FISHERIES BIOLOGICAL ASSESSMENT & EVALUATION
LOLO NATIONAL FOREST, REGION 1, MONTANA

Project Name: Jocko Lakes Fire Salvage **Preparer: Tiffany Vanosdall**
Reviewer: Shane Hendrickson
Ranger District: Seeley Lake **Date Prepared: July 15, 2008**[1]

The following Biological Assessment (BA) is designed to satisfy the requirements of the Forest Service and U.S. Fish and Wildlife Service (FWS) for bull trout consultation. The BA also meets the requirements for a Biological Assessment (BE) for Westslope Cutthroat Trout. This BA/BE consists of 16 parts:

1. Project Description
2. Watershed Description
3. Species Descriptions and Habitat Requirements
4. Forest Plan Standards
5. Environmental Baseline - Species Indicators and Habitat Indicators
6. Status of INFISH Riparian Management Objectives
7. Direct, Indirect, and Cumulative Effects
8. Potential Effects to Species Indicators and Habitat Indicators
9. Matrix Checklist
10. Compliance with INFISH
11. Determination - Dichotomous Key for making ESA Determinations of Effects
12. Documentation of Expected Incidental Take
13. Rationale, Baseline and Determination for Proposed Critical Habitat
14. References Cited
15. Summary and Signature
16. Maps

Appendix A: List of Past, Present and Future Actions Considered in Cumulative Effects Analysis

[1] Modified by Sandy Mack, reviewed and approved by Shane Hendrickson on October 23, 2008, after phone conversation between Sandy Mack and Dan Brewer on October 21. Modifications include: 1) Corrections made that bull trout critical habitat is finalized, not proposed and related changes to primary constituent elements; 2) Modified Table 7 and added the section titled "Rationale, Baseline and Determination for Proposed Critical Habitat"; 3) Added statement that salvaging and timber haul may start in the winter of 2008/2009; 4) Removed confusing, duplicative map, minor word edits.

I. Project Description

The proposed action is comprised of specific activities to meet the purpose and need. The Jocko Lakes Fire Salvage project proposes to 1) salvage dead timber from burned areas on approximately 1,657 acres of National Forest System (NFS) land; 2) maintain (add drainage structures, blade and roll, pull ditches, etc) approximately 55 miles of classified NFS roads to be used as haul-routes for the salvaged timber; 3) construct approximately 2 miles of temporary and 2 miles of short-term specified roads to access proposed salvage areas; 4) store or decommission approximately 10.7 miles of unneeded classified NFS roads and unclassified roads to mitigate potential sedimentation from log haul; and 5) conduct ground-based noxious weed herbicide treatments along approximately 55 miles of NFS road and disturbed soil such as landings as well as the 10.7 miles of decommissioned or stored roads in order to mitigate potential weed spread from harvest activities; and 6) remove one and replace two aquatic barrier culverts in Finley Creek restoring access to approximately 2.5 miles of stream.. Table 1 summarizes the activities included within the Proposed Action. The Jocko Lakes Fire Salvage area is situated in Missoula County, 3 miles south west of the community of Seeley Lake, Montana (See Map 1 and 2). Salvage activities and timber haul could start in the winter of 2008/2009; all activities are anticipated to be completed by 2012.

Table 1. Summary of Activities

Activities	Units
Salvage Harvest Logging System	
Winter Tractor	1376 acres
Summer Tractor	21 acres
Skyline	260 acres
Total	1657 acres
Roads	
Miles of Haul Roads	55.1 miles
Construction – Temporary Roads	2.0 miles
Construction – Short Term Spec Roads	2.0 miles
Decommission	4.3 miles
Storage	6.4 miles
Short-term Spec Road Construction in RHCA	0.04 miles
Culverts	
Replace culvert on Finley Creek, Road #9975	1
Remove culvert on Finley Creek, Road #4339	1
Replace culvert on Finley Creek, Road #4367	1

II. Watershed Description

A. Overall Characterization of Watershed (Clearwater River Drainage)

The Clearwater River drainage is bounded on the west by the Mission Mountains and on the east by the Swan Range. Both mountain ranges are mainly sedimentary carbonate rocks. The entire valley and surrounding mountains were heavily glaciated during the Pleistocene epoch. Topography of the area is dominated by a prominent linear trend roughly paralleling the center of the valley. Glacial till deposits are found from valley floor level to the highest elevations within the area bounded by the Swan and Mission ridges. Alden (1953) shows that valley glacier ice, fed by tributary glaciers from the Swan and Mission Ranges, moved northwestward down the Swan Valley and southeastward down the Clearwater Valley. Apparently the present drainage divide separating the two river systems was the locale for accumulation of an ice mass nourished by tributary glaciers that spread laterally both northwestward and southeastward. Further, according to Alden (1953), the ice was at least 1,000 feet thick in the vicinity of present Salmon Lake and extended as far south as the Blackfoot Valley. Till deposits indicate that ice once covered Rice Ridge to its highest elevations. The surficial deposits underlying Rice Ridge to the south represent a medial moraine emplaced by ice and meltwater from both valley glaciers.

The present climate has moderated considerably in this age. Current average annual precipitation in the valley bottom is 30 inches and ranges up to 40 inches at the crest of the Missions and more than 70 inches on the ridges of the Swans. Temperatures in the valley range from a "normal" low (average of daily lows for the month) in January of 9 degrees (F) to a normal high in July of 82 degrees.

According to Lustgraaf (1972), the valleys of the present Clearwater River and its tributaries consist predominantly of post-glacial stream deposits. Watershed shape is often long and narrow with the main valley floor made up of irregular deposits of glacial till. When this type of soil is bare of vegetation, it is readily eroded, especially in areas of steep slopes. This till can be "heavy" resulting in poor infiltration and subsurface drainage. After the glaciers receded, meltwater streams formed alluvial deposits of water-sorted and stratified particles over a wide range of sizes, although most are sand to gravel size. Approximately 50% of the Clearwater River valley and portions of some tributary valleys are stagnant, marshy land, especially at the inlets to the lakes. A good portion of the remainder of the soils are glacial till deposits which again range from clay to boulder size material. Silt to cobble size fragments are the most common.

The Clearwater River originates at Clearwater Lake, which is fed by underground springs and intermittent avalanche chutes, has an area of approximately 100 acres, and is at an elevation of 4790 feet. From Clearwater Lake the river flows about 5.1 miles to Rainy Lake (elev. 4100, area 100 acres). The East Fork of the Clearwater intersects the river between Clearwater and Rainy Lakes. (A lesser stream, Bertha Creek, empties into Rainy Lake from the northwest but its flow is much less than that of the Clearwater River.)

From Rainy Lake, the Clearwater flows about 1.7 miles to Lake Alva (elev. 4080, area 300 acres), picking up water from Colt Creek from the west and an unnamed creek from the east. Richmond Creek flows directly into Lake Alva from the east.

From Alva to Lake Inez (elev. 4058, area 300 acres) the Clearwater flows about 1.3 miles with Uhler Creek joining from the west. The Clearwater then runs 7.6 miles to Seeley Lake, and Camp, Findell, Murphy, Benedict, and Sawyer Creeks join from the east. Deer Creek from the west and Rice and Seeley Creeks from the east flow directly into Seeley Lake. A small lake of approximately 11 acres is formed above Seeley Lake by a fish barrier.

The Clearwater River exits the west side of Seeley Lake and flows approximately 7 miles to Salmon Lake. During this stretch of river it is joined by Beaver, Morrell, and Owl Creeks (Placid Creek). The Clearwater River continues to flow south into Elbow Lake and then Blanchard Lake. Approximately 4 mile after leaving Blanchard Lake the Clearwater River enters the Blackfoot River. Tributaries to the Clearwater River, between Salmon Lake and the confluence of the Blackfoot River, are Fish, Lost Prairie, Lost Horse, and Blanchard Creeks.

The general nature of the surface and sub-surface hydrologic environment beneath the Clearwater River valley floor can be reasonably inferred from geologic mapping by the U.S.G.S. (Witkind 1977). Bedrock in the area is primarily composed of argillites of Precambrian age. These rocks are hard and generally impervious to fluid flow except where fractured.

The bedrock basin underlying the study area contains a large volume of unconsolidated valley fill and forms an extensive groundwater reservoir. The valley fill, and consequently the groundwater reservoir, is deepest along the center of the valley. Topography and the distribution of rock outcrops indicate that the bedrock basin narrows gradually toward the north also abruptly about 2 miles down valley from the lake.

Recharge for this groundwater reservoir is accomplished by a combination of groundwater inflow from the Clearwater River, subsurface inflow from tributary drainages, subsurface flow through unconsolidated rock material overlying the main valley slopes and the main lake. The water level of the main lake, kettle hole lakes, drift-dammed ponds, and perennial streams are surface expressions of the water table which forms the upper boundary of the groundwater reservoir.

Geologic mapping further portrays the distribution of unconsolidated material units. Drilling indicates that valley fill materials may exceed 600 feet in thickness at several sites. This depth of fill suggests that surface and sub-surface hydrology are closely linked. The materials are dominantly interfingering accumulations of glacial till, outwash and alluvium from several glaciations. To a large extent, the fill materials were derived from local sources though ice transport from areas further north is indicated by the presence of erratics. When till soil is bare of vegetation, it is readily eroded, especially in areas of steep slopes. Glacial tills because of their fine grain soil particles are generally very erosive and are easily transported in water. However, the topography in the main stem valleys is generally undulating with lower slopes which tend to keep sediment delivery risks low. Also, the main stream channels are described as "under-fit"; that is they evolved under conditions of much higher discharge. They are thus able to carry higher volumes of water without a high risk of eroding sediment from within the channels.

III. Species Descriptions and Habitat Requirements

A. Bull Char (*Salvelinus Confluentus*)
USFWS Status: Listed as a Threatened Species within the Columbia River Basin on July 10, 1998
USFS Region One Status: Sensitive

The following discussion of bull trout habitat requirements in Montana is taken from MBTSG 1998. The majority of migratory bull trout spawning in Montana occurs in a small percentage of the total stream habitat available. Spawning takes place between late August and early November, principally in third and fourth order streams. Spawning adults use low gradient areas (< 2%) of gravel/cobble substrate with water depths between 0.1 and 0.6 m and velocities from 0.1 to 0.6 m/s. Proximity of cover for the adult fish before and during spawning is an important habitat component. Spawning tends to be concentrated in reaches influenced by groundwater where temperature and flow conditions may be more stable. The relationship between groundwater exchange and migratory bull trout spawning requires more investigation. Spawning habitat requirements of resident bull trout are poorly documented.

Successful incubation of bull trout embryos requires water temperatures below 8º C, less than 35-40% of sediments smaller than 6.35 mm in diameter, and high gravel permeability. Eggs are deposited as deep as 25.0 cm below the streambed surface and the incubation period varies depending on water temperature. Spawning adults alter streambed characteristics during redd construction to improve survival of embryos, but conditions in redds often degrade during the incubation period. Mortality of eggs or fry can be caused by scouring during high flows, freezing during low flows, superimposition of redds, or deposition of fine sediments or organic materials. A significant inverse relationship exists between the percentage of fine sediment in the incubation environment and bull trout survival to emergence. Entombment appeared to be the largest mortality factor in incubation studies in the Flathead drainage. Groundwater influence plays a large role in embryo development and survival by mitigating mortality factors.

Rearing habitat requirements for juvenile bull trout include cold summer water temperatures (15° C) provided by sufficient surface and groundwater flows. Warmer temperatures are associated with lower bull trout densities and can increase the risk of invasion by other species that could displace, compete with, or prey on juvenile bull trout. Juvenile bull trout are generally benthic foragers, rarely stray from cover, and they prefer complex forms of cover. High sediment levels and embeddedness can result in decreased rearing densities. Unembedded cobble/rubble substrate is preferred for cover and feeding and also provides invertebrate production. Highly variable streamflow, reduction in large woody debris, bedload movement, and other forms of channel instability can limit the distribution and abundance of juvenile bull trout. Habitat characteristics that are important for juvenile bull trout of migratory populations are also important for stream resident subadults and adults. However, stream resident adults are more strongly associated with deep pool habitats than are migratory juveniles.

Both migratory and stream-resident bull trout move in response to developmental and seasonal habitat requirements. Migratory individuals can move great distances (up to 250 km) among lakes, rivers, and tributary streams in response to spawning, rearing, and adult habitat needs. Stream-resident bull trout migrate within tributary stream networks for spawning purposes, as well as in response to changes in seasonal habitat requirements and conditions. Open migratory corridors, both within and among tributary streams, larger rivers, and lake systems are critical for maintaining bull trout populations.

B. Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi*)
USFWS Status: Petitioned for listing under the Endangered Species Act

R-1: Status: Sensitive

Westslope cutthroat trout have two distinctive life forms: migratory and resident. Migratory life forms are either fish that spend most of their adult lives in lakes (Adfluvial) or rivers (Fluvial) and migrate into tributaries to spawn. Resident cutthroat trout are fish that generally spend their entire lives in the tributaries of which they were reared and are usually much smaller in size than their migratory counterparts. Spawning takes place from March to early July with water temperature near 10° Celsius (McIntyre and Rieman, 1995). Westslope cutthroat trout begin to sexually mature at age three and usually are spawning by ages four and five (McIntyre and Rieman, 1995). Spawning adults can be as small as 15 cm with females containing as few as 100 eggs (Meehan and Bjornn, 1991). Fry will emerge from spawning gravels from June to mid-July and will usually stay within their natal streams from one to four years, if they are the migratory form.

C. Extinction Risks for Sensitive Fish Species:

Using the methodology outlined by Rieman (et al. 1993), risks of extinctions for westslope cutthroat trout and bull trout were estimated at the regional level and local level. The regional level was considered as the entire Blackfoot Drainage. Here the risk of extinction for bull trout was rated as moderate and westslope cutthroat trout was rated as low. This is due to increased fish barriers, suppressed native fish populations, introduced fish species, increased fishing pressure, and degraded habitats. At the local levels risks are rated in Table 2.

Table 2. Risk of Extinction Ratings for Bull Trout and Westsclope Cutthroat Trout in each Project Area Watershed

Watershed	Bull Trout Risk of Extinction	Westslope Cutthroat Trout Risk of Extinction
Seeley Archibald	High	Moderate/High
Finley Slippery	High/Extremely High	Moderate/High
Boles	High	Moderate/High
N. Fork Placid	High	Moderate/High
Placid Vaughn	High	Moderate/High
Deer Creek	Moderate/High	Moderate/High

Risk is based on the populations being intermittently isolated by local fish barriers, lower population numbers, and local habitat conditions (Blackfoot Baseline 2003).

These risks are analyzed with respect of the three general mechanisms of extinction: Deterministic, Stochastic, and Genetic. Deterministic extinctions occur when there is a cumulative loss of critical component in a species environment (ex. loss of pool habitat). Stochastic processes are those risks that are a result of chance events (Ex. forest fires, mud slides, etc.). The genetic extinction mechanism is the loss of genetic diversity within a population. Depending on the nature of individual effects the result is usually an increase in the risk of extinction. For example, a culvert that is a fish passage barrier has separated a population in half. Therefore, the population above the culvert is isolated and has a higher risk of extinction based on the inability of recolonizing from below. In addition to being isolated the continuation of the deterministic effects continues to deplete the population unless stabilized. Any given individual effect has the ability to become synergistic in relation to the three mechanisms identified above, therefore, increasing the overall risk of extinction.

IV. Forest Plan Standards

Forest management practices with the potential to affect water quality are governed by the Federal Water Pollution Control Act Amendments of 1972 referred to as "The Clean Water Act of 1972". This Act (Public Law 92-500), as amended in 1977 (Public Law 95-217) and 1987 (Public Law 100-4), was intended by Congress to provide a means to protect and improve the quality of the water resources and maintain their beneficial uses. The Clean Water Act (Sections 208 and 319) recognized the need for control strategies for nonpoint source pollution.

To provide environmental protection and improvement emphasis for water and soil resources and water-related beneficial uses, the National Nonpoint Source Policy (December 12, 1984), the Forest Service Nonpoint Strategy (January 29, 1985), and the USDA Nonpoint Source Water Quality Policy (December 5, 1986) were developed. Soil and water conservation practices were recognized as the primary control mechanisms for nonpoint sources of pollution on National Forest System lands. This perspective is supported by the Environmental Protection Agency (EPA) in their guidance, "Nonpoint Source Controls and Water Quality Standards" (August 19, 1987).

Federal agency compliance with water pollution control mandates are addressed through Section 313 of the Clean Water Act and in Executive Order 12580 of January 23, 1987. Agency compliance is to be consistent with requirements that apply to "any nongovernmental entity" or private person. Compliance is to be in line with "all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution". To comply with State Water Quality Standards, the Forest Service is required to apply water quality practices in State Forest Practices Regulations, where applicable - reasonable land, soil, and water conservation practices, or specialized best management practices. All these types of practices are designed with consideration of geology, land type, soil type, erosion hazard, climate, cumulative affects and other factors in order to fully protect and maintain soil, water, and water-related beneficial uses, and to prevent or reduce nonpoint source pollution.

Montana Water Quality Standards in the Clearwater River are based on protection of resident cold water fisheries and their habitat (Classification B-1). No streams or lakes in the project area are listed as water quality limited under section 303(d) of the Clean Water Act in the 2006 303(d) list, which is under litigation. In the interim, Montana DEQ is operating under court order to address the impairments identified on the 1996 303(d) list, which shows Buck Creek as an impaired stream. A TMDL is being developed in the Middle Blackfoot sub-basin, which includes the project area.

Finally, there is a Memorandum of Understanding between U.S. Forest Service, Montana Dept. of State Lands, Plum Creek Timber Company, Bureau of Land Management, Bureau of Indian Affairs, Flathead Agency, Dept. of Natural Resources and Conservation, and Dept. of Health and Environmental Sciences for the adopting and implementing of Best Management Practices for Forestry in Montana. This memorandum direction went into effect April 1987, and provides that the parties agree to incorporate Best Management Practices into their forest operations in order to minimize or prevent adverse water quality impacts.

Following is a brief synopsis of the Lolo National Forest standards and guidelines for fisheries and water quality as they pertain to bull trout management. All guidelines are contained in The Lolo National Forest Plan and are referenced as to their occurrence.

The Forest-Wide Management Direction (Section II.) provides 3 goals (II.A.) pertinent to this issue:

1) Provide habitat for viable populations of all indigenous wildlife species (II.A.2.);
2) For threatened and endangered species occurring on the Forest, manage to contribute to the recovery of each species to nonthreatened status (II.A.7.); and,
3) Meet or exceed State water quality standards (II.A.8.).

The Objective of these goals is to provide habitat for viable populations of the diverse wildlife and fish species on the Forest through strong standards, quality research, and an extensive Monitoring Program that emphasizes protection of water quality and fishery habitat (II.B.1).

Research needs applicable to fisheries and water quality which are outlined in the Forest Plan state that we will determine the relationship of types and levels of instream sediment to fish habitat productivity potential, and the importance of fish habitat on the Forest to downstream waters (II.C.3.).

The Forest Plan also depicts a Desired Future Condition of the Forest. Specific to bull trout management, the plan states that by 1995 habitat to support threatened and endangered species will have been protected consistent with recovery goals (II.D.1.). It also states that by 2035 sufficient habitat will exist for threatened and endangered species to meet the objectives of the recovery plans. Factors limiting recovery will have been eliminated where possible (II.D.2.).

Lolo Forest Plan Standards (Section II.E.) are designed to supplement National and Regional policies, standards, and guidelines. Forest-wide standards which apply to bull trout management are as follows:

1) The application of "Best Management Practices" will assure that water quality is maintained at a level that is adequate for the protection and use of the National Forest and that meets or exceeds Federal and State standards (II.E.15.);
2) A watershed cumulative effects analysis will be made of all projects involving significant vegetation removal prior to these projects being scheduled for implementation (II.E.17.);
3) Human-caused increases in water (and sediment) yields will be limited so that channel damage will not occur as a result of land management activities (II.E.19.);
4) If and when additional T&E species are identified, appropriate measures, pursuant to Section 7 of the Endangered Species Act, will be taken to protect the species and its habitat consistent with National goals for species recovery to nonthreatened status. For plant and animal species that are not threatened or endangered, but where viability is a concern (i.e., sensitive species), manage to maintain population viability (II.E.27.); and,

5) Land management practices shall be designed to have a minimum impact on the aquatic ecosystem, free from permanent or long-term unnatural imposed stress. (A long-term stress is defined as a downward trend of indicators such as aquatic insect density or diversity, fish populations, intragravel sediment accumulations, or channel structure changes that continue for more than 1 hydrologic year as determined by procedures outlined in the Forest Plan Monitoring Requirements (Section V) (II.E.28).

In addition to these Forest-wide standards, the Forest Plan emphasizes site-specific protection of fisheries and water quality through Management Area standards and guidelines (Section III.). There are 28 management areas on the Forest, each with different management goals, resource potentials and limitations. The specific management areas and standards which usually pertain to fisheries and water quality are summarized below. For a more detailed explanation, refer to Section III under the specified management area.

1) Management Area 13 -- This MA consists of lakes, lakeside lands, major second-order and larger streams and the adjoining lands that are dominated by riparian vegetation and lie outside of existing grazing allotments. Briefly, MA 13 lands are managed to maintain and enhance the value of riparian areas for fishery and aquatic habitat and water quality (III-56.B.1.). Pertinent standards for MA 13 lands are to maintain natural habitat for indigenous aquatic organisms, protect riparian vegetation, and minimize impacts on water quality through project prescriptions developed in coordination with the Forest Fisheries Biologist, Hydrologist, and/or Soil Scientist (III-56.C.5,9,10.). The standards also state that streams containing pure westslope cutthroat will be managed specifically for that subspecies (III-56.C.20.). No standards apply directly to bull trout.

2) Management Area 14 -- This MA consists of lands similar to lands in MA 13, but which lie within existing livestock grazing allotment(s). MA 14 lands are managed for the same goals as MA 13 lands (III-64.B.1.). Pertinent standards for MA 14 lands are to prevent concentration of livestock in riparian areas and to reverse downward trends in riparian habitat resulting from livestock degradation (III-64.C.5,7.).

3) Management Area 16 -- This MA consists of timbered lands which often contain the channels, banks, and lands immediately adjacent to first- and some second-order streams. Goals for lands in MA 16 are to provide for healthy stands of timber, while maintaining water quality and stream stability (III-70.B.1,4.). Pertinent standards for MA 16 lands are that riparian vegetation, including overstory tree cover, will be managed along all perennial and intermittent streams with defined channels to maintain cover and temperatures for trout habitat, maintain streambank stability, and promote filtering of overland flows (III-70.C.7.). The standards also state that timber harvest will not create runoff increases likely to result in channel degradation (III-70.C.4.), and new roads in riparian zones will be minimized (III-70.C.11.).

The Lolo Forest Plan was amended on August 30, 1995 by the Inland Native Fish Strategy (INFISH) (USDA Forest Service 1995). This interim strategy was designed to provide additional protection for existing populations of native trout, outside the range of anadromous fish, on 22 National Forests in the Pacific Northwest, Northern and Intermountain Regions. Implementing this strategy was deemed necessary as these species were at risk due to habitat degradation, introduction of exotic species, loss of migratory forms and over-fishing. As part of this strategy, the Regional Foresters designated a network of priority watersheds. Priority watersheds are drainages which still contain excellent habitat or assemblages of native fish, provide for metapopulation objectives, or are watersheds which have excellent potential for restoration. The Clearwater River above the outlet of Salmon Lake, including all its tributaries, is a priority watershed. Other priority watersheds on the Lolo National Forest include Fishtrap Creek, West Fork Thompson River, Prospect Creek, St. Regis River, Cedar Creek, Trout Creek, Fish Creek, Petty Creek, South Fork Lolo Creek, Rattlesnake Creek, Gold Creek, Belmont Creek, Rock Creek, Cottonwood Creek, and Monture Creek.

INFISH also established Riparian Management Objectives (RMOs) and Riparian Habitat Conservation Areas (RHCA). RMOs are habitat parameters that describe good fish habitat. Where site-specific data is available, these RMOs can be adjusted to better describe local stream conditions. These RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of riparian goals is measured. The Lolo National Forest has developed site specific RMO's for most of the habitat variables based on information collected in roadless watersheds (Riggers et al 1998). RHCAs are portions of watersheds where riparian dependent resources receive primary emphasis. The RHCAs are defined for four categories of stream or waterbody dependent on flow conditions and presence of fish. RHCAs are areas where specific management activities are subject to standards and guidelines in INFISH.

300 ft. RHCA Buffer:

Perennial, fish bearing streams. Buffer shall extend on both sides of the stream and shall be at least 300 feet, or to the outer edges of the 100-yr flood plain, or the outer edges of riparian vegetation, which ever is greatest.

150 ft. RHCA Buffer:

Perennial, non-fish bearing streams. Buffer shall extend on both sides of the stream and shall be at least 150 feet, or to the outer edges of the 100-yr flood plain, or the outer edges of riparian vegetation, which ever is greatest.

Wetlands, ponds, lakes, reservoirs greater than 1 acre. Buffer shall extend to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or 150 feet slope distance from the edge of the maximum pool elevation on constructed ponds, lakes, or reservoirs, or from the edge of the wetland, pond or lake, whichever is greatest.

100 ft. RHCA Buffer:

Intermittent streams. Buffer shall extend on both sides of the stream and shall be at least 100 feet, the distance equal to the height of one site-potential tree, or shall extend to the end of riparian vegetation, which ever is greatest.

Wetlands less than 1 acre: Buffer shall extend to the outer edges of the riparian vegetation, or shall be at least 100 feet, or shall be the distance of one-half of one site-potential tree, whichever is greatest.

V. Environmental Baseline - Species Indicators and Habitat Indicators

A. Clearwater Bull Trout and Westslope Cutthroat Trout Subpopulation:

As discussed within the 1998, Fish and Wildlife Service document "A Framework to Assist in making Endangered Species Act Determinations of Effect for individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale, Draft". A baseline condition must be developed through the use of species and habitat indicators. This section is a discussion of the Species Indicators for all of the Clearwater River. The bull trout and westslope cutthroat trout subpopulation indicator questions used in the Matrix could not be answered at a 6th field HUC scale. Therefore, all the 6th code HUC's within the Clearwater River were combined to make up a subpopulation. For more discussion see (Blackfoot Bull Trout Baseline 2000).

Due to the glaciated nature of the Clearwater drainage, many streams are lower gradient C channel types, providing desirable fish habitat. The Clearwater flows from it's headwaters through a chain of several lakes, where it eventually drains into the Blackfoot River. The Forest Service manages about 70 % of the upper half of the Clearwater River, the remaining 30% a combination of Plum Creek and private ownership. In the lower section of the Clearwater River the Forest Service manages about 5%, with private ownership making up the rest. The most significant uses and impacts are associated with timber, roads, and recreation.

Bull trout and cutthroat are present within the main stem Clearwater River, its tributaries, and the chain of lakes through which the Clearwater River flows. Both bull trout and cutthroat subpopulations are Functioning at Unacceptable Risk in all categories, except subpopulation size, which is Functioning at Risk. Professional judgment would indicate that this drainage does have greater than 50 fluvial adult bull trout and greater than 500 fluvial adult cutthroat within it. This is primarily based on the high number of tributaries to the Clearwater River that have quality spawning gravels. There are also several lakes within this system that provide excellent rearing habitat for adult and juvenile fish. Growth and survival is limited, based largely on the presence of fish barriers throughout the system and the high density of exotic fish species (brown trout, rainbow trout, brook trout, northern pike, yellow perch, walleye, largemouth bass, and pumpkinseed sunfish). As many as 20 different fish species currently inhabit this system. Of particular consequence to the native westslope cutthroat and bull trout is the presence of brown, brook and rainbow trout. These fish hybridize and compete with the native trout, resulting in reduced population viability of the native species. The impact of the introduction of northern pike into these lake systems is currently being evaluated by the Montana Department of Fish, Wildlife, and Parks. Because of the piscivorous nature of pike, the impact on salmonid populations could be substantial.

For both bull trout and cutthroat the fluvial migratory form is present in the watershed, but other metapopulations have been disconnected. Connectivity at a Sub-Basin scale was limited due to Milltown Dam, however, with the recent removal of the dam and the connectivity between other fluvial forms in the Blackfoot River system and Upper Clark Fork fish (Rock Cr. in particular) connectivity has increased at a Sub-Basin scale. Connectivity at a Watershed scale is severely limiting fluvial and adfluvial life forms. This is primarily due to dams at Rainy Lake, Placid Lake, and a dam between Inez and Seeley Lakes. Discussions are ongoing with Montana FWP about mitigation passage at these two dam sites. There is an additional dam at the outlet of Placid Lake which creates an upstream barrier and effectively isolates the Placid Watershed. There is also a water diversion structure at Clearwater Crossing that may be a barrier during low flows. Stream crossings by roads also create potential migration barriers, to what extent has not been fully identified.

Alva, Inez and Seeley Lakes all have Known Present Depressed populations of bull trout and cutthroat, and Presumed Strong populations of rainbow, brown and brook trout. Of all the streams sampled, bull trout were either Presumed Present Depressed or

Known Present Depressed. Cutthroat were the same, except that Deer Creek and the West Fork of the Clearwater have Presumed Strong populations. Belmont and Camp Creek were tested to have genetically pure strains of cutthroat. Blanchard Creek was tested to have hybridization between westslope cutthroat trout and rainbow trout.

Habitat within this drainage has been heavily impacted from timber harvest, roading, and recreation, resulting in a fragmented habitat. Road densities are high in most of the drainage, the lowest being Morrell Cr. at 2.73 and the highest being Lower Placid Cr. at 5.22. All drainages had between 20 and 30% of roads within a 300 ft. buffer. The lower Clearwater was very high at 31.2% and the lowest was Trail Creek at 21.1%. Percent streams without canopy cover is moderate to high. One reason for this may be due to the numerous C channel streams in this glaciated drainage that have characteristics of wide, flat valley bottoms, dominated by shrub species. In these areas, sedimentation is probably increased; decreasing spawning habitat quality and decreased canopy cover will reduce shade and potential large woody debris. Sedimentation is also an increased concern due to the high amount of timber harvest, roading, and sensitive soils within this Watershed. A summary of the habitat and species indicator baselines can be seen in Table 4.

B. Local Watershed Scale

In 1997 the Lolo National Forest completed an analysis of the Placid Creek watershed which detailed the existing condition for most streams in the Jocko Lakes Fire Salvage project area. A walkthrough survey was also conducted in 2007, after the Jocko Lakes Fire.

Placid Creek
Placid Creek begins near the Reservation Boundary and flows in an eastward direction into Placid Lake. Placid Creek has Walkthrough data collected from surveys in 1971, 1981 and 2007. Also during the 1995, season a Basin Wide Survey was conducted on Placid Creek.

1981 Walkthrough Data (T16N R16W S14 near the mouth of Beaver Creek): This reach of stream has a gradient of 1.0%. Average maximum pool depth is 1.3 feet with pool habitat representing 12% of the stream area. This leaves riffle habitat making up the difference of 88%. Substrate in riffle habitat is dominated by rubble (58%) with the remaining 42% as gravel. Flow is estimated at 28 cubic feet per second (cfs) and active large woody debris is in low amounts. The reaches above this point are in similar condition until the gradient increases which is near Second Creek. Here the gradient increases to greater than 2%. Average maximum pool depth increases to 1.7 feet and pools increased to 17% with the remaining inriffle habitat. Again large woody debris is in low amounts.

1995 Basin Wide Data (T16N R16W S14 boundary to mouth of Beaver Creek): This reach has a gradient that varies from 0.5 to 2.0% and is a Rosgen C Channel type. Water temperature during the month of August was 53 degrees Fahrenheit. Average wetted width is 11 meters with an average depth of .4 meters creating a width to depth ratio of 27. Pools created 89% of the surface area leaving the remaining as riffle habitat. Beaver dams were estimated to be creating 60% of the pools with logs and rootwads making up the 40%. Substrate in pools was ocularly measured at 63% fines, 23% gravel, 10% rubble, 2% cobble, 2% boulder, and riffle habitat 15% fines, 25% gravel, 25% rubble, and 35% cobble. Juvenile and adult cover in pools is the total of overhanging cover, submerged cover and large substrate. For this particular reach the juvenile and adult cover measure to 17.5%. Active large woody debris is found in quantities of 32 pieces per mile and potential large woody debris totaled 403 per mile. Approximately 0.41% of the banks were subject to some form of erosion. Canopy cover was dominated by a spruce overstory and willow understory. Snorkeling data revealed 27 eastern brook and 2 westslope cutthroat trout in a 100 meter reach.

General notes indicate that this reach is dominated by large shallow, silted in beaver ponds. Characteristic of an open canopy which allows increased sunlight exposure. Spawning habitat is available in short reaches and many young of the year were observed.

2007, Walkthrough Data (T16N R16W S10): The stream type is a C5, with some areas being more characteristic of a C4 stream type. There was approximately 30’ of bank erosion within this survey reach and 15% of the banks were undercut. Most of the DWD within this section looks as though it was here prior to the fire. LWD totaled 21 pieces for the reach and there was low to moderate complexity throughout this reach. There is an old road bed about 20’ from stream (left bank) that basically parallels the stream through most of the survey reach. (Probably no direct affect on stream). The only living vegetation within this reach is along the banks of the stream. Streamside vegetation mainly consisted of Red-osier dogwood, willow, and some cottonwoods. Estimated live crown ratio through this reach was 5%. (High fire severity). The only shade for the stream is provided by the streamside shrubs and trees. Percent surface fines averaged 4 % and pools made up approximately 14% of the total habitat. Banks generally looked stable, excluding a few areas where erosion is occurring (mainly due to falling trees and lack of streamside vegetation).

Boles Creek
Boles Creek was surveyed in 1971, 1981 and 2007 with the walkthrough survey method. The lower two-thirds of this stream is a Rosgen B and A channel type while the upper third is a beaver influenced C channel type. The Montana Rivers Information System (1996) indicates that this stream supports residential use by rainbow trout, brook trout, bull trout, and westslope cutthroat trout. There is also a high voltage power line that crosses perpendicular to this stream.

1981 Walkthrough Data: This survey broke the stream into five reaches and for the purpose of simplicity they will be combined into two reaches here. The lower reaches, from the power lines to the road crossing in section 31 T16N R16W, have a higher gradient which vary from 2% to 4%. Average maximum pool depth is 1.5 feet. Pools represented approximately 20% of the stream area with riffles making up the difference. Substrate composition varies within this reach; the upper end contains 15% and 35% fines consecutively for riffles and pools. The lower end, near the power lines, contains 30% and 55% fines for riffle and pool habitats. The lower segment is lacking sufficient active and potential large woody debris, but the upper segment contains adequate amounts. This lower segment also had a bright yellow appearance which is believed to be calcareous deposits. This would also explain the high conductivity of the water.

The upper reaches, starting in section 31 to the headwaters, where not impounded by beaver dams consists of deep meandering channels. Stream gradients are low, 1%, and percent surface fines are high (80-90). These high surface fines are expected to occur in streams with low gradients and many beaver ponds. Active large woody debris is in low amounts as the riparian zone is very wide in certain locations]. (LNF 1997)

2007 Walkthrough Data: This reach has conifer dominated riparian vegetation with a lot of fire killed trees, which will contribute to abundant future LWD. Banks are stable with lots of undercut. LWD totaled 14 pieces for this reach. Surface fines averaged 15% and pools made up approximately 20% of the habitat with riffles making up the remainder. Width/Depth ratio averaged 5.8.

Finley Creek
This stream was surveyed in 1972, 1981 and 2007 with the walkthrough method. Finley Creek is subject to road encroachment, historic grazing, and timber harvest between the three land ownerships that it flows through: Plum Creek Timber Co., Forest Service, and private. A high voltage power line also crosses perpendicular to this stream.

1981 Walkthrough Data: Two reaches were surveyed between the Forest Boundary (T16N R16W S22 NE) to approximately 600 meters above the first road crossing in section 28. The lower reach has a stream gradient of 1.8% while the upper reach is 3.7%. Pool to riffle ratio for both of these stream reaches is 40% pools and 60% fast water habitat types. Substrate composition for the upper reach is 2% boulders, 15% rubble, 63% gravel, 20% fines in riffle habitat with 2% rubble, 43% gravel, and 55% fines in pool habitat types. Embeddedness is rated as high for both reaches in pool and riffle habitats. The lower reach substrate is comprised of 10% rubble, 75% gravels, 15% fines for riffle habitat and 40% gravel, 60% fines for pool habitat types. Both reaches have sufficient amounts of acting large woody debris but are limited with the potential amounts. General notes indicate that good residential populations of trout exist within this stream, as several fish were seen during the survey. (LNF 1997)

2007 Walkthrough Data: Reach 1(T16N R16W S22): Reach had good undercut banks (about 30-40cm) covering about 70% of the reach. There is 5 feet of unstable slough at a large blowdown area. There is no live streamside vegetation, although there is a lot of the LWD potential. The only possible shade for the stream is from topographic features (valley walls) in 300' survey reach. Above the survey reach vegetation is a mosaic of live & dead timber with good canopy shade. The valley wall on the right bank is encroaching at the top of the survey reach to about 50 feet of stream bank. LWD totaled 25 pieces for this reach. Surface fines averaged 9% and pools made up approximately 30% of the habitat with riffles making up the remainder. Width/Depth ratio averaged 2.8.

Reach 2 (T16N R16W S28): Reach had good undercut banks (about 60-85cm) covering about 70% of the reach. There is a complex pool-riffle type system (smaller pools than those in sec22) with very stable banks. The fire burned in a mosaic pattern along the valley bottom and walls leaving a timbered valley bottom with larch, spruce, fir; some old growth and a lot of shade from downed wood across the stream and live riparian shrubs. LWD totaled 29 pieces for this reach with lots of potential from downed wood across stream. Surface fines averaged 12% and pools made up approximately 25% of the habitat with riffles making up the remainder. Width/Depth ratio averaged 4.6.

The USDI Fish and Wildlife Service has listed Finley Creek as Critical Habitat for the recovery of bull trout. The Lolo National Forest Plan, as amended by the Inland Native Fish Strategy, also considers the drainage as a Priority Watershed (USDA Forest Service 1995)

Buck Creek
This stream also flows through two different land owners, Forest Service and Plum Creek Timber Co. Buck Creek is listed in the State 305b report as being water quality limited due to siltation and habitat alteration related to silviculture practices. Most of this drainage has been subject to heavy harvesting. There is also a high voltage power line that crosses perpendicular to this stream. This stream was surveyed with the Walkthrough method by Forest Service personnel in 1972, 1981 and 2007. The 1972, data measured water temperature at 53 degrees Fahrenheit, during the month of September, and brook trout were also noted as being present. Westslope cutthroat trout and very limited use by bull trout is also suspected.

1981, Walkthrough Data: Only one reach was surveyed (T16N R16W 8 SE boundary to boundary) as surveys are often restricted by Forest Ownership. Stream gradient was measured at 2.0% with 97% of the reach inundated by beaver ponds. Substrate is 100% fines for pools and 99% for riffle habitat. Active large woody debris was in adequate amounts but potential debris was very limited.

2007 Walkthrough Data: - Reach 1(T16N R16W S20): This reach has stable, vegetated banks with some undercutting. There is frequent LWD, and great potential for recruitment. Many of the largest trees remaining from previous harvest have fallen over due to root burnout. There is evidence (stumps) of old riparian harvest of very large trees (>24") right along stream banks. Riparian regeneration is occurring but definitely much younger and less complex than the unharvested streamside vegetation above the CMP. There is a narrow buffer that has limited shading potential. This reach varies from low to moderate burn severity as well as some unburned areas.

Reach 2 (T16N R16W S8): -Reach begins where Buck Creek is crossed by Road 46375. At this crossing, the pipe is undersized (24" round CMP) although it is difficult to tell a more appropriate size or to define bankfull because of the wet meadow conditions and multiple channels. Water is ponded at inlet and the culvert has recently received maintenance which appears to consist of some cleaning out of the deposition at the inlet and some rock armoring of the inlet. The pipe is in poor condition and the road dissecting the meadow likely impedes down valley flow of marshy waters. There is substantial flow contributed by the ditch on the US side of the road which is intercepting water from the wetland and/or possibly other channel or tributary. Two live 6" brook trout were found trapped in debris which was clogging the culvert inlet.

Grouse Creek
The majority of this stream is located within Forest Service ownership except for the lower half mile. Forest Service personnel conducted surveys of this stream in 1971, and 1981. During the month of October of 1971, water temperature was measured at 36 degrees Fahrenheit. As there are no fish population surveys conducted within this stream it is suspected that there is very limited use by westslope cutthroat trout and brook trout. Bull trout may use the very lower portion of this stream, near the confluence with Placid Creek. There is also a high voltage power line that crosses perpendicular to this stream.

1981 Walkthrough Data: There are five surveyed reaches within Grouse Creek but only the three lower reaches will be discussed. Reach #1 starts with the road crossing in section 8 NE (T. 16 N., R. 16. W) and ends where the gradient steepens and the valley narrows. Here the stream gradient is 4.5% and pools create 15% of the total habitat types with riffles making up the difference. Pools were also listed as being inadequate. Pool substrate consists of 25% rubble, 70% gravel, 5% fines and; riffles contained 5% boulders, 28% rubble, 65% gravel and 2% fines. Flow with recent periods of high precipitation is approximately 2 cfs. Both active and potential large woody debris is in low numbers.

Reach #2 is a short segment of stream that flows through a narrow valley in section 8. The stream gradient is 6.0% with a pool riffle ratio of 18% to 82%. For both pool and riffle habitat types substrate consisted of 5% fines with the remaining equally divided between boulders, rubble and gravel. Again pools were listed as being inadequate and active/potential large woody debris was at low levels. The road is located relatively close to the stream within this reach but does not encroach upon it.

Reach #3 begins where the valley widens and the gradient becomes lower and ends where the gradient picks up again. The stream gradient is 3% with a pool to riffle ratio of 70% to 30%. As this reach is influenced by beaver dams and ponds the fines are the dominate substrate. Active large woody debris was recorded in sufficient amounts but with limited potential.

Beaver Creek
This stream was surveyed in 1972, 1981, and 1995 using the walkthrough methodology. Beaver Creek is approximately 3.0 miles long and originates near 4400 feet and enters Placid Creek at 4200 feet. Data in 1995 was collected one fourth of a mile above and below the stream crossing (T16N R16W S14 NE). The entire reach is very small and shallow with 100% silt substrates. Water is of very low velocity and is stained brown due to heavy organic influence. This stream is not salmonid habitat except for rearing habitat at the confluence with Placid Creek.

Slippery John Creek
The majority of this stream is located on Forest Ownership but parts of it do flow through Plum Creek Timber Co. land. No fish habitat and stream information is available for this stream. However, it is a very small stream and is suspected to have limited use by westslope cutthroat trout, brook trout and very limited use by bull char. The upper reaches are confined by very high terraces which have been historically logged.

Archibald Creek
2007 Walkthrough Data**:** Reach 1: This survey reach is on the section of stream just above where it crosses Rd # 2190. This section of the stream had a spruce, western larch, and Douglas-fir overstory that was not affected by the fire. The stream type was C4 although there wasn't any water flowing in the stream at the time of the survey. The valley width was approximately 40 meters on average. The banks were stable and very well vegetated (willows & grasses) with approximately 35-40% with undercut banks. The fire did not burn through this area and there was approximately 80% crown cover and abundant shade. LWD totaled 36 pieces for this reach. Surface fines averaged 25% and pools made up approximately 20% of the habitat with riffles making up the remainder. Width/Depth ratio averaged 5.5.

Reach 2: This survey reach was located downstream of the road crossing and reach 1 and is slightly more complex but the stream type varies between a C4 at the road crossing to a C5 downstream. This section of stream has approximately 60% undercut banks and approximately 95% of the stream is under shade cover (the fire did not burn through this area). The valley width probably doubles below the road crossing and the entrenchment seams to increase as the stream makes its way into some bogs and swamps. LWD totaled 21 pieces for this reach. Surface fines averaged 12% and pools made up approximately 23% of the habitat with riffles making up the remainder. Width/Depth ratio averaged 4.8.

Placid Lake: This lake is a natural moraine lake that also has a dam structure at its outlet. This structure is also a barrier to upstream movement of fish. Placid lake has a surface area of approximately 1185 acres and a maximum depth of 90 feet. Interagency lake fishery data from 1984 indicates that this lake supports yellow perch, northern pikeminnow, pumpkinseed sunfish, rainbow trout, brook trout, bull trout, largemouth bass, peamouth, longnose sucker, mountain whitefish, westslope cutthroat trout, brown trout and kokanee salmon. A dam at the outlet regulates the lake level and causes the impediment of upstream movement of aquatic organisms.

Hidden Lake: (T. 16 N., R. 16 W., sec 13): This lake is a kettle lake with no surface outlet and has a surface area of approximately 40 acres. Usual maximum depth is 66 feet with an average depth of 43 feet. Fish species use is by westslope cutthroat trout. Limiting factors for this lake are high summer temperatures, oxygen depletion and lack of spawning areas.

Table 3: Jocko Lakes Fire - Vegetative Burn Intensity by HUC

6th Field HUC Name	Total % of HUC w/in fire perimeter	% Underburn/No burn	% Low Intensity	% Moderate. Intensity	% High Intensity
Finley Slippery	83%	3.7%	13.8%	35.7%	29.4%
Boles	19%	0.4%	3.5%	8.2%	7.0%
N. Fork Placid Cr	63%	2.9%	10.6%	34.1%	15.5%
Placid Vaughn	2.4%	0.0%	1.0%	1.3%	0.1%
Seeley Archibald	10%	0.4%	3.7%	4.5%	1.4%
Deer Creek	15%	1.2%	3.0%	8.8%	2.1%

The Lolo National Forest Plan, as amended by the Inland Native Fish Strategy, also considers these drainages as a Priority Watershed (USDA Forest Service 1995)

VI. Status of INFISH Riparian Management Objectives

The Inland Native Fish Strategy defines six Riparian Management Objectives (RMOs) consisting of the following: Pool Frequency, Water Temperature, Large Woody Debris, Bank Stability, Lower Bank Angle, and Wetted Width to Depth Ratio. Bank Stability and Lower Bank Angle only apply to non-forested stream systems thus they do not apply to this project.

Stream surveys, conducted in 2007, were used to analyze the remaining RMOs. Pool frequency, water temperature, wetted width to depth ratio, and large woody debris was only qualitatively measured. Therefore no accurate assessment can be made to determine if they meet RMOs. However based on these observations it is apparent that were past roading and timber harvest has not encroached on the INFISH buffers that the physical RMO's are being met on Forest Service lands (For Example: Boles, Finley, and portions of Placid Creek).

VII. Direct, Indirect, and Cumulative Effects

A. Direct and Indirect Effects

Sedimentation

Under the Modified Proposed Action, the objective to maintain or minimize impacts to fisheries, water and soil would be met with mitigation. In accordance with Streamside Management Act and INFISH regulations no harvest activities would occur within RHCAs. A short-term specified road will be built through the RHCA along Finley Creek to access unit 28-1. An existing road (9974-2) currently bisects the RHCA and is located between the proposed short-term road and Finley Creek.

The primary source of sediment from harvesting is derived from ground disturbing activities, primarily summer dry season tractor harvest systems. Twenty one acres are proposed for potential summer tractor skidding. Areas logged with tractor systems over snow, 94% of all harvest, will have much less disturbance (1376 acres). In units logged with skyline logging systems, trees would be hand felled and activity timber salvage would be either lopped, scattered and burned, or would be hand piled and burned (260 acres). Timber harvest units and landings would not be located in RHCAs under the Modified Proposed Action. Restricting these activities to areas outside of RHCAs would minimize the potential for sediment delivery to fish bearing streams. There would be soil disturbance associated with commercial timber harvest and other proposed activities, primarily as a result of tractor skidding, and subsoiling of landings. Mitigating these effects by winter harvesting over snow, frozen ground and/or by dry soil harvesting over slash mats would reduce the duration of sediment production and erosion. In most cases sediment generated from these activities, which has the potential to move off-site during rare large storm events, would be captured in the RHCA buffer. Broderson (1973) found that a buffer equal to one site potential tree would be effective to remove sediment in most situations. Riparian buffers of 30m (100 ft.) or greater have been documented to prevent adverse affects to salmonid eggs and aquatic insects when harvest activities occurred adjacent to fish-bearing streams (Moring 1982).

There is also the potential for generating sediment from burning hand piles. The risk of sediment reaching fish habitat is negligible because it does not involve heavy equipment and design elements have been developed to reduce the risk of sediment delivery to streams.

There will be an opportunity to perform road maintenance on approximately 55 miles of Forest roads associated with project activities. The type of road maintenance activities which may occur on roads used for commercial haul could include:

- Blading and shaping of road surface and ditches
- Construction or reshaping of drain dips or grade sags
- Construction of waterbars/cross ditches
- Spot rocking of road surface
- Brush removal from roadway
- Felling and or removal of danger trees
- Minor realigning of road junctions
- Cleaning culverts
- Adding slash filter windrows
- Seeding
- Removing excess materials from roadway

Under the Modified Proposed Action, approximately 7.6 miles of commercial haul routes are located within RHCAs. Approximately 3.7 miles of that commercial haul route is within the RHCA of Finley Creek. The Beaver Finley Road (9974-2) accounts for 3 miles within the Finley Creek RHCA and incorporates 1 perennial stream crossing. Rd 9975 includes 0.19 miles of haul route within RHCA and attributes 2 perennial stream crossings, both of which are fish barrier culverts. The fish barrier culvert on Rd 9975 where it crosses Finley Creek is proposed for replacement under the Project. Rd 4367 includes 0.43 miles of haul route within the Finley Creek RHCA and attributes 1 perennial stream crossing. The crossing is a fish barrier culvert and is proposed for replacement under the Project. Rd 4339 includes 0.19 miles of road proposed for storage within the Finley Creek RHCA and attributes 1 perennial stream crossings, which is a fish barrier culvert and is proposed for removal under the Project.

The unique aspect of these roads is the ability to deliver large quantities of sediment to Finley Creek. Most of these routes exist on either flat grades (<3%) with short delivery distances (<50') or on steeper grades (~8%) with longer delivery distances (100-300)

to Finley Creek. These segments are considered a high priority for BMP work. A description of BMP and maintenance work that would be implemented on these roads prior to timber hauling includes:

- 9974-2: Proposed BMP work includes slash filter windrows at stream crossings.
- 9975: Proposed BMP work includes brushing 0.89 miles, riprap at culvert inlets/outlets, reconditioning 0.89 miles of road, cleaning of 1 CMP, 75 feet of berms and 50 feet of slash filter windrows.
- 4367: Proposed BMP work includes replacing 2 culverts, 40 feet of ditch construction, 12 drain dips, 2 miles of brushing, riprap at culvert inlets/outlets, a rock buttress, reconditioning 2 miles of road, narrowing 0.037 miles of road, cleaning 5 CMPs, installing 154 feet of open-top drainage structures, and 260 feet of filter slash windrows.

In the long term, road maintenance would result in maintained or improved road conditions. Road maintenance may decrease chronic sedimentation in some locations. Improving drainage, removing ruts and rills from the driving surface, and adding less erosive surfacing material would reduce detachment and transport of sediment. This is especially important for roads within RHCAs.

Winter haul is likely and BMPs and resource protection measures for winter use will be followed including that snow drainage holes will be designated prior to haul, and kept open throughout the duration of winter hauling. Main routes (2190 and 349) are already plowed each winter for residential access. Additional plowing will be needed on a few miles of road.

The two elements of this proposed project that could have effects on fisheries are sediment generated from log haul as well as the 3 fish barrier culvert removal/replacements that would occur with this project. Those portions of the haul route that either parallel or have potential to deliver surface and ditch sediment to Finley Creek are of particular interest and they are the focus of specific mitigation measures. Because these effects are road related the most effective mitigation will be the implementation of Best Management Practices. Thus implementation of the Management Requirements identified above will need to be completed before log haul and are necessary to meet the Lolo National Forest Plan as amended by the Inland Native Fish Strategy**.** For proposed undersized fish passage culvert replacements, previous monitoring on the Lolo National Forest (Casselli et al. 1999) demonstrated that stream crossing removal/ replacement may generate 1-2 cubic yards of sediment (1-2.5 tons) per 500 cubic yards of road fill volume involved. Assuming this contribution (up to 2.5 tons) would occur at installation and removal of this crossing, the resulting effect would be up to a 5 ton contribution in sediment over several years, assuming 500 cubic yards or less of road fill (McNamara 2008).

According to the hydrology report for this project, "disturbance of the road bed material as a result of the blading normally results in a short-term increase in sediment (Luce and Black 1999). This increase typically subsides 60-80% within the first two years after blading (Luce and Black 2001, and Megahan 1974). However, application of slash filter windrows would be 85% or more effective at eliminating sediment based on monitoring (Seyedbagheri 1996). Each of the crossings which occur on the existing roads to be used for project work would receive road maintenance work, therefore, the modeled short-term increase in sediment from all proposed road maintenance work would be minimized. The benefits of the road maintenance would result in a decrease in sedimentation every year following implementation. Whereas the short-term increase would be a one-time occurrence, the long-term increase from BMP upgrades would persist every year. In addition to road blading/grading, road maintenance work for the proposed action will also include cleaning out culverts, adding cross drains and adding slash filter windrows or other similar BMP practices at each stream crossing on haul routes. Effective implementation of such practices is expected to provide 85% or more sediment mitigation (Seyedbagheri 1996)."

Table 7 summarizes the watershed baseline condition and potential effects in relation to the species and habitat indicators for westslope cutthroat and bull trout. This table also contains numbered habitat indicators. These numbers represent the particular Primary Constituent Elements for Bull Trout Critical Habitat that can be represented or associated with that habitat indicator. Sediment is the only habitat indicator that has the potential to be affected as the other indicators are protected with minimum buffer widths that are consistent with those found in the Inland Native Fish Strategy (1995) (Belt et al. 1992). Although a short-term spec road will be built within the Finley Creek RCHA, the 9974-2 road is between the stream and the proposed temp road and cuts off any source of sediment. In addition, windrow filter strips would be added at culvert locations to impede sediment.

The short-term sediment effects of the proposed road related work and use would include a short-term increase in annual sediment. This load would result primarily from road maintenance work, road decommissioning, culvert removal and replacement, increased haul traffic, and road construction and reconstruction. There would be no sediment delivery to streams from ground-based or other harvesting because of 300' INFISH buffer requirements. In the long-term, indirect sediment related effects of the Proposed Action would include, as modeled in WEPP (see Hydrology Analysis), a decrease in overall sediment contribution primarily as a result of road decommissioning, but also as a result of road maintenance and BMP work. In addition, there would be an unquantified decrease in sediment from stream channel and road-fill scour and decreased risk of sediment

contribution from potential failure of undersized stream crossings as a result of removal and/or upgrades of undersized culverts (McNamara 2008).

Table 4. Estimated Sediment Delivery at Stream Crossings by Sixth Field HUCs and Reduction due to BMP Application Treatments Proposed in Alternative 3.*

6th Code HUC Name	Estimated Number of Project Haul Road Stream Crossings	Existing Sediment Load (0.53 tons/year per crossing), No-Action Alt.	Sediment Reduction From Slash filter and BMP application Mod. Prop. Action Alt. (85% reduction)
Boles	0	0.0	0.0
Deer Cr (Clrwtr)	2	1.1	0.9
Finley Slippery	22	11.7	9.9
N Fk Placid Cr		0.0	0.0
Seeley_Archibald	1	0.5	0.5
Placid_Vaughn	3	1.6	1.4

*Some of these roads already have BMP's in place, so this estimate is high (McNamara 2008).

Stream Temperature and Large Woody Debris

Stream temperature and large woody debris will not be affected by the implementation of the proposed project. This is based on leaving a buffer strip between the stream and harvest units according to the Inland Native Fish Strategy. These buffers are identified in mitigation section of this document. As trees within delivery distance of the floodplain or stream are not being removed there is no potential for a reduction in potential large woody debris. Angular canopy density is being protected and would not change/alter stream shade. Although a short-term spec road will be built within the Finley Creek RCHA, the 9974-2 road is between the stream and the proposed temp road and cuts off any source of Large Woody Debris. In addition, the number of trees that would need to be removed to construct the short-term specified road would not be enough to affect stream shade.

B. Cumulative Effects

Cumulative effects consist of past, present, proposed, and reasonably foreseeable actions.

Past actions are often commensurate with the existing baseline of a watershed. These six watersheds all have been impacted to varying degrees by wildland fire, wildland fire suppression, road maintenance, grazing, etc and the environmental baseline condition of each watershed is described starting on page 9 of this document. Table 3 puts in context the size of the 36,000 acre Jocko Lakes Fire in relation to the size of the drainages.

Present actions include maintenance of exiting roads, stream crossings, powerline corridors, public use of roads and campsites. Plum Creek Timber Company, who is the largest private landowner in these watersheds, is currently salvage harvesting their portion of ownership that was affected by the 2006 fire as is the Montana State Department of Natural Resources, both of whom are required to meet Montana Best Management Practices. Neither entity is building new system roads, but there is increased activity associated with harvest and haul.

The proposed action is discussed above.

Foreseeable actions are those actions that are reasonably certain to occur. Plum Creek Timber Company may have some additional harvest and hauling. Maintenance of exiting roads, stream crossings, powerline corridors, public use of the road system and campsites will likely continue. Additionally, there will be focused use in the burned area by the general public for mushroom picking. For a detailed list of all past, present and future actions considered in the cumulative effects analysis see Appendix A.

As upstream, upslope activities can affect downstream, downslope resources; the cumulative effects area for watershed (soils, water, and fisheries) resources include the six 6th Field HUCs discussed throughout the analysis. These 6th field HUCs represent the lowest point within the overall Clearwater River Watershed, which could possibly be affected by the proposed actions.

Direct effects of the proposed harvest and road activities would include a short-term increase in sediment production and erosion due to road maintenance, log haul and culvert removal/replacement. Mitigating these effects by winter harvesting over snow, frozen ground and/or by dry soil harvesting over slash mats would reduce the duration of sediment production and erosion. Over time, sediment production and erosion would decrease due primarily to the proposed implementation of road BMPs.

Indirectly, the proposed project would have a short-term decrease in water quality due to increased sediment production, and long-term increase in water quality due to decreased sediment production. Long-term benefits to fish habitat would occur with the removal/replacement of 3 fish barrier culverts. Long-term benefits would offset the short-term impacts.

With mitigation measures, all alternatives meet Forest Plan Standards to maintain or minimize impacts to soil and water. In meeting Forest Plan Standards, all alternatives also meet State Water Quality Anti-degradation laws.

VIII. Potential Effects to Species Indicators and Habitat Indicators

Subpopulation Characteristics

Subpopulation Characteristics are based on four indicators: Subpopulation Size, Growth & Survival, Life History Diversity & Isolation, Persistence & Genetic Integrity. As discussed in the existing conditions, these indicators were answered by using a larger scale than the project area. Sediment is the primary indicator of potential concerns with regards to this proposed action. Given that sediment levels are expected to be elevated (see sediment discussions above) due to log haul and culvert replacement/removal, a short-term negative impact to native salmonids is expected. Positive impacts associated with a long-term reduction in sediment levels as well as increased available habitat from culvert replacements would also occur.

Water Quality

Water temperature, sedimentation, and chemical contamination/nutrients make up the indicators for water quality. Since the project does not propose to cut down trees (other than an insignificant number for the short-term specified road near Finley Creek) within the primary or secondary shade zone (150 feet for perennial streams), the only changes in temperature due to shade loss would be due to natural losses following the fire. For sediment see previous discussions. The chemical contamination concern is related to herbicide application along road sides. As roads have compacted surfaces it creates runoff dominated sites, which increases the risk of herbicide entry into streams. Herbicide applications are covered under an existing Forest-wide EIS for noxious weeds and are not discussed further for this project.

Habitat Access

Under the Modified Proposed Action, one fish-barrier culvert would be removed and two fish-barrier culverts would be replaced with ones that would accommodate fish passage and 100-yr flood flows on Finley Creek. Removal or replacement of these barriers would restore access to approximately 2.5 miles of stream and associated fish habitat within Finley Creek. This alternative meets the Lolo National Forest Plan Standards as amended by INFISH.

Habitat Elements

Habitat elements consist of the following six indicators: substrate embeddedness, large woody debris, pool frequency & quality, large pools, off-channel habitat, and refugia. For substrate embeddedness see sediment discussion in Direct and Indirect Effects. Large woody debris, Pool frequency & quality, large pools, off-channel habitat, and refugia will not be affected as INFISH RHCA's will be implemented. This alternative meets the Lolo National Forest Plan Standards as amended by INFISH.

Channel Condition & Dynamics

Wetted Width/Max Depth Ratio, Streambank Condition, and Floodplain Connectivity are three indicators that make up the Channel Condition & Dynamics parameter. Floodplain connectivity is not expected to be impacted as RHCA's are being implemented. This proposed project is not believed to have an effect on streambank stability. As streambank vegetation is not being altered and peak flows are not being affected, there is no mechanism to destabilize the streambank. Width/depth ratios are also not expected to be affected as it is a function of streambank stability.

Flow/Hydrology

The Flow/Hydrology parameters are made up of two indicators: Change in Peak/Base Flows and Drainage Network Increase. These two indicators are not expected to be affected as the proposed action of harvesting is taken place within the burned perimeter. Using the Forest Plan "ECA greater than, or equal to 30%" criterion as an indicator of watersheds that have a high potential for hydrologic alteration due to existing conditions, none of the project area watersheds either individually or collectively would be at risk of impacts from increased water yield from the proposed activities. Effects to stream channels from increased water yield are not anticipated. The project effects on ECA and therefore water yield would not be measurable. Therefore the project would not affect the magnitude, timing, duration of flows or sediment transport beyond the existing conditions (McNamara 2008).

Table 5. Predicted increase in water yield for baseline conditions before the fire and the year immediately after the fire for comparison of direct and indirect effects. ECA's generated by the fire were used to generate post-fire estimated flow increases.

Watershed	Watershed Area (ac)	Baseline Water Yield (ac-ft)	Pre-fire Harvest and Roads ECA, Forest Service only (ac, %)		Post-fire ECA as a result of the Fire only (ac)	Post-Fire Water Yield Increase as of 2008 (% total increase)	Post-Project Water Yield Increase from Mod. Proposed Action (%total increase)
Boles Ck	12,604	23,716	2,359	19%	1,293	3	0
Deer Ck	12,893	10,463	710	5%	724	4	0
Finley-Slippery Ck's	21,789	26,354	1,740	8%	9,529	22	0
N Fk Placid Ck	10,852	2,817	748	7%	3,158	8	0
Placid-Vaughn Ck's	13,577	10,301	526	4%	85	0	0
Seeley-Archibald Ck's	19,752	12,633	3,826	19%	619	3	0

Watershed Conditions

Watershed Condition is made up of the following parameters: Road Density & Location, Disturbance History, Riparian Conservation Areas, and Disturbance Regimes. Implementation of RHCAs will maintain Disturbance History, RHCAs and Disturbance Regimes.

Road Density: The effects of the action alternative to road density would include a decrease of 0.1 mi/mi2 in the Finley-Slippery Watershed. Other road changes are small and are not detectable in the road density calculation. 6.4 miles of road will go into storage and 4.3 miles of road will be decommissioned, both to level 3 conditions. Level 3 storage and decommissioning minimizes the impact of a road because runoff is decreased and infiltration is increased when the hardened road surface is ripped; this also reduces erosion of the road surface. Temporary and short term specified roads would also be built but would have limited duration during the period of project implementation and would not affect long term road density because they would be recontoured to the original hillslope following use.

Table 6. Changes in total road miles and road density between the no action and action alternatives. Numbers based on permanent road changes. Temporary and short-term specified roads for the action alternative would be decommissioned and slopes re-contoured after use.

6th Code HUC Name	No Action Alternative (5)		Action Alternative (3)		
	Existing Total Road Miles	Existing Road Density (miles/mile^2)	Modified Proposed Action (Additional Road miles)	Resulting Road Density (miles/mile^2)	Road Density Change (miles/mile^2)
Boles	76.5	3.9	0	0	0
Deer Cr (Clrwtr)	105.7	5.2	0	0	0
Finley Slippery	171.3	5	-3.5	4.9	-0.1
N Fk Placid Cr	91.5	5.4	0	0	0
Seeley_Archibald	113.2	5.3	0	0	0
Placid_Vaughn	158.4	5.1	0	0	0

Integration of Species & Habitat Conditions:

The integration of all these Species and Habitat indicators is the result of the primary effect of sedimentation. As the sedimentation is primarily related to road obliteration, road maintenance, BMP upgrades, short-term road construction, and culvert removal and replacement the effect will be short-term. Long-term benefits will result from road obliteration, culvert removals & replacements, and BMP upgrades. For more discussion see the Direct and Indirect Effects. As the location of a culvert removal and road obliteration activity is immediately above likely bull trout spawning gravels, this project will result in incidental take and generate a "May Affect, Likely to Adversely Affect" determination for bull trout consultation. This activity will last less than one week but will generate sediment that will affect downstream spawning gravels until the next spring flow. Table 7 summarizes the effects by species and habitat indicator as well as by Primary Constituent Elements (PCE) within the bull trout critical habitat. The numbers in the habitat indicator column correspond to which PCE that they represent or are associated with. This project will not cause an adverse modification of the critical habitat in the Columbia River Basin.

IX. Effects Matrix Checklist

Table 7: Checklist For Documenting Effects Of the Proposed Action On Individual Species And Habitat Indicators and Bull Trout Critical Habitat.

Diagnostic/Pathways: Indicators	Finley Slippery	Boles Cr.	Seeley Archibald	N. Fork Placid	Placid Vaughn	Deer Cr	Proposed Action Effects	Meets Forest Plan S&G
	FA/FAR/FAUR	FA/FAR/FAUR	FA/FAR/FAUR	FA/FAR/FAUR	FA/FAR/FAUR	FA/FAR/FAUR	Restore/Maintain/Degrade	Y/N
Characteristics Subpopulation:								
Subpopulation Size	FAR	FAR	FAR	FAR	FAR	FAR	D/R - Finley Slippery M - All others	Y
Growth & Survival	FUR	FUR	FUR	FUR	FUR	FUR	D/R - Finley Slippery M - All others	Y
Life History Diversity & Isolation[6]	FUR	FUR	FUR	FUR	FUR	FUR	D/R - Finley Slippery M - All others	Y
Persistence and Genetic Integrity[6]	FUR	FUR	FUR	FUR	FUR	FUR	D/R - Finley Slippery M - All others	Y
Water Quality: Temperature[1,6]	FAR	FUR	FUR	FUR	FAR	FAR	M	Y
Sediment[8,3]	FUR	FUR	FUR	FUR	FUR	FUR	D/R - Finley Slippery M - All others	Y
Chemical Contam. / Nutrients[8,6]	FAR	FA	FUR	FAR	FA	FAR	M	Y
Habitat Access: Physical Barriers[6]	FAR	FA	FAR	FUR	FUR	FAR	R - Finley Slippery M - All others	Y
Habitat Elements: Substrate Embeddedness[8,3]	FUR	FUR	FUR	FUR	FUR	FUR	D/R - Finley Slippery M - All others	Y
Large Woody Debris[2]	FUR	FAR	FUR	FUR	FAR	FUR	M	Y
Pool Frequency & Quality[2]	FUR	FUR	FUR	FUR	FUR	FUR	M	Y
Large Pools[2]	FUR	FUR	FUR	FUR	FUR	FUR	M	Y
Off-Channel Habitat[2]	FUR	FUR	FAR	FUR	FUR	FUR	M	Y
Refugia[2]	FUR	FUR	FUR	FUR	FUR	FUR	M	Y
Channel Condition & Dynamics: Wetted Width/Max Depth Ratio[2,6]	FUR	FUR	FUR	FUR	FUR	FUR	M	Y
Streambank Condition[2]	FUR	FUR	FUR	FUR	FUR	FUR	M	Y
Floodplain Connectivity[2,5]	FUR	FUR	FUR	FAR	FUR	FUR	M	Y
Flow & Hydrology: Change in Peak/Base Flows[8,4,6]	FUR	FUR	FUR	FUR	FUR	FUR	M	Y
Drainage network Increase[8,4,6]	FUR	FAR	FUR	FUR	FUR	FUR	M	Y
Watershed Conditions: Road Density & Location[8,4]	FUR	FUR	FUR	FUR	FUR	FUR	M	Y
Disturbance History	FUR	FUR	FUR	FUR	FUR	FUR	M	Y
Riparian Conservation Area[2,5]	FUR	FUR	FAR	FUR	FAR	FAR	M	Y
Disturbance Regime	FUR	FUR	FUR	FUR	FUR	FUR	M	Y

	Finley Slippery	Boles Cr.	Seeley Archibald	N. Fork Placid	Placid Vaughn	**Deer Cr**	**Proposed Action Effects**	**Meets Forest Plan S&G**
Integration of Species & Habitat Condition[7]	FUR	FUR	FUR	FUR	FUR	FUR	D/R - Finley Slippery M - All others	Y

FAUR = Functioning at Unacceptable Risk, FAR = Functioning at Risk, FA = Functioning Appropriately
Primary Constituent Elements within the bull trout critical habitat rule
1. Water temperatures that support bull trout use. Bull trout have been documented in streams with temperatures from 32 to 72 [deg]F (0 to 22 [deg]C) but are found more frequently in temperatures ranging from 36 to 59 [deg]F (2 to 15 [deg]C). These temperature ranges may vary depending on bull trout life history stage and form, geography, elevation, diurnal and seasonal variation, shade, such as that provided by riparian habitat, and local groundwater influence. Stream reaches with temperatures that preclude any bull trout use are specifically excluded from designation.
2. Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures.
3. Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine substrate less than 0.63 cm (0.25 in) in diameter and minimal substrate embeddedness are characteristic of these conditions.
4. A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated, currently operate under a biological opinion that addresses bull trout, or a hydrograph that demonstrates the ability to support bull trout populations By minimizing daily and day-to-day fluctuations and minimizing departures from the natural cycle of flow levels corresponding with seasonal variation.
5. Springs, seeps, groundwater sources, and subsurface water to contribute to water quality and quantity as a cold water source.
6. Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.
7. An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
8. Permanent water having low levels of contaminants such that normal reproduction, growth and survival are not inhibited.

X. Compliance with INFISH

This proposed project is in compliance with the Standard and Guides located within the 1995 Decision Notice of INFISH. Although some short-term impacts to RMOs are expected, with implementation of RHCAs and BMPs the project would maintain/restore RMOs in the long-term.

XI. Determination - Dichotomous Key for making ESA Determinations of Effects

1) Are there any proposed/listed fish species and/or proposed designated critical habitat in the watershed or downstream from the watershed?

No .....No Effect
YES .....go to 2

2) Will the proposed action(s) have any effect whatsoever on the species and/or critical habitat?

No .....No Effect
YES .....go to 3

3) Does the proposed action(s) have the potential to hinder attainment of relevant "functioning appropriately" indicators?

No .....go to 4
YES .....Likely to adversely affect

4) Does the proposed action(s) have the potential to result in "take" of any proposed/listed fish species?

There is a negligible (extremely low) probability of take to proposed/listed fish species or destruction/adverse modification of proposed /designated critical habitat.....Not Likely To Adversely Affect

There is more than a negligible probability of take of proposed/listed fish species or destruction/adverse modification of proposed /designated critical habitat**.....Likely To Adversely Affect**

As sediment may temporarily be increased due to road work and culvert removal/replacement, the effects to survivability of incubating eggs may be reduced. Long-term impacts would be beneficial due to a reduction in sediment. For further discussion see Direct and Indirect Effects.

XII. Documentation of Expected Incidental Take

1. The proposed action may result in incidental take through which of the following mechanisms (Check appropriately)?

___X___Harm: Significant impairment of behavioral patterns such as breeding, feeding, sheltering, and other (identify).

_____Harass: Significant disruption of normal behavior patterns which include, but are not limited to, breeding, feeding, sheltering, or others (identify).

_____Pursue, Hunt, Shoot, Wound, Capture, Trap, Collect.

2. What is the approximate duration of the effects of the proposed action(s) resulting in incidental take?
The duration of increased sediment levels is estimated to last three years. After this three year period the sediment level is expected to drop off, lowering the existing base level.

3. Which of the following life stages will be subject to incidental take (Check appropriately)?

___X___Fertilization to emergence (incubation)
___X___Adult holding and overwintering
_____Adults migrating
___X___Juvenile rearing to adulthood
_____Adults spawning

4. Which life form and subpopulation status are present in the watershed or downstream of the watershed where the activities will take place (Check appropriately)?

Life Form: ___X___Resident ___X___Adfluvial _____Fluvial

Subpopulation Status: _____Stronghold Population ___X___Depressed Population

XIII. Rationale, Baseline and Determination for Proposed Critical Habitat.

A. Rationale

Federally authorized funded or carried out activities require consultation, to ensure that they are not likely to destroy or adversely modify bull trout critical habitat. The Forest Service in Region 1 in western Montana uses the Matrix of Pathway Indicators (matrix; USFWS 1998a) for bull trout to evaluate and document baseline conditions and to determine the likelihood of "take" of bull trout. Matrix analysis incorporates four biological indicators and 19 physical habitat indicators. The majority of the matrix analysis consists of specific consideration of the 19 habitat indicators. Analysis of the matrix habitat indicators provides a thorough analysis of the existing baseline condition and potential impacts to bull trout habitat.

Therefore, when assessing potential effects to bull trout as a species, through use of the matrix, agency biologists concurrently provide an analysis of effects to the primary constituent elements (PCEs) for bull trout critical habitat and related habitat indicators. Table 8 below describes the eight PCEs and the related matrix indicators.

Table 8: PCEs for bull trout critical habitat and associated matrix habitat indicators.

PCE #	PCE description	Associated matrix indicators
1	Water temperatures that support bull trout use. Bull trout have been documented in streams with temperatures from 32 to 72 [deg]F (0 to 22 [deg]C) but are found more frequently in temperatures ranging from 36 to 59 [deg]F (2 to 15 [deg]C). These temperature ranges may vary depending on bull trout life history stage and form, geography, elevation, diurnal and seasonal variation, shade, such as that provided by riparian habitat, and local groundwater influence. Stream reaches with temperatures that preclude any bull trout use are specifically excluded from designation.	- Temperature - Refugia - Average wetted width/maximum depth ratio in scour pools in a reach - Streambank condition - Change in peak/base flows - Riparian conservation areas - Floodplain connectivity
2	Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures;	- Large woody debris - Pool frequency and quality - Large pools - Off channel habitat - Refugia - Average wetted width/maximum depth ratio in scour pools in a reach - Streambank condition - Floodplain connectivity - Riparian conservation areas
3	Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. This should include a minimal amount of fine substrate less than 0.25 inch (0.63 centimeter) in diameter.	- Sediment - Substrate embeddedness - Large woody debris - Pool frequency and quality
4	A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated, currently operate under a biological opinion that addresses bull trout, or a hydrograph that demonstrates the ability to support bull trout populations by minimizing daily and day-to-day fluctuations and minimizing departures from the natural cycle of flow levels corresponding with seasonal variation.	- Change in peak/base flows - Increase in drainage network - Disturbance history - Disturbance regime
5	Springs, seeps, groundwater sources, and subsurface water to contribute to water quality and quantity as a cold water source.	- Floodplain connectivity - Change in peak/base flows - Increase in drainage network - Riparian conservation areas - Chemical contamination/nutrients

PCE #	PCE description	Associated matrix indicators
6	Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.	- Life history diversity and isolation - Persistence and genetic integrity - Temperature - Chemical contamination/nutrients - Physical barriers - Average wetted width/maximum depth ratio in scour pools in a reach - Change in peak/base flows - Refugia
7	An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	- Growth and survival - Life history diversity and isolation - Riparian conservation areas - Floodplain connectivity (importance of aquatic habitat condition-indirectly covered by previous 6 PCEs)
8	Permanent water of sufficient quantity and quality such that normal reproduction, growth, and survival are not inhibited.	- Sediment - Chemical contamination/nutrients - Change in peak/base flows

The crosswalk provides rationale supporting that the PCEs for bull trout critical habitat are thoroughly addressed in the current matrix analysis and that environmental baseline and determination for effects to the species consists of a biological and habitat component addressing in total the PCEs listed in final rule for Critical Habitat (USFWS 2005). Below are the eight PCEs and the supporting rationale.

1. Water temperatures that support bull trout use. Bull trout have been documented in streams with temperatures from 32 to 72 [deg]F (0 to 22 [deg]C) but are found more frequently in temperatures ranging from 36 to 59 [deg]F (2 to 15 [deg]C). These temperature ranges may vary depending on bull trout life history stage and form, geography, elevation, diurnal and seasonal variation, shade, such as that provided by riparian habitat, and local groundwater influence. Stream reaches with temperatures that preclude any bull trout use are specifically excluded from designation.

This PCE is addressed directly by the analysis of *temperature*. It is addressed indirectly through consideration of *refugia*, which by definition is high quality habitat of appropriate temperature. Important components of refugia include pool frequency and quality and large pools. *Average wetted width/maximum depth ratio in scour pools* is an indication of water volume, which indirectly indicates water temperature, (i.e., low ratios indicate deeper water, which in turn indicates possible refugia). This indicator in conjunction with *change in peak/base flows* is an indicator of potential temperature and refugia concerns particularly during low flow periods. *Streambank condition, floodplain connectivity* and *riparian conservation areas* address the components of shade and groundwater influence, both of which are important factors of water temperature. Stable streambanks and intact riparian areas, which include part of the floodplain, typically support adequate vegetation to maintain thermal cover to streams during low flow periods.

2. Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structure.

The analysis of *large woody debris*, such as current values and sources available for recruitment, directly addresses this PCE. Large woody debris increases channel complexity and creates pools and undercut banks. *Pool frequency and quality* would also directly address this PCE, showing the number of pools per mile as well as the amount of cover and temperature of water in the pools. *Average wetted width/maximum depth ratio in scour pools in a reach* is an indicator of channel shape and pool quality. Low ratios suggest deeper, higher quality pools. *Large pools,* consisting of a wide range of water depths, velocities, substrates and cover, are typical of high quality habitat and are a key component of channel complexity (USFWS 1998). An analysis of *off-channel habitat* would describe side-channels and other off-channel areas. *Streambank condition* would analyze the stability of the banks, including such features as undercut banks. The analysis of both *riparian conservation areas* and *floodplain connectivity* would directly address this PCE. Floodplain and riparian functions include the maintenance of habitat and channel complexity, the recruitment of large woody debris and the connectivity to off-channel habitats or side channels (USFWS 1998). Complex habitats provide refugia for bull trout and in turn, *refugia* analysis would assess complex stream channels. All of these habitat indicators consider the numerous characteristics of instream bull trout habitat and quantify critical components that are fundamental to creating and maintaining complex instream habitat over time.

3. Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. This should include a minimal amount of fine substrate less than 0.25 inch (0.63 centimeter) in diameter.

This PCE is addressed directly by analysis of *sediment* in areas of spawning and incubation and considers directly the size class composition of instream sediments, particularly fine sediments $\leq$63 mm. This PCE is also addressed directly by analysis of *substrate embeddedness* in rearing areas, which is a function of sediment size class and bedload transport. Both of these indicators would assess substrate composition and stability in relation to the various life stages of the bull trout as well as the sediment transportation and deposition. *Large woody debris* and *pool frequency and quality* affect sediment transport and redistribution within a stream and would indirectly assess substrate composition and amounts.

4. A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated, currently operate under a biological opinion that addresses bull trout, or a hydrograph that demonstrates the ability to support bull trout populations by minimizing daily and day-to-day fluctuations and minimizing departures from the natural cycle of flow levels corresponding with seasonal variation.

This PCE is addressed by analysis of *change in peak/base flows*, which considers changes in hydrograph amplitude or timing with respect to watershed size, geology, and geography. Considering *increase in drainage network* and *disturbance history* provides further information. Roads and vegetation management both have effects strongly linked to a stream's hydrograph. *Disturbance regime* ties this information together to consider how a watershed reacts to disturbance and the time required to recover back to pre-disturbance conditions.

5. Springs, seeps, groundwater sources, and subsurface water to contribute to water quality and quantity as a cold water source.

This PCE is addressed by analysis of *floodplain connectivity* and *riparian conservation areas*. *Floodplain connectivity* considers hydrologic linkage of off-channel areas with the main channel and overbank flow maintenance of wetland function and riparian vegetation and succession. Floodplain and riparian areas provide hydrologic connectivity for springs, seeps, groundwater upwelling and wetlands and contribute to the maintenance of the water table (USFWS 1998b). The analysis of *changes in peak/base flows* would address subsurface water connectivity. I*ncrease in drainage network* would address potential changes to groundwater sources and subsurface water connectivity. C*hemical contamination/nutrients* would address concerns regarding groundwater water quality.

6. Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.

The biological indicator *life history diversity and isolation* addresses the function of migration and/or subsequent isolation with respect to the population. The biological indicator *persistence and genetic integrity* indirectly reflects the status of migratory corridors. Physical, biological or chemical barriers to migration are addressed directly through water quality habitat indicators, including *temperature, chemical contamination/nutrients* and *physical barriers*. The analysis of these indicators would assess if barriers have been created due to impacts such as high temperatures, high concentrations of contaminants or physical barriers. Analysis of *change in peak/base flows* and *average wetted width/maximum depth ratio in scour pools in a reach* would assess whether changes in flow might create a seasonal barrier to migration. An analysis of *refugia*, which considers the habitat's ability to support strong, well distributed, and connected populations for all life stages and forms of bull trout, would also be pertinent to this PCE.

7. An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

An analysis of *floodplain connectivity* and *riparian conservation areas* would assess these contributions to the food base. Floodplain and riparian areas provide habitat to aquatic invertebrates, which in turn provides a forage base to bull trout (USFWS 1998). This PCE is indirectly addressed through the biological indicator of *growth and survival* and *life history diversity and isolation*. Both of these indicators look at habitat quality and subpopulation condition, which provides information on food base. This PCE is a synthesis of the previous PCEs. It is addressed through the analysis of biological and habitat indicators in that, if a bull trout population either exists or could exist in a watershed, then there is an adequate forage base. A healthy habitat provides a forage base for the target species. Any potential impairment to the forage base has been addressed by way of summarizing the biological and habitat indicators.

8. Permanent water of sufficient quantity and quality such that normal reproduction, growth, and survival are not inhibited.

Flow conditions, such as perennial or ephemeral would be analyzed through *changes in peak/base flows*, and addressed in consideration of current base flows. Changes in hydrograph amplitude or timing with respect to watershed size, geology, and geography would be considered. The level of contaminants is addressed directly by the analysis of *chemical contamination/nutrients* and *sediment*. Current listing under 303(d) status should be considered, as well as the causes for that listing. *Sediment* is considered a contaminant especially in spawning and rearing habitat and analysis would apply to this PCE.

B. Summary of Environmental Baseline for Proposed Critical Habitat

Based on the site specific environmental baseline of bull trout habitat conditions (Table 7) and their relationship to the PCEs associated with those habitat indicators described in Table 8, as well as other factors deemed necessary, all PCEs are in less than optimal condition

C. Determination- Summary Narrative of Matrix Indicator(s) and Relationship to PCEs

Analysis for the proposed Jocko Lakes Fire Salvage Project found that activities associated with this project (road work and culvert removal/replacement) were likely to impact the Habitat Indicators Sediment and Substrate Embeddedness, as described in sections VII and VIII of this biological assessment. This impact is anticipated to result in a minor, short-term degradation to these habitat elements and subsequently PCEs 3 and 8 (Table 8). Long-term impacts from these activities would be beneficial due to an annual reduction in sediment. The impact associated with the proposed action is expected to be discountable or insignificant. As such, the proposed Jocko Lakes Fire Salvage Project is not likely to adversely affect critical habitat for bull trout in Trout Creek.

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XV. Summary and Signature

LISTED SPECIES BIOLOGICAL ASSESSMENT SUMMARY OF CONCLUSION OF EFFECTS

Species	No Effect	May Affect, Not Likely To Adversely Affect	May Affect, Likely To Adversely Affect	Likely To Jeopardize The Continued Existence Of
1. Bull Char			X	

SENSITIVE SPECIES BIOLOGICAL EVALUATION SUMMARY OF CONCLUSION OF EFFECTS

Species	No Impact	May impact Individuals or Habitat, But will Not Likely Contribute to A Trend Towards Federal Listing or Loss Of Viability to The Population Or Species.	Will Impact Individuals Or Habitat With A consequence That The Action May Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To The Population Or Species.	Beneficial Impact
1. Westslope Cutthroat Trout		X		

Form 1 (R-1/4/6-2670-95)

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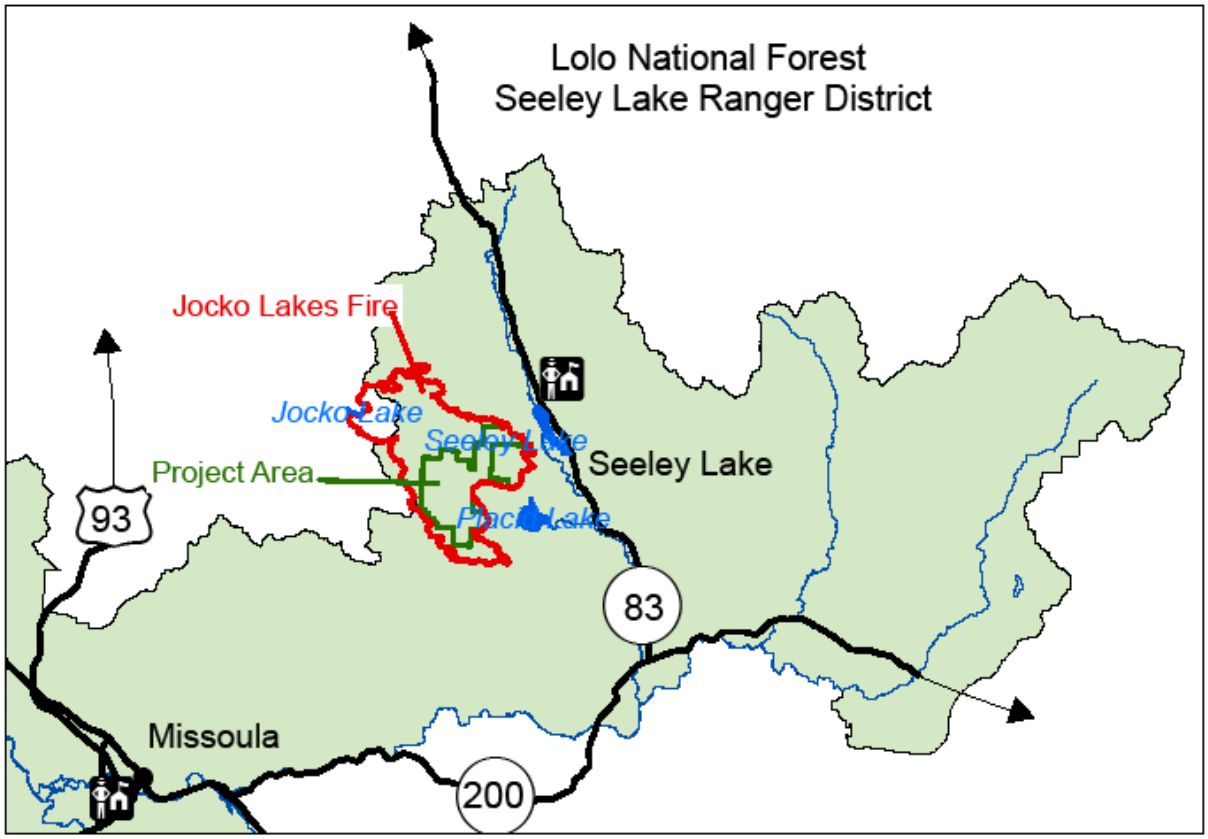
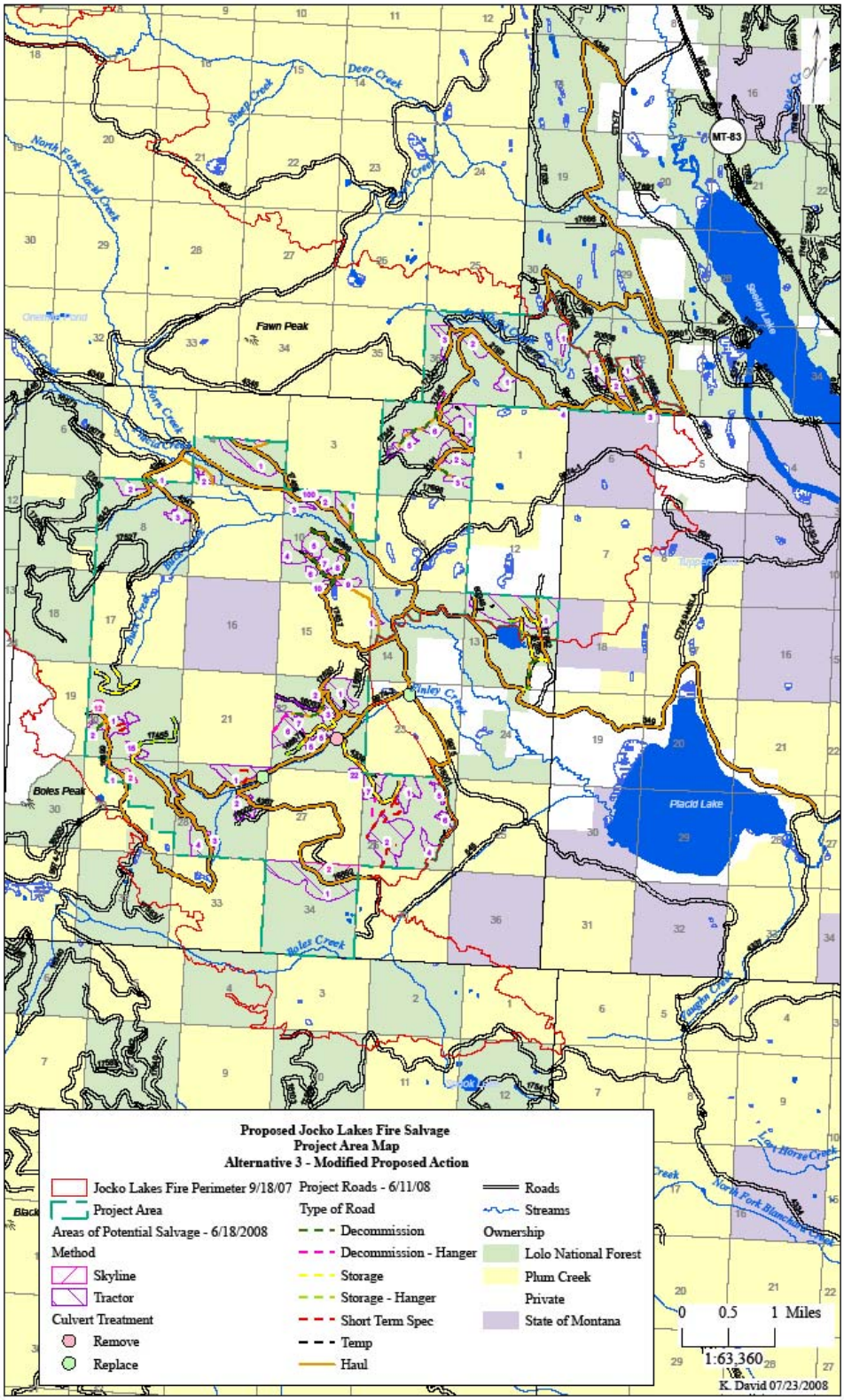
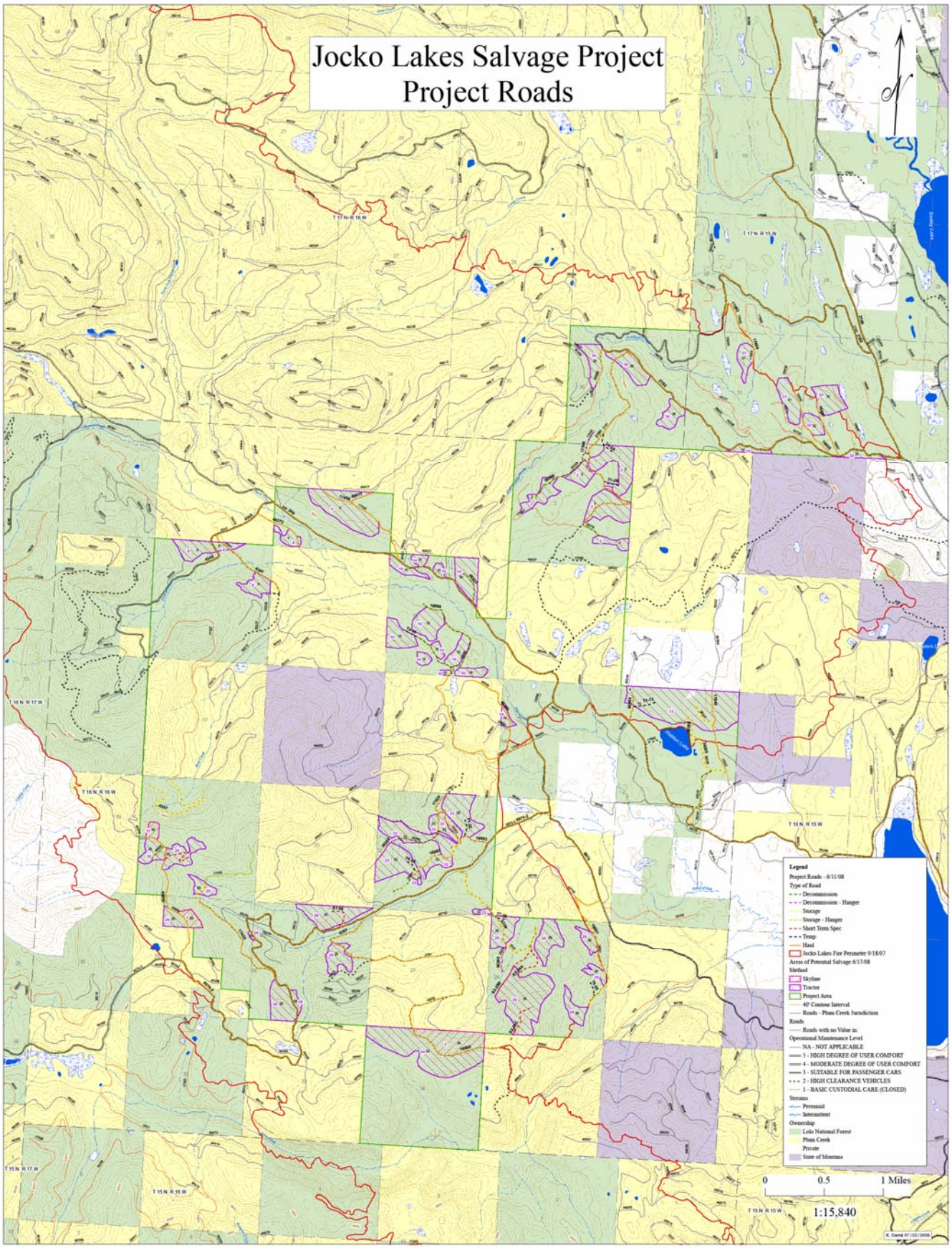
Map 1: Vicinity Map



Map 2: Modified Proposed Action



Map 3: Project Roads



Map 4: Fish Barrier Culvert Map

Appendix A: List of Past, Present and Future Actions Considered in Cumulative Effects Analysis

Table A-1. Cumulative Effects Summary by Ownership. Actions spanning each column are relevant to past, present and reasonably foreseeable actions.

Actions on All Ownerships	Past	Present (Spring 2008 – Spring 2009)	Reasonably Foreseeable
Wildland Fire	Wildland fires were historically a major disturbance factor throughout history on the Seeley Lake Ranger District. Within the Jocko Lakes Fire perimeter three relatively recent fires have occurred. 1981- Grouse Creek Fire (91 ac.); 1987 Slippery John Fire (10 ac.); and 2003 Boles Meadow Fire (85 ac.). All of these fires are encompassed within the 2007 Jocko Lakes Fire perimeter (Total = 36,000 ac.: National Forest = 11,600 ac. State = 2,100; Private = 19,300; Tribal = 3,000).		It is reasonable to assume wildland fire may occur in the area in the future.
Wildland Fire Suppression	Beginning with the Fire Control Policy of 1935, the Forest Service procedure has been to suppress forest fires as quickly as possible. Suppression efforts for the Jocko Fire included 79 miles of dozer line; 9 miles of hand-line; and, unknown gallons of retardant	Suppression of wildland fires, as appropriate will continue. Wildland fire use may be used on portions of the Seeley Ranger District (not within the project area)	Suppression of wildland fires, as appropriate will continue. Wildland fire use may expand, where resource objectives can be met, in the future.
Hunting, Trapping, Predator and Beaver Control	Hunting has been a popular use of National Forest System land and other ownerships. Some predator populations such as wolves and coyotes were reduced in numbers from the project area in the early part of the last century. Trapping of beavers and destruction of their dams occurred has occured on all ownerships.	Hunting and trapping will continue. A limited amount of coyote and beaver population control may be occurring.	Hunting and trapping will continue. A limited amount of coyote and beaver population control may take place in the future, particularly on and near private property.
Firewood and Other Miscellaneous Forest Product Gathering	Firewood gathering has occurred in the area. Other products gathered in small quantities include post and poles, berries, and Christmas trees.	Gathering will continue.	Will continue. Higher than historic energy costs may increase the public's desire to obtain firewood but air quality concerns may also reduce reliance on this source of fuel in the future.
Mushroom Harvest	Past personal use mushroom harvest likely occurred on all ownerships after past fires.	Fee commercial harvest permits will be issued by the USFS in a designated portion of NFS Land in the Jocko fire	

Actions on All Ownerships	Past	Present (Spring 2008 – Spring 2009)	Reasonably Foreseeable
		perimeter to harvest mushrooms. Personal harvest will also occur. Though no specific permitted season or picking start/end dates are proposed for the Forest most activity is expected between April and July. No camp sites will be designated.	
Snowmobiling	This area has a number of popular snowmobile trails including groomed routes.	Use will continue.	Use will continue.
Driving	Driving, sightseeing, and wildlife viewing on open Forest and private roads have occurred.	Use will continue.	Use will continue.
Road Maintenance and BMPs	Roads on all ownerships have been maintained for use either by all users or for just the individual landowners. Roads used for the transport of forest products are generally maintained to meet Montana Best Management Practices (BMP). Road work to improve surface drainage, stabilize slopes, and reduce erosion and stream sedimentation has occurred.	Will continue.	Will continue.
Hiking trails	Boles Creek trail was maintained in 1993. The trail is probably used mostly by hunters.	Use will continue.	Use will continue.
Power line & Substation	Northwestern Energy has easements and maintains a 230 KV line 100 feet wide across multiple ownerships. There is a substation near the mouth of Finely Creek.	Will continue.	Will continue.
Grazing	There are no Forest Service grazing leases in this area; however, the area has traditionally received grazing use on state land (Section 16) and what were Champion (now Plum Creek) lands. Because of intermingled lands, grazing trespass on Forest Service land has occurred.	May continue.	May continue.

Actions on National Forest System Land Only	Past	Present (Spring 2008 – Spring 2009)	Reasonably Foreseeable
Implementation of Burned Area Emergency Stabilization & Rehabilitation (BAER)	BEAR activities in the Jocko Lakes post-fire environment were initiated immediately after the suppression efforts. Due to weather (snow) some of the BEAR work could not be completed. Specific activities that either occurred last fall or	Three repairs that will occur prior to any hauling for Jocko Salvage include: Rd. 9974 which was damaged by fire (Finley Creek). 4347	

	will occur before spring 2009 include: 9 miles of handline restored to infiltrate precipitation; 60 miles of dozer line berms pulled back, logs, topsoil, and organic matter put on fireline to blend with adjacent ground to promote infiltration, erosion control implemented including waterbarring; 30 miles of rehabilitated roads seeded with approved seed mix; spot seeding of safety zones, helispots, drop points and staging areas; replaced 3 culverts (Culvert # 1397 on Placid Cr., Trib. #1289 on Slippery John Cr. # 1194 on Grouse Cr.); closed stabilized 2.1 miles of road; storm-proofed 3.25 miles of roads, armored 5 spillways.	(Buck Creek) pipe (plastic pipe culvert burned). 17458 (plastic pipe culvert burned). Approximately 5.2 miles of road will be decommissioned including recountouring (Rd. 36210, 36212, 36213, 3614, 4342, 36023, and 36022 in Grouse Creek – outside the Jocko Salvage project area, and 46618 in Slippery John Creek)	
Removal of timber associated with fire suppression and hazard reduction	Approx. 0.5 mbf was removed from fire lines and roadside areas for fire suppression efforts that had commercial value and was sold.	Less then 1 mbf of timber removed for fire suppression or safety remains to be sold.	
Fishing/Camping and Dispersed Sites.	Fishing and camping at Hidden Lake has a long history of use. In 2006 a new vault toilet (SST) was installed to create a healthier atmosphere for Forest visitors. This area does not receive as much dispersed recreation use as compared to the east side of the district, which is mostly wilderness and proposed wilderness.	Use will continue	Fishing and camping use at Hidden Lake is expected to continue to rise.
Special Use Permits	Outfitting and guest ranch near the project has utilized a FS special use permit to provide guided snowmobile tours within the project boundary for over 10 years.	Will continue	Will continue
Fish Stocking & MDFW Non-native fish presence management	Montana Department of Fish, Wildlife and Parks have annually stocked approximately 1,000 westslope cutthroat per year in Hidden. Stocking also occurs in Placid and Seeley lake. Non-native fish are present and are managed by MDFW	Will continue.	Will continue.
Placid lake dam	Placid lake dam is a fish barrier to the Placid drainage.	Will continue.	Will continue.
Stream Rehabilitation	Across the Forest approximately 0.21 miles of stream was rehabilitated in 2007; approx. 4.4 miles (direct channel reconstruction)	This type of work will continue.	This type of work will continue.
Road-Stream Crossing Replacements	Across the Forest approximately 6 stream crossing replacements occured in 2007; approx. 55 (majority pipe arch & bridge replacements) On the Seeley Ranger District 6 crossings were removed in 2007 and a total of 66 have been removed since 1996.	This type of work will continue.	This type of work will continue.
Miles of Fish Habitat Made Available	Across the Forest in 2007: Culverts Removed: 6.65 miles and Culvert Replacements: 190 miles Across the Forest since 1996: Culverts	This type of work will continue.	This type of work will continue.

	Removed: 127.6 miles; Diversion Rehabilitation: 13 miles; Total: 330.6 miles On the Seeley Ranger District 2 miles was made available in 2007 and 18.22 miles have been made available since 1996 by culvert removals and .8 miles was made available in 2007 and 31.5 miles have been made available since 1996 by culvert replacements.		
Road Construction	Within the Jocko Lakes roads analysis area (an area larger than the project area) approximately 77 miles of road have been built on federal. The roads are in varying levels of use including roads that are closed and no longer drivable. The majority of roads built on federal lands were completed between 1950 to the mid-1980s. The most recent system road construction projects in the project area are shown below.	No new system roads are being constructed.	Unlikely any new system roads will be built in the reasonably foreseeable future on NFS land.
Road Maintenance	Roads open for motorized use by the public are maintained with safety as a high priority. This primarily involves repairing drainage features and clearing live and down vegetation. Some roads have been closed (via closure orders) year-long or seasonally and are maintained at a lower level. Culvert replaced with bridge at NFSR#2190 and Archibald crossing (compelted with KV funds from Archloop Timber Sale).	Will continue.	Will continue.
Road Storage and Decommissioning	Across the Forest approximately 788 miles of road under USFS jurisdiction have been closed or decommissioned since 1996. 51.6 miles in 2007. On the Seeley Ranger District approximately 15.2 miles of road were closed or decommissioned in 2007 and 125.2 miles since 1996.		The Jocko Lakes Roads Analysis recommends the storage or decommissioning of 9.6 miles of road within the roads analysis area that are not part of the salvage proposal and may be completed in the reasonable foreseeable future.
Land Acquisition/Exchange	The District acquired a 20 acre lot around the Double Arrow Lookout in T16,R15,S5 just on the edge of the Jocko Fire perimeter, to facilitate management of the lookout and communications site. Forest Service acquired land from Champion Timber Company in 1992 in the Deep Creek Exchange near Hidden Lake.	Will continue.	Will continue.
Noxious Weed Control		Noxious weed control as outlined in	Will continue.

		the 2007 Integrated Weed Management on the Lolo National Forest Environmental Impact Statement and Decision will take place in the Jocko Fire perimeter.	
Irrigation	The BIA ditch takes water from the N. Fk. Placid and carries it over the divide into the Jocko drainage.	Will continue	Will continue
Timber Harvest	Approximately 34,092 acres of timber have been harvested on National Forest System land in the project area since the 1950s within the six, 6th order HUC's that encompass or are next to the project area. An acre of land may have had multiple harvest entries, so a straight percentage of the area that has been treated is not accurate. Within the Jocko Lakes Fire Salvage Project area approximately 4,894 acres of timber have been harvested on NFS land. An acre of land may have had multiple harvest entries, so a straight percentage of the area that has been treated is not necessarily accurate. The majority (67%) of the treatments in the HUC were accomplished in the 1970s and 1980s.	Within the Jocko Salvage project area the Hidden Lake Timber Sale planned in 2007 to thin 388 ac. A portion of the area planned for thinning was burned by the Jocko Lakes fire and is included in this Salvage proposal (Unit 131).	

Actions on State and Private Ownership Only (Tribal?)	**Past**	**Present** **(Spring 2008 – Spring 2009)**	**Reasonably Foreseeable**
State – School Trust Land: Timber Sales including Jocko Fire Salvage and activities	In 1990, the DNRC completed the Double Arrow Timber Sale shelterwood harvesting approximately 2.5 MMBF from 362 acres in **Section 6, and N1/2 Section 8,** Township 16 North, Range 15W – Winter harvest. In the early 1990's, DNRC harvested approximately 1.8 MMBF from approx. 220 acres in **Section 16,** T16N, R16W - In 1991 the Finley Creek Timber Sale harvested approx. 1.8 mmbf of seedtree and overstory removal from 220 acres in **Section 16**, T16N, R16W. Additional harvest entries occurred in the early 1960s. In 1996 Hidden Bugs Salvage Timber Sale and Hidden Bugs Timber Sale Supplemental EA – Under	The DNRC is currently developing a proposed timber permit to salvage harvest approximately 34 acres of burned timber in Section 36 T16N R16W.	DNRC will plant, starting as early as the spring of 2009, appropriate tree species (western larch, ponderosa pine, and Douglas-fir) in high-severity burned areas to supplement natural regeneration. Approx. 0.5 miles of the new road construction, **Section 16** of Township 16 North Range 16 West, would be removed post-harvest.

	the original timber sale, the DNRC was harvesting approximately 800 thousand board feet of dead, dying, and susceptible lodgepole pine from approximately 125 acres in **Section 18**, Township 16 North, Range 15 West. In addition to timber harvesting, the original activities also included approximately 4 miles of road maintenance, 0.5 miles of new road construction, and 0.25 miles of road decommissioning. In August of 2007, the Jocko Lakes Fire burned approximately 140 acres of the original project area. Under the Hidden Bugs Supplemental EA, the DNRC harvested an additional 70 acres of partially and severely burned timber within **Section 18**. No additional road was constructed but some road maintenance was conducted to meet Montana Best Management Practices. Approximately 5,000 feet of fireline was used as a skid trail, and then it was obliterated. In **Section 6 and 8** of Township 16 North, Range 15 West and **Section 16** of Township 16 North Range 16 West, harvest approx. 8 to 11 MMBF of dead and dying timber from up to 1,503 acres. Approx. 2.75 miles of road constructed and decommissioned approx. 0.5 miles of existing road all within **Section 16.**		
State – School Trust Land: Road construction, reconstruction (State)	Jocko Salvage Roadwork – In 2007 the DNRC constructed new roads, reconstructed existing roads, and replaced road features within Section 6 of Township 16 North Range 15 West and Section 16 of Township 16 North Range 16 West. Specifically, the DNRC constructed 1.5 miles of new road, reconstructed and maintained 3.6 miles of		

	existing road, and replaced 10 culverts that were at risk of flooding or loss due to fire effects, with larger culverts. Activities are expected to be completed during the fall of 2007.		
State – School Trust Land: Mineral Extraction	A flagstone/rock mineral lease removed approximately 60 tons of material from Sections 6 and 8, Township 16 North, Range 15 West in 2007 (less than 1 ac.).		
Private – Commercial Timber Lands	Since 1999 through 2007 Plum Creek has harvested, with associated actions, approx. 7,600 ac., removing approx. 26 mmbf of timber from their ownership in or near the Jocko Lakes fire perimeter (an area of roughly 18,000 ac.). Approx. 5,400 ac. of the harvest was some stage of regeneration harvest and 2,200 ac. was intermediate harvests.	Additional timber harvest can be anticipated on Plum Creek lands within the Jocko fire perimeter.	Additional timber harvest can be anticipated on Plum Creek lands within the Jocko fire perimeter.
Private Land Development	Within the Jocko Fire perimeter, T16,R16,S12,S ½, has been subdivided and sold to individuals.		
Noxious Weed Control	The State of Montana applies herbicides on State lands near or adjacent to the Lolo NF. These programs treat adjacent areas and roads, State roads and highways within and around the Jocko Salvage area. Adjacent private landowners actively control weeds and some use herbicides. Methods include both aerial and ground application of herbicides.	Weed control is likely to continue.	Weed control is likely to continue.

Project Area Information

Tables A-2 through A-5 show information for within the 11,881 acre Jocko Salvage Project area. One acre of land may have had multiple activities, including more then one harvest entry, therefore a straight percentage of the area that has had activities (vs. no activity) can not be made with these figures.

Table A-2. Past Timber Harvest Activity Acres on National Forest System Land Within the Project Area.

Harvest Type	1950s	1960s	1970s	1980s	1990s	2000s	Total

Regeneration* (acres)	283	933	1,153	1,282	0	0	**3,651**
Intermediate** (acres)	42	185	552	395	38	31	**1,242**
Totals	**325**	**1,118**	**1,705**	**1,677**	**38**	**31**	**4,894**

* includes: patch clearcuts, seed trees, shelterwoods etc. The same acre may receive more than one harvest entry.
** includes: thinning, sanitation and salvage, etc. The same acre may receive more than one harvest entry.

Table A-3. Most Recent Timber Sale Projects on NFS Land within the Jocko Salvage Project Area.

Project Name	Year Project was Most Active	Acres of Timber Harvest
Hidden Lakes	2008	386
Arch Loop	2000	31
Archibald	1996	35
Schoolhouse Greensli	1996	2
Section 24	1989	34
Fallen Arch	1988	21

Table A-4. Total Acres and Percentage of the Jocko Salvage Project Area Burned Since 1980.

JOCKO SALVAGE PROJECT AREA - INCLUDING 2007 JOCKO FIRE	Acers	% of Project Area Burned
Total Fire Acres in Jocko Salvage Project Areas since 1980 (including 2007 burn – all ownerships)	11,881	100%
Total Acres in Jocko Salvage Project Area (all ownerships)	11,881	

Table A-5. Percentage of Area Burned in the Jocko Salvage Project Area Since 1980 with Pre and Post Burn Harvest.

	Acers	% of FS in Project Area Total Burned
FS Acres Burned in Jocko Project Area since 1980 no harvest activity pre or post	4,078	56%
FS Acres Burned in Jocko Project Area since 1980 with post-burn harvest	0	0%
FS Acres Burned in Jocko Project Area since 1980 with harvest prior to burn	3,259	44%
Total FS Acres Burned in Jocko Project Area since 1980	7,337	100%

Six, 6th order HUCs Within or Adjacent to the Project Area.

Tables A-6 through A-7 show information for within the 91,467 acres in the six, 6th order HUCs within or adjacent to the project area. One acre of land may have had multiple activities, including more then one harvest entry, therefore a straight percentage of the area that has had activities (vs. no activity) can not be made with these figures.

Table A-6. Past Timber Harvest Activity Acres on National Forest System Land in the Six, 6th order HUCs Within or Adjacent to the Project Area.

Harvest Type	1950s	1960s	1970s	1980s	1990s	2000s	Total
Regeneration* (acres)	2,213	4,266	3,232	3,763	1,852	420	**15,746**
Intermediate** (acres)	840	1,135	3,469	2,223	2,038	2,142	**11,847**
Totals	**3,053**	**5,401**	**6,701**	**5,986**	**3,890**	**2,562**	**27,593**

* includes: patch clearcuts, seed trees, shelterwoods etc. The same acre may receive more than one harvest entry.
** includes: thinning, sanitation and salvage, etc. The same acre may receive more than one harvest entry.

Table A-7. Past Site Prep and Reforestation Activity Acres on NFS Land in the Six, 6th order HUCs Within or Adjacent to the Project Area.

Activity	1950s	1960s	1970s	1980s	1990s	2000s	Total
Planting (ac.)	844	2,332	1,175	1,552	1,818	150	**7,872**
Natural Regeneration (ac.)	346	2,563	3,337	3,789	873	1,009	**11,918**
Mechanical Site Prep for planting (ac.)	2	521	1,281	1048	333	856	**4,042**

Seeley Lake Ranger District and the Lolo National Forest

One comment we received from the public during the scoping for the Jocko Salvage project expressed concern that high quality post-burn habitat (i.e. habitat that had not been harvested prior to or after a fire) was limited on the Lolo National Forest. We compiled the information in Tables A-8 and A-XX to consider the context of the Jocko Salvage project, relative to all areas burned within the Seeley Lake Ranger District and harvest pre and post fire, and within the Lolo National Forest. Similar information – for within the Jocko Salvage project area is presented above.

Table A-8. Total Acres and Percentage of the Seeley Ranger District Burned Since 1980.

SEELEY RANGER DISTRICT	Acers	% of Seeley District Burned
Total Fire Acres on Seeley RD since 1980 (including 2007 burn)	123,289	38%
Total Acres in Seeley RD	322,591	

Table A-9. Percentage of Area Burned on the Seeley Ranger District Since 1980 with Pre and Post Burn Harvest.

SEELEY RANGER DISTRICT	Acers	% of Total Burned
Acres Burned on Seeley RD since 1980 no harvest activity pre or post	115,351	94%
Acres Burned in Seeley RD since 1980 with post-burn harvest	1,074	0.9%
Acres Burned in Seeley RD since 1980 with prior-burn harvest	6,863	5.6%
Total Acres Burned on Seeley RD since 1980	123,289	100%

Table A-10. Total Acres and Percentage of the Lolo National Forest Burned Since 1980.

LOLO NATIONAL FOREST (LNF)	Acers	% of LNF Burned
Total Fire Acres on LNF since 1980 (including 2007 burn)	340,505	16%
Total Acres on the LNF	2,092,075	

Table A-11. Percentage of Area Burned on the Lolo National Forest Since 1980 with Pre and Post Burn Harvest.

LOLO NATIONAL FOREST	Acers	% of Total Burned
Acres Burned on LNF since 1980 no harvest activity pre or post	293,896	86%
Acres Burned on LNF since 1980 with post-burn harvest	3,464	1%
Acres Burned on LNF since 1980 with prior-burn harvest	43,144	13%
Total Acres Burned on LNF since 1980	340,504	100%