, Endangered, and Proposed Species

In accordance with the Endangered Species Act and its implementing regulations and FSM 2671.4, the Lewis and Clark National Forest is required to request written concurrence from the U.S. Fish and Wildlife Service (USFWS) with respect to the determination of potential effects on the Canada lynx.

Need for Reassessment Based on Changed Conditions

The findings of this Biological Assessment are based on the best data and scientific information available at the time of preparation. If new information reveals effects that may impact threatened, endangered, proposed, or sensitive species or their habitats in a manner or to an extent not considered in this evaluation; if the proposed action is subsequently modified in a manner that causes an effect that was not considered in this assessment; or if a new species is listed or habitat identified that may be affected by the action, a revised biological assessment should be prepared.

INTRODUCTION

This Biological Assessment addresses the potential effects of the proposed federal action on all threatened, endangered, and proposed species known or suspected to occur within the area of influence of the proposed action. This evaluation also considers the cumulative effects of other projects that will occur within the area of influence during the same time period. General life history information on addressed species is provided in Reel et al. (1989) and is incorporated by reference into this Biological Assessment.

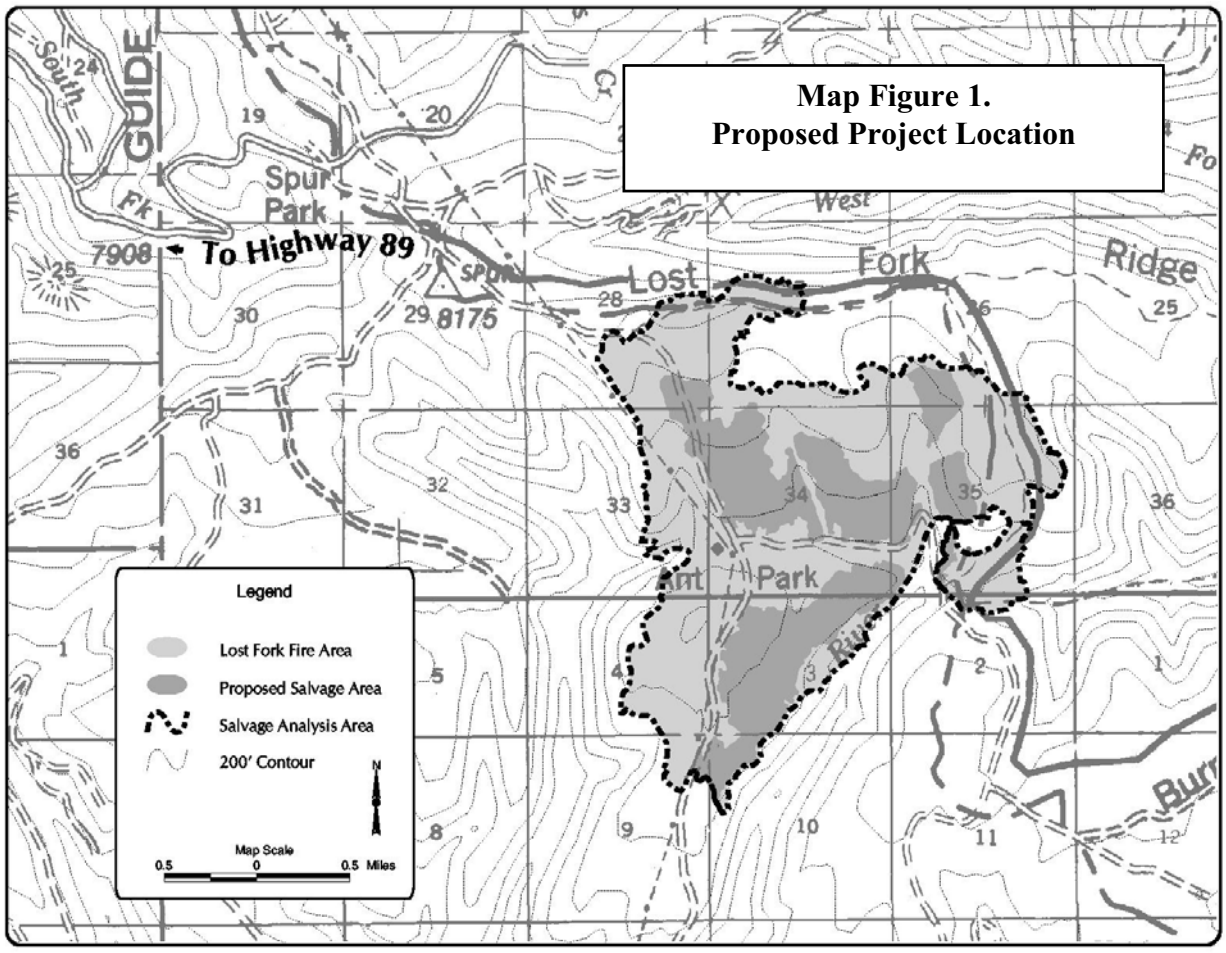
Threatened, endangered, and proposed species are managed under the authority of the Federal Endangered Species Act (PL 93-205, as amended) and the National Forest Management Act (PL 94-588). The Endangered Species Act requires federal agencies to ensure that all actions which they "authorize, fund, or carry out" are not likely to jeopardize the continued existence of any threatened, endangered, or proposed species. For proposed species, federal agencies are required to confer with the U.S. Fish and Wildlife Service (USFWS) on any actions which are "likely to jeopardize the continued existence of any species that is proposed to be listed… or which results in the destruction or adverse modification of critical habitat proposed to be designated for such species" (50 CFR 402.10). Agencies are further required to develop and carry out conservation programs for these species. Conservation measures implemented to date for threatened, endangered, proposed, and sensitive species by the Lewis and Clark National Forest are on file at the Supervisor's Office.

Description of the Proposed Action

The proposed federal action is salvage of dead trees killed in the Lost Fork Wildfire of 2001, and is described in Alternative 3 of the Black Ant Salvage Final EIS. The project is located in the headwaters of the North Fork Musselshell in the Little Belt Mountain Range approximately 20 miles northeast of White Sulphur Springs, Montana. Figure 1 below displays the general location of the project. The Lost Fork Wildfire burned during August when temperatures were high and fuel moistures low. Thus, the fire was of high intensity and resulted in a stand-replacement fire that killed almost all trees within the 2,323 acre fire boundary perimeter. Most all of the shrub, grass, and forb component on the forest floor (as well as the coarse woody debris component) was totally consumed, resulting in 2,168 acres of "black" landscape dominated by snags. Three small patches 77, 63, and 15 acres in size were not burned, and remain as "green islands" within the fire perimeter.

This proposal would harvest approximately 3.5 mmbf of dead timber using ground based logging systems from a total of six units totaling approximately 739 acres. The stands that burned in the wildfire (and that are proposed for harvest) consist of mixed conifers, which include lodgepole pine, Douglas-fir, subalpine fir, Engelmann spruce, limber pine, and whitebark pine. This proposal would salvage harvest approximately 50 percent of the existing dead component, and most trees remaining post-harvest would be subalpine fir, limber pine, and whitebark pine; limited amounts of lodgepole pine and Engelmann spruce in the smaller size classes that no longer have commercial value would also be left.

No new roads are proposed for construction in this alternative. However, road blading and light reconstruction would occur on approximately 1.2 miles of existing road within the immediate sale area. Two haul routes have been proposed for hauling logs from the sale area: Forest Route 487 (Deadman Road) may require minor blading, but Forest Route 47 (Jamison Road) would require periodic right-of-way widening and minor reconstruction work over a distance of approximately 2 miles. Timber harvest activities would occur during two consecutive winter logging seasons when the ground is frozen to a depth of 4 inches or more, or covered by a minimum of 12 inches of snow. Any required post-sale road maintenance or slash piling would



likely occur during summer months following completion of winter logging activities.

Species List

The USFWS published an updated Notice of Review of plant, animal, and fish taxa that are candidates for listing as threatened or endangered in the February 28, 1996, Federal Register (61 FR 7596). Beginning with that notice, the Service will recognize as candidates only those species for which the Service has sufficient information on biological status and potential threats to propose listing as threatened or endangered under the Endangered Species Act.

Formerly, such species were considered Category 1 candidate species. The status of such species within the project area will be included in this assessment.

The U.S. Fish & Wildlife Service (USFWS) provided the most recent updated list of threatened, endangered, candidate, and proposed animal, fish and plant species in the state of Montana to the Lewis and Clark National Forest on April 21, 2001. Based on that list and the most recent website updates (USFWS T&E Web Page, updated 9/07/2001), Table 1 below displays the status of those listed species for which habitat is provided on the Jefferson Division of the Lewis and Clark National Forest. Only those species whose potential distribution includes the area of influence of the proposed action are addressed in detail in this Biological Assessment.

Table 1. Status of Montana threatened, endangered, proposed and candidate species known or suspected to occur on the Jefferson Division of the Lewis and Clark National Forest.

Threatened, Endangered, and Proposed Species			
Listed Status	**Common Name**	**Scientific Name**	**Status in Project Area**
Endangered	Gray Wolf	*Canis lupus*	Not Suspected **NS /1**
Threatened	Bald Eagle	*Haliaetus leucocephalus*	Not Suspected **NS /2**
	Canada lynx	*Lynx canadensis*	Suspected
Proposed	Mountain Plover	*Charadrius montanus*	Not Suspected **NS /3**

The Grizzly Bear, Water Howellia, and Spalding's Catchfly are also considered threatened species on the Lewis and Clark National Forest. However these species or habitat for these species are not known to occur within the Jefferson Division of the Lewis and Clark National Forest, and would not be affected by the proposed project.

NS /1 The Little Belt Mountains are part of the Yellowstone National Park (YNP) experimental population area for released gray wolves. Although wolves have not been released in or near the Little Belt Mountains, they are expected to expand from YNP release sites eventually reaching areas like the project area. These wolves are classified as "nonessential experimental wolves" under section 10(j) of the Endangered Species Act (ESA) of 1973, as amended. Section 10(j) of ESA states that "nonessential experimental animals are not subject to formal consultation of the Act unless they occur on land designated as a national wildlife refuge or national park" (50 CFR Part 17, Fed. Reg. Vol 59, No 224). According to section 7 of ESA, nonessential experimental wolves found outside of national wildlife refuges and national park lands will be treated as if they were only proposed for listing (50 CFR Part 17, Fed. Reg. Vol. 59, No 224). Under section 7, Federal agencies are required to establish conservation programs for the particular species and to informally confer with USFWS on actions that will likely jeopardize the continued existence of the proposed species to be listed as threatened or endangered (50 CFR Part 17, Fed. Reg. Vol 59, No 224). No resident gray wolves have been documented in the Little Belt Mountains. However, individual wolves are believed to periodically "pass through" the mountain range. Although wolves from the experimental population or from natural populations may eventually occupy the Little Belt Mountains, no populations are known to occur at this time.

The wolf prey base and ungulate habitat would not be negatively impacted by the proposed action, and would not preclude future wolf occupation. Therefore, the proposed project would have **no effect on the gray wolf or its habitat**. This species will not be further discussed.

NS /2 There are no known historic or currently occupied nest stands, nesting territories, or winter roost sites within or immediately adjacent to stands within the proposed project area. Typical foraging habitat such as lakes, large ponds, and rivers do not occur in the immediate vicinity of the project area. Review of raptor observation records for a ten year period indicate bald eagles have not been found in the project areas during the proposed period of operation., and proposed harvest activities would not impact nesting, roosting or foraging habitat for the northern bald eagle. Therefore, the proposed project would have **no effect on the bald eagle or its habitat** and this species will not be further addressed.

NS /3 The Mountain plover occupies short-grass prairie habitats, and favored areas include those which have been heavily grazed by livestock. Mountain plover are known to occupy short-grass benchlands near the southern borders of the Little Belt and Snowy Mountains from Haymaker to Cameron Creeks (Knowles and Knowles 1993). No suitable habitat is present in the Little Belt Mountains or the project area. Thus, implementation of the proposed action would have **no effect on the mountain plover or its habitat**, and this species will not be further discussed.

AFFECTS ASSESSMENT

Canada Lynx

Population and Habitat Status – Existing Condition

The Canada lynx is commonly associated with the boreal forests of Alaska and Canada, but is also found among the isolated spruce, subalpine fir, and lodgepole pine forests in the mountains of the West (Koehler and Brittel 1990). Ruggiero (2000) and many others have characterized suitable lynx habitat in the U.S. as boreal and montane forests at higher elevations within their range. Lynx habitat in Montana east of the divide occurs at 5,500 to 8,000 feet elevation; subalpine fir forest types are considered the primary vegetation, and intermixed Engelmann spruce and moist Douglas-fir habitat types where lodgepole pine is a major seral species are considered secondary vegetation types (Ruediger et al. 2000). Both types are considered suitable habitat for lynx. In the Little Belt Mountain Range of eastern Montana, lynx are believed to inhabit mixed stands of subalpine fir, lodgepole pine, Engelmann spruce, Douglas-fir and whitebark pine at elevations exceeding 6,000 feet.

Lynx prey primarily on snowshoe hares, but at times are known to feed on a variety of other species like voles, mice, red squirrels, northern flying squirrels, grouse, and occasionally other carnivores (Ruggerio et al. 2000; Brand and Keith 1979; Nellis et al. 1972). In the only published food habits study of lynx conducted in the western U.S. mountains, Koehler (1990) found that tree squirrels represented 24 percent of the food items found in 29 scats in his study area in north-central Washington.

The lynx has characteristically long legs and large feet, which allows them to utilize high elevation habitats where deep snow persists much of the winter. This adaptation provides lynx with a competitive wintertime advantage over other small carnivores such as bobcats, mountain lions, and coyotes that also prey on snowshoe hare. The best lynx habitat in the lower 48 states is most likely closely tied to good snowshoe hare habitat (Ruggiero et al. 2000; Ruediger et al. 2000), and management activities that benefit hares should in most cases benefit lynx.

In the Little Belt Mountains, the highest snowshoe hare densities appear to be associated with dense stands of 15 to 50 year old lodgepole pine/Engelmann spruce/subalpine fir stands in newly established forests (clearcuts or stand replacing wildfires) or in open canopied mature forests where dense stands of subalpine fir/lodgepole pine/Engelmann spruce saplings dominate the under-story.

Mature and old growth spruce and alpine fir forest types, which provide large amounts of large woody debris on the forest floor, are most preferred by lynx as denning habitat. Large amounts of woody debris in the form of large hollow logs or "jack-strawed" deadfalls provide natal and maternal denning sites and cover for kittens when they are most vulnerable to predation. Scientists at the Rocky Mountain Research Station near Seeley Lake, Montana have documented natal den sites in "dense and tangled" patches of woody debris covering areas as small as 1 hectare (Squires, personal communication). Contiguous, coniferous or deciduous vegetation greater than six feet in height and dense enough to hide a lynx is considered suitable travel cover (Ruediger et al. 2000). Travel cover is considered an important component of lynx habitat considering their relatively large home range and movement patterns between special habitats (denning and forage habitats). Lynx tend to avoid large openings and generally do not cross openings wider than 300 feet (Ruggerio et al. 1994).

Documented home range sizes vary dramatically with variation occurring between the sexes, and also between seasons, and apparently correlate strongly with prey base density and other variables associated with habitat quality. Brainerd (1985) radio-collared seven lynx in western Montana and measured mean annual home ranges of 48 square miles for males, and 16 square miles for females.

Verified lynx occurrence records (trapping records, museum specimens, etc…) indicate lynx historically occurred within the Little Belt Mountain Range (Ruggerio et al. 2000). Montana Fish, Wildlife and Park's records indicate that the last legally trapped lynx in the Little Belts occurred in 1980 and 1981, when three individuals were taken. However, and as is the case with many occurrence data in the lower 48 states, researchers are currently unsure if these data represent the presence of persistent populations, or if they are simply immigrating individuals from known populations in northwestern Montana, Canada, or Alaska (*Ibid.*).

Furbearer snow track surveys conducted by U.S. Forest Service and Montana Fish, Wildlife and Park's biologists in various locations within the Little Belt Mountain Range since 1994 have found three separate track sets believed to be that of lynx. One of those was recorded in April 2001 and located near Hoover Mountain just south of the project area. Biologists on the Lewis and Clark National Forest have been participating in a National Lynx Survey project the past three years that includes the Little Belt Mountain Range.

The survey method, referred to as "hair snagging," is a technique which utilizes hair snares to capture hair from carnivores enticed by scent lures to detection stations, and DNA testing to validate their visits. Surveys in the Little Belts are a part of the National Lynx Survey effort to find any remaining lynx populations in the lower 48 states using a survey protocol developed by McKelvey et al. (1999) at the U.S. Forest Service Rocky Mountain Research Station. The Little Belts' hair snagging survey covers approximately 64,000 acres of contiguous lynx habitat, which includes the proposed project and surrounding area. DNA results indicate that no lynx were found in the Little Belts during the 1999 or 2000 survey; results of the 2001 survey have not yet been received from the Carnivore Genetics Lab. A Forest Bio-Tech conducting this survey reported visually sighting what he thought was a lynx in September of 2001; this observation occurred within approximately one mile southeast of the project area. However, this visual observation (as well as the snow track observations mentioned earlier) lacks positive validation, and it is therefore uncertain if lynx individuals occur anywhere within the Little Belt Mountain Range at the present time. If lynx do exist in the Little Belts, they likely occur at very low densities.

Even before the Canada lynx was listed as a threatened species under the Endangered Species Act in 2000, the US Forest Service, Bureau of Land Management, and U.S. Fish and Wildlife Service began the process of cooperatively developing a conservation strategy for the lynx. In August of 2000 the Canada Lynx Conservation Assessment and Strategy was completed (Ruediger et al. 2000), and provides guidance for lynx management on U.S. Forest Service and Bureau of Land Management administered lands. Using habitat-modeling guidelines provided in the Canada Lynx Conservation Assessment and Strategy, lynx habitat within the Little Belts has been modeled and mapped, and further subdivided into Lynx Analysis Units based on 6th code watershed boundaries. Modeling parameters are on file at the Lewis and Clark National Forest Supervisor's office. Per the Canada Lynx Conservation Assessment and Strategy (page 6-2), Lynx Analysis Units should approximate the size of a female's annual home range, and encompass all seasonal habitats; they are intended to provide analysis units of the appropriate scale with which to assess potential direct and indirect effects of projects or activities on individual lynx, and to monitor habitat changes. Although the proposed action would only occur within Lynx Analysis Unit LB16, Lynx Analysis Unit LB17 is immediately adjacent to proposed units, and habitat conditions in LB17 will be included in this analysis when appropriate.

The entire burned area is located within portions of LB16 and LB17, and prior to the fire provided lynx habitat suitable for denning (782 acres) and forage/travel (1,130 acres); the remaining 411 acres were parks and conifer forest types not suitable as lynx habitat (referred to as non-habitat in the model). The Lost Fork Fire was a stand replacing event that killed almost all trees within the fire boundary perimeter; most all of the shrub, grass, forb, and coarse woody debris components on the forest were totally consumed. Thus, the area burned now provides no cover for lynx or snowshoe hare, and is considered unsuitable habitat. The three small patches or "green islands" within the fire perimeter that did not burn (77, 63, and 15 acres in size) remain suitable for lynx in the form of denning habitat (85 acres) and travel/forage habitat (70 acres).

Within the cumulative effects area defined by LB16 and LB17 (See Map Figure 2), past timber harvest and wildfires have altered habitat suitability for lynx. As a result of past timber harvest, 673 acres of lynx habitat within LB16 and 86 acres within LB17 are considered openings not

currently suitable for lynx.

Cumulatively, past wildfires within each Lynx Analysis Unit, including the Lost Fork Fire, intensely burned 2,396 acres of previously suitable habitat in LB16 and 9,138 acres in LB17, have not regenerated well enough to provide cover for the lynx, and are currently considered unsuitable cover types.

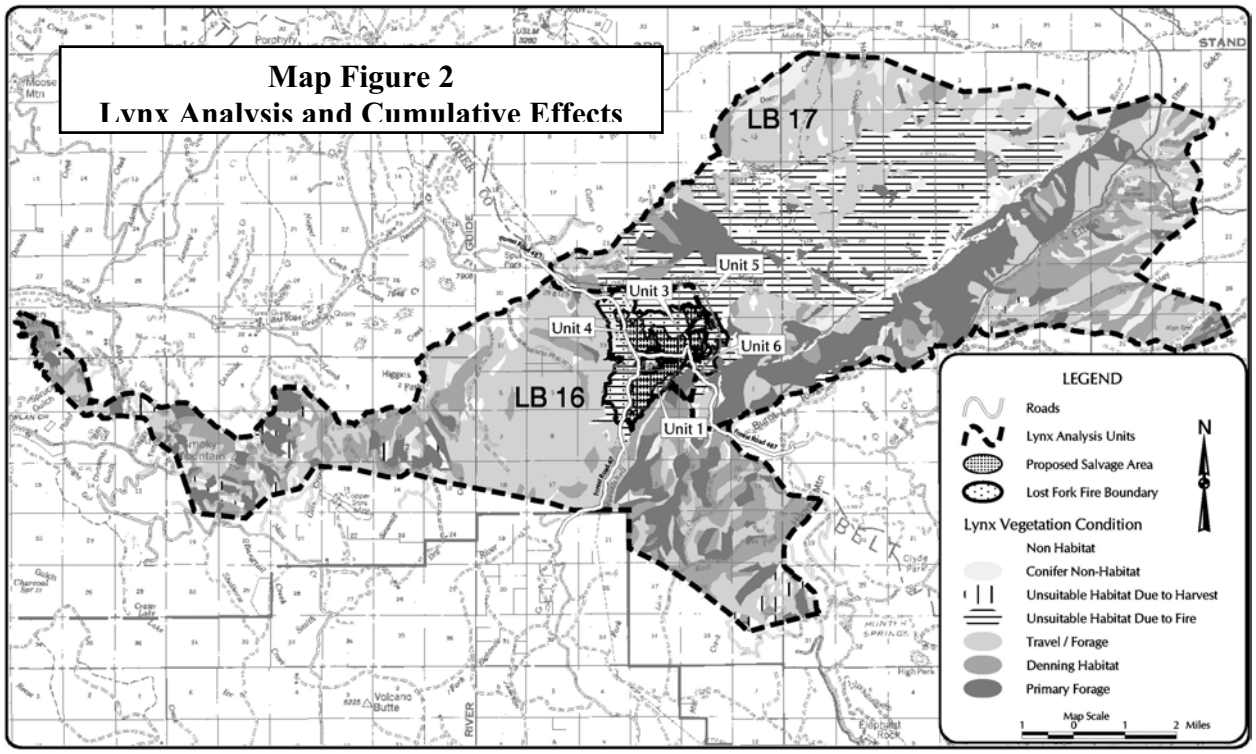
Existing habitat conditions for lynx within affected Lynx Analysis Units were modeled per guidelines provided in the Canada Lynx Conservation Assessment and Strategy, are summarized in Table 2, and reflect the cumulative habitat conditions for lynx within each affected Lynx Analysis Unit.

TABLE 2. Existing Lynx Habitat Conditions by Lynx Analysis Unit

LAU Name [1]	Non-Habitat [2]	Potential Habitat [3]	Unsuitable Due To Timber Harvest [4]	Unsuitable Due To Wildfires [5]	Total Potential Suitable [6]	Potential Suitable Denning [7]	Potential Suitable Forage [8]	Potential Suitable Travel [9]
LB16 24,035 Ac.	1,745 Ac. 7.3%	22,290 Ac. 92.7%	673 Ac. 3%	2,396 Ac. 11%	19,221 Ac. 86.2%	5,388 Ac. 24.2%	3,360 Ac. 15.1 %	10,437 Ac. 46.8%
LB17 34,777 Ac.	4,892 Ac. 14.1%	29,885 Ac. 85.9%	86 Ac. 0.3%	9,138 Ac. 30.1%	20,677 Ac. 69.2%	4,228 Ac. 14.1%	6,121 Ac. 20.5%	10,328 Ac. 34%

1. Total Lynx Analysis Unit area.
2. Non-lynx habitat within the Lynx Analysis Unit (unsuitable conifer types, parks, meadows, lakes and private lands).
3. Potential suitable habitat within the Lynx Analysis Unit less non-lynx habitat and private lands.
4. Potential suitable habitat within the Lynx Analysis Unit currently in an unsuitable condition due to past timber harvests.
5. Potential suitable habitat within the Lynx Analysis Unit currently in an unsuitable condition due to recent wildfires.
6. Total potential lynx habitat within the Lynx Analysis Unit currently in suitable condition for lynx.
7. Potential habitat currently suitable for denning.
8. Potential habitat currently suitable for forage.
9. Potential habitat currently suitable for travel.

Habitat cover types well distributed within each Lynx Analysis Unit are highly desirable. As shown in Map Figure 2 (Cumulative Effects Analysis Area for lynx), habitat distribution in LB17 has been impacted by past wildfires – recent wildfires in this Lynx Analysis Unit burned a large and relatively contiguous block of suitable habitat within the core of the Lynx Analysis Unit. These fire areas have not yet regenerated, and do not currently facilitate north/south movement (travel corridors) across the width of the Lynx Analysis Unit. This condition would be expected to change within the next 15-30 years, however, as conifers grow to provide cover and forage habitat for snowshoe hare and lynx. Since these wildfires were not salvage logged, large quantities of snags (standing and down) occur throughout, and should provide high quality denning habitat in 30 to 50 years.



The Canada Lynx Conservation Assessment and Strategy provides programmatic and project planning standards for analyzing effects of planned and ongoing projects on lynx and lynx habitat. Standards applicable to the proposed project include: 1) If more than 30 percent of lynx habitat within a Lynx Analysis Unit is currently in unsuitable condition, no further reduction of suitable condition shall occur as a result of vegetation management activities by federal agencies; 2) Management actions (e.g., timber sales, salvage sales) shall not change more than 15 percent of lynx habitat within a Lynx Analysis Unit to an unsuitable condition within a 10 year period; 3) Maintain denning habitat in patches generally larger than 5 acres, comprising at least 10 percent of lynx habitat; and 4) Do not allow livestock use in openings created by fire or timber harvest that would delay successful regeneration of the shrub and tree components.

As shown in Table 3, lynx habitat conditions in LB16 and LB17 currently meet applicable Canada Lynx Conservation Assessment and Strategy standards with the exception of the 30 percent suitability standard in LB17, which is the result of recent existing wildfires that have not yet regenerated.

Table 3. Canada Lynx Conservation Assessment and Strategy Standards And Existing Condition of Lynx Habitat in LB16 and LB17.

LAU	CLCAS Standard	Existing Condition	Meets Standard?
LB16	No more than 15% management change due to timber harvest in last 10 year period	3%	Yes
LB16	Maintain at least 10% denning habitat	24.2%	Yes
LB16	No more than 30% in unsuitable condition	13.8%	Yes
LB16	Grazing in newly established openings	No	Yes
LB17	No more than 15% management change due to timber harvest in last 10 year period	0.3%	Yes
LB17	Maintain at least 10% denning habitat	14.1%	Yes
LB17	No more than 30% in unsuitable condition	30.8%	No
LB17	Grazing in newly established openings	No	Yes

Two major forest system roads (Forest Road 47 and Forest Road 487) intersect the center of the analysis area, and provide good access for big game hunting, camping, firewood cutting, and other miscellaneous recreation opportunities. Disturbances associated with these activities would not be expected to directly influence lynx habitat use. However, these routes (and two other non-system roads off of Forest Road 467 leading to Lost Fork Ridge to the north) are groomed by local snowmobile clubs, and receive considerable use by snowmobile enthusiasts during winter. Compacted snowmobile trails can provide access for competing predators (bobcats, coyotes, and lions) into higher elevation habitats where lynx currently have a competitive advantage for the same prey base, and may expose lynx to increased predation risk (Ruediger et al. 2000). Although the trapping of lynx is not legal in Montana, these routes also provide access for trapping of other species, and could increase incidentally lynx mortality risk.

Environmental Consequences

Analysis of Direct and Indirect Effects

Implementation of the proposed action would not be expected to significantly change existing lynx cover type conditions, nor would implementation be expected to significantly effect natural regeneration processes (reestablishment of native conifers and shrubs) in the longer term. The area burned by the Lost Fork Fire (including the proposed harvest units) currently provides no cover for lynx or snowshoe hare, and is considered habitat in an unsuitable condition for lynx. The Lost Fork Fire burn area (including the proposed harvest units) would be expected to re-generate with shrubs and new conifers (lodgepole pine, Engelmann spruce, subalpine fir, limber pine, and whitebark pine) within 15 to 30 years and provide approximately 1,900 acres of suitable foraging habitat for both snowshoe hares and lynx that currently is not available. The project silviculturist estimates that approximately 60 percent of the land area proposed for salvage harvest would be expected to regenerate with some amount of lodgepole pine whether logged or not. The three small patches or "green islands" within the fire perimeter that did not burn (77, 63, and 15 acres in size) are not proposed for harvest, and would remain suitable for lynx in the form of denning habitat (85 acres) and travel/forage habitat (70 acres).

Although only 40 to 50 percent of the standing snags within the 739 acres of salvage affected area are expected to be logged in this proposal, the residual stand of snags remaining within harvest units, in conjunction with the coarse woody debris target set by the Black Ant Salvage interdisciplinary team (7 to 15 tons per acre of 3+ inch woody debris) would not likely result in enough coarse woody debris to meet denning needs of the lynx in the long term. Although denning areas need not cover large areas, documented den sites occur in very "dense and tangled patches" (Squires, personal communication). To mitigate impacts on denning habitat due to logging, the interdisciplinary team incorporated the retention of "leave patches" within the largest of harvest units (units 1, 3, and 4). One "leave patch" per unit, approximately three acres in size, would be left near the center of the unit to provide natal denning opportunities for lynx. An additional patch in Unit 1, approximately 10 acres in size, would be left between existing green timber "islands" that did not burn in the fire. Research done by Squires (personal communication) on the Lolo National Forest indicates that lynx will take advantage of these denning sites if they are located within or close to good forage habitat; as described above, the

fire affected area (including harvest units) would be expected to provide good forage habitat for snowshoe hare in 15 to 30 years post harvest.

Timber stands burned by the Lost Fork Wildfire not proposed for harvest (approximately 1,160 acres) would provide significant denning opportunities for lynx in the long term as existing snags fall to the ground. As much as 97 percent of existing snags would be expected on the forest floor in 29 years or less (Gilbert 2000). Regenerated stands of subalpine fir/Engelmann spruce/lodgepole pine would also be expected to provide good habitat for snowshoe hare in 15 to 30 years, and would increase denning values for lynx even more; denning opportunities located within or adjacent to productive lynx foraging areas are highly desirable by females with kittens.

Although lynx are not currently known to occupy habitats within the influence zone of the proposed project, and although the fire affected area does not presently provide suitable habitat for this species, it is possible that dispersing individuals could use the project area as a travel corridor and could be directly impacted during harvest activities. However, direct, consequential effects are not likely since there is currently no evidence that lynx are significantly impacted by human disturbances.

As described in the existing condition, Forest Road 47, Forest Road 487, and two other non-system roads leading to Lost Fork Ridge on the north periphery of the project area are groomed by local snowmobile clubs, and receive considerable use by snowmobile enthusiasts during winter. These compacted routes currently provide access for competing predators (bobcats, coyotes, and lions) into higher elevation habitats where lynx currently have a competitive advantage for the same prey base, and may expose lynx to increased predation risk (Ruediger et al. 2000). These routes also provide access for trapping of other species, and could increase lynx mortality risk incidentally. Although no new roads would be constructed in this proposal that could result in an increase in compacted snowmobile trails over existing conditions, this project would occur during winter and would result in new snow-compacted trails as a result of log skidding. Therefore, an increased risk of predation by other carnivores, increased opportunities for competition with competing carnivores for the same prey base, and an increased mortality risk as a result of better access for trappers are all possible during the two year activity period. However, these impacts would likely be negligible and insignificant because groomed snowmobile access for competing predators and trappers is already being provided as described above, and because lynx are not likely to use the 2,323 acre fire affected area in its current vegetative condition.

Cumulative Effects

Cumulative effects associated with past management activities and events that altered vegetative lynx cover types (timber harvest and wildfires – including the Lost Fork Wildfire) were discussed in the Existing Conditions section for lynx above, and were included in the existing condition cover type calculations for the Lynx Analysis and Cumulative Effects Areas of LB16 and LB17 as shown in Table 2 and displayed in Map Figure 2.

One foreseeable activity not connected to this proposed action is hand tree planting on 300 acres burned in the Lost Fork Fire with lodgepole pine seedlings (300 trees per acre). This foreseeable

action would occur regardless of whether or not the proposed action is implemented, and would result in a slightly higher density of lodgepole pine and higher forage habitat quality for the snowshoe hare and lynx.

The project area is within an existing sheep grazing allotment. Although this allotment is currently vacant, it is still considered active, and a grazing permit could be issued. Sheep grazing in newly established openings created by fire or timber harvest could effect establishment and density of shrubs and conifers important to snowshoe hares, and could impact the reestablishment of effective foraging and travel habitat for lynx. Sheep tend to "herd up and camp" when foraging, and could adversely impact the establishment of naturally regenerating forbs, shrubs, and conifers within the fire affected project area, especially during the first five years post-fire (Monson, personal communication). However, a protection measure was added to this proposed project that would postpone grazing within the analysis area until after regeneration becomes reestablished. This action would be accomplished through the Annual Operating Instructions for permits, and the need for fencing would not be anticipated. Therefore, no adverse cumulative effects due to grazing are anticipated within planned harvest units or within the fire affected area.

No additional and reasonably foreseeable future management activities that might affect lynx or lynx habitat cover types are known for the analysis area or anywhere within LB16 or LB17. Therefore, implementing the proposed action, in conjunction with all known past, present and future cumulative actions, would not significantly change existing conditions for lynx or change existing lynx cover type conditions displayed in Table 2 and Map Figure 2.

Consistency With Canada Lynx Conservation Assessment and Strategy Planning Standards

As was discussed in the Existing Conditions section for lynx, the Canada Lynx Conservation Assessment and Strategy provides programmatic and project planning standards for determining effects of planned and ongoing projects on lynx and lynx habitat. This section describes how the direct, indirect, and cumulative effects of project implementation relate to applicable planning standards.

Applicable timber management standards to the proposed project include: 1) If more than 30 percent of lynx habitat within a Lynx Analysis Unit is currently in unsuitable condition, no further reduction of suitable condition shall occur as a result of vegetation management activities by federal agencies; 2) Management actions (e.g., timber sales, salvage sales) shall not change more than 15 percent of lynx habitat within a Lynx Analysis Unit to an unsuitable condition within a 10 year period; and 3) Following a disturbance, such as blow-down, fire, or insect mortality that could contribute to lynx denning habitat, do not salvage harvest when the affected area is smaller than 5 acres, and maintain denning habitat in patches generally larger than 5 acres, comprising at least 10 percent of lynx habitat. The direct, indirect, and cumulative effects analysis determined that no changes in vegetative cover types would occur as a result of project implementation. Thus, vegetation conditions (post harvest) in LB16 and LB17 would be the same as that described for the current, existing condition. As shown in Table 2, lynx habitat conditions in LB16 and LB17 currently meet applicable Canada Lynx Conservation Assessment

and Strategy timber management standards with the exception of the 30 percent suitability standard in LB17; this condition is the result of recent existing wildfires that have not yet regenerated. In addition, the proposed action would occur in LB16, and would not affect current conditions in LB17.

Additional, applicable standards are related to grazing and recreation management activities, and include: 1) Do not allow livestock use in openings created by fire or timber harvest that would delay successful regeneration of the shrub and tree components; and 2) Allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU (winter logging activity is not subject to this restriction). As described in the cumulative effects analysis, the grazing standard would be met since a protection measure was added to this proposed project that would postpone grazing within the analysis area until after regeneration becomes reestablished. The recreation standard would also be met since no new roads would be constructed, and no new groomed snowmobile routes would be created or designated. Skid trails could provide new play areas post harvest, but this standard allows an exception for winter logging activities.

Findings Statement for Lynx

Implementation of the proposed action **may affect, but would not be likely to adversely affect the threatened Canada lynx** or its habitat because: 1) no existing lynx cover types would be altered; 2) increased mortality risk associated with incidental trapping may be slightly increased, but would likely be negligible and insignificant since trapper access is already provided by existing Forest Roads 47 and 467; 3) during and immediately after timber harvest activities, slight increases in the total amount of compacted trails and snowmobile "play areas" are likely, but a significant increase in risk of predation by other carnivores and competition with competing carnivores for the same prey base is not likely since the harvest affected area does not currently provide suitable habitat for the lynx or its primary prey, the snowshoe hare; 4) applicable Canada Lynx Conservation Assessment and Strategy planning standards for managing lynx habitat would be met; and 5) denning habitat on approximately 720 acres of salvage harvested area would be adversely affected in the long term.

Potential Measures for Removing, Avoiding, or Compensating for Adverse Effects

The analysis performed in conjunction with this biological evaluation identified no significant adverse effects on the lynx or lynx habitat. No mitigation or compensation for adverse effects is required beyond those already identified in this document.

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PERSONAL COMMUNICATIONS

Squires, J. November 26, 2001. Lynx Research Scientist, Rocky Mountain Research Station, Forestry Science Laboratory, Missoula, MT.

Monson, K. January 04, 2002. Range Management Specialist, Lewis and Clark National Forest, White Sulphur Springs, MT.

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File:M19 Lewis and Clark National Forest (I) August 21, 2002

Rick Prausa, Forest Supervisor
Lewis and Clark National Forest
1101 15th Street North
P.O. Box 869
Great Falls, MT 59403-0869

Dear Mr Prausa:

This is in response to your August 6, 2002 request, received in this office on August 8, 2002, for U.S. Fish and Wildlife Service (Service) review of the biological assessment for federally listed threatened and endangered species regarding the effects of the proposed Black Ant Timber Salvage. The proposed project is located in the headwaters of the North Fork Musselshell in the Little Belt Mountain range approximately 20 miles NE of White Sulphur Springs, Montana. The action area is within the Jefferson Division of the Lewis & Clark National Forest.

The proposed action would involve salvaging dead trees killed in the Lost Fork Wildfire of 2001. The fire was of high intensity and resulted in a stand-replacement fire that killed almost all the trees within the 2,323 acre fire boundary perimeter. Most all of the shrub, grass and forb component on the forest floor was totally consumed resulting in 2,168 acres of "black" landscape dominated by snags. The proposal includes harvesting about 3.5 mmbf of dead timber, approximately 50% of the existing dead component, using ground based logging from six units totaling 739 acres. No new roads are proposed for construction, however, some blading and light reconstruction would occur. Harvest activities would occur during two consecutive winter logging seasons when the ground is frozen to a depth of four inches or more, or covered by 12 or more inches of snow.

The Service has reviewed the biological assessment and concurs with the determination that the proposed action is not likely to adversely affect the threatened Canada lynx (*Lynx canadensis*). The Service notes the no effect determination for the endangered gray wolf (*Canis lupus*) and the threatened bald eagle (*Haliaeetus leucocephalus*). Therefore, pursuant to 50 CFR 402.13 (a), formal consultation on the species referenced above is not required.

The Service bases its concurrence on the information and analyses in the biological assessment prepared by Gary Hanvey, Project Wildlife Biologist for the Lewis and Clark National Forest. Due to the stand-replacing fire, the harvest area does not currently provide suitable habitat for the lynx or its primary prey. Applicable planning standards from the Canada Lynx Conservation

Assessment and Strategy for managing lynx habitat would be met. If the final project design is changed so as to have effects on threatened or endangered species other than those described in the biological assessment, a revised biological assessment will be necessary. The Service will then issue a letter of concurrence/non-concurrence on the revised biological assessment.

We appreciate your efforts to ensure the conservation of threatened and endangered species as part of your responsibilities under the Endangered Species Act, as amended. If you have questions or comments related to this issue, please contact Katrina Dixon of my staff at 406-449-5225, extension 222.

Sincerely,

Lori H. Nordstrom

Lori Nordstrom
Acting Field Supervisor

Appendix E
Glossary

A

Active management: Management approach in which humans actively manipulate ecosystems through timber harvesting and thinning to improve forest health and to reduce fire hazard.

Activity fuels: All live and dead vegetation on the forest floor because of harvest, thinning, or similar management activities.

Aerial fuels: All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush.

Agency: Any federal, state, or county government organization participating with jurisdictional responsibilities.

Allowable sale quantity (ASQ): The quantity of timber that may be sold from an area covered by a land management plan during a period specified by the plan, usually expressed as the average annual allowable sale quantity.

Arterial roads: Classified roads that provide service to large land areas; arterial roads are usually developed and operated for long-term land and resource management purposes and constant service.

Aspect: Direction toward which a slope faces.

B

Backcountry: A generic term that refers to areas that are relatively unmodified and usually accessible only by foot, horse, watercraft, or off-highway vehicle (OHV).

Basal area: The cross-sectional area of all stems of a species or all stems in a stand measured at breast height (4.5 ft. or 1.37 m. above the ground) and expressed per unit area of land (e.g., 25 sq. ft. per acre).

Best management practices (BMPs): A practice or usually a combination of practices that are determined by a State or a designated planning agency to be the most effective and practicable means (including technological, economic, and institutional considerations) of controlling point and nonpoint source pollutants at levels compatible with environmental quality goals.

Biological diversity (biodiversity): The variety and abundance of species, their genetic composition, their communities, and the ecosystems and landscapes of which they are a part. As used in this document, biodiversity refers to native biological diversity; therefore, increases in species diversity resulting from the introduction of nonnative species would not constitute an increase in biodiversity.

Biological stronghold: An area that supports all major life-history forms of a species that were historically found within that area, with stable or increasing population numbers at levels not substantially diminished from their historical size or density.

Blow-up: A sudden increase in fire intensity or rate of spread strong enough to prevent direct control or to upset control plans. Blow-ups are often accompanied by violent convection and may have other characteristics of a fire storm. See Flare-up.

Brush: A collective term that refers to stands of vegetation dominated by shrubby, woody plants, or low growing trees, usually of a type undesirable for livestock or timber management.

Brush fire: A fire burning in vegetation that is predominantly shrubs, brush, and scrub growth.

Burning index: An estimate of the potential difficulty of fire containment as it relates to the flame length at the most rapidly spreading portion of a fire's perimeter.

C

Cable logging: The transport of logs from the stump to a landing and stationary yarder using winch-driven cables to which the logs are attached.

Cable yarding: The movement of felled trees or logs from the area where they are felled to the landing on a system composed of a cable suspended from spars and/or towers. The trees or logs may be either dragged across the ground or carried while suspended from the cable.

Carrying capacity: A measure used to signify the optimum use that the area can accommodate without having unacceptable degradation of resources or undesirable social interaction, in accordance with **specified standards usually found in the land and resource management plan.**

Chain: A unit of linear measurement equal to 66 feet.

Choker: A length of wire rope with attachments for encircling the end of a log to be yarded.

Class I air quality areas: National Forest System Wilderness areas, national parks, or national wildlife refuges greater than 5,000 acres in size, designated prior to the establishment of the Clean Air Act Amendments of 1977. Class I areas can also include lands designated by Tribes or States. These areas serve as benchmarks for monitoring changes in air quality over adjacent lands.

Classified roads: Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for motor vehicle access, such as State roads, County roads, privately owned roads, National Forest System roads, and roads authorized by the Forest Service that are intended for long-term use.

Clearcutting: Cutting essentially all trees in a given area, which produces a fully exposed microclimate for the development of a new age class. Regeneration can be from natural seeding, direct seeding, planted seedlings, or advance reproduction. See even-aged management.

Collector roads: Classified roads serving smaller land areas than arterial roads; collector roads collect traffic from local roads and usually connect to forest arterial roads or State and County highways. They are operated for either constant or intermittent service depending on land use and resource management objectives.

Commercial timber harvest: The removal of merchantable trees, portions of trees, and timber products from the National Forest System lands.

Commodity-purpose timber sale (commodity purpose timber harvest): A component of the Forest Service timber sale program that includes timber sales made primarily to supply timber in response to society's demand for wood.

Community: (a) A group of species of plants and/or animals living and interacting at a particular time and place. (b) A group of people residing in the same place and under the same government; spatially defined places such as towns.

Complex: Two or more individual incidents located in the same general area that are assigned to a single incident commander or unified command.

Composition: The numbers and kinds of plants and animals in an area.

Condition Class 1: Low risk from uncharacteristic wildfire effects – Fire regimes within this class are within the historical range of variability for fire frequency and intensity.

Condition Class 2: Moderate risk from uncharacteristic wildfire effects – Fire regimes are beginning to be altered since one or more wildfires have been suppressed allowing for forests to become noticeably denser especially with younger sapling trees.

Condition Class 3: High risk from uncharacteristic wildfire effects – The fire regimes in this condition class are significantly altered, having missed many natural fires. Forests that were once open and park-like are now densely stocked.

Confluence: The flowing together of two or more streams, rivers, etc., or their place of junction.

Connectivity: The arrangement of habitats that allows organisms and ecological processes to move across the landscape; patches of similar habitats are either close together or linked by corridors of appropriate vegetation. The opposite of fragmentation.

Contain a fire: A fuel break around the fire has been completed. This break may include natural barriers or manually and/or mechanically constructed line.

Contiguous: Used in a geographic sense, the term applies to situations where areas of land physically touch and share substantial common boundaries or have a common border of considerable length. The term is not intended to include 'point-to-point' touching or 'cornering,' or instances where only small portions of land areas touch. It is not intended to encompass or encourage creative mapping exercises that result in irregular shapes, such as narrow corridors and 'gerrymandered' roadless areas.

Control a fire: The complete extinguishment of a fire, including spot fires. Fireline has been strengthened so that flare-ups from within the perimeter of the fire will not break through this line.

Cooperating agency: An agency supplying assistance other than direct suppression, rescue, support, or service functions to the incident control effort; e.g., Red Cross, law enforcement agency, telephone company, etc.

Coppice method: Regeneration method in which all trees in the previous stand are cut, and the majority of regeneration is from sprouts and root suckers.

Creeping fire: Fire burning with a low flame and spreading slowly.

Criteria Air Pollutants: A group of common air pollutants (such as carbon monoxide, particulate matter, or ozone) regulated by the Environmental Protection Agency (EPA) on the basis of criteria (information on health and/or environmental effects of pollution). Criteria air pollutants are widely distributed across the country.

Crown fire (crowning): The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.

D

DBH: Diameter of the tree at breast height.

Dead fuels: Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

Deck: A stack of trees or logs.

Decommissioning: Demolition, dismantling, removal, obliteration, or disposal of a deteriorated or otherwise unneeded asset or component, including necessary cleanup work. This action eliminates the deferred maintenance needs for the fixed asset. Portions of an asset or component may remain if they do not cause problems or require maintenance.

Developed recreation: Activities that are consistent with the settings and experiences identified with the Roaded Natural (RN), Rural (R), and Urban (U) classes of the Recreation Opportunity Spectrum. These activities are usually associated with an area that has been improved or developed for recreation, such as campgrounds and picnic areas, scenic overlooks and interpretive sites, or visitor centers and resorts.

Dispersed recreation: Activities usually associated with backcountry and trails and are consistent with the settings and experiences identified with Primitive (P), Semi-Primitive Non-Motorized (SPNM), and Semi-Primitive Motorized (SPM) classes of the Recreation Opportunity Spectrum. Examples of these activities include hiking, snowmobiling, mountain biking, wilderness use, backpacking, horseback riding, and OHV use.

Disturbance: A natural or human event that causes a change in the existing condition of an ecological system.

Domestic water sources: Watersheds containing National Forest System lands that provide surface waters to facilities that treat and distribute water for domestic purposes. These purposes include normal household uses such as drinking, food preparation, bathing, washing clothes and dishes, watering lawns and gardens, and similar uses.

Dozer: Any tracked vehicle with a front-mounted blade used for exposing mineral soil.

Dozer line: Fire line constructed by the front blade of a dozer.

Drought index: A number representing net effect of evaporation, transpiration, and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

Duff: The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.

Dynamic equilibrium: A natural state of stream stability when channel features persist over time within a range of conditions. Dynamic equilibrium uses a series of self-correcting mechanisms that allow the ecosystem to control external stresses or disturbances, thereby maintaining a self-sustaining condition. For example, a stream is able to consistently transport its sediment load, both in size and type, associated with local deposition and scour.

E

Ecological sustainability: The maintenance or restoration of the composition, structure, and processes of ecosystems over time and space. This includes the diversity of plant and animal communities, and the productive capacity of ecological systems and species diversity, ecosystem diversity, disturbance processes, soil productivity, water quality and quantity, and air quality.

Ecosystem: An arrangement of organisms defined by the interactions and processes that occur between them. Ecosystems are often defined by their composition, function, and structure.

Ecosystem health: The degree to which ecological factors and their interactions are reasonably complete and functioning for continued resilience, productivity, and renewal of the ecosystem.

Edge effect: The influence of two communities on populations in their adjoining boundary zone or ecotone, affecting the composition and density of the populations in these bordering areas.

Endangered species: A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.

Endemic species: Plants or animals that occur naturally in a certain region and whose distribution is relatively limited to a particular locality. Endemism is the occurrence of endemic species in an area.

Energy Release Component (ERC): The computed total heat released per unit area (British thermal units per square foot) within the fire front at the head of a moving fire.

Environmental Assessment (EA): EAs were authorized by the National Environmental Policy Act (NEPA) of 1969. They are concise, analytical documents prepared with public participation that determine if an Environmental Impact Statement (EIS) is needed for a particular project or action. If an EA determines an EIS is not needed, the EA becomes the document allowing agency compliance with NEPA requirements.

Environmental Impact Statement (EIS): EISs were authorized by the National Environmental Policy Act (NEPA) of 1969. Prepared with public participation, they assist decision makers by providing information, analysis and an array of action alternatives, allowing managers to see the probable effects of decisions on the environment. Generally, EISs are written for large-scale actions or geographical areas.

Ephemeral stream: A stream lasting a very short time; short-lived.

Essentially roaded: Areas of National Forest System land where classified and temporary roads now exist.

Essentially unroaded: A combination National Forest System Wilderness and inventoried roadless areas.

Evapotranspiration: The transfer of moisture from the earth to the atmosphere by the evaporation of water and transpiration of plants.

Even-aged (silvicultural) management: The methods used to regenerate and maintain a stand with a single age class.

Exception: A specific circumstance where prohibited activity would be allowed within an inventoried roadless area that is otherwise subject to the prohibitions in the alternatives.

Exemption: A geographic area that is not subject to the prohibitions in the alternatives.

Existing mineral lease: A mineral lease that has been issued by the Department of the Interior and has not expired, terminated, or been relinquished**.**

Extreme fire behavior: "Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One of more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

F

Faller: A person who fells trees. Also called a sawyer or cutter.

Fine (light) fuels: Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Fire-adapted ecosystem: An arrangement of populations that have made long-term genetic changes in response to the presence of fire in the environment.

Fire behavior: The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire break: A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Fire frequency: How often fires occur within a given time period in a specified area.

Fire hazard: The overall potential for wildfire in a vegetated ecosystem, often expressed as a condition of fuels on the ground and the probability of ignition. To reduce the fire hazard in an area, managers must deal primarily with the fine fuels on the surface of the forest floor and with the smaller diameter trees growing in the understory of a forest that provide a ladder to the larger, dominant overstory trees.

Fire intensity: The rate at which fuel is consumed and heat is generated.

Fire-intolerant: Vegetation with characteristics that make it more susceptible to damage from fire, such as thin bark, shallow root systems, or a low-branching habit.

Fire load: The number and size of fires historically experienced on a specified unit over a specified period (usually one day) at a specified index of fire danger.

Fire perimeter: The entire outer edge or boundary of a fire.

Fire regime: The fire pattern across the landscape, characterized by occurrence, interval, and relative intensity. Fire regimes result from a unique combination of climate and vegetation and exist on a continuum from short-interval, low-intensity fires to long-interval, high-intensity fires.

Fire return interval: The average number of years between successive fires in a designated area.

Fire severity: Denotes the scale at which vegetation and a site are altered or disrupted by fire, from low to high. It is a combination of the degree of fire effects on vegetation and on soil properties.

Fire storm: Violent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface indrafts, near and beyond the perimeter, and sometimes by tornado-like whirls.

Fire suppression: The practice of controlling forest and rangeland fires in a safe, economical, and expedient fashion while meeting the natural resource objectives outlined in each national forest's or grassland's land management plan.

Fire-tolerant: Vegetation with characteristics that increase its resistance to fire, such as thick bark and high-branching habits.

Flame height: The average maximum vertical extension of flames at the leading edge of the fire front. Occasional flashes that rise above the general level of flames are not considered. This distance is less than the flame length if flames are tilted due to wind or slope.

Flame length: The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); an indicator of fire intensity.

Flare-up: Any sudden acceleration of fire spread or intensification of a fire. Unlike a blow-up, a flare-up lasts a relatively short time and does not radically change control plans.

Flash fuels: Fuels such as grass, leaves, draped pine needles, fern, tree moss and some kinds of slash, that ignite readily and are consumed rapidly when dry. Also called fine fuels.

Floodplain: A naturally flat plain along the course of a stream or river that is naturally subject to flooding.

Forb: A plant with a soft, rather than permanent woody stem, that is not a grass or grass-like plant.

Forest health: The perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigor, presence of unusual levels of insects or disease, and resilience to disturbance. Individual and cultural viewpoints, land management objectives, spatial and temporal scales, the relative health of the stands that make up the forest, and the appearance of the forest at a point which influences the perception and interpretation of forest health.

Forest road or trail: Any road or trail wholly or partly within, or adjacent to, and serving the National Forest System and which is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.

Forward: To haul a log from stump to collection point by a forwarder.

Forwarder: A self-propelled machine, usually self-loading, that transports logs by carrying them completely off the ground.

Fragmentation (habitat): The break-up of a large land area (such as a forest) into smaller patches isolated by areas converted to a different land type. The opposite of connectivity.

Fuels: Living and dead parts of trees and shrubs, organic material, and surface material that can readily burn in a wildfire.

Fuel bed: An array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also, commonly used to describe the fuel composition in natural settings.

Fuel loading: The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Fuel management: The practice of evaluating, planning, and executing the treatment of wildland fuel to control flammability and reduce the resistance to control.

Fuel model: Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuel moisture (fuel moisture content): The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.

Fuel reduction: Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

Fuel type: An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Fuels treatment: The rearrangement or disposal of fuels to reduce fire hazard or to accomplish other resource management objectives.

G

Gateway communities: Communities that are economically and socially interdependent on the associated public lands. Proximity to these lands contributes to the quality of life and sense of place for residents and visitors.

Ground-based logging: The dragging or carrying of trees or logs from the stump to the landing using various types of self-propelled machines (e.g., tractors, skidders, forwarders).

Ground fuel: All combustible materials below the surface litter, including duff, tree or shrub roots, punchy wood, peat, and sawdust, that normally support a glowing combustion without flame.

Group selection: An uneven-aged cutting method in which small groups of trees, usually no more than two acres in size, are removed to meet a predetermined goal of size distribution and tree species in the remaining stand.

H

Haines index: An atmospheric index used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire.

Hazard reduction: Any treatment of a hazard that reduces the threat of ignition and fire intensity or rate of spread.

Heavy fuels: Fuels of large diameter such as snags, logs, large limb wood, that ignite and are consumed more slowly than flash fuels.

Hiding cover: Cover that provides avenues of escape from predators and hunters.

Historic range of variability: The fluctuations of composition, structure, and function within stable ecosystems over time.

I

IMPLAN (Impact Analysis for Planning): The input-output model used by the USDA Forest Service to estimate economic effects by tracing the interrelationships between producers and consumers in an economy as measured by jobs and income.

Incident: A human-caused or natural occurrence, such as wildland fire, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Infrared detection: The use of heat sensing equipment, known as Infrared Scanners, for detection of heat sources that are not visually detectable by the normal surveillance methods of either ground or air patrols.

Inholding: A parcel of land in other ownership (State, private, other Federal agency) surrounded by National Forest System land.

Intermittent stream: A stream that stops or ceases for a time; alternately stopping and beginning.

Inventoried roadless area: Undeveloped areas typically exceeding 5,000 acres that met the minimum criteria for wilderness consideration under the Wilderness Act and that were inventoried during the Forest Service's Roadless Area Review and Evaluation (RARE II) process, subsequent assessments, or forest planning.

L

Ladder fuels: Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Landing: Any place where logs are laid after being yarded, awaiting subsequent handling, loading, and hauling.

Land use allocation: Site-specific management direction applied to National Forest System lands.

Landscape: An area of interacting and interconnected patterns of habitats (ecosystems) that are repeated because of the geology, landform, soil, climate, biota, and human influences throughout the area. A landscape is composed of watersheds and smaller ecosystems.

Landscape characteristics: The distribution and representation of ecoregions and elevation classes; the size of relatively large and intact habitat areas, and their adjacency to protected habitats; the effects of lands with protected or conservation status on landscape fragmentation; and the relationship between landscape and disturbance patterns.

Large fire: 1) For statistical purposes, a fire burning more than a specified area of land e.g., 300 acres. 2) A fire burning with a size and intensity such that its behavior is determined by interaction between its own convection column and weather conditions above the surface.

Light (fine) fuels: Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Lightning Activity Level (LAL): A number, on a scale of 1 to 6, that reflects frequency and character of cloud-to-ground lightning. The scale is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2).

Litter: Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Live fuels: Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.

Local roads: Classified roads that connect terminal activities (e.g., trail head, log landing, camping site) to collector and arterial roads. They are constructed to meet the access requirements of a specific resource activity rather than for travel efficiency. When not in use for the activity for which they were constructed, local roads may be used for other purposes. They are often closed to restrict motor use. The construction standards for these roads are determined by the requirements necessary for the specific resource activity.

M

Major watershed (sub-basins): Fourth-level Hydrologic Unit Codes (HUCs), as defined by the U. S. Geologic Survey. Formerly known as 'cataloging units.'

Manageable size: Geographic areas that the local official determines are of a shape and position within the landscape for reasonable achievement of the long-term conservation of roadless characteristics. For example, many long narrow strips or 'stringers' between two highly developed areas would usually not be considered manageable.

Management direction: A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.

Management indicator species: Species used to monitor the effects of management activities on viable populations of groups of similar species with the same or similar habitat requirements.

Management prescription: Management practices and intensity (frequency and duration) selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives.

Map unit: The individual parcels defined in the geographic information system (GIS) database. For reporting purposes, forests often group several map units into a single named inventoried roadless area.

Mechanical pre-treatment: Preparing a forest or shrubland for prescribed burning by using machinery such as bulldozers and rubber tire skidders to create a fuel bed where a prescribed fire can be ignited without undue risk of the fire escaping or killing the dominant trees on the site.

Mechanical transport: Any device for moving people or material in or over land, water, or air, having moving parts, that provides a mechanical advantage to the user, and that is powered by a living or nonliving power source. This includes, but is not limited to, sailboats, hang gliders, parachutes, bicycles, game carriers, carts, and wagons. It does not include wheelchairs when used as necessary medical appliances. It also does not include skis, snowshoes, rafts, canoes, sleds, travois, or similar primitive devices without moving parts.

Mechanized Falling: Falling of standing timber by a self-propelled mobile wheeled or tracked machine equipped with a shear or other powered cutting device.

Median: A value in an ordered set of quantities below and above which falls an equal number of quantities.

Mineral reserve: An estimate within specified accuracy limits of the valuable metal or mineral content of known deposits that may be produced under current economic conditions and with present technology.

Mineral resource: A concentration of naturally occurring solid, liquid, or gaseous material in or on the earth's crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible.

Mineral soil: Soil layers below the predominantly organic horizons; soil with little combustible material.

Motorized equipment: Machines that use a motor, engine, or other nonliving power sources. This includes, but is not limited to, chain saws, aircraft, snowmobiles, generators, motorboats, and motor vehicles. It does not include small battery or gas powered hand carried devices such as shavers, wristwatches, flashlights, cameras, stoves, or other similar small equipment.

Mosaic: A pattern of vegetation in which two or more kinds of communities are interspersed in patches, such as clumps of shrubs with grassland between.

N

National Ambient Air Quality Standards: Levels of pollutants above which detrimental effects on human health and welfare could occur.

National Environmental Policy Act (NEPA): NEPA is the basic national law for protection of the environment, passed by Congress in 1969. It sets policy and procedures for environmental protection, and authorizes Environmental Impact Statements and Environmental Assessments to be used as analytical tools to help federal managers make decisions.

National Forest System road: A classified forest road under the jurisdiction of the Forest Service. The term 'National Forest System road' is synonymous with the term 'Forest development road', as used in 23 U.S.C. 205.

Non-attainment areas: Geographic areas in which the level of a **criteria air pollutant** is higher than the level allowed by the federal standards. A single geographic area may have acceptable levels of one criterion air pollutant but unacceptable levels of one or more other criteria air pollutants; thus, an area can be both attainment and non-attainment at the same time.

Nonnative invasive species: Plant species that are introduced into an area in which they did not evolve, and in which they usually have few or no natural enemies to limit their reproduction and spread. These species can cause environmental harm by significantly changing ecosystem composition, structure, or processes, and can cause economic harm or harm to human health.

Noxious weeds: Plant species designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. These species are generally aggressive, difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and are nonnative, new, or uncommon to the United States.

O

Old-growth forest – **Old single story forest:** single canopy layer consisting of large or old trees. Understory trees are often absent, or present in randomly spaced patches. It generally consists of widely spaced, shade-intolerant species, such as ponderosa pine and western larch, and high frequency fire regimes. **Old multi-story forest:** a forest stand with moderate to high canopy closure—a multi-leveled and multi-species canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood; numerous large snags; and heavy accumulations of wood, including large logs on the ground.

1 Hour Fuels: 0 -.25" in size. The internal moisture content of these fuels will change within one hour after a change in surrounding air moisture (relative humidity).

10 Hour Fuels: .25 – 1" in size. The internal moisture content of these fuels will change ten hours after a change in surrounding air moisture.

100 Hour Fuels: 1 – 3" in size. The internal moisture content of these fuels will change one hundred hours after a change in surrounding air moisture.

P

Partial cutting: Removal of part of a stand of trees for purposes other than regenerating a new age class. Partial cutting is not a regeneration method.

Passive (natural) management: Management approach in which human intervention in an ecosystem is minimal, with natural processes such as fire and insect and disease infestations allowed to play out their 'natural' role. For fire management, this would mean allowing some lightning fires to burn or allowing only prescribed fires with burning prescriptions that mimicked the natural fire regime in size, intensity, and frequency.

Perennial stream: A stream lasting or continuing through the entire year.

Precommercial thinning: The removal of trees not for immediate financial return but to reduce stocking, to concentrate growth on the more desirable trees, or to accomplish some other resource objective such as fuel reduction.

Prescribed burning: The fire management technique of purposely igniting a fire in a vegetated ecosystem to restore forest health and to reduce fire hazard.

Prescribed fire: Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Prescribed Fire Plan (Burn Plan): This document provides the prescribed fire burn boss information needed to implement an individual prescribed fire project.

Prescription: A written statement defining goals and objectives and the actions or treatments needed to attain the goals and objectives. Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations. Prescriptions are written for discrete portions of National Forest System lands. A prescription can be resource specific (such as for prescribed fire or silviculture) or, in the case of management prescriptions, broad to attain multiple use goals and objectives.

Prevention: Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards.

Primitive (P): A definition used in the Recreation Opportunity Spectrum (ROS) to characterize an area that is essentially an unmodified natural environment of large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.

Proposed species: Any species that is proposed by the Fish and Wildlife Service or the National Marine Fisheries Service to be listed as threatened or endangered under the Endangered Species Act.

Public road: Any road or street under the jurisdiction of and maintained by a public authority and open to public travel.

R

RARE II roadless area (**Roadless Area Review and Evaluation):** Roadless areas on National Forest System lands that were inventoried by the Forest Service in 1979.

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Reburn: The burning of an area that has been previously burned but that contains flammable fuel that ignites when burning conditions are more favorable; an area that has reburned.

Refugia: Areas that have not been exposed to great environmental changes and disturbances undergone by the region as a whole. In this FEIS, refugia include inventoried roadless areas that are relatively free from human-caused disruptions and disturbances when compared to roaded areas; refugia provide conditions suitable for survival of species that may be declining elsewhere.

Regeneration method: A cutting procedure that results in a new age class of trees. Methods include clearcutting, seed tree, shelterwood, selection, and coppice.

Rehabilitation: The activities necessary to repair damage or disturbance caused by wildland fires or the fire suppression activity.

Relative Humidity (Rh): The ratio of the amount of moisture in the air, to the maximum amount of moisture that air would contain if it were saturated. The ratio of the actual vapor pressure to the saturated vapor pressure.

Resources: 1) Personnel, equipment, services, and supplies available, or potentially available, for assignment to incidents. 2) The natural resources of an area, such as timber, crass, watershed values, recreation values, and wildlife habitat.

Resource Management Plan (RMP): A document prepared by field office staff with public participation and approved by field office managers that provides general guidance and direction for land management activities at a field office. The RMP identifies the need for fire in a particular area and for a specific benefit.

Responsible line officer: A Forest Service employee with authority to select or carry out a specific planning action.

Riparian: Situated or dwelling on the bank of a river or other body of water.

Road: A motor vehicle travelway over 50 inches wide, except those designated and managed as a trail. A road may be classified, unclassified, or temporary.

Road analysis: An integrated ecological, social, and economic science-based approach to transportation planning that addresses existing and future road management options.

Road-based recreation: Activities that are normally associated with classified roads and are consistent with the settings and experiences identified with Semi-Primitive Motorized (SPM), Roaded Natural (RN), Rural (R), and Urban (U) classes of the Recreation Opportunity Spectrum. Examples of these activities include car camping and picnicking, gathering berries and firewood, driving for pleasure, wildlife viewing, and OHV use.

Road construction: Activities that result in the addition of road miles to the forest transportation system.

Road maintenance: The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective.

Road obliteration: A form of road decommissioning that re-contours and restores natural slopes.

Road reconstruction: Activities that result in road realignment or road improvement, as defined below: ·

- **Road improvement:** Activities that result in an increase of an existing road's traffic service level, expand its capacity, or change its original design function.
- **Road realignment:** Activities that result in a new location for an existing road or portions of an existing road, including treatment of the old roadway.

Roaded Natural (RN): A definition used in the Recreation Opportunity Spectrum (ROS) to characterize an area that has predominantly natural-appearing environments with moderate evidences of the sights and sounds of humans. Such evidences are usually in harmony with the natural environment. Interaction between users may be low to moderate, but evidence of other users is prevalent. Resource modification and practices are evident but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and facilities design.

Roadless areas: For the purposes of this EIS, a generic term that includes inventoried roadless area and unroaded areas.

Roadless characteristics: Roadless area characteristics include the following: Soil, water, and air; Sources of public drinking water; Diversity of plant and animal communities; Habitat for threatened, endangered, proposed, candidate, and sensitive species, and for those species dependent on large, undisturbed areas of land; Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of recreation opportunities; Reference landscapes; Landscape character and scenic integrity; Traditional cultural properties and sacred sites; Other locally identified unique characteristics

Rural (R): A definition used in the Recreation Opportunity Spectrum (ROS) to characterize an area with a substantially modified natural environment. Sights and sounds of humans are readily evident, and the interaction between users is moderate to high. A considerable number of facilities are designed for use by large numbers of people. Facilities for intensified motorized use and parking are available.

S

Salvage: An intermediate cutting made to remove trees that are dead or in imminent danger of being killed by injurious agents.

Sanitation: An intermediate cutting made to remove dead, damaged, or susceptible trees to prevent the spread of pests or pathogens.

Scheduled timber harvest: The quantity of timber planned for sale during a specified time period from the area of suitable land covered by a land management plan. Scheduled timber harvest accomplishes the allowable sale quantity.

Sediment (sedimentation): Solid materials, both mineral and organic, in suspension or transported by water, gravity, ice, or air; may be moved and deposited away from their original position and eventually will settle to the bottom.

Seed tree cutting: The cutting of all trees except for a small number of widely dispersed trees retained for seed production and to produce a new age class in a fully exposed microenvironment. Seed trees may or may not be removed after regeneration becomes established.

Selective cutting: A cutting method that removes only a portion of trees in a stand.

Semi-Primitive Motorized (SPM): A definition used in the Recreation Opportunity Spectrum (ROS) to characterize an area that has a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is permitted.

Semi-Primitive Non-Motorized (SPNM): A definition used in the Recreation Opportunity Spectrum (ROS) to characterize an area that has a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but they are subtle. Motorized use is not permitted.

Sense of place: The aesthetic, nostalgic, or spiritual effects of physical locations on humans based on personal, use-oriented or attachment-oriented relationships between individuals and those locations. The meaning, values, and feelings that people associate with physical locations because of their experiences there.

Sensitive species: Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or by significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Service contract: A contract normally used by the government to carry out land management activities such as tree planting, site stabilization, thinning of forest stands where the trees to be cut have no commercial value, and similar activities.

Shelterwood cutting: The removal of most trees, leaving those needed for sufficient shade to produce a new age class in a moderated microenvironment. Removal of the shelter trees may or may not occur after regeneration becomes established.

Single-tree selection: Individual trees of all size classes are removed, as uniformly as possible, throughout the stand to promote the growth of remaining trees and to provide space for regeneration.

Skid trail (skid road): An access cut through the woods for skidding.

Skidder: A self-propelled machine (cable, clam-bunk, or grapple) used for dragging trees or logs.

Slash: Debris left after logging, pruning, thinning, or brush cutting; includes logs, chips, bark, branches, stumps and broken understory trees or brush.

Slumping: To fall heavily; collapse.

Smoke management: Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.

Smoldering fire: A fire burning without flame and barely spreading.

Snag: A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Species richness: A measure of biological diversity referring to the number of species in an area.

Spotting: Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Stand: A distinguishable, contiguous group of similar plants or trees that are uniform in age-class distribution, composition, and structure, and are growing on a site of uniform quality.

Stewardship: Administration of land and associated resources in a manner that enables them to be passed on to future generations in a healthy condition.

Stewardship-purpose timber sales or harvest: A component of the Forest Service timber sale program that includes timber sales made primarily to help achieve desired ecological conditions or to attain some non-timber resource objective requiring manipulation of the existing vegetation.

Structure: The sizes, shapes, and/or ages of the plants and animals in an area.

Stumpage: The value of standing timber.

Subsistence: The customary and traditional uses of wild renewable resources for personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for making and selling handicraft articles out of the nonedible byproducts of fish and wildlife resources; for barter or sharing for personal or family consumption; and for customary trade.

Succession: A predictable process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant communities or successional stage create conditions that are favorable for the establishment of the next stage. The different stages of succession are often referred to as seral stages.

Suppression: All the work of extinguishing or containing a fire, beginning with its discovery.

Surface fuels: Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.

T

Temporary roads: Roads authorized by contract, permit, lease, or emergency operation, not intended to be a part of the forest transportation system and not necessary for long-term resource management.

Thermal cover: Cover that provides protection from extreme weather conditions.

Thinning: (a) The cutting down and/or removing of trees from a forest to lessen the chance of a ground fire becoming a crown fire; a method of preparing an area so that a prescribed fire can be more easily controlled. Thinning influences the available amount of fuel and fuel arrangement, and it can indirectly affect fuel moisture content and surface wind speeds. (b) A culture treatment made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover potential mortality.

Threatened species: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and which the appropriate Secretary has designated as a threatened species.

Timberland (commercial forest land): Land suitable for producing timber crops and not withdrawn from timber production by statute or administrative regulation. The typical minimum level of productivity is 20 cubic feet per acre per year.

Timber harvest: The volume of trees with commercial value that are cut and removed from the forest. Most of this volume was sold in prior fiscal years, as the contract life of most timber sales is 2 to 3 years. Volume harvest in a given year can be more or less than volume offered or volume sold, depending on market conditions (which can cause purchasers to adjust their harvest schedule), volume of timber sold in the previous few years, and other unforeseen situations such as severe fire seasons that limit operating time because of fire danger.

Timber offered: The volume of timber advertised for sale. The volume offered depends on forest estimates of capability (with allowable sale quantity as a ceiling), budget constraints, and success in completing stages of the timber sale preparation process.

Timber sale: A contractual process of selling timber to a purchaser and implementing a series of harvesting requirements for how, when, and what type of trees will be removed.

Timber sold: The timber volume sold and under contract with a purchaser. Volume sold in a given year is usually less than volume offered because some sales offered receive no bids and are not sold.

Timelag: Time needed under specified conditions for a fuel particle to lose about 63 percent of the difference between its initial moisture content and its equilibrium moisture content. If conditions remain unchanged, a fuel will reach 95 percent of its equilibrium moisture content after four timelag periods.

Torching: The ignition and flare-up of a tree or small group of trees, usually from bottom to top.

Total Maximum Daily Load (TMDL): A calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources.

Tractor: A self-propelled machine (cable, clam-bunk, or grapple) used for dragging trees or logs, another name for a skidder.

Trail: A pathway for travel by foot, stock, or trail vehicles.

U

Uncharacteristic wildfire (wildland fire) effects: An increase in wildfire size, severity, and resistance to control, and the associated impacts to people and property.

Unclassified roads: Roads on National Forest System lands that are not needed for, and not managed as part of, the forest transportation system, such as unplanned roads, abandoned travelways, off-road vehicle tracks which have not been designated and managed as a trail, and those roads no longer under permit or authorization.

Uncontrolled fire: Any fire which threatens to destroy life, property, or natural resources, and

Underburn: A fire that consumes surface fuels but not trees or shrubs. See Surface Fuels.

Uneven-aged (silvicultural) management: Methods used to regenerate and maintain a multi-aged structure by removing some trees in all size classes, either singly, in small groups, or in strips.

Unroaded area: Any area, without the presence of a classified road, of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. Unroaded areas do not overlap with inventoried roadless areas.

Unscheduled timber harvest: Any harvest of timber that was not included in the calculation of the allowable sale quantity.

Urban (U): A definition used in the Recreation Opportunity Spectrum (ROS) to characterize a substantially urbanized environment, although the background may have natural appearing elements. Affiliation with individuals and groups is prevalent, as is the convenience of sites and opportunities. Large numbers of users can be expected, both on-site and in nearby areas. Facilities for highly intensified motor vehicle use and parking are available. Regimentation and controls are obvious and numerous.

Urban area: As defined by the Census Bureau for the 1990 census, an area comprising all territory, population, and housing units in urbanized areas, or places of 2,500 or more persons outside of urbanized areas. An urbanized area comprises one or more places (central place) and the adjacent densely settled surrounding territory (urban fringe) that together have a minimum of 50,000 persons.

V

Viability: The ability of a population of a plant or animal species to persist for some specified time into the future. Viable populations are populations that are regarded as having the estimated numbers and distribution of reproductive individuals to ensure that its continued existence is well distributed in a given area.

Volume sold: The amount of timber actually purchased, which is usually less than offered volume because some sales are judged as economically marginal by prospective purchasers, and they receive no bids.

Volume harvested: The actual volume removed from the forest in a given year, which may be higher or lower than volume sold depending on market conditions. Most harvest volume was actually sold 1 to 3 years earlier.

W

Wilderness: A designated area defined in the Wilderness Act of 1964 in the following way: A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which – (a) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (b) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (c) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (d) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Wildfire: An unwanted wildland fire.

Wildland: Land other than that dedicated for other uses such as agriculture, urban, mining, or parks.

Wildland fire: Any nonstructure fire, other than prescribed fire, that occurs in the wildland. A lightning, or human-caused fire can be suppressed or, if lightning-caused, allowed to burn. Often used synonymously with 'wildfire' or 'forest fire.'

Wildland Fire Implementation Plan (WFIP): A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits.

Wildland Fire Situation Analysis (WFSA): A decision-making process that evaluates alternative suppression strategies against selected environmental, social, political, and economic criteria. Provides a record of decisions.

Wildland fire use: The management of naturally ignited wildland fires to accomplish specific prestated resource management objectives in predefined geographic areas outlined in Fire Management Plans.

Wildland Fire Used for Resource Benefit (WFURB): A lightning-caused wildland fire that is allowed to burn because it meets the resource objectives outlined in the Land Management Plan and the site-specific prescriptive elements outlined in a Fire Management Plan.

Wildland-urban interface: The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Because of their location, these structures are extremely vulnerable to fire should an ignition occur in the surrounding area.

Y

Yarder: A machine for cable logging consisting of a system of power-operated winches and a tower used to haul logs from a stump to a landing.

***Source documents for these definitions include – proposed Forest Service Roadless Area Conservation Final Environmental Impact Statement, proposed Road Policy, proposed Planning Regulations, Interim Roads Rule Environmental Assessment, Recreation Opportunity Spectrum Planning Guide, and the Wildland Fire Glossary.*