

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name: Wilson Creek Salvage Timber Sale

Proposed Implementation Date: July 1, 2002

Proponent: Montana Department of Natural resources and Conservation, Bozeman Unit Office, 151 Evergreen, Bozeman, MT 59715 Ph: 406-586-5243

Type and Purpose of Action: The proposed action would salvage harvest an estimated 450MBF of dead timber burned on state land during the Purdy fire in September 2001. The fire burned an estimated 5,000 acres of which approximately 200 acres was state land. An estimated 75 acres the state ownership incurred 100% tree mortality. The salvage proposal would harvest up to a estimated 60 acres of the burned area from 4 cutting units. All harvest activities would be ground based operations/tractor/rubber tire skidder. All of the roads on the state land for the proposal are in place and no new permanent road construction is planned. Up to .35 miles of temporary road or skid trail access would be needed.

The purpose of this proposal is to salvage the economic value of the timber resources that were destroyed by fire and ensure appropriate conditions exist for regeneration of forested stands. This section of land is part of the school trust lands held by the State of Montana in trust for the support of specific beneficiary institutions such as public schools, state colleges and universities and other specific institutions such as the school for the deaf and blind (Enabling Act of Feb 22, 1889; Montana Constitution 1972). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required by law to administer these trust lands for the largest measure of reasonable and legitimate return over the long run for those beneficiary institutions (Section 77-1-202, MCA). This particular tract is a classified grazing section held in trust for the support of Public Schools.

Location: S1/2 Section 36, T3S-R4E

County: Gallatin

I. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED: Provide a brief chronology of the scoping and ongoing involvement for this project.	A legal notice was published in the Bozeman Daily Chronicle on December 30, 2001 and January 3, 2002 to request comments by January 18, 2002. On December 27, 2001 scoping letters, requesting comments were mailed to more than 15 individuals, organizations and resource specialists known to have an interest in forest management activities in this vicinity. Comments were received from, the Ecology Center and the Alliance for the Wild Rockies, R-Y Timber, US Forest Service - Bozeman Ranger District. The DNRC Hydrologist conducted an on-site field review. Montana Fish, Wildlife and Parks, Fisheries Biologist also provided input.
2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:	No additional permits are required for the harvest proposal. There are no new stream crossings that would require a "124" permit and no slash burning that would require a burning permit. DNRC-Bozeman Unit has acquired a Temporary Road Use Agreement from the adjoining landowners to conduct management activities on the State ownership.
3. ALTERNATIVES CONSIDERED:	No Action: A salvage harvest of burned timber would not be conducted on the school trust lands. No income from the timber resources

would be received. DNRC could expend forest improvement funds to seed selected areas with grass and cut a portion of the standing dead trees to ensure sufficient downed woody debris is on the ground for protection of soil resources. The restoration work could be conducted during the summer months of 2002.

Proposed: Salvage harvest an estimated 350,000 board feet of burned, dead timber to recover residual value of the resource. Seed disturbed sites and selected sensitive areas with grass prior to winter so the seed is available for establishment in the spring. Physically close any temporary roads or skid trails to prohibit future use, install appropriate drainage prior to closure and grass seed disturbed sites upon completion of use. The project would be expected to begin as early as July 1, 2002 and be completed no later than November 1, 2002.

II. IMPACTS ON THE PHYSICAL ENVIRONMENT

RESOURCE	[Y/N] POTENTIAL IMPACTS N = Not Present or No Impact will Y = Impacts may occur (explain below)
<p>4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE: Are fragile, compactible or unstable soils present? Are there unusual geologic features? Are there special reclamation considerations? Are cumulative impacts likely to occur as a result of this proposed action?</p>	<p>[Y] Jeff Collins, DNRC Soils Scientist was consulted for input. (See attached Soils Review)</p> <p>It is anticipated that a limited amount of soil movement will occur on the state land with or without the proposed salvage harvest as a result of the reduced vegetation from the fire. An estimated .35 miles of temporary road or skid trail access would need to be constructed to access two units associated with the proposed action. The following mitigation measures would be incorporated into the proposal to reduce any potential soil impacts.</p> <p>Mitigations incorporated in the proposal:</p> <ul style="list-style-type: none"> • Exclude equipment operation on slopes greater than 35% slope. • Install sediment infiltration on outlets of drainage features with direct delivery to streams or ephemeral draws. • Limit operations to conditions that are dry, frozen or snow covered. • Grass seed all disturbed areas. • Close all temporary roads or skid trails through spot recontouring, and the distribute slash and debris upon completion of use.

II. IMPACTS ON THE PHYSICAL ENVIRONMENT

- Install and maintain road drainage concurrent with activities.
- Maintain a minimum of 5-10 tons/acre of coarse woody debris on site.
- Implement BMP'S in the design and operation of the salvage harvest.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION: Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality? Are cumulative impacts likely to occur as a result of this proposed action?

[Y] The proposal was reviewed on site by George Mathieus, DNRC Hydrologist (See attached report).

The proposed sale area is located near the Gallatin Gateway, approximately 10 air miles south of Bozeman, Montana. The proposed sale area is located in a State half section that lies within the Wilson Creek watershed. Both Wilson Creek and an unnamed ephemeral tributary flow through the state section.

The watershed analysis area addresses each watercourse draining the proposed project area to facilitate hydrologic analysis and cumulative watershed effects assessment. A description of those drainage's follows:

Wilson Creek: Wilson Creek is an 8,100-acre watershed, which receives between 18 inches at the valley floor to 100 inches at the headwaters of annual precipitation. This second order stream is a tributary to the Gallatin River. Wilson Creek is a Class I perennial stream according to the Montana Streamside Management Zone (SMZ) Law and Rules.

Little Bear Creek: Little Bear Creek is a 3,300-acre watershed, which also receives approximately 18-100 inches of annual precipitation. This first order stream is a tributary to Big Bear Creek. It is a Class I Stream.

The Purdy fire burned an estimated 30% of the entire reach of the Wilson Creek drainage (~2.5 miles of ~ 8.5 miles). There is a substantial risk of increased surface runoff and erosion from the drainage basin and from the existing road system.

Operations conducted in or near draw features and on steeper slopes have a higher risk of impacting soil resources and water quality. The following recommended mitigation measures would help minimize risk of impacts during the proposed activities. These mitigation measures are standard practices that may be applied to all harvest activities associated with the proposed Wilson Creek Fire Salvage Timber Sale.

General Road Design and Mitigation Measures:

- Plan, design and improve existing road

II. IMPACTS ON THE PHYSICAL ENVIRONMENT

systems to meet long-term access needs and to fully comply with current BMPs.

- Construct drain dips, grade rolls and other drainage features where necessary and practical to insure adequate road surface drainage.
- Grass seed all newly constructed or reconstructed road or skid trail cut and fills immediately after excavation or upon closure of the road or trail.
- Leave all temporary or abandoned roads in a condition that will provide adequate drainage and will not require future maintenance.
- Filter outlets of all ditches with direct delivery to streams or ephemeral draws with slash or filter fabric and straw bales.
- Limit road use and hauling to dry, frozen or snow covered conditions. Suspend operations when these conditions are not met **before** rutting occurs.

General Design and Mitigation Recommendations for Harvest Units:

- Implement Forestry BMPs as the minimum standard for all operations with the proposed timber sale.
- Protect all ephemeral draws, springs and wet areas with marked equipment restriction zones (ERZ).
- Develop a skidding plan prior to equipment operations.
- Leave 5 - 10 tons per acre of coarse woody material larger than 3 inches in diameter scattered throughout the sale units, predominately perpendicular to the slope.
- Seed skid trails over 30%. Scatter slash on skid trails where feasible.

6. AIR QUALITY: Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I airshed)? Are cumulative impacts likely to occur as a result of this proposed action?

[N] Air quality is not expected to be impacted by the proposed activity. No slash burning is expected to occur. Debris not removed from the site will be distributed on the ground to reduce the potential for erosion and protect the soil resources.

7. VEGETATION COVER, QUANTITY AND QUALITY: Will vegetative communities be permanently altered? Are any rare plants or cover types present? Are cumulative impacts likely to occur as a result of this proposed action?

[N] The Purdy fire burned approximately 5,000 acres during September 2001. The crown fire that passed through the State ownership killed 100% of the trees on an estimated 200 acres of the 320-acre track. The state land was nearly 90% forested prior to the fire. Approximately 120 acres of forested area remains. The stands

II. IMPACTS ON THE PHYSICAL ENVIRONMENT

result of this proposed action?

on the State tract were primarily Douglas fir and spruce. There was a timber harvest conducted in 1983 on approximately 40 acres. A majority of these harvest areas were not a part of the burn.

Salvage harvest activities would focus on harvesting up to 60 acres of burned timber. Natural regeneration of Douglas-fir is expected to occur from along the edge of the burned area. Seed drift was noted during post-fire site visits. It is unknown whether the seed drift from the edge of the fire will adequately provide seed for the entire burned areas. All units will be monitored the next few years to evaluate future planting needs.

Although the tree canopy on approximately 200 acres was 100% killed, the fire intensity was considered moderate since most of the ground vegetation is expected to survive and flourish this growing season. Surface vegetation was consumed but root systems appear to have survived, except in a few areas. No rare or special concern plant species were known to exist in the project area prior to the fire (Montana Natural Heritage Program, 11/01). There are no old growth stands that would meet a Green et al. definition within the proposed project area. The no action alternative would have the least potential for affecting ground vegetation. Ground skidding activities associated with the proposed salvage harvest would have a low to moderate potential to affect vegetation. The mitigations measures would be incorporated into the harvest plan are expected to be effective in reducing the potential for vegetative impacts.

Mitigations incorporated in the harvest alternative:

- Skidding to be conducted only when soil is dry, snow covered or frozen.
- Equipment will be pressure washed prior to moving on site as a measure to prevent the introduction of weeds to the site.
- The area would be monitored for weed infestations and treated as necessary for 3 years after the harvest.

The fire fragmented the already naturally fragmented forested landscape and the proposed project would have minimal influence on any further habitat fragmentation.

TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS: Is there substantial use of

[N] Ross Baty, DNRC Wildlife Biologist was consulted for input. Joe Fontaine, USEWS

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the area by important wildlife, birds or fish? Are cumulative impacts likely to occur as a result of this proposed action?

Biologist was also contacted by R. Baty, (See attached checklist).

Prior to the fire, the area provided habitat for deer, elk, moose, black bear, grouse, squirrels and assorted other game and non-game species. As the area revegetates and regenerates many of these species will resume their use of the area while other species not previously present will move in as a result of the changed conditions. Some species, dependant on fire-killed snags will experience an increase in available habitat. Other species dependent on closed canopy forest conditions will likely not utilize the area for several decades. There are no fish bearing streams in the proposed project area.

Due to the limited size of the project, unappreciable alteration of habitats preferred by ungulates, and duration and location of the proposed activities, no substantial long term, direct, indirect or cumulative impacts are expected to occur as a result of any of the alternatives considered.

Mitigations incorporated in the proposal:

- Retain trees that were snags prior to the fire and large diameter trees that are considered less than 50% merchantable and do not pose a significant safety hazard.
- Retain additional large diameter Douglas fir trees at the rate of 2 per acre where available for snag replacement.
- Maintain a minimum of 5-10 tons/acre of coarse woody debris on site.

Input received from the Montana Department of Fish, Wildlife and Parks Fisheries Biologist, Patrick Byorth, indicated that no fishery issues exist. In summary, no significant impacts on Wilson Creek or it's aquatic life beyond the impacts of the fire would be expected as long as best management practices were followed, adequate buffers associated with drainages were maintained and temporary roads or skid trails were adequately reclaimed. All if these measure would be observed.

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES: Are any federally listed threatened or endangered species or identified habitat present? Any wetlands? Sensitive Species or Species of special concern? Are cumulative impacts likely to occur as a result of this proposed action?

[Y] The project area does not provide habitat for Bald Eagles. The project area may receive occasional transient use by grizzly bears, gray wolves and Canada lynx, however no denning or other appreciable use of the area has been documented. The project area lies 16 miles north of the Yellowstone Grizzly Bear Recovery Area. The project area does not provide preferred habitats suitable for lynx denning or foraging. Measurable direct, indirect or

II. IMPACTS ON THE PHYSICAL ENVIRONMENT

cumulative impacts are not expected for T/E species (See attached Species Checklist Assessment).

Habitat suitable for use by black-backed woodpeckers occurs in the project area and would be treated under the Action Alternative (ie., up to 60 acres). Habitat is also present in portions of the 5,000 acres associated with the Purdy Fire-2001 and within 140 acres of burned forest that would remain on the project area post treatment. As such the proposed project would reduce by a small proportion, the available habitat suitable for use by black-backs at the landscape scale. Thus, the project would result in minor, indirect and cumulative adverse effects to black-backed woodpeckers. On State ownership the proposed salvage acreage would be approximately 30% of the burned State land. At a landscape level it is expected that the cumulative salvage on the state parcel and other private and federal ownerships would be only a small fraction of the total burn area.

Habitats and elevations used by boreal owls occur within the project area, however, proposed activities would not be expected to alter any usable existing habitat, or create disturbance that would be expected to measurably influence nesting pairs, should they occur in the project area or adjacent parcels.

The project area does not provide habitat for flammulated owls, pileated woodpeckers, northern bog lemmings, harlequin ducks, ferruginous hawks, peregrine falcons, mountain plovers or Townsend's big-eared bats (See attached Species Checklist Assessment).

Mitigation incorporated into the proposal:

- Retain 140 acres (70% of burned area on state land) of no harvest that would serve as Black-Backed Woodpecker habitat and habitat substrate for other species associated with snags and large woody debris.
- Leave nonmerchantable trees standing for residual cover, structure and feeding substrate that are not needed for immediate soil protection.
- Retain snags, snag recruitment trees and large woody debris on site (minimum of 5-10 tons/acre).
- Immediately suspend operations and contact DNRC Wildlife Biologist if a wolf den or T & E species is observed in the project area and develop appropriate mitigations before re-commencing project activities.

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<p>10. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or paleontological resources present?</p>	<p>[N] There are no known historical, archaeological or paleontological sites within the project area. DNRC Archaeologist, Patrick Rennie, reviewed the proposal and determined it is unlikely that any cultural resource sites would be encountered during activities conducted under any of the alternatives considered.</p> <p>Mitigations incorporated into the proposal:</p> <ul style="list-style-type: none"> • All operations will be immediately suspended in the vicinity and the DNRC Archaeologist contacted if cultural resources are identified.
<p>11. AESTHETICS: Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light? Are cumulative impacts likely to occur as a result of this proposed action?</p>	<p>[Y] The Purdy fire north perimeter is already clearly visible from the Gallatin Valley. The proposed salvage harvest units would be a continuation of the salvage harvest conducted on the adjacent private ownership located to the south. The 100% killed timber does not provide for a harvest design to selectively blend the proposed salvage harvest into the landscape. The existing unburned edge of green timber would be maintained to lessen the visual effects as one approaches the site from the valley floor. Based on the size and scope of the proposed salvage harvest and the existing burned landscape, impacts on the aesthetics of the area would be minimal.</p>
<p>12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project? Are cumulative impacts likely to occur as a result of this proposed action?</p>	<p>[N] The Purdy fire burned an estimated 5,000 acres of which approximately 90% was forested. The greatest portion of the fire area occurred on federal ownership administered by the Gallatin National Forest.</p> <p>The Bozeman Ranger District is currently preparing a scoping notice for potential salvage operations on their holdings located 1 mile to the south of the State land.</p> <p>Salvage harvest operations have been conducted on the adjacent private land immediately following the fire. Approximately 385 acres has been treated in the private section to the south.</p>
<p>13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA: Are there other studies, plans or projects on this tract? Are cumulative impacts likely to occur as a result of other private, state or federal actions that are</p>	<p>[N] DNRC will be a participant in the Purdy Weed Management Area, Integrated Noxious Weed Management Plan that is expected to be implemented during the Spring 2002 through Fall of 2004.</p>

II. IMPACTS ON THE PHYSICAL ENVIRONMENT

under MEPA review (scoping) or permitting review by any state agency w/n the analysis area?

III. IMPACTS ON THE HUMAN POPULATION

RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES
14. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?	[N]
15. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?	[N] The state land included in the proposed project is classified grazing and has been leased for that use for many years. It is currently leased for 32 AUM'S per year at the rate of \$5.52/AUM for an annual income of \$176.64. The grazing lease would continue under the current lease until renewal scheduled for 2010.
16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so, estimated number. Are cumulative impacts likely to occur as a result of this proposed action?	[N] The proposed salvage harvest would result in a harvest of an estimated volume of 350,000 board feet of timber from the state land. This would be a relatively small sized project for the vicinity and would represent a 2-3 months of work for a logging contractor. There would not be any permanent shift or creation of long-term jobs as a result of proposed action alternative.
17. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue? Are cumulative impacts likely to occur as a result of this proposed action?	[N] People are currently paying taxes from the wood products industry in the region. Due to the relatively small size of the timber sale program, there will be no measurable cumulative impact from this proposed action on tax revenues.
18. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc) be needed? Are cumulative impacts likely to occur as a result of this proposed action?	[N] Salvage harvest would result in approximately 85-95 truckloads of logs delivered to mills in the vicinity on county and state roads. The roads in the vicinity are suitable for such use and are maintained in part through the taxes generated by the forest products industry.
19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?	[Y] In June 1996, DNRC began a phase-in implementation of the State Forest Land Management Plan (Plan). The management direction provided in the Plan comprises the framework within which specific project planning and activities take place. The plan philosophy and appropriate Resource Management Standards have been incorporated into the

	design of the proposed action.
20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] With adjacent landowners permission for access and the purchase of a State Land Recreational Use License, persons may recreate on the State tract. However, recreational use in the past has been minimal. The proposed harvest is expected to reduce recreational use of the tract while activity is being conducted due to the noise and disturbance associated with the harvest. No affects to hunter opportunity is anticipated due to limited access and the habitats preferred by ungulates would not be appreciable altered.
21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing? Are cumulative impacts likely to occur as a result of this proposed action?	[N] There will be no measurable cumulative impacts related to population and housing due to the relatively small size of the timber sale program, and the fact that people are already employed in this occupation in the region.
22. SOCIAL STRUCTURES AND MORES: Is some disruption of native or traditional lifestyles or communities possible?	[N]
23. CULTURAL UNIQUENESS AND DIVERSITY: Will the action cause a shift in some unique quality of the area?	[N]
24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES: Is there a potential for other future uses for easement area other than for timber management? Is future use hypothetical? What is the estimated return to the trust? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] The proposed salvage harvest would generate an estimated trust income from stumpage of \$66,000 to \$81,000. The volume harvested and value received will depend on how quickly the burned timber is harvested and how much defect occurs as result of cracking and checking

EA Checklist Prepared By: Curt Tesmer
Name

Bozeman Unit Forester/DNRC
Title

5-08-02
Date

IV. FINDING	
25. ALTERNATIVE SELECTED:	The fire salvage harvest project as proposed.
26. SIGNIFICANCE OF POTENTIAL IMPACTS:	The proposed harvest will salvage an estimated 450 MBF of dead timber that was recently burned in the Purdy Fire. The salvage value is estimated to generate approximately \$66,000 to \$81,000 in trust revenue. The proposal would harvest approximately 30% of the forested state land burned in the fire. This proposal would affect only an estimated 1% of the burned forested area in the 5,000-acre Purdy Fire. It is estimated that cumulatively across all ownerships, less than 15% of the burned forestland would be salvage harvested.

There is no critical habitat for Endangered, Threatened and Sensitive Species in the project area. Appropriate and effective mitigation measures such as snag retention; snag recruitment, coarse woody debris retention and "no harvest" areas have been incorporated and designed into the proposal to retain habitat value for sensitive species and biodiversity on the state land. The proposed harvest areas are situated on primarily gentle terrain and benches well suited for traditional ground skidding operations.

Significant impacts are not anticipated as a result of the proposed salvage harvest

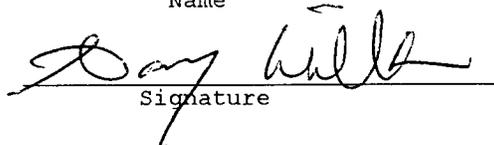
27. Need for Further Environmental Analysis:

EIS More Detailed EA No Further Analysis

EA Checklist Approved By:

Garry Williams
Name

Central Land Office Area Manager
Title

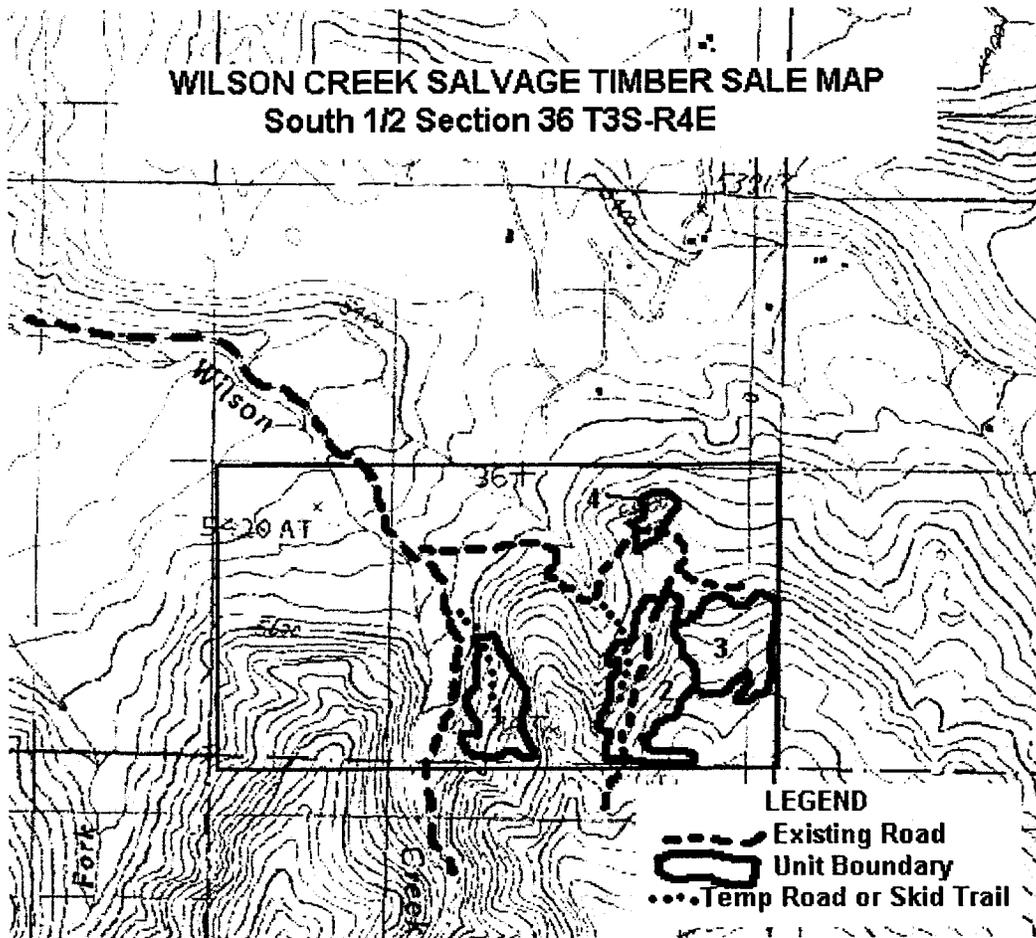

Signature

5/20/02
Date

ATTACHMENTS

- Wilson Creek Salvage Timber Sale Map
- Wilson Creek Salvage Watershed Report, (G.Mathieus, 3-26-2002)
- Wilson Creek Salvage Checklist for Endangered, Threatened and Sensitive Species, (Ross Baty, 4-30-2002)
- Wilson Creek Salvage Soils Review, (J. Collins, 5-6-02)

WILSON CREEK SALVAGE TIMBER SALE MAP
South 1/2 Section 36 T3S-R4E



Wilson Creek Salvage Watershed Report

Hydrology Existing Conditions & Affects Analysis
Wilson Creek Salvage Timber Sale
T3S-R4E, Section 36
Central Land Office, Bozeman Unit

George Mathieus
Forest Management Bureau
Hydrologist

March 26, 2002

Field Review Date: January 29, 2002

INTRODUCTION

The following document contains background information for the watershed, fisheries and soils portions of the proposed Wilson Creek Salvage Timber Sale Environmental Assessment. This analysis includes an existing condition assessment of all watersheds draining the proposed sale area. Write-up and assessments are based on a coarse filter screening approach, references to post-fire assessments and an on-site field review of all contributing areas within the proposed state section.

POTENTIAL ISSUES

Water Quality:

Land management activities such as timber harvest and road construction can impact water quality primarily by accelerating sediment delivery above natural levels to local stream channels and draw bottoms. These impacts are caused by erosion from road surfaces, skid trails, log landings and by the removal of vegetation along stream channels.

Cumulative Watershed Effects:

Cumulative watershed effects can be characterized as impacts on water quality and quantity that result from the interaction of disturbances, both human-caused and natural. Wildfires and timber harvest activities can affect the timing of runoff, increase sediment yields, increase peak flows and increase the total annual water yield of a particular drainage.

Cold Water Fisheries:

Land management activities such as timber harvest and road construction can impact fish habitat primarily by increasing water temperatures, accelerating sediment delivery above natural levels to local stream channels and by decreasing large woody debris input and shade cover through the removal of recruitable trees near the stream channel.

Soil Resources:

Equipment operations and timber harvest on wet sites or sensitive soils can result in soil impacts that effect soil productivity depending on area and degree of physical effects and amount or distribution of coarse woody debris retained for nutrient cycling.

Noxious Weeds:

Following disturbance events such as wildfires, fire suppression damage and timber harvest activities, invasion and spread of noxious weeds is more prevalent than in undisturbed areas. Noxious weed invasion and spread detrimentally influences surface cover, erosion and native species growth.

AFFECTED ENVIRONMENT

Watersheds:

The proposed sale area is located near the Gallatin Gateway, approximately 10 air miles south of Bozeman, Montana. The proposed sale area is located in a State half section that lies within the Wilson Creek watershed. Both Wilson Creek and an unnamed ephemeral tributary flow through the state section.

The watershed analysis area addresses each watercourse draining the proposed project area to facilitate hydrologic analysis and cumulative watershed effects assessment. A description of those drainage's follows:

Wilson Creek:

Wilson Creek is an 8,100-acre watershed, which receives between 18 inches at the valley floor to 100 inches at the headwaters of annual precipitation. This second order stream is a tributary to the Gallatin River. Wilson Creek is a Class I perennial stream according to the Montana Streamside Management Zone (SMZ) Law and Rules.

Little Bear Creek:

Little Bear Creek is a 3,300-acre watershed, which also receives approximately 18-100 inches of annual precipitation. This first order stream is a tributary to Big Bear Creek. It is a Class I Stream.

Regulatory Framework:

This portion of the Upper Missouri River basin, including the Wilson Creek drainage, is classified B-1 in the Montana Water Quality Standards. Waters classified B-1 are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonoid fishes and associated aquatic wildlife, waterfowl and furbearers; and agricultural and industrial water supply. State water quality regulations prohibit any increase in sediment above naturally occurring concentrations in waters classified B-1 (ARM 16.20.618 2(f)).

Naturally occurring means conditions or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable land, soil and water conservation practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The state of Montana has adopted Forestry Best Management Practices (BMPs) through its Non-point Source Management Plan as the principal means of meeting Water Quality Standards.

Existing beneficial uses in the immediate vicinity of the proposed sale area include water rights for groundwater sources

to include lawn & garden, irrigation, and domestic uses. Surface water sources include irrigation, fish/wildlife and stock uses. Downstream sensitive beneficial uses include aquatic life support, cold water fisheries and a surface water domestic use diverted from Wilson Creek. However, the surface domestic use has no surface water connectivity with the proposed sale activities.

The Gallatin River (MT41H001_020) is currently listed as a water quality limited water body (as per Section 303(d) of the Clean Water Act) in the 305(b) report. The 303(d) list is compiled by the Montana Department of Environmental Quality (DEQ) as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify water bodies that do not fully meet water quality standards, or where beneficial uses are threatened or impaired. These water bodies are then characterized as "water quality limited" and thus targeted for Total Maximum Daily Load (TMDL) development. The TMDL process is used to determine the total allowable amount of pollutants in a water body of watershed. Each contributing source is allocated a portion of the allowable limit. These allocations are designed to achieve water quality standards.

The Montana Water Quality Act (MCA 75-5-701-705) also directs the DEQ to assess the quality of state waters, insure that sufficient and credible data exists to support a 303(d) listing and to develop TMDL for those waters identified as threatened or impaired. Under the Montana TMDL Law, new or expanded nonpoint source activities affecting a listed water body may commence and continue provided they are conducted in accordance with all reasonable land, soil and water conservation practices. Total Maximum Daily Loads have not been completed for the Gallatin River drainage. DNRC will comply with the Law and interim guidance developed by DEQ through implementation of all reasonable soil and water conservation practices, including Best Management Practices and Resource Management Standards as directed under the State Forest Management Plan.

The cause of impairment in the Gallatin River is dewatering, flow alteration, lead and metals with the probable sources being agriculture, crop-related sources, irrigated crop production, construction, highway/road/bridge construction, resource extraction, abandoned mining and natural sources. According to this report, the Gallatin River is fully supporting its agriculture beneficial use, but only partially supporting its industrial uses and not supporting its aquatic life support, cold-water fishery, drinking water supply and recreation beneficial uses.

The Montana Streamside Management Zone (SMZ) Law (MCA 77-5-301) and Rules regulate timber harvest activities that occur adjacent to streams, lakes and other bodies of water. This law prohibits or restricts timber harvest and associated activities within a predetermined SMZ buffer on either side of the stream. The width of this buffer varies from 50-100 feet, depending on the steepness of the slope and the class of the stream.

The Montana Stream Protection Act (MCA 87-5-501) regulates activities conducted by government agencies that may affect the bed or banks of any stream in Montana. This law provides a mechanism to require implementation of BMPs in association with stream bank and channel modifications carried out by governmental entities. Agencies are required to notify the Montana Department of Fish, Wildlife and Parks (MDFWP) of any construction projects that may modify the natural existing conditions of any stream.

Water Quality – Existing Conditions:

The greatest pollutant of concern within the proposed project area is sediment. Increased sediment delivery and deposition can affect water quality both physically and biologically as well as affecting channel stability and geomorphology. Increased and accelerated sediment delivery and deposition have impacted the streams within the analysis area. The primary sources of sediment delivery are roads, particularly at stream crossings and road segments adjacent to stream channels.

From the paved Highway 191, approximately 4.2 miles of county, private and State gravel road provide access to the proposed sale area. Existing improved gravel road to the State ownership is suitable for use as is. The more unimproved gravel roads located on the State are adequate for use with minor improvements improve and maintain proper drainage. No additional permanent road construction is expected to occur.

Other sources of sediment delivery to stream channels within the analysis area include streambank disturbance and channel instability induced by livestock grazing. These impacts are limited to the lower stream reaches and the agricultural segments along the valley floor.

In addition to past management activities, all the drainage's within the proposal area have been exposed to the recent Purdy Wildfire during September of 2001. The Purdy Wildfire consumed approximately 5,000 with ~ 200 of those acres occurring on State ownership. Effects from the fire cover a full range of burn intensities. Within State section 16, approximately 120 acres burned high to moderately high intensity and 80 acres burned moderate/low intensity.

Direct and Indirect Effects - Water Quality:

Erosion and sediment delivery are expected to have increased following this past spring runoff within the moderate and high severity burn areas located within the proposed project area. Additionally, these impacts (only at a lower degree) are expected to continue following summer and fall rainstorm events. Therefore, additional direct impacts to water quality and direct and indirect impacts to downstream beneficial uses are anticipated in all streams within the proposed project area. The amount of sediment delivery and subsequent impacts to water quality resulting from the recent wildfires are expected to be considerable. A sediment yield analysis completed by the nearby Fridley Fire Burned Area Emergency (BAER) Team estimated that post-fire sediment yields could increase as much as 120% of the pre-fire conditions. We expect runoff to be highest in the first 5 years following the fire while the sites revegetate. Severe thunderstorms could result in dramatically accelerated runoff and erosion. Sediment delivery would be expected to reduce substantially by the end of the 2003-growing season as vegetative recovery occurs (USFS BAER 2001).

Sediment delivery from existing open roads is also expected to be greater than in the recent past. This is due to increased road surface runoff and loss of stabilizing vegetation on road surfaces, cuts and fills. These road segments will continue to provide long-term sources of sediment delivery until additional improvements or restoration measures are implemented.

Other direct impacts to water quality are increased concentrations of nutrients. Concentrations of both phosphorus and nitrogen are expected to increase in streams draining severe burn areas. Many published studies have shown elevated levels of these nutrients immediately following wildfires and during subsequent spring runoff (Spencer and Hauer 1990, Salminen and Beschta 1991). The large increases in nutrients frequently observed immediately after fires appears to be the result of direct deposition of ash and subsequent rapid leaching of dissolved nutrient materials. Vegetative regrowth is expected to help reduce additional delivery from summer and fall rain events. This is due to the natural buffering and sediment trapping that occurs along vegetated surfaces versus bare soils.

Direct impacts to water quality also occurred in several of the affected streams during the wildfire due to elevated water temperatures. Fish mortality may have occurred on several of the nearby streams in the area, immediately following the wildfires. It is expected that lethal temperatures were obtained during stand-replacement burns. The lethal temperature threshold for juvenile salmonids has been identified under laboratory conditions at between 22 and 25 degrees centigrade (Beschta 1987). While the possibility of fish mortality exists, no evidence following the Purdy Fire suggests that fish kills occurred within the State ownership. Speculation could be made that in fact, this occurred within the segments of streams exposed to stand-replacement burns. However, field observations within State ownership indicate that severe burn intensities occurred only the ridges, while the draws and stream bottoms burned much cooler.

Indirect impacts to water quality include increased summer maximum stream temperatures. Within the proposed project area only a minor number SMZ trees and shrubs were consumed in those very short stream reaches affected by stand replacement fire. Summer maximum stream temperatures are not expected to elevate due to the increased amount of direct solar radiation reaching the stream within the State ownership.

Areas that burned low to mixed severity may have some indirect effects on stream water temperatures. Because direct-beam solar radiation is the primary factor influencing temperature changes in the summer, the effect of partial canopy removal (burned by mixed severity fire) is directly proportional to the reduction in canopy providing shade to the stream (Beschta 1987).

Increased nutrients, increased stream temperatures and loss of tree canopy following the fire may also have indirect effects on water quality by contributing to increased periphyton algal growth (Beschta 1987 and Spencer 1990). Light availability often limits algal growth in heavy canopied mountain streams. However, the fire within the State ownership impacted very little streamside area. Therefore, increased levels of algal growth would not be expected to occur within the proposed project area.

Cumulative Watershed Effects:

Past management activities surrounding the proposed sale area include agriculture, grazing, fire suppression, road construction and timber harvest. Timber harvest activities in the analysis area have been minimal over the past 30 years, constituting selective harvest on State and adjacent private lands. Additionally, recently salvage harvest has occurred in the adjacent Sections 1, 35 & 2, constituting approximately 490 acres.

A cumulative watershed effects (CWE) analysis for the proposed sale area was completed by DNRC to determine the existing conditions of the affected watersheds and the potential for cumulative effects due to increased sediment yields. The Wilson Creek and Little Bear Creek watersheds were chosen as the analysis boundaries. These analysis areas were selected because they were determined to be the most appropriate scale to detect potential effects.

As outlined in the SFLMP Watershed RMS # 7, the CWE analysis was completed using a Level II coarse filter approach to determine the existing conditions of the proposed sale area. This Level II was used to determine cumulative effects from past management activities and effects from wildfire. The coarse filter approach consisted of on-site evaluation, mapping the percent forested of each watershed and documenting history of past activities through the use of maps, aerial photographs and harvest records.

All drainage features in the proposed sale watershed analysis area were inventoried and evaluated by a DNRC hydrologist. Impacts occurring are the result of poor road locations and design, trampling, bank shearing and soil erosion from cattle trails. The cattle impacts are moderate in extent, as they are confined to the lower reaches easily accessible to cattle.

All primary and secondary roads within the proposed sale area were evaluated for past or potential impacts. Field evaluations indicate that past management activities within the analysis area have resulted in impacts to water quality. These impacts are limited to sediment delivery and erosion from roads and cattle use and are restricted to stream crossings and isolated segments of existing roads.

Within the more extensive Purdy Fire analysis area, increases in peak flows, surface runoff, erosion and subsequent sediment delivery, nutrient levels and stream temperatures are anticipated following the recent wildfire. Measurable quantities of these impacts may vary across the fire area and would be dependent on the nature of the stream channels, intensity of burned area, local geology, and the timing, duration and intensity of snowmelt and spring rain events. Measurable impacts are more likely to occur in perennial drainage's where burn intensities are high.

In addition to the proposed State harvest, there are current salvage activities on private ownership within the Purdy Fire perimeter. This salvage includes harvesting of any merchantable trees killed or damaged by the recent wildfire. This activity falls within the Wilson Creek watershed. Increases in water yield are likely following this activity, depending on the amount of green tree harvest. The majority of the private harvest occurs within high severity burn areas where leaf area was completely lost.

Increases in erosion and sedimentation are also likely as a result of additional harvest on private lands. The levels of these impacts would be dependant on planning, rehabilitation efforts and the level of mitigation applied on site.

Cold Water Fisheries – Existing Conditions:

Population data was not available for either Wilson Creek or Little Bear Creek. However, personal communication with Pat Boyorth, Fisheries Biologist with the Montana Department of Fish, Wildlife & Parks (DFWP), indicated that a pure strain of westslope cutthroat trout existing in the West Fork of Wilson Creek. Input received from the Biologist did not indicate concern regarding the westslope cutthroat trout populations since the proposed project area is located entirely outside of the West Fork Wilson Creek.

Past management activities have resulted in increased sediment and a decrease in the riparian shrub component and recruitable trees for in-channel large woody debris along existing tributary stream channels. These impacts have occurred following grazing, agriculture and road building activities. It is likely that these impacts have resulted in loss of shade cover, bank stability, recruitable trees and increased sediment.

Direct and Indirect Effects - Cold Water Fisheries:

Substantial increases in stream water temperatures may have occurred in those reaches of stream channel subjected to severe burn intensities during the Purdy Fire. However, field review indicates that draws and stream bottoms within the State ownership were not subjected to severe burn intensities.

A direct effect of elevated water temperatures may have occurred during the fire, resulting in juvenile fish mortality. Lethal threshold temperatures for juvenile salmonids have been identified in laboratory conditions at between 22 and 25 degrees centigrade (Beschta 1987). Future indirect effects on stream water temperatures may occur from the loss of stream shading vegetation. Other existing indirect effects associated with fish habitat within the proposed project area include accelerated rates of erosion and subsequent sediment deposition, increased nutrient loading, increased channel instability, loss of stream bank vegetative cover and shade, resulting in increased stream temperatures.

Other potential indirect impacts to cold water fish habitat resulting from the recent wildfires is a reduction in large woody debris (LWD) available for recruitment into fish-bearing streams. The importance of LWD and its role in fish habitat and channel development has been described in recent literature (Bragg et al. 2000). Streamside areas that were subjected to high intensity burns are expected to provide LWD recruitment over the next few years. However, long-term recruitment is expected to be limited.

Cumulative Effects – Cold Water Fisheries:

Existing cumulative watershed effects that have resulted in increased sediment yields and contributed to channel instability have also degraded cold-water fisheries and their habitat. Sediment deposition from roads, riparian grazing and increased sediment delivery and nutrient loading resulting from the recent wildfire has occurred in stream channels

within the proposed project area. These impacts are expected to increase in the short-term and decline as hydrologic and vegetative recovery continues to occur.

ENVIRONMENTAL CONSEQUENCES

The proposed State timber sale is comprised of a no-action and action alternative. The prescription for the action alternative is to salvage log up to 60 acres of timber damaged or killed by wildfire. Up to 0.35 miles of temporary road or skid trail construction would be constructed and 0.10 of a mile of old road reconstructed to access a portion of the sale area.

Water Quality:

No Action Alternative:

Under the No Action Alternative, existing substandard roads with inadequate road surface drainage would continue to impact water quality and downstream beneficial uses unless mitigation and remedial actions are undertaken. Existing effects from the recent wildfire would continue to decline as natural recovery occurs.

Action Alternative:

Several changes to water quality are expected as a result of the recent Purdy Wildfire. Conceivably, areas with severe burn intensities would show increased levels of sediment, nutrients and temperature in local stream channels. In addition to minimizing impacts from the proposed harvest activities, mitigation measures will be implemented to also help minimize erosion associated with the recent wildfire.

Harvest units can directly impact water quality if not properly located or buffered. The risk of impacts is greatest along streams, wetlands and lakes. The Streamside Management Zone Law (SMZ Law) regulates forest management activities that occur adjacent to streams, lakes or other bodies of water. All proposed activities will be conducted in accordance with the SMZ law and Rules. All areas requiring SMZ delineation have been field reviewed by a DNRC Hydrologist to determine their adequacy in meeting the requirements of the law and satisfying the SFLMP guidance to protect water quality and aquatic resources. There is no SMZ harvest planned for this proposed activity.

Mitigation measures implemented during salvage operations are expected to minimize direct impacts to water quality resulting from the proposed salvage harvest. These measures are also expected to help reduce the effects from the recent wildfire. Mitigation and rehabilitation measures planned for the proposed harvest areas have been demonstrated to be effective in reducing erosion and sediment delivery to stream channels (Robicaud 2000 and Klock 1975). Mitigation measures include contoured log felling, installation of water bars on skid trails, seeding with grass and spreading of logging residue on disturbed areas for use as protective cover and mulch. Extended SMZ widths and defining slope skidding restrictions would also be utilized to provide additional protection and reduce soil disturbance on sensitive slopes.

Recent studies concluded that trees killed by wildfire and left standing could still provide substantial levels of shade to small mountain streams (Amaranthus 1988). There will be no harvesting adjacent to Wilson Creek. The burn intensities were not intense enough to suggest fire salvage below the existing road segment paralleling Wilson Creek. The existing road is the unit boundary.

Portions of the sale area are drained by ephemeral draws, swales and wet areas that lack discernable stream channels. Equipment restrictions and designated crossings will be utilized to protect all wet areas and ephemeral draws.

The primary risk to water quality is associated with roads, especially roads constructed along or crossing streams. Sediment delivery from existing roads is expected to increase over past levels as a result of the recent wildfire. This is largely due to increases in runoff from loss of leaf area and the loss of road cut and fills vegetation, which provided a stabilization mechanism. DNRC will utilize all reasonable mitigation and erosion control practices during any reconditioning or reconstruction of all roads, stream and draw crossings during the proposed activities. Site specific design recommendations from DNRC Hydrologist, Soil Scientist would be fully implemented under the action alternative. Approximately .35 miles of temporary road or skid trail construction would occur to access the portions of the proposed harvest areas. These temporary disturbances are not expected to impact water quality. This is due to BMP design, and the proposed construction locations are not near any perennial stream channels.

Up to 1.7 miles of existing low standard road would be improved under the action alternative to a standard that meets minimum BMPs. Under the DNRC proposal, these road segments will be improved to reduce erosion and delivery to the affected stream channels and draw bottoms. Improvements include, but are not limited to, installation and or reconstruction of road surface drainage features, stabilization of eroding cut and fill slopes and installation of sediment buffer structures i.e. slash filter windrows and/or filter fabric fencing with straw bales (depending on site location).

Cumulative Effects - Water Quality:

Proper application of BMPs and site-specific designs and mitigation measures will reduce erosion and potential water quality impacts to an acceptable level as defined by the water quality standards. Acceptable levels are defined under the Montana Water Quality Standards as those conditions occurring where all reasonable land, soil and water conservation practices have been applied.

The proposed harvest activities are not expected to increase sediment yield to stream channels. This is largely due to the location of the proposed harvest units along the landscape and mitigation designed to minimize erosion. Several studies suggest that increases in erosion and sediment yield associated with post-fire harvest are largely attributed to new road construction and use of ground based and cable yarding systems in areas having steep slopes and sensitive soils without the protection of snow cover or frozen soils (Klock 1975 and McIver 2000). Harvest operations would be conducted under dry or frozen conditions.

The proposed salvage harvest is not expected to increase water yield, surface runoff, or magnitude and duration of peak flows and consequently increased sediment delivery over those levels already expected due to the effects of the wildfire. Only a limited number of green trees within the clearing limits of the needed skid trail or temporary road access routes would be harvested. Within the proposed units, only trees dead or dying from the direct effects of the fire or bug kill would be salvaged.

Erosion control measures and other improvements to the existing road system are expected to result in long-term improvements to downstream water quality and improved protection of beneficial uses. There is little risk of measurable adverse impacts to downstream water quality and beneficial uses occurring as a result of the proposed action alternative. No activities associated with the Wilson Creek Salvage will occur adjacent to Wilson Creek.

Cumulative Watershed Effects:

No Action Alternative:

The No Action Alternative would maintain measurable cumulative effects from past management activities and recent wildfire effects, but would decline as hydrologic recovery continues to occur.

Action Alternative:

The proposed salvage will occur in stands of dead timber as a result of the recent wildfire. These trees are no longer capable of removing water from the soil profile through the evapotranspiration process and they no longer provide substantial green canopy critical for snow and rainfall interception. Therefore, an increase in water yield above existing post-fire conditions is not applicable.

No increases in water yield or the magnitude and duration of peak flows are anticipated in the analysis area as a result of the proposed salvage harvest. This is due to the fact that, primarily, only dead and dying trees will be harvested. Increases in sediment yield are expected to be negligible due area treated, location along the landscape, and mitigation designed to minimize erosion.

Cold Water Fisheries:

No Action Alternative:

The no action alternative would continue to impact cold water fisheries habitat through erosion and sedimentation due to existing road conditions and locations and the current grazing strategy.

Action Alternative:

Increased levels of sedimentation resulting from the wildfire are expected to have occurred and will continue to occur until vegetative recovery is complete. The largest "pulse" of sediment is expected to have already occurred following fall rain events and the recent spring runoff. Mitigation measures implemented during the proposed harvest operations are expected to reduce existing and potential sediment delivery and subsequent impacts to local fish-bearing streams. Due to planning, harvesting locations and additional mitigation measures, it is unlikely that the proposed timber sale will affect large woody debris recruitment, shade or in-stream temperature into downstream fish-bearing streams.

The proposed activity would not have SMZ harvest or any harvest west of the existing Wilson Creek road. This is expected to maximize existing stream shade and minimize the potential for increases in stream temperatures due to the removal of standing trees along the channels. Additionally, this would provide for maximum future potential large woody debris recruitment.

In conclusion, no additional impacts as a result of the proposed project are expected to effect stream temperatures and LWD recruitment.

Cumulative Effects – Cold Water Fisheries:

The action alternative includes improvements to mitigate problems associated with the existing road system. These improvements are expected to reduce the risk of additional impacts to fish-bearing streams during the proposed sale activities. In addition, these improvements would have a minor long-term positive influence on water quality and fisheries habitat in the watersheds draining the proposed sale area.

No additional impacts to cold water fisheries are anticipated as a result of the proposed project. Retention tree

requirements are expected increase the longer-term probability of standing trees which would provide for LWD recruitment and stream shade.

RECOMMENDED MITIGATION MEASURES

Operations conducted in or near draw features and on steeper slopes have a higher risk of impacting soil resources and water quality. The following recommended mitigation measures would help minimize risk of impacts during the proposed activities. These mitigation measures are standard practices that may be applied to all harvest activities associated with the proposed Wilson Creek Fire Salvage Timber Sale. Recommended site-specific, contract design mitigation will be provided in a separate document.

General Road Design and Mitigation Recommendations:

- Plan, design and improve existing road systems to meet long-term access needs and to fully comply with current BMPs.
- Construct drain dips, grade rolls and other drainage features where necessary and practical to insure adequate road surface drainage. **Install and maintain all road surface drainage concurrent with harvest activities, reconstruction and reconditioning.** Drain dips constructed on sustained road grades greater than 8% may require gravel surfacing to function properly. Sustained road grades greater than 10% may require installation of conveyor belt water diverters.
- Grass seed all newly constructed or reconstructed road or skid trail cut and fills immediately after excavation or upon closure of the road or trail.
- Leave all temporary or abandoned roads in a condition that will provide adequate drainage and will not require future maintenance. Partially obliterate abandoned roads through ripping and seeding. Where it is available, scatter slash across the ripped road surface. Install water bars at regular intervals to facilitate surface drainage.
- Filter outlets of all ditches with direct delivery to streams or ephemeral draws with slash or filter fabric and straw bales.
- Limit road use and hauling to dry, frozen or snow covered conditions. Suspend operations when these conditions are not met **before** rutting occurs.

General Design and Mitigation Recommendations for Harvest Units:

- Implement Forestry BMPs as the minimum standard for all operations with the proposed timber sale.
- Protect all ephemeral draws, springs and wet areas with marked equipment restriction zones (ERZ). If absolutely necessary, designate locations for skid trail crossings. Minimize number of crossings and space at 200 feet where feasible. This will minimize soil disturbance within the vicinity of the draws. Use designated crossings only under dry or frozen conditions.
- Develop a skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use,

and what additional trails are needed. Trails that do not comply with BMPs (i.e. draw bottom trails) should not be used and closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.

- Leave 5 – 10 tons per acre of coarse woody material larger than 3 inches in diameter scattered throughout the sale units, predominately perpendicular to the slope. The Forest Officer should determine the appropriate amount of material and should designate pieces that would otherwise be skidded to be left for this purpose. This may require return skidding.
- Seed skid trails over 30%. Scatter slash on skid trails where feasible.

REFERENCES

- Amaranthus, M., H. Jubas and D. Arthur, 1988. Stream Shading, Summer Streamflow and Maximum Water Temperature Following Intense Wildfire in Headwater Streams. Proceedings of the Symposium on Fire and Watershed Management, October 26-28, 1988. Sacramento, California, USDA, Forest Service, Pacific Southwest Forest and Range Experiment Station, GTR PSW-109, p75-78.
- Beschta, R.L., R.E. Bilby, G.W. Brown, L.B. Holtby and T.D. Hofstra, 1987. Stream Temperature and Aquatic Habitat: Fisheries and Forestry Interactions. In Proceedings of Symposium Streamside Management: Forestry and Fishery Interactions held at the University of Washington, February 12-14, 1986, Seattle, WA. p191-232.
- Bragg, D.C., J.L. Kershner and D.W. Roberts, 2000. Modeling large Woody Debris Recruitment for Small Streams of the Central Rocy Mountains. USFS Rocky Mountain Research Station. General Technical Report, RMRS-GTR-55, June 2000. 36pp.
- Klock, Glen O. Impact of five postfire salvage logging systems on soils and vegetation. J. of Soil and Water Cons. 1975.
- McIver, James D. and L. Starr eds. 2000. Environmental effects of post-fire logging: Literature Review and Annotated Bibliography. General Tech. Report PNW-GTR-486. U.S. Forest Service, Pacific Northwest Research Station, Portland, OR. 72p.
- Montana Department of Environmental Quality. 2000. Draft Montana 303(d) List: Waterbodies in Need of Total Maximum Daily Load Development. Montana DEQ, Helena, MT. 315pp.
- Montana Department of Fish Wildlife and Parks, Clancy, C.G., Ij, Bitterroot Forest Inventory, July 1 1989 to June 30, 1990; August 1990; Statewide Fisheries Investigations. 1991.
- Obichaud, P.R., J.L. Beyers and D.G. Neary, 2000. Evaluating the Effectiveness of Postfire Rehabilitation Measures. USFS Rocky Mountain Research Station. General Technical Report RMRS-GTR-63. September 2000. 85pp.
- Salminen, E.M. and R.L. Beschta, 1991. Phosphorus and Forest Streams: The Effects of Environmental Conditions and Management Activities, Unpublished report. Department of Forest Engineering, Oregon State University, Corvallis, OR. 185pp.
- Spencer, C.N. and F.R. Hauer, 1990. Effects of Wildfire on Nutrient and Carbon Dynamic of Streams in Glacier National Park and the Flathead Nationsl Forest Associated with the Red Bench Fore. Open File Report 111-90, March 1990, Flathead Lake Biological Station, University of Montana, 54pp.
- USDA Forest Service, 2000. Burned Area Emergency Rehabilitation (BEAR) Report: Fridley Creek Fire, Gallatin National Forest, September 2001.

Wilson Creek Salvage
Ross Baty
Wildlife Biologist
April 30, 2002

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

Threatened and Endangered Species	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Bald Eagle (<i>Haliaeetus leucocephalus</i>) Habitat: late-successional forest <1 mile from open water	[N] Suitable nesting and foraging habitat does not occur within the project area or within portions of adjacent parcels that could be influenced by project-related activities. No direct, indirect or cumulative effects to bald eagles would be anticipated.
Gray Wolf (<i>Canis lupus</i>) Habitat: ample big game pops., security from human activity	[N] Transient use of the project area could occur, however, no known den sites occur on the project area or within one mile of the project area (J. Fontaine, USFWS, 4/30/02). Due to the limited size, duration and location of the proposed activities, there would be low potential for direct, indirect or cumulative effects to gray wolves.
Grizzly Bear (<i>Ursus arctos</i>) Habitat: recovery areas, security from human activity	[N] The project area lies 16 miles north of the Yellowstone Grizzly Bear Recovery Zone. Transient use of the project area could occur. However, due to the limited size, duration, location of the proposed activities, and incorporation of temporary roads in the proposed project design, there would be low potential for measurable direct, indirect or cumulative effects to grizzly bears.
Canada Lynx (<i>Felis lynx</i>) Habitat: mosaics—dense sapling and old forest >5,000 ft. elev.	[N] Preferred lynx habitat types do not occur in the project area, thus, it is unlikely that lynx would use the area appreciably. Some transient use of the project area is possible, however, measurable direct, indirect or cumulative effects would not be anticipated to result from proposed activities.
DNRC Sensitive Species	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
	[N] Habitat suitable for use by flammulated owls

<p>Flammulated Owl (<i>Otus flammeolus</i>) Habitat: late-successional ponderosa pine and Doug.-fir forest</p>	<p>does not occur in the project area, thus, no direct, indirect or cumulative effects would be anticipated.</p>
<p>Boreal Owl (<i>Aegolius funereus</i>) Habitat: mature to late-successional forest >5,200 ft. elev.</p>	<p>[N] Habitats and elevations used by boreal owls occur within the project area, however, proposed activities would not be expected to alter any usable existing habitat, or create disturbance that would be expected to measurably influence nesting pairs, should they occur in the vicinity. Thus, direct, indirect or cumulative effects to boreal owls would not be expected.</p>
<p>Black-Backed Woodpecker (<i>Picoides arcticus</i>) Habitat: mature to old burned or beetle-infested forest</p>	<p>[Y] Habitat suitable for use by black-backed woodpeckers occurs in the project area and would be treated under the Action Alternative (ie., up to 60 acres). Habitat is also present in portions of the 5,000 acres associated with the Purdy Fire-2001 and within 140 acres of burned forest that would remain on the project area post treatment. As such the proposed project would reduce by a small proportion, the available habitat suitable for use by black-backs at the landscape scale. Thus, the project would result in minor, indirect and cumulative adverse effects to black-backed woodpeckers. Anticipated effects would likely not be measurable at the scale of the 5,000-acre burn complex.</p>
<p>Pileated Woodpecker (<i>Dryocopus pileatus</i>) Habitat: late-successional ponderosa pine and larch-fir forest</p>	<p>[N] The project area occurs outside of the normal breeding range of pileated woodpeckers. Thus, direct, indirect or cumulative effects would not be anticipated to result from proposed activities.</p>
<p>Northern Bog Lemming (<i>Synaptomys borealis</i>) Habitat: sphagnum meadows, bogs, fens with thick moss mats</p>	<p>[N] Sphagnum meadows, bogs and fens with thick moss mats do not occur in the project area. Thus, direct, indirect or cumulative effects would not be anticipated to result from proposed activities.</p>
<p>Harlequin Duck (<i>Histrionicus histrionicus</i>) Habitat: white-water streams, boulder and cobble substrates</p>	<p>[N] Streams or rivers suitable for use by harlequin ducks do not occur in the project area, thus, direct, indirect or cumulative effects to harlequin ducks would not be expected.</p>
<p>Ferruginous Hawk (<i>Buteo regalis</i>) Habitat: prairies and badlands</p>	<p>[N] Grassland and badland habitats suitable for use by ferruginous hawks do not occur in the project area, thus, direct, indirect or cumulative effects to ferruginous hawks would not be expected.</p>
<p>Peregrine Falcon (<i>Falco peregrinus</i>) Habitat: cliff features near open foraging areas and/or wetlands</p>	<p>[N] Cliff features suitable for use by nesting peregrine falcons do not occur in, or within 1/2 mile of the project area. Thus, direct, indirect or cumulative effects would not be expected.</p>
<p>Mountain Plover (<i>Charadrius montanus</i>) Habitat: short-grass prairie, alkaline flats, prairie dog towns</p>	<p>[N] Grassland habitats suitable for use by mountain plovers do not occur in the project area, thus, direct, indirect or cumulative effects to</p>

	<u>mountain plovers would not be expected.</u>
Townsend's Big-Eared Bat (<i>Plecotus townsendii</i>) Habitat: caves, caverns, old mines	[N] No caves, or old mines suitable for use by Townsend's big-eared bats occur in the project area or within portions of adjacent parcels that could be influenced by project-related activities. Thus, direct, indirect or cumulative effects to Townsend's big-eared bats would not be expected.

May 6, 2002

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TO: CURT TESMER, Forester, Bozeman Unit
JIM KALITOWSKI, Unit Supervisor, Bozeman Unit
GARRY WILLIAMS, Area Manager, Central Land Office
GARY FRANK, State Land Management Section

FROM: JEFF COLLINS, Soil Scientist, DNRC

SUBJECT: Wilson Creek Salvage Timber Sale Soils Review
S ½ Section 36, T3S, R4E

EXISTING ENVIRONMENT

1.) Geology & terrain

The sale area is located on moderate to steep slopes at the base of the foothills of the Gallatin Range. Parent materials are mainly limestone and shale which weather to cobbly clay loam soils on the mountain sideslopes and rocky residual soils on the ridges. Deep tertiary deposits of silts and clays occur on the draw bottoms, and grassland footslopes. There are no unusual geologic features in the sale area. There are localized spots of marginal slope stability within the general area that require careful location of roads and harvest units. Harvest units are located to avoid areas of marginal slope instability. Rock outcrops and fractured bedrock occur along ridgelines

2.) Soils

Primary soils within the harvest area are a complex of Whitore gravelly clay loams and Sicksteets cobbly clay loams on moderate slopes of 20 to 45% with a few steep pitches over 45%. Whitore soils have more fractured gravels developed from fractured limestone forming on mountain hillsides. Sicksteets soils have higher clay contents and more commonly occur in concave slopes and draws. Surface soils are typically 8-12" depth gravelly silt loams. Erosion hazard is moderate to high, increasing with slope and area where the soil duff was burned. Erosion can be controlled with standard drainage features. These soils are subject to deep rutting and compaction if operated on when wet. Season of use is limited to frozen ground or dry summer months because soils tend to remain wet until late in the spring (typically June). These soils are adequately suited to tractor operations.

Ridges and the steeper sideslopes have shallower soils of loams over gravelly and cobbly silty clay loams and fractured rock, are more droughty and have a longer season of use. Slopes over 40% have a higher risk of displacement.

Environmental Effects of No Action Alternative

The No-Action alternative would have some potential direct and indirect effects on soil resources associated with the fire. Direct effects of the fire are varying levels of loss of vegetative cover, surface duff in severe burn, coarse woody debris on the soil surface and heat altered soils. The indirect effect is increased soil erosion related to burn severity and increased runoff associated with the moderately hydrophobic (water repellent) soils within the State section until ameliorated.

With No-action alternative we expect erosion to increase the first year after fire and slowly stabilize as native vegetation reoccupies the site. Summer thunderstorms present the highest risk of short term erosion. Existing roads with inadequate drainage would continue to erode without maintenance. There is some risk of shallow slope instability on some areas with increased soil moisture associated with the burned loss of trees, and depending on seismic activity. Roads with poor drainage would be at higher risk of localized instability.

Cumulative Effects of No Action

No-action would have some limited effect of continued erosion. Without the salvage operations there could be some cumulative effects over time that adequate Forest Improvement funds may not be available to complete periodic road maintenance, erosion control and weed control efforts. Funds from salvage operations provide funds for periodic maintenance and repairs.

Effects of the Action Alternative

For the Action Alternative we evaluate the effects of timber harvest and expect that fire effects would be similar to the no-action alternative. Effects of tractor skidding harvest could cause direct effect of soil disturbance that could result in increased erosion. Natural rates of erosion will be high, but we expect erosion would not be substantially more than severe burned areas not planned for harvest, based on implementation of attached mitigation measures. During sale development, DNRC was very concerned about the effects of the fire on soils, loss of vegetation and design of harvest systems relative to terrain and slope. Harvest units are designed to avoid ground skidding on small areas of marginal stability.

For the action alternative, specific mitigations and BMP's would be implemented to minimize the area and degree of soil effects associated with proposed harvest. Mitigations include skid trail planning, limit tractors to slopes less than 35%, placing drainage and woody debris on trails to control erosion. The most sensitive soils are found on wet sites and steep slopes in the severe burn areas, which will avoided or protected with site specific mitigation measures. Ground effects of harvest operations will be closely monitored. Placing coarse woody debris and broken tops on slopes can have some immediate benefit to slow surface water runoff and reduce erosion as observed on other fires (Sula 2000).

We do not expect any significant soils impacts if action alternative will implement BMP'S and site specific mitigation measures to protect soil and water resources. Portions of existing roads that have inadequate drainage and do not comply with BMP's will be repaired to improve drainage and control erosion. New temporary roads or skid trails are short in length (two segments totaling .35 of a mile), involve minimal excavation and would be stabilized and revegetated after use.

Cumulative Effects

No previous harvest units would be reentered, and there is low risk of cumulative effects based on the mitigation planned (see mitigation measures) that would minimize the area of detrimental soil impacts. As part of salvage rehab treatments, roads would have adequate drainage installed and revegetated to control erosion on roads will help reduce erosion and help disperse runoff from roads. Coarse woody debris will be retained to help reduce erosion within harvest units, and maintain nutrient cycling for long term productivity.

MITIGATION MEASURES FOR ACTION ALTERNATIVE:

- * Limit equipment operations to periods when soils are relatively dry (less than 20%) to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.
- * The logger and sale administrator will agree to a general skidding plan prior to equipment operations. Designate landing sites and skid trails to avoid short steep slopes and small slumps.
- * Retain 5-10 tons/acre coarse woody debris in harvest units as feasible for nutrient cycling and long-term productivity. Where woody debris is less than 5 tons/acre, in woods processing, return skid or other options may be required to achieve well distributed woody debris.