Biological Assessment for the Potential Effects of Managing the Payette National Forest in the Main Salmon SW Section 7 Watershed on Snake River Spring/Summer Chinook Salmon, Snake River Steelhead, and Columbia River Bull Trout and Biological Evaluation for Westslope Cutthroat Trout

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Open Errata

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I. INTRODUCTION

This Biological Assessment (BA) determines the effects of various Federal actions in the Main Salmon River Tributaries (Southwest: Little Salmon River to South Fork Salmon River) Section 7 Watershed, hereinafter referred to as the Main Salmon Southwest Section 7 Watershed, or simply the Main Salmon SW Section 7 Watershed, on Snake River spring/summer Chinook salmon *(Oncorhynchus tshawytscha)* and their designated critical habitat, Snake River steelhead *(Oncorhynchus mykiss)* and their designated critical habitat, and Columbia River bull trout *(Salvelinus confluentus)*. These species were identified in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). This BA is tiered to previous BAs and supplements for the Section 7 watershed defined as the Main Salmon SW Section 7 Watershed (Figure 1). These BAs are listed at the end of this document under a section of the references cited called *Previous BAs*. Actions in this BA are similar actions as described in 50 CFR 402.12 (g). All acronyms, phrases, references, and associated documents from these BAs are included. Actions supersede all those in previous consultations within the boundaries of the Payette National Forest, including, but not limited to, those lands in the Frank Church River of No Return Wilderness.

This document also includes a Biological Evaluation (BE) of the effects of Federal actions on westslope cutthroat trout *(Oncorhynchus clarki lewisi)*. Biological Evaluations for sensitive species are prepared by direction of the Forest Service manual (FSM 2670).

Descriptive information in this BA covers the Main Salmon SW Section 7 watershed. The assessed federal actions occur in portions of the watershed that have been divided into four analysis areas, which are composite collections of hydrologic units (HUs) and often not true watersheds.

II. General Description of the Section 7 Watershed

The Main Salmon SW Section 7 watershed is not a true watershed, but a grouping of several tributaries of the main Salmon River (CD1: \Support Documents\Maps\sec7watersheds.pdf). As defined here, only 5th level HUs with some portion of their area on the Payette National Forest are considered, though some of the 5th level HUs contain land outside the PNF boundary on both sides of the Salmon River. The watershed contains primarily federally administered lands with sections of private land in the lower portions of several subwatersheds. Private land also exists in the upper portions of some tributary watersheds, particularly Warren Creek in the Warren Mining District, because of current and historic mining operations. The watershed also contains a large section of Bureau of Land Management (BLM) land on Marshall Mountain (the Marshall Mountain Mining District). The federally administered lands are largely the responsibility of the Payette National Forest, though BLM administers some areas. Land uses across the watershed include timber harvest, grazing, localized areas of mining, recreation, road and trail maintenance, and others.

The three analysis areas for this BA in the Main Salmon SW Section 7 Watershed are described below (CD1: \Support Documents\Maps\mssw_aa_map.pdf) (Table 1, Figure 1). These analysis areas generally correspond to the PNF 5th HUs. Miscellaneous tributaries in the Main Salmon corridor area are insignificantly affected by PNF activities and are not included in this assessment.

The streams in this watershed are generally steep because the Salmon River canyon is steep, creating high-energy systems and streams that are classified primarily as “A” channels (Rosgen 1994). Elevations range from about 1,800 feet (549 m) at the mouth of Lake Creek to 8,841 feet (2,695 m) at the summit of Patrick Butte. Overall, the area is mountainous and rugged. Wildfire is a common disturbance on PNF lands, and was especially well expressed in 1994 and 2000.

Riparian vegetation generally consists of shrubs and trees including Engelmann spruce (*Picea englemanni*), dogwood (*Cornus stolonifera*) and alder. High, fast flows in the lower portions of the main channels of most tributaries prevent the establishment of grasses and forbs. Riparian zones are narrow where steep canyons form stream channels. At higher elevations, there are open grassy meadows

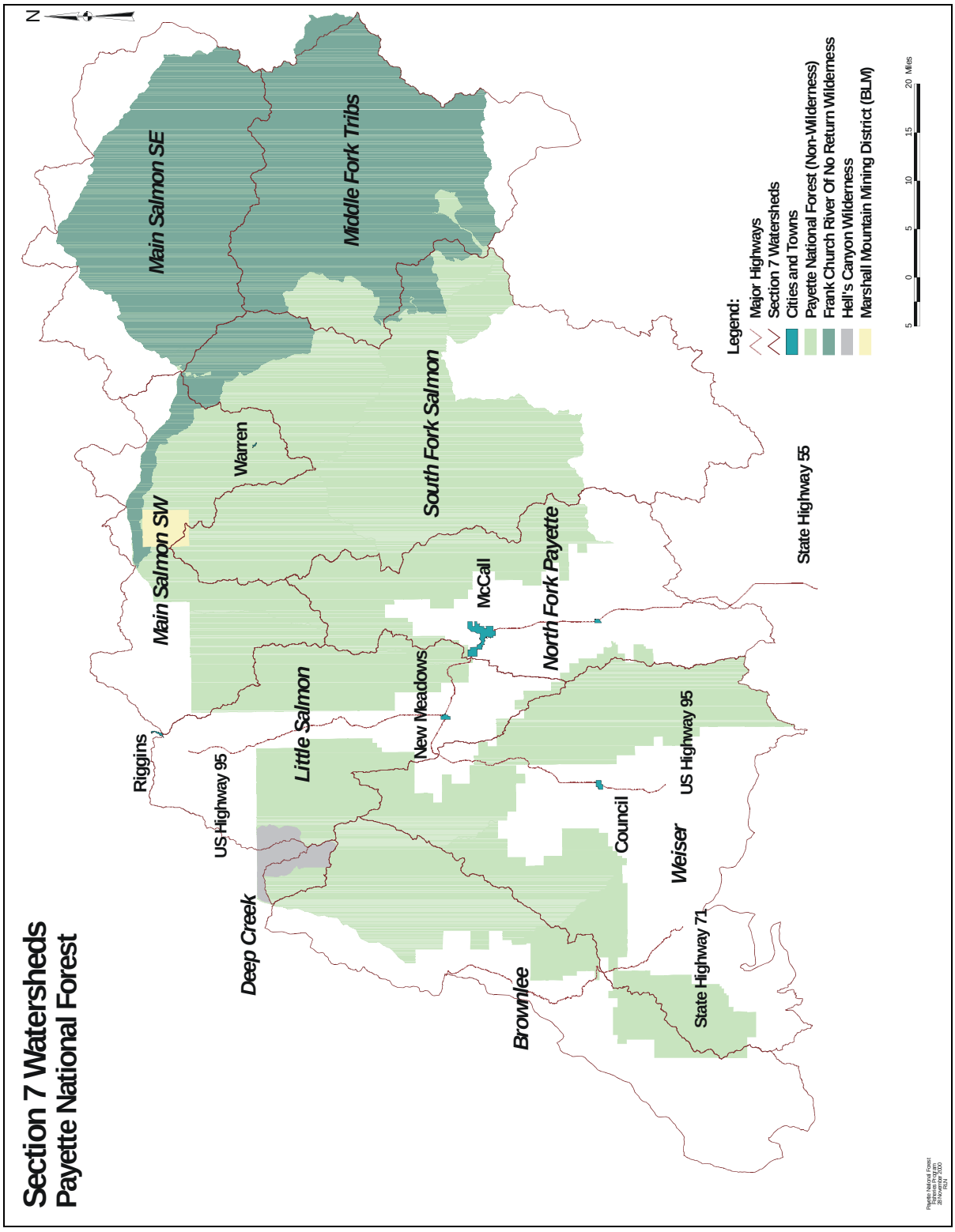

Figure 1.—Section 7 watersheds on the Payette National Forest.

surrounded by sparse conifer forest in some analysis areas, and particularly in the Elkhorn Creek, French Creek, and Warren Creek drainages. Specific discussions of the individual analysis areas follow.

Domestic livestock grazing, timber harvest, and road construction have all influenced the characteristics of the watershed. In addition, mining has altered the natural characteristics of the Warren Creek analysis area in particular, and has played a lesser role in some other areas. Recreation and fire suppression have also influenced the watershed.

In general, these activities result in ground disturbance and vegetation removal and increase the potential for erosion and sediment delivery to stream channels. Some effects are more pronounced near the mouths of streams, where grazing, residential development, timber harvest and associated road construction occurs on private land, typically with less regulation than on federally administered land. Removal of shading vegetation (from anthropogenic activities) has resulted in increased stream temperatures in some areas. Some analysis areas are isolated by their steep terrain, with few roads and few anthropogenic influences.

Recreational ATV use is very popular in some parts of the watershed, which is usually within the scope of the Forest travel plan; however, evidence of ATV use has been found in areas closed to this activity (Gary Elliot, Recreation Program Coordinator, personal communication). Ground disturbance, fording of streams, and creation of new, unauthorized ATV trails have caused resource damage in areas of both authorized and unauthorized use.

Timber harvest is generally low in the Main Salmon SW watershed, but some areas have been salvage logged since the 1994 fires. Some old logging areas still contain old roads that have not been obliterated and are still open to use.

Appendix 1 contains a list of past watershed-level actions submitted for consultation. In general, actions were mitigated to avoid adverse effects through site-specific measures, application of PACFISH direction, or a reduction in the scope of activity.

Limited amounts of listed and sensitive fish habitat exist primarily near the mouths of tributaries. Additional, isolated habitat occurs higher in some of the subwatersheds. Steep gradients and natural impairments and barriers to movement influence the distribution of the listed species in this watershed. During low flows, large, steep deltas lacking defined channels develop at the mouths of some tributaries, creating passage impairments or barriers for anadromous fish.

Table 1.—Hydrologic unit and analysis area composition of the Main Salmon SW Section 7 watershed.

4th Level HU	5th Level HU	Analysis Area	Area (acres)
17060207	17060207-09 Warren Creek	Warren Creek	57,488
17060207	17060207-08 Middle Salmon-Sheep (PNF only)	Middle Main Salmon (California, Rabbit, Carey, Fall Creeks)	54,191
17060209	17060209-01, 02 Salmon River-Partridge (PNF only)	Lower Main Salmon (Lake, Partridge, Elkhorn, Frernch)	84,149
		Total	**195,828**

Computed by clipping groups of HUs to PNF forest boundary as needed. Area rounded to nearest acre, on-Forest portions only (using the PNF administrative boundary: in the MSSE, this excludes the Salmon River corridor administered by the Nez Perce NF). Miscellaneous tributaries in the Main Salmon corridor area that are insignificantly affected by PNF activities are not included in this assessment.

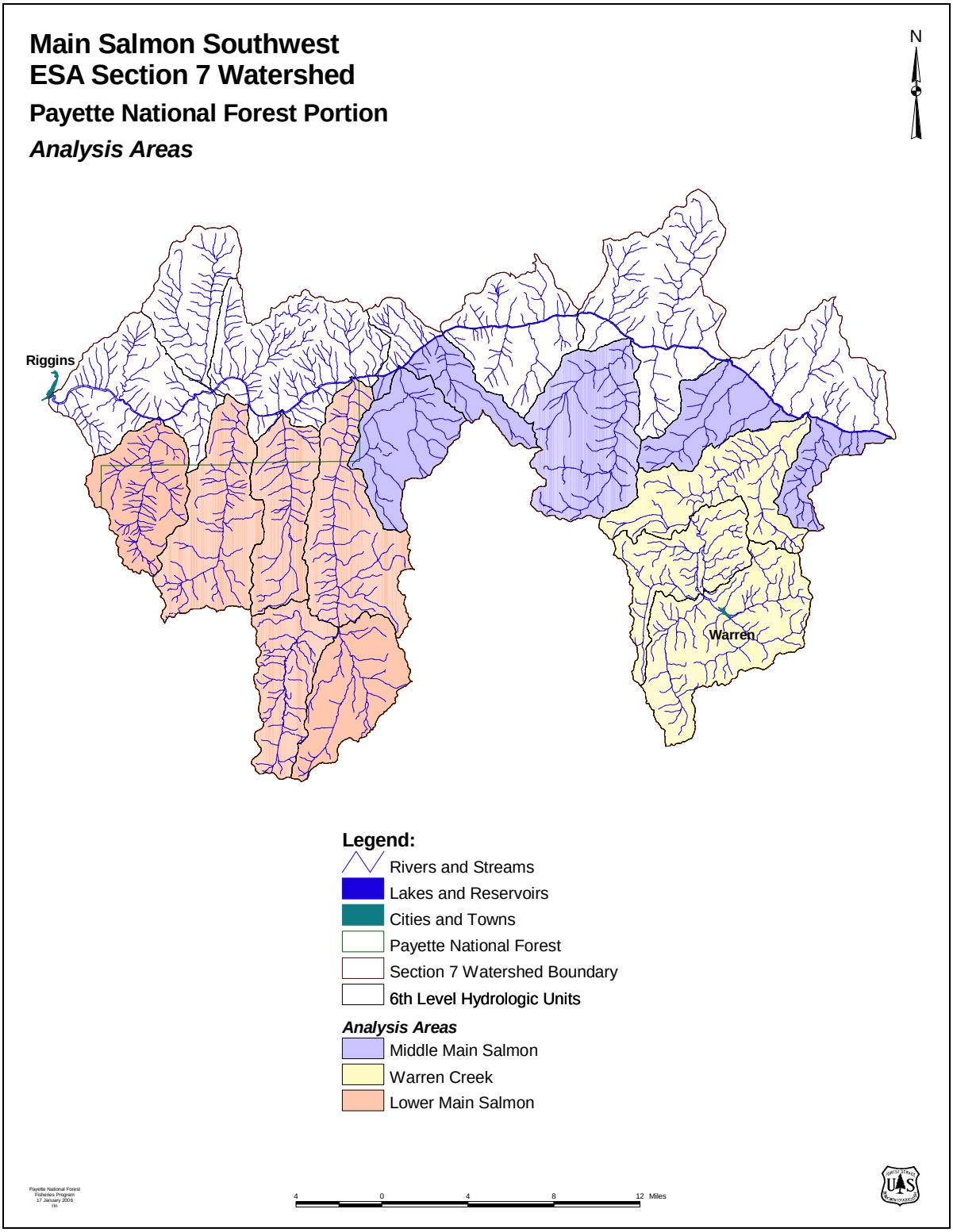

Figure 2.—Analysis areas for the Main Salmon Southwest Tributaries Section 7 Watershed for the 2006 Ongoing Actions BA (CD1: \Support Documents\Maps\mssw_aa_map.pdf).

A. Listed Species and Critical Habitat and Sensitive Species

1. Overview

Forest-wide maps indicating the state of our knowledge of actual fish distribution by Forest stream are included in CD1: \Support Documents\Maps\bull_trout_map.pdf, chinook_map.pdf, cutthroat_map.pdf, steelhead_map.pdf.

These maps, which may be incomplete, were produced from primary sources that included: raw data, formal reports analyzing data, formal publications of analyzed data, and file letters documenting observations by trained personnel. Reports and publications containing second hand descriptions of fish distribution were not used. Documentation of anadromous species presence from sources created prior to 1965 when Hells Canyon Dam was completed was not accepted; and various other sources suspected to contain inaccurate descriptions of species distributions were rejected. Inferences with respect to species presence in areas where they were not observed were based on connectivity and population in adjacent reaches. Survey data used to create these maps are on file at PNF SO.

All of the listed species are found in the Main Salmon SW Section 7 Watershed, but fall Chinook are found only in the mainstem Salmon River downstream from the mouths of streams draining the analysis areas discussed in this BA; fall Chinook are not mentioned or discussed further in this BA.

In general, anadromous species in the Main Salmon SW Section 7 watershed are limited to the lower sections and mouths of streams by steep gradients and passage impairments, while bull trout are also found above such barriers in several streams; distribution of cutthroat trout in poorly understood. Known locations occupied by the listed species will be identified below in each analysis area. Very limited amounts of habitat for spawning and early life history stages of spring/summer Chinook salmon are found in Main Salmon tributaries, and spawning and rearing may occur at the mouths of tributaries; a dearth of suitable habitat, natural impairments, and barriers have limited historic and current Chinook salmon distribution. There is more habitat available to steelhead, and spawning and rearing is thought to occur in most Main Salmon River tributaries below existing fish migration barriers. Resident bull trout populations are known to occur in several Main Salmon River tributaries, but their complete distribution, population dynamics, and metapopulation structure are unclear; however, fluvial bull trout are known to occur downstream in the Little Salmon River watershed and upstream in the South Fork Salmon River watershed, so they are assumed to still be present in this portion of the mainstem Salmon River. Westslope cutthroat trout were noted in surveys of French Creek, Partridge Creek, and one tributary of Warren Creek; however, they do not occur in large numbers in the Main Salmon SW Section 7 watershed and may have resulted from stocking of lakes in the headwaters of streams in the analysis area.

2. Chinook Salmon

a. Species Distribution

Snake River spring/summer Chinook salmon and fall Chinook salmon, listed as threatened by the National Marine Fisheries Service (NMFS) in 1992 (57FR14653), occur in the Main Salmon SW Section 7 watershed. Hereinafter, all references to Chinook salmon are to the listed species.

b. Critical Habitat

Critical habitat for Chinook salmon was designated in 1993 (58FR68543) and specifically defines geographic areas, and essential habitat elements. This critical habitat for Chinook salmon includes all river reaches presently or historically accessible, including adjacent riparian ecosystems, except reaches above impassable natural waterfalls. The Main Salmon SW Section 7 watershed contains habitat elements necessary to support Chinook salmon, and all analysis areas are at least partially accessible to them.

c. Essential Fish Habitat

This biological assessment also evaluates the potential effects within the MSSW Section 7 watershed on Essential Fish Habitat (EFH), in accordance with applicable requirements of section 305(b) of the Magnuson-Stevens Act (MSA), implementing regulations in 50 CFR Part 600.920. EFH is coincident with designated critical habitat for Chinook salmon in these section 7 watersheds.

3. STEELHEAD

a. Species Distribution

Snake River steelhead, listed as threatened by NMFS in 1997 (62FR43937) occurs in the Main Salmon SW Section 7 watershed and in the Lake, Partridge, French, Fall, Carey, and Warren subwatersheds. Hereinafter, all references to steelhead are for the listed species.

b. Critical Habitat

The final rule designating critical habitat for steelhead was published by NMFS on September 2, 2005, and took effect on January 2, 2006 (70FR52629). The SFSR provides spawning and juvenile rearing, adult holding and migration habitat.

4. BULL TROUT

a. Species Distribution

Columbia River bull trout were listed as threatened by the U.S. Fish and Wildlife Service (USFWS) in 1998 (63FR31647). Columbia River bull trout occur in the Main Salmon SW Section 7 watershed and in the Lake Creek, Partridge Creek, French Creek, Fall Creek, and Warren Creek analysis areas. Hereinafter, all references to bull trout are to the listed species.

b. Critical habitat

Critical habitat for bull trout was proposed by the USFWS on November 9, 2002 (U.S. Fish and Wildlife Service, 67FR71236). In the October 6, 2004, final rule there is no designated critical habitat for bull trout within or immediately downstream of the analysis area (U.S. Fish and Wildlife Service, 69FR59996).

5. WESTSLOPE CUTTHROAT TROUT

a. Species Distribution

Westslope cutthroat trout are designated by the Regional Forester as a sensitive species. Westslope cutthroat trout were petitioned for listing (63FR31691) but were determined by the USFWS to not be warranted in 2000 (65FR20120). Westslope cutthroat trout occur in the Main salmon SW Section 7 watershed in the Partridge Creek, French Creek, and Warren Creek drainages. Hereinafter, all references to cutthroat trout are for the petitioned species.

b. Critical habitat

Critical habitat is not applicable to westslope cutthroat trout.

B. SCOPE

This BA covers both programmatic actions that can occur throughout the watershed and individual, site-specific actions. The actions covered in this BA include those where previous consultation would have expired in 2006, as well as new proposed actions.

C. LOCATION

The Salmon River watershed is within the Snake River and Columbia River basins. The sections of the Salmon River watershed encompassing the Main Salmon SW Section 7 watershed are in USGS 4th level Hydrologic Units 17060207 and 1700209 (Table 1). Streams in the watershed

flow generally northerly into the Salmon River between the Little Salmon River and the South Fork Salmon River.

III. Specific Descriptions of the Analysis Areas (Environmental Baselines)

Analysis areas in this BS are synonymous with action areas. The analysis areas for this BA in the Main Salmon SW Section 7 Watershed are described below (CD1: \Support Documents\Maps\mssw_aa_map.pdf**).** Miscellaneous tributaries in the Main Salmon corridor area are insignificantly affected by PNF activities and are not included in this assessment.

A. Lower Main Analysis Area (Salmon River – Partridge and French Ck 5TH HUs)

1. Natural Physical Characteristics

The major tributaries in this analysis area are Lake, Partridge, Elkhorn, and French Creeks; small lakes are found in the headwaters. Major streams flow through deep, steep-walled, V-shaped canyons. See Nelson and Burns (2001) for further description and tabulated physical characteristics. Wildfire is a common disturbance in the watershed, however no fires over 100 acres acres burned from 2001-2005 in the analysis area, (CD1: \Support Documents\Maps\fire_history.pdf). Maps of prescribed, wildland, and wildland fire use fires since 2000 are in CD1: \Support Documents\Maps\large_fire_map.pdf and rx_fire.pdf).

In Elkhorn Creek, two miles above the confluence with the main Salmon River, a natural falls about 12 feet high, and a second falls, about 7 miles upstream, exist; these probably limit fish movement between the Salmon River and most of the analysis area. In most cases, migratory individuals probably cannot reach resident populations in any streams except Lake Creek, and Partridge Creek, because the others have barrier falls near their mouths. Overall, we know very little about biological integrity and life history expression, but small fish size suggests predominantly resident populations with little genetic exchange (Burns et al. 2005).

The lowermost falls on French Creek provide at least a partial barrier to fish movement upstream from the Salmon River, though there have been isolated reports of Chinook salmon above the barrier that may be able to ascend the falls during some flows. Natural barriers restrict upstream movements into Little French Creek and French Creek. French Creek also has many very steep reaches that may not be regarded complete barriers but certainly limit movement (Burns et al. 2005).

2. Human-Caused Physical Characteristics

See Appendix 1 for a summary of past actions and their effects for which consultation has been completed. Unauthorized activities and potential effects for this analysis area are tabulated in Nelson and Burns (2001). Road densities, road/stream crossings, and ECA are discussed by Watershed Condition Indicator (WCI) in Appendix 2. Restoration actions completed since 2001 that were prescribed in Nelson and Burns (2001) include:

- trail maintenance on slope failures on the Patrick Creek trail (Linda Wagoner, personal communication),
- rail maintenance on the Partridge Creek trail through riparian areas (Linda Wagoner, personal communication),
- dropping steep trail sections above Partridge Creek from the trail system (Linda Wagoner, personal communication),
  Road to trail conversion, and/or obliteration of non-system roads in the Cloochman Saddle area (Linda Wagoner, personal communication.)

The Forest began monitoring effects of sheep and cattle grazing in watersheds supporting anadromous fish in 1993 to determine effects of changes in grazing management that were expected to reduce potential adverse effects to Chinook salmon. The monitoring includes annual

measurements of substrate conditions (cobble embeddedness, free matrix, and surface fines), stream temperature, streambank disturbance, and forage utilization. Annual reports summarize approximately 13 years of sediment and temperature monitoring at fixed sites in grazed watersheds (the actual length of monitoring records varies among sites) (Nelson 2006 draft, Zurstadt and Bonaminio 2005, Zurstadt 2004, 2003). Current trends and current conditions in these indices do not indict grazing, as currently managed, for degrading salmonid habitat conditions in these streams, In most cases, sediment conditions were favorable for salmonid species. Temperatures were typically satisfactory or higher than preferred for anadromous species but often unfavorable for bull trout as defined by LRMP WCIs; discussion of this issue and rationale for refining this indicator is described in Nelson 2006 (draft). Recommendations and actions from past BAs (including surveys of allotment streams for bull trout spawning areas) are addressed in the annual reports.

Most of the sites from French Creek and west, including the Little French Creek site, will be discontinued because they were deemed to be unsuited to monitoring grazing effects on fish habitat. For the Little French Creek Site l, grazing in the meadow upstream was discontinued for several years because of obvious damage to streambanks. Although the streambanks have recovered considerably, unvegetated streambanks still exist and could be contributing to the potential increasing trend at the monitoring site downstream. However, a recent field review determined that resumption of grazing has not increased erosion in the watershed (Nelson 2006 Draft).

3. Cumulative Analysis Area Effects

Cumulative effects in the analysis area are addressed in Appendix 2.

4. Analysis Area Restoration Opportunities

There are limited restoration opportunities in this analysis area. No specific restoration projects are known to be planned. Signing system trails to advise users that the trail is closed to motorized use is a potential opportunity that has been suggested from trail surveys (trail survey report, portions on file, PNF Supervisor's Office, McCall, Idaho).

5. Description and Distribution of Chinook, Steelhead, Bull Trout, and Cutthroat Trout

For general life history and distribution, see Section I.A. – General Species Overview. For specific distribution, see Fish Distribution Maps (CD1: \Support Documents\Maps\bull_trout_map.pdf, chinook_map.pdf, cutthroat_map.pdf, steelhead_map.pdf).

6. Habitat Condition, Trend, Limiting Factors

Appendix 2 tables address the status of Watershed Condition Indicators (WCIs). WCIs which are Functioning at Unacceptable Risk (FUR) or which have changed in status since 2001 (Nelson and Burns (2001)) are described below.

a. Temperature – FUR.

This WCI was FA for Lake and Partridge, and FUR for Elkhorn and French in Nelson and Burns (2001). Data for 2003-2004 show temperatures in the FR range for Lake (Unpublished data on file at the PNF SO). Nelson (2006) reports FUR temperatures for Elkhorn and French Creek in 2005.

b. Interstitial Sediment Deposition – FR.

Free Matrix data from French Creek (Klip and Boundary sites) show values in the FUR range in 2003 (Zurstadt and Bonaminio 2005) and in the FA range in 2005 (Nelson 2006), for Little French in the FUR range (Nelson 2006), and for Elkhorn in the FR range (Zurstadt and Bonaminio 2004), and FA range (Nelson 2006). More historic data shows FA for Lake and Partridge Creeks (unpublished ddata on file at PNF SO). (Sediment thresholds for granitics based on Nelson and Burns 2005).

c. Large Woody Debris – FR.

This WCI was FA in Nelson and Burns (2001), but the data that this judgment was based on did not clearly include PACFISH wood. Limited data collected in 2005 shows LWD in the FR range for Lake and Partridge Creeks, and FA for French Creek (unpublished data on file at the PNF SO).

d. Width/Maximum Depth Ratio – FA.

This WCI was FR (Partridge) and FUR (Lake, French and Elkhorn) in Nelson and Burns (2001), due to high gradients and flooding in the lower reaches of Lake Creek. Limited data collected in 2005 shows this WCI in the FA range (unpublished data on file at the PNF SO).

e. Streambank Condition – FA.

This WCI was FUR for Lake Creek in Nelson and Burns (2001) due to flooding in the lower reaches. Limited data collected in 2005 shows this WCI in the FA range (unpublished data on file at the PNF SO). Localized stability concerns were noted in unpublished French Creek riparian surveys in 2002 (unpublished riparian surveys on file at the PNF SO).

f. Change in Peak/Base Flows – FR.

This WCI was FA for Lake and Partridge, and FR for Elkhorn and French, in Nelson and Burns (2001). The analysis area has been moderately disturbed in ways that could cause change in peak/base flows (personal observation).

B. Middle Main Analysis Area (Middle Salmon/Sheep 5TH HU)

This analysis area includes Fall, Carey, California, and Rabbit Creeks.

1. Natural Physical Characteristics

Physical characteristics are tabulated in Nelson and Burns (2001). Wildfire is a common disturbance in the watershed, however no fires over 100 acres burned from 2001-2005 in the analysis area (CD1: \Support Documents\Maps\fire_history.pdf). Maps of prescribed, wildland, and wildland fire use fires since 2000 are in (CD1: \Support Documents\Maps\large_fire_map.pdf, rx_fire.pdf).

Natural barriers restrict upstream movements into Carey Creek, California Creek, and Rabbit Creek. These streams also have steep reaches that may not be regarded complete barriers but certainly limit movement.

Fluvial bull trout were observed in 2002 at the mouth of California Creek, though it was noted that "seems unlikely that bull trout could migrate up this reach [about 1.5 miles upstream of the mouth] at low flow". A barrier to fish passage was noted about 980 feet above the California Creek mouth (Burns et al. 2005). A barrier to fish passage was noted about 7 miles upstream of the mouth of Rabbit Creek, though fish (steelhead and cutthroat) were only observed in the lower 1.5 miles (2002 unpublished data on file PNF Supervisors Office). Carey Creek is steep over the lower several miles of its course, and would present a very serious challenge to dispersal upstream where there is better habitat (Hurley 1996). For Fall Creek, migrants cannot migrate upstream into the analysis area because of the barrier falls near the mouth of Fall Creek.

2. Human-Caused Physical Characteristics

See Appendix 1 for a summary of past actions and their effects for which consultation has been completed. Unauthorized activities and potential effects for this analysis area are tabulated in Nelson and Burns (2001). Road densities, road/stream crossings, and ECA are discussed by Watershed Condition Indicator (WCI) in Appendix 2. Restoration actions completed since 2001 that were prescribed in Nelson and Burns (2001) include:

- An action plan has been developed to obliterate and hence eliminate adverse effects of the California Creek jeep trail. This action is addressed in Faurot and Burns 2005 (CD1: \Support Documents\BAs\MSSW\MSR_BA18.pdf) and is planned for 2006.
- Other roads, mines, and trails are scheduled for obliteration and rehabilitation, described in Faurot and Burns 2005 (CD1: \Support Documents\BAs\MSSW\MSR_BA18.pdf)
- Disturbance from historic mining in upper reaches has been reclaimed in recent years (personal communication with John Rygh, Payette NF, Minerals, Supervisors Office, McCall, ID).
- Rabbit Creek has been surveyed for bull trout in the ford area of FT137; no bull trout were found (unpublished data on file at PNF SO)

See above analysis areas for a discussion on range monitoring.

3. Cumulative Analysis Area Effects

Cumulative effects in the analysis area are addressed in Appendix 2.

4. Analysis Area Restoration Opportunities

There is an opportunity to further address the effects associated with the condition of the Carey Creek road; because the road is little used and difficult to maintain properly, the feasibility of obliterating or relocating the lower portion along Carey Creek should be evaluated; high elevation sections are sufficiently removed from streams as to have less effect on stream condition or listed fishes.

One opportunity that has been identified in Rabbit Creek is to replace the open ford on FT 137 with a trail bridge.

There is a culvert where FS Road 592 crosses EF Fall Creek that blocks all upstream movement of fish at all flows and fragments occupied bull trout habitat (Hurley 1996; unpublished data on file, PNF Supervisors Office). This culvert could be replaced with a structure that is passable to fish.

The Burgdorf Roads BA (Faurot and Burns 2005) includes conversion of 2.85 miles of nonsystem roads, and 0.35 miles of system road, to ATV trails. Specifically, actions involve:

- Ripping compacted areas of the non-trail portion of the road to 16 inches or the depth of compaction and reducing the trail width to 60 inches,
- Installing drivable dips to improve drainage,
- Pulling of fill slopes where necessary on 13.5 miles of existing road,
- Selectively placing native soil and woody debris (from adjacent undisturbed sites) to facilitate vegetation establishment and discourage use of reclaimed areas,
- Selectively using native seed where onsite vegetation would be expected to colonize slowly,
- Selectively using organic fertilizer,
- Placing straw mulch or similar products on disturbed areas to promote moisture retention and nutrient recycling,
- Rerouting up to 500 feet of trail to avoid steep or unstable sites, and
- Turnpiking or otherwise protecting wetlands or boggy sites.

Stream crossings for these road to trail conversions would be treated as follows:

- Removing fill in the flood-prone area;
- On non-fish-bearing streams, installing crossing structures to maintain grade control and armoring fords and approaches with coarse, durable rock sized to withstand the flows expected for the stream;

- Evaluating all stream crossings on fish-bearing streams on a case-by-case basis for the type of crossing structure; and
- Transplanting riparian vegetation; improving soil fertility with organic fertilizer;
- and placing mulch, straw and/or woody debris to achieve 100 percent coverage of disturbed areas.
- The project fisheries biologist will agree in writing that the effects to listed species and to designated and proposed critical habitat will not likely be adverse.

5. Description and Distribution of Chinook, Steelhead, Bull Trout, and Cutthroat Trout

For general life history and distribution, see Section I.A. – General Species Overview. For specific distribution, see Fish Distribution Maps (CD1: \Support Documents\Maps\bull_trout_map.pdf, chinook_map.pdf, cutthroat_map.pdf, steelhead_map.pdf).

6. Habitat Condition, Trend, Limiting Factors

Appendix 2 tables address the status of Watershed Condition Indicators (WCIs). WCIs which are Functioning at Unacceptable Risk (FUR) or which have changed in status since 2001 (Nelson and Burns (2001) are described below.

a. Temperature – FR/FUR.

This WCI was FA for Fall, California, and Rabbit, and FR for Carey in Nelson and Burns (2001). Stream temperatures have only been continuously recorded for Fall Creek within the analysis area, data there is within the FR range for bull trout, and the FUR range for Chinook salmon /steelhead spawning (unpublished data on file at PNF SO)

b. Physical Barriers – FA California, Rabbit, Carey; FUR Fall.

This WCI was FA in Nelson and Burns (2001) for Fall Creek. There is a culvert where FS Road 592 crosses the EF Fall Creek that blocks upstream movement of fish at all flows.

c. Interstitial Sediment – FR.

This WCI was FA for California, Rabbit, and Carey, and FUR for Fall in Nelson and Burns (2001). California Creek values were in the FR range in 2004 (unpublished data on file at PNF SO). Nelson (2006) reports cobble embeddedness and free matrix values in the FUR range for Fall Creek.

d. Large Woody Debris – FA.

This WCI was FR in Nelson and Burns (2001) (non-PACFISH LWD measurements). Recent data collected for this analysis area showed FA.

e. Refugia – FUR Bull Trout Fall Creek, FR Chinook Fall Creek, FA Carey, California, Rabbit.

This WCI was the same for Carey and California, was FA for Rabbit, and was FR for Fall Creek in Nelson and Burns (2001). Bull trout in the analysis area are isolated above the barrier falls near the mouth of Fall Creek, and the occupied habitat upstream of the falls is further fragmented by a culvert (Hurley 1996; Nelson and Burns (2001); unpublished data on file, PNF Supervisors Office).

Chinook salmon and steelhead spawning and rearing habitat is restricted to the lower ~300 m of Fall Creek (Hurley 1996; unpublished data on file, PNF Supervisors Office). The natural barrier falls eliminates the potential for refugia upstream in the analysis area. Other refugia is available outside of the analysis area (Nelson and Burns 2001).

f. Floodplain Connectivity – FA.

This WCI was FR in Nelson and Burns (2001) for Fall Creek. Riparian inventories do not indicate that channel entrenchment or other moderate alterations to floodplain connectivity have occurred (Bailey et al. 1994a, b; unpublished riparian inventories 2004, on file at PNF SO).

g. Change in Peak/Base Flows – FA.

This WCI was FR for Carey, Fall, and California in Nelson and Burns (2001). There are no current flow data for the analysis area, but there are no actions that would have degraded this indicator. Data from fish habitat and riparian inventories do not indicate altered peak flow, base flow and/or flow timing relative to an undisturbed watershed of similar size geomorphology and climate. Bank stability is high (see streambank condition WCI) and riparian inventories indicate almost all streams are in generally stable condition (Hurley 1996; unpublished data on file, PNF Supervisors Office; Bailey et al. 1994a, b; unpublished riparian inventories 2004, on file at PNF SO).

h. Change in Drainage Network – FA Carey, California, Rabbit; FR Fall.

This WCI was the same for all drainages in Nelson and Burns (2001) except for California Creek, which was FR due to headwater development. Fish habitat and riparian inventories indicate that some past mining activities have straightened channels in isolated areas, but the total amount of altered channel is low relative to the analysis area (Bailey et al. 1994a, b. Unpublished riparian inventories, on file at PNF SO).

i. Road Density – FR California, Carey, Rabbit; FUR Fall.

This WCI was FR for Fall and California; and FA for Carey and Rabbit; in Nelson and Burns (2001). For Fall Creek, the total road density is 2.30 miles/square miles and there are a total of 4.97 miles within RCAs (PNF GIS database).
Motorized vehicle damage was documented in the headwater wetlands, at the tributary/trail crossing, and in seep areas along the trail south of the wetlands (unpublished riparian surveys 2002, on file at PNF SO).

j. Integration of Species and Habitat Conditions – FA for California, Rabbit, and Carey; FR for Steelhead and Chinook and FUR for Bull Trout in Fall.

For Fall Creek, steelhead and Chinook salmon are restricted to the lower ~300 m of Fall Creek. The significance of spawning and rearing habitat in Fall Creek to the overall population of steelhead and Chinook salmon is unknown. Environmental factors outside of the analysis are more likely to have a significant affect on population trends.

The bull trout population within the Fall Creek drainage area is fragmented by a natural barrier near the mouth of Fall Creek and by a culvert in EF Fall Creek. Connectivity within the local population has been altered and will not improve under current management (i.e. barrier culvert remains in place). Data are lacking to assess how local populations have fluctuated with normal environmental events; however barriers would prevent colonization if natural or anthropogenic disturbance led to extirpation of bull trout within the analysis area.

C. Warren Creek Analysis Area

1. Natural Physical Characteristics

The lower section of Warren Creek is a steep gradient (6.9 – 12% gradient from Raleigh 1995) "A" type channel, however "C" type reaches are found near the mouth and through the Warren meadows (gradient 0.4-0.5% from Raleigh 1995) area between Steamboat and Mitchell creeks, where extensive dredge mining occurred historically. The analysis area is within the Idaho Batholith, with granitic soils that decompose rapidly into fine particles. Additional physical characteristics are described by reach in Raleigh (1995).

Physical characteristics are tabulated in Nelson and Burns (2001). Wildfire is a common disturbance in the watershed, however no fires larger than 100 acres burned from 2001-2005 in the analysis area (CD1: \Support Documents\Maps\fire_history.pdf). Maps of prescribed, wildland, and wildland fire use fires since 2000 are in CD1: \Support Documents\Maps\large_fire_map.pdf and rx_fire.pdf).

2. HUMAN-CAUSED CHARACTERISTICS

See Appendix 1 for a summary of past actions and their effects for which consultation has been completed. The Warren Creek analysis area is primarily within Forest Service-administered lands, with inholdings of private land totaling about 8.5% of the landbase. Approximately the lower 3 miles of Warren Creek are within the Frank Church-River of No Return Wilderness boundary. The main Salmon River in the vicinity of Warren Creek is a designated Wild and Scenic river section. The most notable alteration has included changes to stream channels from past mining. Recently, recreational ATV use has become more apparent in this analysis area. A corridor of private land exists along Warren Creek roughly between Steamboat Creek downstream to Mitchell Creek. Nine stream crossings (fords) were counted through this area, which is used by 4-wheel drive vehicles and ATVs.

A long history of mining has altered the upper portion of the Warren Creek analysis area, through the Warren meadows area and upstream, and in some tributaries. Nelson and Burns (2001) provide a more detailed description of past mining activity. Presently there are four mines with current, approved operating plans in the analysis area that conduct mineral exploration (the Big Four, Rescue, Larson Gulch and Crystal mines). These are all lode mines with total disturbances of 2-6 acres. Activities are related to the exploration and developments of adits and ore processing. These mines all have previous consultation records, and mitigation measures have been added to avoid or reduce potential adverse effects.

There are numerous unauthorized and/or unclassified roads in the analysis area. Many of these roads were constructed to access mining areas during the height of gold mining. These roads ford streams and contribute sediment to streams as their condition deteriorates. A bare ford across Steamboat Creek for motorized traffic on FDR 370 has raw, eroding banks that contribute sediment to Steamboat Creek. A bridge is planned at this ford for 2006.

Pony Creek Outfitters (previously Warren Outfitters) operate within the Warren Creek analysis area providing recreational opportunities to the public. Although this site is used for about a two-month period in September and October when the area is dry, precipitation is low and water levels are low, which reduces the likelihood of any sediment, horse waste, or other products on site (e.g., petroleum products) to be transported to live water. Unauthorized activities and potential effects for this analysis area are tabulated in Nelson and Burns (2001). Road densities, road/stream crossings, and ECA are discussed by Watershed Condition Indicator (WCI) in Appendix 2.

Restoration actions completed since 2001 (some of which were prescribed in Nelson and Burns (2001)) include:

- Area closure of the Schissler watershed to motorized vehicles to eliminate trail-related erosion into bull trout streams. (However, this mitigation measure was not effective, as numerous violations occurred. See actions described in Faurot and Burns 2005).
- The open ford over Schissler Creek on FT 132 was replaced by a bridge (personal observation).
- The dispersed campsite adjacent to Mayflower Creek on FDR 340 was closed (Linda Wagoner, personal communication).
- The Burgdorf Roads Analysis Process Report (RAP) was completed, which has led to the planned closure or road-to-trail conversion of many unclassified roads (Faurot and Burns 2005).
- Reclamation of Canuk, Shamrock, and other small mining areas occurred

3. CUMULATIVE ANALYSIS AREA EFFECTS

Cumulative effects in the analysis area are addressed in Appendix 2.

4. ANALYSIS AREA RESTORATION OPPORTUNITIES

There are restoration opportunities in the analysis area associated with some system roads (e.g., Steamboat Creek ford), ATV trails, non-system roads, and mine claims where past activity has

occurred that do not have current operating plans. The following restoration opportunities were identified in Nelson and Burns (2001), but have not been implemented:

- A proposal by the Forest to rehabilitate four mine sites is being pursued. The proposed action would include obliterating several sections of mining access road totaling about 3 mi (4.8 km) that are mostly within RCAs, revegetating disturbed areas at mining sites totaling about 5 acres, and closing adits and shafts.
- A non-system road was identified in the vicinity of the Canuk mine (Wagoner and Burns 1999) that was of concern because of erosion and consequent sediment production; concurrence by the NMFS of operations at the Canuk mine required specific maintenance by the Forest (Stelle 2000).
- There is an extensive network of non-system roads in the watershed that the Forest is attempting to catalog. The effects of these roads is unclear, but they are typically poorly maintained and are be contributing to sediment in streams that support listed species.
- The Steamboat Creek ford is on a system road, FDR 370, clearly contributes sediment to Steamboat Creek. This is about 2 miles (3.2km) upstream from known populations of listed fish, however, and may not be directly affecting listed species; however, such chronic sediment sources undoubtedly contribute to overall degradation of the aquatic system for a considerable distance downstream. The approaches to this ford were armored in 2000, and currently there are plans to install a bridge starting in 2006.

Additional restoration opportunities not included in Nelson and Burns (2001) include the following:

- There is an area off of road FDR 340 just past the Rescue mine that is susceptible to fording and ATV caused resource damage. Access to this area could be reduced by the placement of large boulders.
- Reduce unauthorized vehicular, and ATV travel in Warren Meadows.
- Implement activities described in Burgdorf Roads BA (MSSW vol. 18 [CD1: \Support Documents\BAs\MSSW\MSR_BA18.pdf]).

5. Description and Distribution of Chinook, Steelhead, Bull Trout, and Cutthroat Trout

For general life history and distribution, see Section I.A. – General Species Overview. For specific distribution, see Fish Distribution Maps (CD1: \Support Documents\Maps\bull_trout_map.pdf, chinook_map.pdf, cutthroat_map.pdf, steelhead_map.pdf).

6. Habitat Condition, Trend, Limiting Factors

Appendix 2 tables address the status of Watershed Condition Indicators (WCIs). WCIs which are Functioning at Unacceptable Risk (FUR) or which have changed in status since 2001 (Nelson and Burns (2001) are described below.

a. Temperature – FUR.

In 2001, stream temperatures were recorded with continuously recording temperature loggers at seven locations within the analysis area. In general temperatures exceeded the WCI desired conditions. At the mouth of Warren Creek, the 7-day avg. max was 30.1 (data on file at PNF SO). Mayflower was the exception, where stream temperatures were at the WCI desired condition. Past activities, such as dredge mining, and road construction within RCAs, has likely led to an increase in stream temperatures by reducing shade, and increasing the width to depth ratio (Zurstadt and Burns 2005).

b. Physical Barriers – FR.

This WCI was FA in Nelson and Burns (2001). At least four culverts in the analysis area have been identified as potential barriers to fish passage (2002 data on file at PNF Supervisors Office). In some tributaries, such as Smith Creek, dredge piles in the stream channel may hinder or block fish passage (Raleigh 1995, unpublished data on file, PNF Supervisors Office).

c. Large Woody Debris – FUR.

This WCI was also FUR in Nelson and Burns (2001). Survey data show very low frequencies of LWD in Warren Creek, but better in some tributaries. Quantities of LWD are often below levels given in the Idaho Natural Conditions Database (ICND, Overton et al. 1995), and are below the desired values provided for the default WCI. Past activities, such as dredge mining, road construction within RCAs, and logging has likely led to reduced quantities of LWD. In areas where stream channels flow through dredge piles, or along roads, future potential for LWD recruitment is limited. The WCI is considered functioning at unacceptable risk due to a general lack of LWD and the existence of many areas with reduced potential for recruitment. (Raleigh 1995; unpublished 2001 data on file, PNF Supervisors Office).

d. Width/Maximum Depth Ratio – FR.

This WCI was FUR in Nelson and Burns (2001). There are some isolated areas in Warren Creek and Steamboat Creek where both wetted width to maximum depth and wetted width to depth ratios are well above INCD values and WCI desired conditions. In other streams in the analysis area wetted width to maximum depth ratio and wetted width to depth ratios are generally similar to INCD values and wetted width to maximum depth ratios are at the WCI desired condition of < 10 (Raleigh 1995; unpublished 2001 data on file, PNF Supervisors Office).

e. Streambank Condition – FR.

This WCI was FA in Nelson and Burns (2001). Streambank stability was > 90% in the analysis area in 1995 and 2001 (Raleigh 1995, unpublished 2001 surveys on file at PNF SO), but recent data has shown values within FR ranges (Dugaw et al. 2005).

f. Disturbance History – FR.

This WCI was FUR in Nelson and Burns (2001). Overall, ECA is less than 15% but there has been some recent fire and considerable anthropogenic disturbance on Warren Creek. Streambanks in the analysis area are generally stable but development on Warren Creek has altered riparian ecosystems extensively in certain areas leading to loss of shade, LWD recruitment, and sediment buffering capabilities. Impacts to stream channels and riparian areas from historic and current mining activities were noted in inventories (Bailey et al. 1994a,b).

IV. DESCRIPTIONS OF PROPOSED ACTIONS

Programmatic actions that can occur across the watershed, as well as individual, site-specific actions occurring in individual subwatersheds are the subject of this consultation (Table 2).

Table 2.—Ongoing and proposed actions that are included in this consultation.

Analysis Area	Federal Action
Entire Watershed	Miscellaneous forest products
	Mistletoe control and precommercial thinning
	Fire management activities
	Fish habitat/riparian sampling
	Watershed and fish habitat improvements and maintenance
	Noxious weed management
	Road management
	Trails, recreation and administrative site O&M
	Travel plan
Salmon River-Partridge and French Creek Analysis Areas	Grazing Allotments
	Ace Outfitters
Warren Creek Analysis Area	Pony Creek Outfitters
	Warren Heights water development

A. FEDERAL ACTION: MISCELLANEOUS FOREST PRODUCTS

PURPOSE AND NEED: Public harvest of miscellaneous forest products such as firewood, posts and poles, Christmas trees, small volumes of timber (less than 70 acres of green harvest, or 250 acres of salvage in any analysis area annually), mushrooms and other plants and seeds for use by permitted Forest users until December 31, 2017.

LOCATION: MSSW Section 7 Watershed

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001
- NMFS: August 9, 2001

DESCRIPTION: Public harvest of miscellaneous forest products such as firewood, posts and poles, Christmas trees, small volumes of timber (less than 70 acres of green harvest, or 250 acres of salvage in any analysis area annually), mushrooms and other plants and seeds for use by permitted Forest users.

REQUIRED MITIGATION:

Adopt LRMP buffer strip widths for tree harvest with the exception that the District Ranger may designate areas for miscellaneous forest products harvest or collection within RCAs that have been agreed to by both a journey level hydrologist and fisheries biologist and meet the following criteria:

Trees may be harvested or collected if all the following conditions are met:

- where trees do not provide shade to a perennial stream during any part of the day or year,
- where trees do not contribute to potential large woody debris recruitment to adjacent perennial or intermittent stream channels or floodplains,
- where tree removal or tree felling would not impact stream banks, springs, seeps or other wetlands,
- where vehicles would remain on existing open roads,

- where trees would not be felled or brought across any road cutslope,
- where root or tree firmness is high and blow down potential is low,
- where a riparian area exists for effective sediment filtering.

Adopt LRMP buffers for storage and refueling operations with regard to post and pole and small sales.

Restrict campsites for commercial forest product harvesters to areas outside of RCA's unless approved by a fisheries biologist or hydrologist. This restriction would cover all forest product harvest activities listed in the federal action. Large campsites will have site plans completed with necessary mitigation measures. Grey water will be removed from camp and disposed of properly. At locations where camps will encroach on RCAs, a fisheries biologist or hydrologist will assist in laying out the camp to avoid effects to WCIs. Measures used to avoid effects to streams and WCIs may include flagging no-entry zones to maintain a desired distance between camp and streams, maintaining a close dialog with campers as to resource concerns, and regular visits to camp(s) by a fisheries biologist, hydrologist, or contract administrator.

In order to avoid and mitigate effects identified in the environmental baseline, the Forest will conduct additional activities. In addition to previous requirements developed for consultation, the Forest will do the following:

- Forest employees with training and knowledge of riparian function will talk to firewood cutters in the field concerning LWD in riparian areas. Contacts will occur if employee believes that he/she is safe doing so, or is accompanied by another employee and they believe that they are safe. Safety training will be provided. Any observed violations should be called in on the radio with necessary information, at a minimum.
- “Forest officers" who can approve cable yarding of any products identified as part of this action will be limited to line officers or persons authorized to sign permits and contracts.
- A positive emphasis will be used on signing. Signs will emphasize areas open to use of miscellaneous forest products and the reasons certain areas, like RCAs, are generally closed.
- Increased monitoring of firewood harvest will occur.
- If monitoring shows no decrease in incidents of unauthorized firewood harvest over the next two years, the results will be brought to the attention of the level one streamlining team, who will decide whether initiation of consultation is warranted, or whether to make other recommendations to the Forest to avoid adverse effects.
- Equivalent Clearcut Area (ECA) will not be increased to greater than 15% in any 6th level HU.

B. Federal Action: Mistletoe Control and Pre-commercial Thinning

Purpose and Need: To control mistletoe infestation in timber and to reduce competition among trees in merchantable timber stands until December 31, 2017.

Location: MSSW Section 7 Watershed

Dates of Previous Concurrence:

- USFWS: October 15, 2001
- NMFS: August 9, 2001

Description: Mistletoe control and pre-commercial thinning occur as follow up activities to previous timber harvest, or in other tree stands where stand density is too great to meet management objectives. Mistletoe control can involve the removal of any size tree infested with mistletoe, but treatment generally focuses on large over story trees. Previously harvested stands are precommercially thinned 15 to 25 years after a timber sale to reduce the stand density. Most

stands to be thinned are plantations. Pre-commercial thinning will not occur in RCAs except to improve WCIs, which will be agreed to by a journey-level fisheries biologist and hydrologist. An annual list of pre-commercial thinning projects within RCAs will be provided to the Level 1 Team for informal review by May 1 each year.

MITIGATION MEASURES:

No fuel will be stored or transferred within RCAs. These activities will be conducted to insure that ECA is not increased over 15 percent in any 6th field HU.

These activities will not occur within RCAs except in RCAs that have been agreed to by both a hydrologist and journey-level fisheries biologist and must meet all the following criteria:

- where trees do not provide essential shade to a perennial stream during any part of the day or year.
- where trees to be thinned are not required to meet WCIs (i.e., to contribute to potential large woody debris recruitment).
- where tree removal or tree felling would not impact stream banks, springs, seeps or other wetlands.
- where vehicles would remain on existing open roads.
- where trees would not be felled or brought across any road cutslope.
- where a riparian area exists for effective sediment filtering.

Or:

- where trees are located away from streams upslope, uphill, from an existing open road.

C. FEDERAL ACTION: FIRE MANAGEMENT ACTIVITIES

PURPOSE AND NEED: This action involves all activities that could occur during management of wildland fires on the Payette National Forest until December 31, 2017. This includes wildfires, wildland fire use fires, and prescribed fires.

- Wilderness management objectives may be met by permitting lightning-caused fires to play, as nearly as possible, their natural ecological role within wilderness, and
- Lightning-caused fires in non-wilderness lands that allow wildland fire use for resource benefit can be permitted; this action has previously been called prescribed natural fire.

The action also includes prescribed fires to restore, and maintain ecosystem health and resilience.

***LOCATION*:** Within the MSSW Section 7 Watershed this action will amount to an estimated annual average of 32 ignitions, most of which will receive initial attack, an average of one large fire per year (i.e., larger than 100 acres), which may be designated a Wildland Use Fire (WFU), amounting to approximately 2,038 acres. These estimates are based on historic fire occurrence (see CD1: \Support Documents\Maps\large_fire_map.pdf & rx_fire.pdf, and Sanders 1998). The Payette National Forest has suppression responsibility for initial attack on some areas outside of the Forest.

DATES OF PREVIOUS CONCURRENCE: SIMILAR ACTION

- USFWS: October 15, 2001, July 16, 2003, October 27, 2004
- NMFS: August, 9, 2001, July 30, 2003, June 18, 2004

DESCRIPTION: The fire management activities within this area include application of appropriate measures to control unwanted “wildfires” as well as activities that strive to meet land

management objectives through a combination of management ignited prescribed fire and management of natural ignitions for resource benefit. The later action is referred to as "Wildland Fire Use". All activities are implemented in accordance with the Forest Service Manual (FSM 5140) and the Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide (1998), and the Wildland Fire Use Implementation and Procedures Reference Guide (see CD2: \Support Documents\Fire\wildland_fire_use_guide052505.pdf [in Fire.zip]). These activities include aerial application of water and chemical fire retardants, (including FIRE-TROL [CD2: \Support Documents\Fire\janik_2000.doc [in Fire.zip]), construction of fuel breaks by hand and machinery around fire perimeters, the opening and use of closed roads in areas where tractors are allowed, complete removal of under story and over story vegetation as a part of fire line construction, the establishment and operation of base and spike camps which could involve hundreds or thousands of people, burnout operations between fire lines and the wildfire, application of water drafted from stream courses, construction of temporary dams for drafting water into hoses, establishment of helispots and helibases where Jet-A fuel is transported and stored, bucket dipping (or snorkeling) of water from rivers, large streams, and lakes by helicopter, and transport and use of gasoline and diesel fuel for pumps, saws, and engines, and management ignition of prescribed fires using aerial or hand ignition methods. More detailed descriptions of these activities are included below.

Camps, Helicopter Landing Sites, and other Operational Facilities

Camps, helibases, staging areas, and helispots are areas used to camp or stage personnel and equipment and places to land and park helicopters:

- Camps vary in size and impacts from coyote camps for two people with minimal equipment and comforts to large camps for several hundred personnel camped in one area. Large camps have areas for sleeping, eating, showering, staging supplies and equipment, fueling equipment and for Incident Management Teams to work. Large campsites will have site plans completed with necessary mitigation measures. Grey water will be removed from camp and disposed of properly. Where possible, camps will be located outside RCAs. At locations where camps will encroach on RCAs, resource advisors will be contacted prior to camp setup and assist in laying out the camp to avoid effects to WCIs. Measures resource advisors may use to avoid effects to streams and WCIs include flagging no-entry zones to maintain a desired distance between camp and streams, maintaining a close dialog with camp managers as to resource concerns, educating personnel at morning and evening briefings about why measures to protect streams & fish are in place, and regular visits to camp(s) by both resource advisors and law enforcement personnel assigned to the fire to quickly fixing problems observed.
- Helicopter bases are areas where helicopters can be fueled, loaded, parked, and maintained. One to several helicopters can be stationed at a helibase. Helispots are areas where personnel and equipment can be loaded or unloaded from a helicopter. Helicopters are usually only at helispots long enough to drop or pickup a load. Helicopter bases will have plans completed identifying necessary mitigation measures.
- Staging areas are places where personnel and equipment are placed for rapid deployment on large fires. These areas have sanitation facilities and places to safely park personnel carriers and equipment. Some fueling and light maintenance may be performed on equipment. Food and sleeping facilities are normally not provided at staging areas. Staging areas are short-term and for temporary use only. Where possible, staging areas will be located outside RCAs. At locations where staging areas will be in RCAs, resource advisors will be contacted prior to use and assist in laying out the area to avoid effects to WCIs. Examples of measures resource advisors may use to avoid effects to streams and WCIs can be seen in "camps" above.

Fire Line Construction

Fire lines are constructed to control the spread of the fire:

- Fire line construction involves clearing a path; removing all flammable material and scraping a line clear to mineral soil wide enough to check the spread of fire. The line may be constructed wider if the conditions warrant. A cup trench may be used across the bottom of the fire to catch rolling debris.
- Most often hand tools and chainsaws are used for line construction though tractors or explosives may be used. Use of explosives would only occur outside RCAs of fishbearing streams. Fuel characteristics, fire behavior, topography, access, and suppression strategy dictate the type and size of fire line constructed.
- In some instances, a wet line using a hose lay with pump and water source or cold trailing the fire's edge may be sufficient. Natural barriers are used whenever possible, including rock outcrops, areas of little or no fuel, and streams, rivers, or lakes.
- Cooling the fire and knocking down the hotspots can include separating burning heavy fuel and using dirt, water, or humidity to cool them down. Some felling and burning of hazard snags or trees, and bucking of down logs may be required using hand tools or a chainsaw.
- Fireline construction may be completed by use of helicopters or fixed-wing aircraft dropping water, foam, or retardant to create a “wet-line” in front of the advancing fire. As directed under “chemical use” below in this action, no retardant or foam is to be dropped in streams or adjacent riparian areas.

Water Drafting

Where available, water is used to suppress fires:

- Water may be transported to the fire in a truck or a portable pump and hose. A draft source is used to refill the truck and draw water for the pump and hose. Helicopters are also used to dip water from lakes and streams and drop it on the fire.
- The pump used varies with the size of the water source, and stream flows are not significantly affected by pump operations. If the water source has inadequate flow for effective pumping, a “porta-tank” may be used or occasionally a sump is created. When available, a culvert crossing is generally used to create this sump by temporarily restricting stream flow. A sump may be constructed by hand using native materials, plywood, and/or plastic. These sites are usually (but not always) located in steep, low-order headwater streams. Intakes will be screened with 3/32” mesh screen to prevent fish entrainment. In all cases:

    - □ Drafting equipment will be inspected for proper screening when it arrives on Forest prior to deployment on a fire.
    - □ Any sump created by blocking flow will be performed in coordination with a fisheries biologist to prevent dewatering.
    - □ Crews will be trained to avoid dewatering of streams.

- Portable pumps are fueled either by an attached tank or by a portable fuel container.
- In the case of a portable pump, a water source is located near the fire and a sump may be developed.
- Helicopter bucket drops of water or retardant may be used. Buckets range in size from 75 gallons to more than 1,000 gallons, depending on the allowable helicopter payload.
- Water is dipped (or snorkeled, which is considered synonymous with dipping) by helicopters from lakes, rivers, streams, or portable tanks that are located as close to the incident as possible unless they are identified as closed; areas shown as closed to dipping will only be used to provide protection for life or property. Snorkeling occurs when the snorkel is appropriately screened and the location avoids spawning fish. A suitable dip (or snorkel) site is located according to specific criteria that include safety considerations for the helicopter, water depth, and water surface area. Dipping (or snorkeling) generally occurs from lakes and large rivers. Sometimes dipping occurs in smaller streams; the size of the stream used is limited by the pool size available.

- The Forest will complete an Invasive Species Action Plan that addresses treatment and protocol for limiting invasive species spread through fire management activities. Helicopter buckets, snorkels and tanks as well as engine and portable pump drafting equipment and tanks will be treated in accordance with this plan.

Invasive Species

The following steps will be taken to limit spread of invasive species:

- Keep all water handling equipment, including helicopter buckets, clear of mud or plant material. Following each use, rinse foot valves, draft hoses, buckets, etc with fresh clean water (well or city would be best) and allow the equipment to completely dry before putting back in service. This may require having several sets of this equipment at stations or vehicles to switch out with.
- While on assignments, try to limit drafting or dipping to one drainage or water source, or if you have to change water sources, change out the equipment (implement step 1 to the equipment before placing back in service). This way the potential of inadvertently transferring an invasive species from one pond or creek to another is limited.
- Wash underside of vehicles often, especially after fording a stream.

Application of Retardant, Foams, and Surfactants

Chemical fire retardants, foams, and other surfactants may be used to increase the effectiveness of water in checking the spread of fire or to support burnout and/or prescribed fire operations:

- The volume of retardant drops ranges from 400 to 3,000 gallons depending on the size of the aircraft involved. Retardant is usually laid out in a linear fashion near the hottest part of the fire and most often loads are split into multiple drops.
- Retardant generally reaches the fuel in the form of a mist or rain and not as a concentrated mass.
- Retardant is generally applied on areas above the drainage bottoms because of the limited maneuverability of aircraft in drainage bottoms; most retardant drops occur on ridges or side slopes, where the fire is burning hottest.
- Heavy Airtankers, Single Engine Air Tankers (SEAT) and Helicopters may be able to deliver either retardant, foam, or water only depending on the need, environmental restrictions, and their loading capabilities.

Mop-Up

Once the fire is contained and the spread is stopped, mop-up is started. Mop-up involves insuring that the fire is out. This includes cold trailing, a process by which a bare hand is used to feel for heat along the edge of “the black” on larger fires or throughout the entire area of smaller fires, in search of hotspots. When hotspots are found, they are extinguished with hand tools, dirt, and water.

Rehabilitation Activities

After the fire is controlled, rehabilitation of the fire line, roads, camps, and other areas used, will be planned and completed as necessary. Actions associated with rehabilitation will be identified in the Incident Action Plan or Rehabilitation Plan and may include measures such as:

- Construction of water bars and covering the fireline with debris is usually sufficient for hand lines.
- Tractor fire lines, in particular, usually require extensive rehabilitation, and these areas are usually seeded in addition to water bars and debris placement.
- Any required seeding will be done with certified weed-free seed mixes.
- Trees felled in RCAs during suppression actions will be left in place, unless they are a safety hazard around facilities.

Wildland Fire Use and Fire Management Plans

This action has previously been called prescribed natural fire. There are two basic premises of the Wildland Fire Use program:

- Wildland fire will be used to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role.
- Use of fire will be based on approved fire management plans and will follow specific prescriptions contained in operational plans.
- Wildland fire use can be applied to any lands identified and permitted by the Forest Plan to meet resource management objectives so long as a Fire Management Plan has been approved for the area in question. This means that lightning-caused fires occurring within areas covered by the above plans would be evaluated and allowed to burn if evaluation criteria are met. For a fire to be designated under the wildland fire use (WFU) program, a fire must meet the following criteria:
- Fire must be lightning-caused. Anthropogenic ignitions will not be considered for WFU designation and will receive an appropriate management response.
- Effects to cultural and natural resources may be mitigated by various management techniques, fuels, weather, or topography, under appropriate circumstances.
- Weather Forecasts and fire behavior (current and expected) must be considered acceptable for a fire to be declared a WFU.
- Risk indicators are acceptable. Risk indicators are defined in the Wildland Fire Use Implementation and Procedures Reference Guide (2005) and include fire danger indexes, time of season, fire size, and potential complexity, safety concerns, threats to boundaries, fuels & fire behavior, objectives, management organization, improvements, natural/cultural/social values, air quality values, logistics, political concerns, tactical operations, and inter-agency coordination.
- Current wildfire activity on the Forest, in the Region, or nationally must be at a level where resources are available to manage the fire or hold it if necessary.

- There are no other compelling reasons to preclude WFU designation (line officer discretion).
- If the WFU event exceeds the planned parameters for risk or is no longer meeting resource objectives, then it may be declared a wildfire, in which case the appropriate management response would be implemented.

The decision to classify a fire under "Wildland Fire Use" or as a "Wildland Fire needing an appropriate suppression response" is complex, requiring consideration of many factors, and involvement of fire, wilderness, and other resource specialists:

- Within a maximum of eight (8) hours of the discovery of a fire, the appropriate line officer will decide whether or not to allow a candidate fire to be managed as a WFU event. The decision is documented in a Stage I Initial Assessment. This assessment is a report on the fire situation that includes information as to where the fire is located, start date/time, current size, fuel conditions in the fire area, weather (current/predicted), fire behavior (current/predicted), and availability of resources to manage the fire under WFU. If the decision is to declare the fire a wildfire, then the appropriate management response will be applied to suppress the fire. If the decision is to manage as a WFU, further planning will be completed in accordance with the Wildland Fire Use Implementation Procedures Reference Guide. The Stage II and Stage III plans as they are referred to, are described in the guide (CD2: \Support Documents\Fire\wildland_fire_use_guide052505.pdf [in Fire.zip]) and would be completed as needed if incident complexity changes.
- Whether an ignition is declared a WFU or not, it is still considered on an equal basis with other fires for allocation of resources, meaning fires that pose greatest threat to life and

property will receive highest priority for receiving requested resources regardless of their designation as WFU or Wildfire.

Prescribed Fires

The Payette National Forest is proposing to burn up to 1000 (varies by watershed) acres per year. A five-year plan (CD2: \Support Documents\Fire\plan05.pdf [in Fire.zip]) is updated annually to identify burn locations.

The intent is re-introduce fire, using aerial and ground based ignition during the predetermined weather conditions that will allow a mixed severity fire to take place. Ignition will depend on site conditions. The creation of openings, similar to what natural fire might produce is anticipated. Aerial ignition may take place on the upper slopes and ridge tops to create a backing fire. A prescribed burn of low to moderate intensity will reduce surface and ladder fuels in order to mitigate future stand replacement fires of intensities which exceed the historic norm, and will increase opportunities to manage naturally occurring wildland fires. This treatment will be used to mimic historic vegetative characteristics by reintroducing early stages of succession, altering species composition, and reducing unusually high stand densities.

Individual burn units would range from about 100 to 1000 acres, totaling up to 1000 acres for this project depending on site-specific objectives and the available prescription window for meeting objectives. Burning may also occur of material piled from either harvest of Miscellaneous Forest Products, or Mistletoe Control and Pre-Commercial Thinning actions as described above. Hand-piling in RCAs may occur when agreed to by both a hydrologist and fisheries biologist. Hydrologist and fisheries biologist will designate distance hand piles must be from streams or other waters.

Ignitions are planned to occur during appropriate weather conditions whenever a specific set of fuel moisture, soil moisture, humidity, and weather criteria (prescription elements and management requirements) can be met. No mechanical fire-line construction is planned. Contingencies will be identified should an escaped fire warrant line construction. Natural barriers to fire movement such as moist riparian areas, changing fuel conditions, and topographic breaks will be used to confine the prescribed fires.

Burn units would be ignited aerially either by dispensing plastic spheres from a helicopter, with a heli-torch, and/or with some areas hand-ignited with torches. The spheres contain potassium permanganate (3 grams each) and are injected with glycol (0.75-1.5 cc's, i.e., antifreeze) just prior to release to cause ignition. Ignition typically occurs after about 20 seconds, on the ground. Additional details of this procedure are in the current CD2: \Support Documents\Fire\Rx_fire_aerial_ign_process.doc [in Fire.zip].

There would be no purposeful ignition, except for burning of hand-piles, and no active prevention within RCAs, and fire would be allowed to burn into RCAs. For burning piles the objective would be to consume the pile and limit spread from it.

For prescribed fires, a burn plan will be written that meets FSM 5140 direction. Important considerations include duff moisture, mineral soil exposure, terrain breaks, and fuel reduction objectives.

Mitigation applied to prescribed fires.—(The proposed action includes the following mitigation measures):

- No ignition activity, except for ignition of hand-piles, will occur within 300 feet (slope distance) of fish bearing perennial streams. Fire that "backs" into riparian zones will be allowed to burn, since higher fuel moistures in riparian areas typically limit fire impacts/spread in these zones.

- Ignition will be avoided on Landslide Prone and moderate-high risk /hazard landtypes, and will only occur uphill from these areas.
- Helicopter landing sites and refueling areas will be located outside of the RCAs.
- Burn plans will address required elements as discussed in FSM 5140 and the *Prescribed Fire Planning and Implementation Procedures Reference Guide*.
- A fish biologist will review the burn plan prior to line officer approval.
- No new roads will be built to access prescribed burns, no roads will be re-opened that are presently closed and vegetated.
- Approved spill prevention containment and countermeasure plans (SPCC) will be used for prescribed fire. Plans will include direction for transporting, storing, and use of toxic materials, such as spheres and torch fuels, to minimize risk of accidental spills and/or introduction into live water.
- During actions to prevent the spread of fire use guidelines below for fire suppression.
- The prescribed burn will not increase ECA above 15% in the corresponding 6th level hydrologic units.
- A post-burn visual assessment will be conducted by fire personnel and a fisheries biologist via a walk through of selected stream corridors. This will assess implementation of the burn and associated mitigation listed above (e.g., avoidance tactics) in riparian areas.

Design Criteria (Mitigation Measures part of all fire management actions)

These project design criteria address potential adverse effects such that they can be avoided or minimized to the point of being negligible or discountable. They are guidelines that apply unless protection of life and property require deviation. They are often discussed in the program description and are listed here as a summary.

Guidelines for Fire Management within Drainages Supporting Listed Fish and Critical Habitat.—Rangers ensure all personnel involved in fire suppression have been briefed and are familiar with these guidelines:

- Utilize minimum impact suppression tactics in areas where there is potential to damage listed fishes or critical habitat. Every effort should be made to minimize stream course disturbance, sedimentation, and actions that will result in increased water temperatures.

- Use of tractors:

  - □ Do not use tractors in the South Fork Salmon River basin (section 7 watershed), Rapid River, or Big Creek, except for the direct protection of human life and property.
  - □ Minimize tractor use in other areas.
  - □ Do not use tractors in RCA and landslide prone areas.

- Chemical Use:

  - □ Do not use chemicals when there is a potential for direct stream contamination.
  - □ Minimize the application of retardant near live streams. Do not drop retardant or foam directly in streams or adjacent riparian areas.
  - □ Do not pump directly from streams if chemical products are going to be injected into the system without mitigation in place. If chemicals are needed, pump from a fold-a-tank, pumpkin, blivet or other water containment device, or use a backflow check valve.
  - □ Do not authorize storage of fuels and other toxicants or refueling within RCAs unless there are no other alternatives. Storage of fuels and other toxicants or refueling sites within RCAs shall be approved by the responsible official and have an approved spill containment plan commensurate with the amount of fuel (Forest Plan standard SWST11).
  - □ Spill containment equipment will be readily available and utilized when neccessary.

- Petroleum products will be contained in impermeable devices of sufficient size to contain amount of fuel/oil stored. Examples of fuel containers requiring containment are fuel trucks, portable pumps and their fuel, portable generators and their fuel, fuel stored in cans at camps and staging areas.
- Helicopter bucket dipping (or snorkeling) from lakes and streams with juvenile bull trout, salmon, and steelhead is not permitted except as otherwise described in the no dipping map (see current CD1: \Support Documents\Maps\no_dipping_map.pdf).
- The Forest will develop a contingency plan identifying procedures to be initiated should a chemical spill or contamination occur.

- Suppression tactics (backburns or burnouts) should minimize fire severity in riparian areas.
- Resource Advisor:

  - A fish biologist will be involved in planning and training for the development of a Wildland Fire Situation Analysis (WFSA) and/or, working with or as the Resource Advisor.
  - Resource advisors assist to locate camps, staging areas, and base heliport locations which will be identified early during the action. Identification will be approved either during presuppression planning, or on a case-by-case basis. Resource advisors will work to locate camps, staging areas, etc. outside RCAs where no or negligible effects to listed fish species are likely to occur. Should camp, staging areas, etc. be located in RCAs, measures to mitigate effects such as those described under "camps" above will be taken.
  - A Resource Advisor, usually a resource specialist, is assigned to large fires requiring either a Type I or II Incident Management Team. This advisor is a representative of the responsible PNF line officer and will:

    - Provide constant linkage between the suppression objectives of the Incident Management Team and the resource interests of the PNF.
    - Be readily available to the Incident Commander and the Operations Chief.
    - Review Operational Period Plans to assess the potential effects of the planned actions to develop suppression strategies and tactics to minimize the impacts of the fire's effects and those of the suppression actions on natural and social resources.
    - Provide information about the local areas resource values.

  - Provide updates to the Level 1 team.
  - Contact Level 1 team members if emergency consultation is triggered.

- Suppression Rehabilitation

  - An Emergency Suppression Rehabilitation Team will be assigned to all fires over 100 acres and report to the Resource Advisor.
  - A fisheries biologist, or hydrologist, will always be assigned to the Rehabilitation Team.
  - After suppression, rehabilitation is completed, a Rehabilitation Team will review the suppression and rehabilitation efforts to see if the tactics identified successfully avoided adverse effects to listed fishes and critical habitat.
  - A separate Burn Area Emergency Rehabilitation Team (BAER) may be formed as appropriate, but burn area rehabilitation is not part of the fire suppression action. That team would have to initiate an independent consultation should any BAER actions be recommended that might affect listed species or critical habitat. BAER actions are infrequent on any fires on the Payette National Forest over the past 20 years with fewer than four total actions.

- Briefings

- □ Present a brief to the fire overhead team on threatened species present and the legal requirements, before they deploy to the fire.

Program Evaluation, Monitoring, and Reporting

The following monitoring and reporting will be accomplished for fires, including ignitions, project fires, wildland fire use fires, and prescribed fires insofar as they are applicable:

- The Forest Supervisor be responsible for determining consistency of fire suppression activities with this BA. They are encouraged to seek counsel from fisheries biologists regarding the expectations of this BA.
- When the IC determines that the fire suppression activities being implemented are inconsistent with this BA, the Forest Supervisor will be notified. In general, this may lead to the initiation of emergency consultation on the fire (see CD2: \Support Documents\Fire\Emergency Consultation Guidelines.doc [in Fire.zip]), and should occur before resources available to mitigate effects are released from the incident.
- When the burn boss determines that the prescribed fire activities being implemented are inconsistent with this BA, the District Ranger or Forest Supervisor will be notified. In general, this may lead to the initiation of emergency consultation on the fire (see CD2: \Support Documents\Fire\Emergency Consultation Guidelines.doc [in Fire.zip]), and should occur before resources available to mitigate effects are released from the incident.
- Critical information about the incident and expected suppression actions will be shared with the USFWS and the NMFS when listed species are involved; documents submitted to these agencies for emergency consultation will be tracked where emergency consultation is triggered. The Forest will follow guidelines for emergency consultation provided by the Level 1 team (CD2: \Support Documents\Fire\Emergency Consultation Guidelines.doc [in Fire.zip]).
- A monitoring report on this program will be completed, as part of the next Biological Assessment for programmatic fire management and presented to the Level 1 team during consultation. The monitoring report will include:

  - □ fire location and size for all types of fires.
  - □ summary of fire intensity, or fire intensity map, if available, and results of prescribed burn monitoring.
  - □ results of post-fire reviews and monitoring.

D. FEDERAL ACTION: FISH HABITAT AND RIPARIAN SAMPLING

PURPOSE AND NEED: To conduct fish habitat and riparian surveys to gain fuller knowledge of existing conditions and trends until December 31, 2017. This work may be contracted to private firms.

LOCATION: Streams within the MSSW Section 7 watershed.

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001
- NMFS: August 9, 2001.

DESCRIPTION: The Payette National Forest's Land and Resource Management Plan (USFS 2003), specifies that monitoring of aquatic species and habitats will occur to evaluate implementation of standards and the effectiveness of these standards in achieving WCIs. Section 4 (c) 2 A of the Endangered Species Act directs the U.S. Fish and Wildlife Service to review the status of species listed under the Act. Other federal agencies are directed under 50 CFR 402.01 (a) to "utilize their authorities to further the purposes of the Act by carrying out conservation programs for listed species". Among the purposes of the Act specified in Section 2 (b) is "to

provide a program for the conservation of each endangered and threatened species". Conservation programs, to be successful, must monitor the effectiveness of measures taken to protect listed species and their habitats. To monitor the habitat and population trends of aquatic species on the Payette National Forest, the actions described below will be carried out annually in many streams on the Forest.

Habitat surveys

Some streams will be surveyed to produce quantitative assessments of fish habitat. Survey methods are similar to those described in Overton et al. (1997) and Burton et al. (1992). Habitat surveys involve walking and snorkeling within stream channels, measuring channel and habitat dimensions and qualities, using stadia rods, measuring tapes, or surface fines grids. Methods to measure substrate composition and quality that may be used include determination of cobble embeddedness, percent surface fines, free matrix measures, and core sampling. Measurement of cobble embeddedness involves removing cobble-sized rocks from the stream bottom. The cobbles are returned to the site after measurements are taken. Percent surface fine determination is a visual estimate that involves no disturbance other than that caused by the presence of the crews in the stream channel. Determination of free matrix measures involves randomly placing a sampling hoop and counting the number of non-embedded rocks within the hoop; this action requires disturbing all loose rocks within the hoop. Core sampling requires removing from the stream all substrate within the substrate samples, which may be taken from any part of the habitat. Most core samples will be done with a hollow cores sampler; some freeze sampling may occur.

Aquatic invertebrate sampling

Aquatic invertebrate sampling will occur on some streams. Invertebrates will be sampled with a Hess sampler, Surber sampler, or kick nets.

ASSUMPTIONS:

- Chinook, steelhead, and bull trout rearing and spawning occur in some of the streams to be sampled.
- Crews are able to recognize and avoid Chinook, steelhead, and bull trout redds.

REQUIRED MITIGATION:

- Crews will be trained in redd identification, likely redd locations, and methods to avoid stepping on redds or delivering fine sediment to redds.
- Crews will avoid redds and spawning Chinook, steelhead, and bull trout while walking within or near stream channels to the extent possible and will typically work more than one stream width or greater than one habitat unit upstream of redds. Avoidance will be accomplished by examining pool tail-outs and low gradient riffles for clean gravel and characteristic shapes and flows prior to walking or snorkeling through these areas.
- If redds or spawning Chinook, steelhead, or bull trout are observed at any time, the habitat surveyors will step out of the channel and walk around the habitat unit on the bank at a distance from the active channel and take all precautions to avoid any harassment of individuals.
- If continuing to survey while avoiding Chinook, steelhead, or bull trout is not possible the crew will step out of the active stream channel and walk around the habitat unit at a distance from the stream.
- While conducting free matrix substrate measurements or core samples, and while sampling aquatic invertebrates, redds and areas immediately above redds will not be sampled in order to avoid killing eggs or delivering sediment to redds. The distances involved will be approximately the same as for other measures.

E. FEDERAL ACTION: WATERSHED AND FISH HABITAT IMPROVEMENTS AND MAINTENANCE

PURPOSE AND NEED: To maintain existing watershed improvement projects and to complete new small projects (up to 10 acres each) using the Watershed Improvement Tracking inventory list and other sources from which to draw projects. To maintain existing fish habitat projects and to complete new small projects (less than one acre each or 20 structures) as funds become available. The Forest will provide a list of project descriptions and maps annually for informal review by US Fish and Wildlife Service Level 1 team members before the projects are implemented. The current planning period runs until December 31, 2017.

LOCATION: Within the MSSW Section 7 watershed

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001
- NMFS: August 9, 2001.

DESCRIPTION:

Watershed Improvements

These projects include such things as gully stabilization, road obliteration, vegetation and structure placement, using gabions, trees, wooden grids, and soil cementing techniques to stabilize slopes. Structures have been, and will be, placed on slopes that are actively eroding to help stabilize and vegetate these slopes. Structures are generally used in combination with other techniques such as the planting of trees and shrubs, and the use of matting materials. This action includes mining reclamation (less than 10 acres) including re-contouring to restore hydrologic function, clean up of existing facilities and other previously mentioned activities. This action includes the clean up of small toxic spills and dumps. This action does not include when the volume of substance requires the implementation of the Clean Water Act, Resource Conservation Act, Comprehensive Environmental Response Compensation and Liability Act or Oil Pollution Act. Emergency consultation will occur if any of the aforementioned Acts are implemented.

Fish Habitat Improvements

These projects include stream/riparian area improvements, woody debris management, stream bank stabilization and vegetation, fine sediment removal, boulder cluster placement, anchored whole-tree revetments, log weirs, and fish barrier removal. Maintenance of these projects would consist of an inspection, followed by the repair of any deficiencies found. This includes, vegetation of eroded areas, debris removal (from weirs), reshaping or reinforcement of existing structures and the addition of rock or other woody material to stabilize existing structures, especially on stream bank stabilization structures.

Actions Not Covered

Actions not described in this action include channel realignment, handling and relocating fish, and actions that cause adverse displacement or disruption of listed fish.

REQUIRED MITIGATION:

- Instream work will be timed to avoid spawning activity, and eggs or alevins in the substrate.
- Watershed Improvements:

    - The watershed improvement and maintenance program is mitigation for past watershed impacts (i.e, not from ongoing actions). Projects address erosion and sedimentation

problems associated with old roads, timber sale areas, old grazing, and old mining projects.

- □ These mitigation projects will use the highest level of additional mitigation (water control devices, mulch or erosion control matting, vegetation and grass seed and fertilizer) when the construction site is within the RCA buffers or on slopes greater than 45 percent, or where necessary to minimize effects. A moderate level of erosion control (mulch, grass seed and fertilizer) will be used on other areas. Generic BMPs (Best Management Practices) that can be used include:

    - ○ Silt fence and filter barriers
    - ○ Straw-bale sediment barriers
    - ○ Erosion control blankets and mats
    - ○ Hydromulching
    - ○ Mulching
    - ○ Waterbars and rolling dips
    - ○ Temporary sediment basins
    - ○ Straw rolls
    - ○ Straw bale dikes
    - ○ Slash filter windrows
    - ○ Scattered slash
    - ○ Brush layering
    - ○ Shrub planting

    Specific details including instructions and diagrams for some of the BMPs listed above are provided on this CD1: \Support Documents\Misc\bmp.pdf

- **Fish Habitat Improvements**:

    - □ The fish habitat improvement and maintenance program is mitigation for recognized habitat deficiencies.
    - □ Ground disturbing construction activities within the RCA buffers will be fully mitigated at the “high” level of mitigation as explained above. Mechanized equipment, such as a trackhoe, must be free of any petroleum or hydraulic leaks and must be serviced outside the RCA buffers.
    - □ Use of mechanized equipment within the RCA buffers, including within the stream channel, would only occur after a journey level fisheries biologist has determined that effects to substrate embeddedness, other WCI’s, and individual listed fishes (including their eggs and alevins) would be negligible.

- **Any culvert replacement will conform to the following guidelines**:

    - □ Before work begins a journey level fisheries biologist will confirm that any effects to listed fishes, due to their proximity to the activity, would be negligible.
    - □ Culverts will meet LRMP standards.
    - □ FishXing or similar software may be used to determine culvert specifications required for fish passage.
    - □ Use erosion control at the work site to minimize sediment delivery to the stream prior to any construction.
    - □ Remove fill from around existing culvert and store at a stable location.
    - □ Construct a temporary channel and line it with plastic and/or geotextile, or use some other water conduction facility (e.g., pipe) that must meet fish passage requirements.
    - □ Divert the stream into the temporary water conduction facility.
    - □ Remove existing culvert.
    - □ Install replacement culvert.
    - □ Reconstruct approaches over new culvert.

- Seed and mulch disturbed areas, remove sediment collected by erosion control material as specified by a hydrologist, soil scientist, or fisheries biologist.
- Additional site-specific measures, including modifications to BMPs because of site-specific conditions, may be identified and approved by a fisheries biologist or hydrologist.

F. Federal Action: Noxious Weed Management

Purpose and Need: To control, contain or eliminate noxious weed invasion and infestations on National Forest Systems lands, and maintain vegetative communities and the species dependent on them, in the MSSW Section 7 watershed until December 31, 2017. This action does not include weed treatment within the Frank Church River of No Return Wilderness. Noxious weed management and control has been recognized through national policy, forest plan development, broad scale assessments, and site-specific NEPA decisions. Laws that require management of noxious weeds include:

- Federal Noxious Weed Act of 1974, as amended.
- The Forest and Rangeland Renewable Resource Planning Act of 1974.
- The Public Rangelands Improvement Act of 1978.
- The Carlson-Foley Act of 1968.

In Addition, Executive Order 13112, signed by the President of the United States in February 1999, directs federal agencies to conduct activities that will reduce noxious weed populations. The Idaho Noxious Weed Law (Title 22, Chapter 24, Idaho Code) requires landowners to eradicate noxious weeds on their lands, except in special management zones. This requires prevention of their above- ground parts for at least two years. The Forest cooperates with the state but is not bound by most state laws.

Location: This activity would occur throughout the MSSW Section 7 watershed. Known noxious weed locations that are mapped into GIS, where management and/or control could occur, are shown in CD1: \Support Documents\Maps\weeds.pdf. This map is continually being updated as known locations are verified.

The Forest would provide a list of site-specific project descriptions and maps annually (separate from this document) for informal review and approval by National Marine Fisheries Service and US Fish and Wildlife Service Level 1 team members before the projects are implemented. Unknown sites found during project implementation may be treated following the guidelines within this BA, and would be mapped and reported annually.

Dates of Previous Concurrence:

- USFWS: October 15, 2001
- NMFS: August 18, 2003 (Biological Opinion)

Description: This action covers all activities involved with the noxious weed management program. Noxious weed management activities include herbicide application, mechanical controls (hand pulling or digging), biological treatments, and rehabilitation (i.e. seeding, plantings). Herbicide treatment occurs annually from April through September. The noxious weed management activities on the PNF include: awareness/education, prevention/early detection, inventory, an array of weed treatment practices, monitoring, and rehabilitation.

Noxious weed management measures depend on the area being considered and the particular weed situation, management objectives may range from containment to control and eventually to eradication.

Introduced noxious weeds and non-native species are found in many plant community types and at many locations. Weed management efforts may be necessary on rangelands, in timber harvest areas, along roads and road rights-of-way, along trail routes, at dispersed recreation sites, on developed recreation sites, and at other disturbed sites (i.e. fires, flood events).

Noxious weeds are plant species that have been designated "noxious" by law. In addition to noxious weeds, additional plant species may be identified and treated over the course of the consultation. The word "noxious" simply means deleterious by definition. Examples of noxious weeds and other weedy species that may require control measures within the analysis area are (**bold** indicates priority target species for the PNF):

- **Hoary Cress** (whitetop**)** ***Cardaria draba***
- Musk Thistle *Cardus nutans*
- Canada Thistle *Cirsium arvense*
- **Diffuse Knapweed** ***Centaurea diffusa***
- **Spotted Knapweed** ***Centaurea maculosa beibersteinii***
- **Yellow Starthistle** ***Centaurea solsititialis***
- **Rush Skeletonweed** ***Chondrilla juncea***
- Field Bindweed Convolvulus arvensis
- **Leafy Spurge** ***Euphorbia esula***
- Dyers Woad *Isatis tinctoria*
- Perennial Pepperweed *Lepidium latifolium*
- **Dalmation Toadflax** ***Linaria genistifolia***
- Yellow Toadflax *Linaria vulgaris*
- Purple Loosestrife *Lythrum salicaria*
- **Scotch Thistle** ***Onopordum acanthium***
- Tansy Ragwort *Senecia jacobaea*
- Johnsongrass *Sorghum halepense*
- Chicory *Cichorium intybus*
- Hound's Tongue *Cynoglossum officianale*
- St. John's Wort *Hypericum perforatum*
- Sulfur Cinquefoil *Potentilla recta*
- Mediterranean Sage *Salvia aethiopis*
- Medusahead Rye *Taeiathrum caput-medusae*
- Common Tansy *Tanacetum vulgare*

The noxious weed program on Forest Service lands is based on weed management objectives and priorities that are influenced by weed infestations and site susceptibility. These criteria provide focus and direction for the noxious weed program and allow for site specific and adaptive decision-making. Table 3 identifies the objective and priority system used on FS lands. The intent of containment is to prevent the spread of the weed to beyond the existing infestation perimeter.

The control objective is to reduce the infestation through time; some level of infestation may be tolerated. The eradication objective is total elimination of all weeds.

Table 3.—Weed treatment prioritization and objectives used for noxious weed control on FS lands.

Operational Objectives	Operational Priorities
Eradicate: The weed is treated to the extent that no viable seed is produced over the entire infestation and all plants (above ground portions) have been eliminated during the current field season. **Control:** Portions of the infestation or outbreak are treated to the extent that overall infestation area diminishes because no viable seed is produced and/or plants have been eliminated. Contain: Portions of the infestations are treated to the extent that the weed is not expanding beyond the established treatment zones. The main body of the infestations may be left untreated. **Reduce:** The infestation is treated to the extent that densities and/or rate of spread are reduced to an acceptable level.	**Critical:** Urgent actions due to a combination of outside funds and/or invasive weeds found in susceptible and relatively intact habitats. **High:** Important actions associated with outbreaks of invasive weeds along key spread-vectors and/or linked to a combination of treatment strategies. Moderate: moderately important actions associated with invasive weeds in somewhat susceptible but disturbed habitats. **Low:** Actions associated with non-invasive weeds or in areas of low susceptibility where rapid spread is unlikely. May not need immediate (current year) attention.

Table 4.—Annual Noxious Weed Control Program for the Payette National Forest (includes Wilderness)

Type of Noxious Weed Control Activity	Acres
Mechanical/Manual Control	5 – 25 (about 5 acres per Section 7 watershed)
Biological Control No. Site Releases	0 -5
Chemical Ground Based Application	100 – 1000 (100-500 per Section 7 watershed)
Restoration, Seedings, and Plantings	0 – 200 (about 10 acres per Section 7 watershed)
Cooperative Weed Management Areas (CWMAs)[a]	4

[a]These include the Upper Payette River, Lower Weiser River, Adams, and Frank Church Wilderness CWMAs.

Control Methods

All vegetation treatments conducted for control of noxious weeds are done in accordance with established FS policy, regulations, and product labels. FS policy requires the use of specific design features when in close proximity to sensitive areas to insure vegetation treatments do not have an adverse impact on non-target plants or animals. For example, design features for herbicide application include: use of aquatic-approved herbicide where there is a probability that the herbicide may enter the water; buffers adjacent to live waters; and spot-spraying or manual control only of target species in sensitive areas (see Effects section and "Required Mitigation", below).

Chemical Control.—Generally, less than 200 acres will be annually treated with herbicide in the Little Salmon, Middle Fork/Main Salmon Southeast, and Main Salmon Southwest Section 7 watersheds, and less than 500 acres in the SFSR Section 7 watershed. Herbicide treatments would be conducted in accordance with FS procedures found in Pesticide-Use Management FSH 2109 (CD1: \Support Documents\Law\2109.14, individual chapters) and Noxious Weed Management (FSM 2080; CD1: \Support Documents\law\2080.rtf). The chemicals can be applied by many different methods (see below), and the selected technique depends on a number of variables. Some of these are (1) the treatment objective (removal or reduction); (2) the accessibility, topography, and size of the treatment area; (3) the characteristics of the target species and the desired vegetation; (4) the location of sensitive areas in the immediate vicinity (potential environmental impacts); (5) the anticipated costs and equipment limitations; and (6) the meteorological and vegetative conditions of the treatment area at the time of treatment (see Effects section and "Required Mitigation", below).

Herbicide applications are scheduled and designed to minimize potential impacts to non-target plants and animals, while remaining consistent with the objectives of the vegetation treatment program. The rates of application (i.e., pounds of active ingredient per acre) depend on the target species, the presence, and condition of non-target vegetation, soil type, depth to the water table, presence of other water sources, riparian areas, special status plants, and the requirements of the herbicide label. The majority of treatments will be in travel corridors.

Herbicides
Herbicides that could potentially be used that are approved by the USFS, have completed risk assessments, and are EPA-registered and approved, include the following: 2,4-D amine (Weedar® 64, Amine 4); glyphosate (Rodeo®); picloram (Tordon™); clopyralid (Transline®); metsulfuron methyl (Escort®); dicamba (Banvel®); and imazapic (Plateau®). These herbicides, further described in the following text, would be the primary chemicals used in the Federal Action that include the chemical treatment of weeds. The Forest will continue to evaluate new chemicals and amend this consultation to include them where they meet the following conditions: 1) any chemicals appearing on the Forest Service's list of herbicides approved for use on National Forests; and 2) any new or updated chemicals as they are registered and approved by the EPA and added to the Forest Service's list of herbicides approved for use and accompanied by complete risk assessments.

Selection of a herbicide for site-specific application would depend on its chemical effectiveness on a particular weed species, success in previous similar applications, habitat types, soil types, proximity of the weed infestation to water, and the presence or absence of listed fish species. All herbicide applications would follow label instructions, specifications, and precautions as well as applicable Forest Service policy. Characteristics and properties of herbicides are discussed further below.

Table 5.—Common herbicides used by the Payette National Forest, trade name, and typical application rates.

Common Name	Trade Name	Typical Rates
Clopyralid	Transline®	0.1-0.5 lb/ac
Picloram	Tordon™	0.25-1.0 lb/ac
Glyphosate	Rodeo®, Roundup®, Accord®	0.5-2.0 lb/ac
Metsulfuron Methyl	Escort®	0.5-2.0 oz/ac
2,4-D	Amine 4, Weedar® 64	0.5-2.0 lb/ac
Dicamba	Banvel®	0.25-4.0 lb/ac
Imazapic	Plateau®	0.06-0.75 lb/ac

Carriers, Dyes, and Adjuvants
Carriers are gases, solids, or liquids used to dilute or suspend herbicides during application and allow for proper placement of the herbicide, whether it is to the soil or on foliage. Water is the only carrier that is proposed for use and addressed in this document.

Non-hazardous indicator dye is required to be used with herbicides based on direction from the NMFS BO (NMFS 2007). The presence of dye makes it easier to see where the herbicide has been applied and where or whether it has dripped, spilled, or leaked. Dye makes it easier to detect missed spots and to avoid spraying a plant or area more than once.

Adjuvants are not being proposed for use within this watershed.

Application Methods
Ground based application for treatment of noxious weed infested areas would utilize vehicle-mounted or ATV sprayers (spot-gun) (most common method); spot-spraying with hand-held spray nozzles either mounted on a vehicle (slip tank) or attached to a backpack system (very common method); hand-spreading granular formulations (least common method); and wicking, wiping, dripping, painting, or injecting target weeds (uncommon method). All application methods may be used for each herbicide and herbicide combinations. Specific treatment of individual plants can be accomplished with wicking, wiping, dripping, painting, or injecting target weeds. Most of the herbicides that may be used are liquid formulations that are applied onto the foliage of the target vegetation, although soils also may be a major receptor for these chemicals.

Within 50 feet of streams and wetlands, and where riparian or hydrophilic plants are present, and where surface material is obvious recent deposition of sediment of any diameter(s), only herbicides approved for use adjacent to water bodies (glyphosate - Rodeo®) will be used.

***Manual Control*.—**Hand-operated power tools and hand tools are used in manual vegetation treatment to cut, clear, mow, or prune herbaceous and woody species. In manual treatments, workers would cut plants above ground level; pull, grub, or dig out plant root systems to prevent subsequent sprouting and growth; scalp at ground level or remove competing plants around desired vegetation; or place mulch around desired vegetation to limit the growth of competing vegetation.

Hand tools such as the handsaw, axe, shovel, rake, machete, grubbing hoe, mattock (combination of axe and grubbing hoe), brush hook, and hand clippers are used in manual treatments. Axes, shovels, grubbing hoes, and mattocks can dig up and cut below the surface to remove the main root of plants that have roots that can quickly sprout in response to surface cutting or clearing. Workers also may use power tools such as chain saws, power brush saws, and line trimmers (i.e. weed eaters). A less common method that may be used is mowing of weeds, and typically involves hand/motor-powered mowers or tractor mowers.

The manual method of vegetation treatment is labor intensive and costly when compared to herbicide application. However, it can be extremely species selective and can be used in areas of sensitive habitats. Manual control may occur in a variety of areas and is often used in sensitive areas to avoid adverse effects to non-target species or water quality. All noxious weed disposals would be in accord with proper disposal methods. Noxious weeds that have developed seeds would be bagged and burned.

***Biological Control*.—**Biological control would include the use of insects, pathogens, or some combination of the two. Biological methods of vegetation treatment use living organisms to selectively suppress, inhibit, or control herbaceous and woody vegetation. This method is viewed as one of the more natural processes because it requires the proper management of plant-eating organisms and may be used in combination with other control methods within a general area, such as chemical treatments and mechanical. Biological weed control activities include the release of insect agents which are parasitic and “host specific” to target noxious weeds. This activity includes the collection of beetles/insects, development of colonies for collection, transplanting parasitic beetles/insects, and supplemental stocking of populations.

Insects and pathogens would be used as biological control methods generally in conjunction with other control methods (i.e. herbicides), although at the present these methods can control few plant species. Insects are the main natural plant enemies being used at the present time. Other natural enemies include mites, nematodes, and pathogens. This treatment method would not eradicate the target plant species but merely reduces the target plant densities to more tolerable levels. This method also reduces competition with the desired plant species for space, water, and nutrients. This treatment method would be used on larger sites where the target plant has become established and is strongly competitive (e.g., yellow star thistle) or remote locations.

Particular insects, pathogens, or combinations of these biological control agents may also be introduced into an area of competing or undesired vegetation to selectively feed upon or infect those target plants and eventually reduce the target plant density to the desired level of control. There fore in most situations, a complex of biological control agents is needed to reduce the target plant density to a desirable level. But even with a complex of biological control agents, often 15 to 20 years are needed to bring about an economic control level. In most circumstances, biological control agents would not control weeds. They are only creating stresses on the weeds, which is not the same as control.

Cultural Control.—Cultural control would include preventing weed introduction and/or minimizing rate of spread by requiring the following actions on public lands:

- Clean all ground disturbing equipment prior to moving into and out of weed-infested areas before and after use (applies to both USFS and contract equipment. Forest Plan Standard NPST03: "To prevent invasion/expansion of noxious weeds, the following provisions will be included in all special use authorizations, timber sale contracts, service contracts, or operating plans where land-disturbing activities are associated with the authorized land use: b) Earth-disturbing equipment used on NFS lands - such as cats, graders, and front-loaders – shall be cleaned to remove all visible plant parts, dirt, and material that may carry noxious wed seeds. Cleaning shall occur prior to entry onto the project area and again upon leaving the project area, if the project area has noxious weed infestations).
- Use only certified, noxious weed-free grains, hay, or pellets for feeding domestic animals and wildlife; and inspect all feeding sites during and following use.
- Use only certified noxious weed-free seed, along with hay, straw, mulch, or other vegetation material for site stability and vegetation projects.
- Use only noxious weed-free gravel and fill material from inspected sites.
- Vegetate disturbed areas as soon as practical; use temporary fencing if required assuring new seedling establishment.
- Evaluate current and proposed vegetation management practices (i.e. livestock grazing, prescribed burning, and seeding), and implement practices to restore desired plant communities.

Rehabilitation, Seeding, and Plantings.—Noxious weeds commonly invade areas that have vegetation that can't compete with aggressive invader species. Consequently, after weeds are controlled on a site it is beneficial to establish desirable native vegetation that would compete with noxious weeds, restrict or prevent additional infestations, and help prevent soil erosion and further soil nutrient loss. These treatments may involve ground or aerial application of seeds.

Adaptive Management

The noxious weed control program is a long-term endeavor to control weeds where/when practical. However, because there are areas of scientific and management uncertainty, management actions would need to be refined over time to meet the basic objective of noxious weed control activities systematically reducing weed abundance, extent and spread throughout the PNF. Annual site-specific monitoring would assess the effectiveness of specific control measures on weed species relative to application rate/method and area. Management actions may require refinement or change over time as data from specific effectiveness monitoring is analyzed.

Landscape level management would be reevaluated if consultation were reinitiated. Information from weed inventories and results from treatments will be mapped spatially and the PNF will use this information to assess the noxious weed program objectives and can use this information to build a current baseline for future consultations.

Monitoring

The PNF would be monitoring the effectiveness of the noxious weed program on both a site-specific treatment level and on a landscape level.

Site-specific treatment level monitoring would involve assessing the effectiveness of the treatment agent or control method on a specific patch of noxious weeds. Follow-up treatments would occur as staffing and funding allow. Monitoring may involve multiple years to determine effectiveness. Monitoring of physical, cultural, and chemical control methods would be conducted on randomly selected sites (approximately one site per Section 7 watershed) within one to two months of treatment through visual observation of target species' relative abundance/site dominance compared to pre-treatment conditions. Sequential monitoring of these sites would occur in subsequent years.

Landscape level effectiveness monitoring would be accomplished over the consultation period of the BA by tracking noxious weed occurrence through Geographic Information System (GIS) mapping across the PNF. Noxious weed infestations would be inventoried, mapped, and tracked through GIS to monitor the amount of the PNF land base with noxious weeds and how the control program has worked over the consultation period.

Landscape level inventory and monitoring is expected to reveal new populations of noxious weeds, which would be mapped and evaluated for control or eradication. Management of these newly discovered sites would occur under the guidelines as described in the preceding proposed action.

Program Reporting and Evaluation

Project proposals (with methods, objectives of treatment, location, map of treatment area, acreage, proposed dates to be started and completed, sensitive areas, and special mitigation) for noxious weed control activities involving herbicides will be prepared annually by Weed Coordinators and submitted by April 1, for review by PNF biologists. Project proposals would be reviewed for compliance with this BA. The PNF biologists (Level 1) would provide a list of project descriptions and maps annually (or as identified) for informal review and approval by National Marine Fisheries Service and US Fish and Wildlife Service Level 1 team members before the projects are implemented. All projects would be reviewed and approved by the NMFS and USFWS before herbicide application occurs.

Annually, a project summary of treatments would be prepared for land treatments that took place during the past year. The report would document treatments that took place, methods used, location, map, acreage, evaluation of achievement of objectives, brief summary of environmental effects, and evaluation of compliance with the BA. This summary report would be completed by April 1, annually, and will likely be provided in a NMFS consultation document.

Based on annual treatment evaluations and with the likely development of new control methods and technology, changes in existing or use of new noxious weed treatments may be authorized and warranted. Any changes to the proposed action, as described in the BA, would be analyzed for impacts to listed/proposed species and critical habitat, and consultation would be reinitiated as appropriate.

Partnership and Cooperative Weed Management Areas

The Payette National Forest is a cooperative partner in four Cooperative Weed Management Areas (CWMAs). The cooperative partnerships undertaken through these WMAs make individual and cooperative efforts more effective. Partners include Federal, State, County, private organizations, and private landowners. The cooperative WMAs are listed below:

- Adams.
- Frank Church Wilderness.
- Lower Weiser.
- Upper Payette River.

The cooperative WMAs provide an opportunity for coordinating weed control efforts within a specific project area and provide a more efficient method of control, restoration, and monitoring. When a federal agency is a cooperator in CWMAs, it does not necessarily mean the Forest is the action agency for non-federal lands. However, it does provide the Forest the opportunity of identifying potential private land ESA concerns and issues and recommending noxious weed control BMPs that would reduce risk to listed species and their habitats. It is recognized that the federal listing of species requires the Forest to ensure that all actions authorized or funded by the Forest are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of critical habitat of listed species. Where FRTA easements

are granted, the Payette NF conditions the easements with these PDCs. Where CWMAs are treating on forest, any cooperators are bound by the same PNF PDCs.

Required Mitigation

- The PNF would follow established USDA Forest Service guidelines (FSM 2080; CD1: \Support Documents\law\2080.rtf)
- The PNF would have a certified herbicide applicator overseeing all spray projects.
- A spill cleanup kit would be available whenever herbicides are transported or stored.
- A spill contingency plan would be developed prior to all herbicide applications. Individuals involved in herbicide handling or application would be instructed on the spill contingency plan and spill control, containment, and cleanup procedures.
- Herbicide applications would only treat the minimum area necessary for the control of noxious weeds.
- Trained personnel would monitor weather conditions at spray sites during application.
- All herbicide labels would be strictly enforced
- No spraying would occur when wind velocity exceeds 8 miles per hour.
- No spraying would occur if precipitation is occurring or is imminent (within 3 hours) (this measure is considered to be effective at reducing herbicide delivery from ditches into streams).
- No carrier other than water would be used.
- No use of 2,4-D ester formulations would be authorized.
- The Weed Coordinator will map and identify buffers, methods of application, and herbicide restrictions that may be required for the project, and will make a pre-project review of all spray projects to provide to the level one team by April 1, annually.
- Equipment would be designed to deliver a median droplet diameter of 200 to 800 microns. This droplet size is large enough to avoid excessive drift while providing adequate coverage of target vegetation.
- Equipment used for transportation, storage, or application of chemicals shall be maintained in a leak proof condition.
- All vehicles carrying herbicides shall have a standard spill kit.
- No herbicide storage, mixing or post-application cleaning would be authorized within RCA (100 feet of any live waters). Mixing and loading operations must take place in an area where an accidental spill would not contaminate a stream or body of water before it could be contained.
- Only very low risk, or “aquatic-approved” chemicals (glyphosate-Rodeo®) could be used within 50 feet of open water, where riparian or hydrophilic plants are present, and/or where surface material is obvious recent deposition of sediment of any diameter(s), and these would be applied with hand spraying or wiping only.
- No more than one application of picloram would be made on a given site in any given year to reduce the potential for picloram accumulation in the soil.
- Manual control (e.g. hand pulling, grubbing, cutting, etc.) is authorized in all areas, and may be used in sensitive areas to avoid adverse effects to non-target species or water quality. All noxious weed disposals would be in accord with proper disposal methods. Noxious weeds that have developed seeds would be bagged and burned.
- Only the amount of herbicides that are planned to be used daily would be transported in vehicles.
- Equip drafting equipment for filling spray tanks with back siphoning prevention devices.
- Non-hazardous indicator dye is required to be used with herbicides based on direction from the NMFS BO (2007). The presence of dye makes it easier to see where the herbicide has been applied and where or whether it has dripped, spilled, or leaked. Dye makes it easier to detect missed spots and to avoid spraying a plant or area more than once.

Spill plan.—The following procedures for mixing, loading, and disposal of herbicides and spill prevention plan will accompany all herbicide spraying operations:

Procedures for Mixing, Loading, and Disposal of Herbicides

Procedures for mixing, loading, and disposing of herbicides will comply with Forest Service Manual (FSM) 2109.14 Chapter 40.

The following summary is taken from the Frank Church River of No Return Noxious Weed Treatments Final Environmental Impact Statement, Intermountain and Northern Regions: Bitterroot, Nez Perce, Payette, and Salmon-Challis National Forests (USFS 2007 [draft]).

- All mixing of herbicides will occur at least 100 feet from surface waters or well heads
- All hoses used to add dilution water to spray containers will be equipped with a device to prevent back-siphoning
- Applicators will mix only those quantities of herbicides that can be reasonably used in a day
- During mixing, mixers will wear a hard hat, goggles or face shield, rubber gloves, rubber boots, and protective overalls
- All empty containers will be triple rinsed and disposed of by spraying near the treatment site at rates that do not exceed those on the treatment site
- All unused herbicides will be stored in a locked building in accordance with herbicide storage regulations contained in FSM 2109.14
- All empty and rinsed herbicide containers will be punctured and either burned or disposed of in a sanitary landfill
- Any additional herbicide label requirements will be strictly followed during the mixing, loading, and disposal of herbicides

Herbicide Spill Plan for Weed Control
All actions involving incidents, spills, and accidents will comply with FSM 2109.14 Chapter 60. The following has been modified from the Flathead National Forest Noxious and Invasive Weed Control Environmental Assessment (USFS 2000).

A reportable herbicide spill is one pint of concentrate of herbicide and/or five gallons of mixed herbicide, even if these amounts can be contained and recovered by the weed field crew. Spills that can be contained and recovered will thereafter be applied in the field according to the label requirements for the herbicide. If an herbicide spill occurs, the field crew will radio the Ranger District they are working in, and report the spill. The receptionist on duty will use the form on the attached sheet to gather information. The information will then be forwarded to the appropriate District Safety Officer and to the FS/BLM Interagency Hazardous Materials coordinator for appropriate action. The National Poison Control Center (1-800-222-1222) will be contacted as necessary. If there is a spill, report it on approved forms.

At a minimum, the following equipment and materials will be available with vehicles or pack stock used to transport herbicides.

- A shovel
- Absorbent material or the equivalent
- Plastic garbage bags or buckets
- Rubber gloves
- Safety goggles
- Protective clothing
- Rubber boots
- Applicable Material Safety Data Sheets (MSDS)

G. FEDERAL ACTION: ROAD MANAGEMENT

PURPOSE AND NEED: To conduct management activities on National Forest System roads within the MSSW Section 7 watershed on the Payette National Forest until December 31, 2017. These

activities are performed by Forest engineering staff, other authorized Forest personnel, contractors, or cooperators who have written agreement with the Forest to perform maintenance.
LOCATION: MSSW Section 7 Watershed

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001
- NMFS: August 9, 2001

DESCRIPTION: Road management has several major components, road maintenance, administration of easements, rights of way and permits, and physical closures of various types related to reducing resource impacts. Road maintenance that is part of mining operating plans is the sole road maintenance activity that is not part of this federal action; operating plans require separate consultation where they may affect listed species and/or critical habitat. Road management and the travel plan Federal action are interdependent actions; therefore, they will be discussed collectively in the effects matrix (Appendix 3).

Maintenance can be summarized as routine road surface blading, culvert repair and cleaning, brushing on roadways (top of the cut to the bottom of the fill) and road ditch cleaning. Road maintenance includes replacing existing facilities (e.g. road, culvert, bridge, retaining wall, etc.) and resurfacing roads with pre-existing materials, except as identified under "acts of God." Road surfaces may be upgraded to reduce erosion and sedimentation so long as cut and fill-slopes are not enlarged or disturbed; for example, a native surface road may be upgraded to pit-run gravel, crushed aggregate or asphalt. The federal action includes replacement of facilities normally maintained by the Forest where they are obliterated (severely damaged, or eroded) for up to 500 feet of full prism by flood, fire or other "acts of God" if a journey level fisheries biologist agrees that the effects are not likely to be adverse. Repairs due to "acts of God" may involve alignment shifting to reduce encroachments of RCAs and flood plains. Within funding constraints, the maintenance level assigned to a road dictates the frequency and extent of maintenance work performed on a particular road, or section of road. Roads assigned a higher maintenance level are traveled more often and therefore receive more maintenance more frequently (for further detail refer to Fall Back Emergency Steps below). . Maintenance Levels also provide a way to classify forest roads according to their assigned use, so that the road will perform as planned. A description of the various road maintenance levels is located in CD2: \Support Documents\Roads/7709.58,12.3,ex.01[1].rtf (in file Roads.zip). Routine road maintenance activities, snow plowing, and road dust abatement will be conducted to prevent resource damage. Road plowing will follow standards described in the Land and Resource Management Plan. These standards are designed to reduce the potential for damage to the road from snow plowing activities and thereby reduce sediment delivery to streams.

Maps indicating maintenance levels and responsible agencies are included on the accompanying CD:

Maintenance Levels and Responsibility

- CD1: \Support Documents\Maps\rds_oper_ML.pdf.

These maps represent the most current information available, and may change as additional information becomes available.

A more detailed description of road maintenance is that road maintenance is any activity that takes place on an existing classified for unclassified road for the expressed purpose of maintaining the road or road system in a safe and properly functioning condition for the user and level of use identified by the road use objective and maintenance level. This activity would be further defined by the following sub-categories:

- ***Rote or Routine Road Maintenance.—***Maintenance is anticipated/planned on a repeated/yearly basis, e.g. surface blading, brushing, culvert & bridge clearing, cleaning & repair, surface clearing, deadfall removal. Slide and slough removal occurs. Ditch clearing and cleaning occurs. Rock raking, and dust abatement applications occur. Hazard trees are felled.
- ***Normal or Frequent Road Maintenance.—***Road resurfacing, gravel placement (new or resurface), pavement patching and sealing (including new bituminous surface treatments (seal coats, and similar measures) occur but not annually. Culvert installations, including replacements, upgrades, extensions and new installations, can occur providing LRMP standards, at a minimum, are met and the listed BMPs are used. Such actions in fishbearing streams will be reviewed by the Level 1 Team prior to implementation. Aggregate crushing and hauling can occur from existing rock pit sources. Minor concrete work, i.e. small headwalls can occur. Riprap slope protection, prism reconstruction, retaining walls for slope stabilization, seeding and mulching can occur. Riprap placement for culvert inlet and outlet protection and bridge repairs can occur if limited to a cumulative linear distance of 100 feet or less at an individual site and after approval by a fisheries biologist, except where there may be potential adverse effects to listed species or designated critical habitat. Snow removal occurs on roadways to facilitate access following inclement weather.
- ***Extreme or Very Infrequent Road Maintenance.—***Road re-alignments can occur. Re-alignment is defined as road maintenance because: the road exists and is part of an existing road system, and the local road network accesses a portion of the National Forest maintaining the systems function. In addition, meeting present Forest Plan Standards or Legal requirements, (i.e. Endangered Species Act & Clean Water Act, etc.) is a maintenance function. Road re-alignment could occur if the Ranger through the input of fisheries biologists, hydrologists, and others has determined that listed species or designated critical habitat would benefit by road re-alignment, and a fisheries biologist has determined there would be no adverse affects due to sediment delivery, harassment of adults, or other mechanisms of effect. Temporary bridge placement or permanent bridge replacement in locations where a fisheries biologist has determined listed fishes are not present; when utilizing existing abutments or supports or with minor movement or improvement of abutments, and when effects to listed fishes or designated critical habitat from sediment delivery are negligible (see erosion control mitigations below). Actions may require stream fording after fisheries biologist approval. All design criteria applicable to Forest Service roads would be implemented with extreme or very infrequent road maintenance.

Administration of permits and easements results in conducting similar activities to road maintenance except that the Forest Service jurisdiction is limited to prescribing terms and conditions. Permits contain the most flexibility and can contain all mitigation measures that the Forest Service believes are appropriate. The terms and conditions applied to easements, or rights of way can only contain those measures consistent with the property rights identified in the easement or right of way; the latter may apply to state or county roads, access to private property and similar circumstances.

Administration of permits and easements also includes grooming of snowmobile routes and connections among them; the routes are mostly on existing roads; these agreements are with the counties and the state of Idaho.

Physical road closures are those identified according to the mitigation measures described below. The Forest has a process for making decisions about what roads to close for resource protection and otherwise how to manage roads; that process is identified below.

SITUATIONS REQUIRING SEPARATE CONSULTATION: Separate consultation will be required for Forest road maintenance activities if:

- A specific road maintenance action on roads for which the Payette National Forest has maintenance responsibility (including maintenance by County personnel or road use permittees) does not adhere to Payette National Forest road maintenance standards, does not adhere to all applicable mitigations listed below, and/or may adversely affect a listed species (which could include stranding or harassing fish) or designated critical habitat;

and/or

- A maintenance activity or assigned maintenance level results in adverse effects to a listed species (which could include stranding or harassing fish) or designated critical habitat regardless of whether maintenance standards are followed.

Road maintenance crews, contractors and cooperators will be provided training by the Payette National Forest, prior to operation, regarding the potential for effects to listed fishes and designated critical habitat, and what maintenance practices are mandatory and appropriate.

REQUIRED MITIGATION: Mitigation, in this case, consists of practices aimed at minimizing sediment production and delivery to streams, maintaining or improving the designed drainage of the road, and avoiding the introduction of dust abatement chemicals that could be delivered to streams.

Regular maintenance keeps roads in good functioning condition and allows for identifying and correcting problems promptly. Recommended maintenance (mitigation) for activities in the MSSW Watershed is found in Furniss et al. 1991. These practices will help reduce the adverse effects of road deterioration on habitat.

General Practices

- Do not leave berms along the outside edge of roads, unless an outside berm was specifically designed to be a part of the road and low-energy drainage is provided for. The creation of outside berms during road grading is a common mistake, and frequently turns low-impact roads into high-impact, chronic sediment producers.
- Grade and shape roads to conserve existing surface material. Road grading and shaping should maintain, not destroy, the designed drainage of the road, unless modification is necessary to improve drainage problems that were not anticipated during the design phase.
- Inspect ditches and culverts frequently, as appropriate to the maintenance level, and clean them out when necessary. Do not over-clean them, however, because excessive cleaning of ditches causes unnecessary sedimentation. Use care to not undercut the ditch back slope, or the cut-slope.
- When blading and shaping roads, do not side cast excess material onto the fill. End haul all excess fine material that cannot be bladed into the surface as periodic side casting can prevent fill stabilization and promote erosion. End haul and prohibition of side casting is not required for organic material like trees, needles, branches, and clean sod; however, fine organics like sod and grass should be cast somewhere other than into water. Slides and rock failures including fine material of more than approximately ½ yard at one site should be hauled to disposal sites. Fine materials from slides, ditch maintenance, or blading can be worked into the road. Scattered clean rocks could be raked or bladed off the road except within 300' of perennial or 100' of intermittent streams. Fine material is 1" minus; rocks are 1" plus.
- When treating weeds or brush follow all measures identified in the federal action titled "Noxious Weed Control."
- Apply dust-abatement additives and stabilization chemicals (typically $MgCl_2$ or $CaCl_2$ salts) so as to avoid run-off of applied dust abatement solutions to streams. Spill containment equipment will be available during chemical dust abatement application.
- Promptly remove debris that obstructs drainage systems.

- Identify and close those unsurfaced roads that during the wet season can directly contribute sediment to streams.
- Identify, close, and reclaim unneeded classified and unclassified roads. These roads should be put into shape to be stable and drain properly without maintenance. This usually requires earthwork for removing culverts or "dishing out" crossings that have high potential for diversion, shaping the road for long-term stability (Eubanks 1980; Weaver et al. 1987). Where high-value fisheries are at risk from abandoned roads, more extensive obliteration and reclamation of roads should be considered. Road obliteration and reclamation actions are covered under the *Watershed and Fish Habitat Improvements and Maintenance* action.
- Locate fuel storage areas outside of RCAs and provide facilities to contain the largest possible spill. Leaks of motor oil and hydraulic fluids from heavy equipment should be monitored and controlled to prevent water contamination.

In addition, the following practices will be followed during road maintenance activities:

- Avoid road maintenance activities during times in which listed fish eggs or alevins are in gravels near enough downstream to the disturbance to possibly be affected by the action. A fisheries biologist will determine this time period and whether the action is near enough to the fish to warrant this protection.
- Preventive maintenance should be practiced on all roads, not just actively used ones, as prioritized based on resource impacts and funding.
- Do not side cast road grading material (<1 inch diameter fine inorganic material) along all roads within one-quarter mile of perennial streams and from roads onto fill slopes having a slope greater than 45 percent.
- Do not "undercut" cutslopes when cleaning inside ditches so as to avoid destabilizing the slope and thereby accelerating erosion.
- End-haul all large rocks, slides, and other material that ends up on the road to a designated disposal area as agreed by a journey hydrologist/soils scientist or a journey fisheries biologist.
- Earth disturbing projects, such as emergency culvert replacement, where listed fishes are present, shall have the agreement of the Level 1 team that the effects are not likely to be adverse and agreement of a journey hydrologist/soils scientist, one of whom should be on hand to monitor the project. In addition, any culvert replacement will conform to the following guidelines:

    - Culverts will meet LRMP standards.
    - FishXing or similar software will be used to determine culvert specifications required for fish passage.
    - Place erosion control at the work site prior to any construction so as to reduce sediment delivery to the stream to negligible levels.
    - Remove fill from around existing culvert and store at a stable location.
    - Construct a temporary channel and line it with plastic and/or geotextile, or use some other water conduction facility (e.g., pipe) that must meet fish passage requirements.
    - Divert the stream into the temporary water conduction facility.
    - Remove existing culvert.
    - Install replacement culvert.
    - Reconstruct approaches over new culvert.
    - Seed and mulch disturbed areas, remove sediment collected by erosion control material as specified by a hydrologist, soil scientist, or fisheries biologist.
    - Additional site-specific measures, including modifications to BMPs because of site-specific conditions, may be identified and approved by a fisheries biologist, soil scientist or hydrologist.

- Road maintenance will not be attempted when surface material is saturated with water and erosion problems could result.
- Do not excessively "brush" (cutting vegetation) along roads where the vegetation is stabilizing slopes, or providing shade to a stream or river channel.
- Road maintenance may interrupt the delivery of large woody debris to streams thereby inhibiting the maintenance or attainment of good habitat conditions. Therefore, large woody debris (LWD > 9 m in length and >50 cm in diameter) present on roads within this watershed's RCAs shall be moved intact to down slope of the road, subject to site-specific considerations. Movement down-slope will be subject to the guidance of a journey level fisheries biologist; that guidance will be provided at annual training sessions for road crews and on a site-by-site basis as necessary.

In order to avoid and mitigate effects identified in the environmental baseline, the Forest will conduct additional activities. In addition to previous requirements developed for consultation, the Forest will:

- In February 2000, the Forest began to examine priorities for road management's actions to incorporate the Chief's agenda and incorporate listed fishes and designated critical habitat into the priority setting process.
- In order to fully evaluate appropriate road management options the Forest will use a new Trails/Roads Analysis Process (TRAP, Current CD2: \Support Documents\Roads\TRAP process [in Roads.zip]). TRAP was developed to be compatible with sub-basin review and watershed analysis. This process is being incorporated into a national Roads Analysis Process (RAP), which will be required in all NEPA projects involving road management after 12 July 2001.
- A journey soils scientist has been incorporated into the road maintenance crew.

Documentation Requirements

The following documentation is required and will be provided to the USFWS or the NMFS if requested:

- All culvert replacement will be documented with respect to location, problem, action, date, fisheries biologist approval, etc.
- Road resurfacing will be documented with respect to resurfacing material, method of application, dates, fisheries biologist approval, etc.

Fall Back or Emergency Steps

Situations such as culvert failures, slides, and road failures are evaluated and prioritized according to the maintenance level of the road and the potential for damage to other resources. Road maintenance problems that may pose a threat to listed fishes or their designated critical habitat will receive the highest priority. Problems on roads of either maintenance levels 1 (closed) or 2 are usually given a lower priority than more heavily used roads of levels 3, 4, or 5. Problems are usually reported to the road operations engineer and a work order is given to the road crew to repair the problem. "Road Situation" forms are available to apprise Engineering staff of road-related problems or potential problems by other Forest personnel.

Road maintenance problems are usually corrected within 1 to 10 days, depending upon the priorities of the road maintenance crew. Problems threatening listed fishes or their designated critical habitat will be addressed immediately. If Forest road crews are unable to respond immediately (e.g., because of equipment problems or location), the work will be contracted and supervised by Forest personnel, including a fisheries biologist, soil scientist, or hydrologist.

A fisheries biologist will review road-related maintenance problems that require more than routine maintenance (see definition above). The Forest will complete a BA and consultation with the

NMFS and the USFWS, as appropriate, for major road repairs or maintenance that may pose a threat to listed fishes or their designated critical habitat.

H. Federal Action: Trails, Recreation and Administrative Site Operation and Maintenance

Purpose and Need: To conduct routine operation and maintenance (O & M) of trails, recreation and administrative facilities on the Payette National Forest until December 31, 2017.

Location: MSSW Section 7 Watershed

Dates of Previous Concurrence:

- USFWS: October 15, 2001
- NMFS: August 8, 2001

- ***Recreation and Administrative facilities (Forest Service work station and recreation sites).—***Operation, maintenance and repair of the administrative facilities will occur that includes hazard tree removal, water system repair, structural repair of fences, structural repair of buildings and barns, painting, and maintaining current septic systems. This action would also include the replacement, maintenance, improvement, and installation of structures at recreation and administrative sites such as outhouses, fences, water tanks, signs, septic systems, parking areas, etc. for the purposes of maintaining site function, to serve site users, and to provide for user's health & safety and for resource protection, etc.
- ***Airstrips.***—Leveling, smoothing, removing surface hazards, protecting surface from erosion, watering, mowing, raking rocks, applying fill dirt, re-seeding, and felling of encroaching trees.
- ***Trails.***—Conducting Trail maintenance on National Forest Systems trails to keep them in a condition suitable for use and to minimize resource impacts from the trail location and use will be conducted.. Trail characteristics and use levels vary, with the location and destination of the trail. The Forest Service Trail Maintenance Management System is "a method to plan, schedule, perform, and evaluate the maintenance activities necessary to ensure the safety, protection, proper administration, and appropriate use of the forest trail system" (Forest Service Handbook [FSH] 2309.18). Maintenance on these trails is performed after maintenance needs have been identified from condition and prescription surveys and an Annual Maintenance Plan is developed (within funding constraints). Maintenance is conducted on routine (usually annual or bi-annual schedule) and intensive (for one-time resolution of site-specific problems) levels using the methods outlined in Lund and Burns (1995) (Table 6).

Table 6.—Trail maintenance activities (Forest Service Handbook 2309.18)

Activity	Level of Maintenance	Concern
loose rock removal	routine	tread maintenance
rock & root removal	routine	tread maintenance
slough & berm removal	routine, intense	tread erosion water management
slide maintenance	routine, intense	tread erosion slope stabilization
borrow (fill)	routine, intense	Tread maintenance
drainage maintenance	routine, intense	erosion
maintain waterbars	routine, intense	erosion
maintain culverts	routine, intense	erosion
maintain stream fords	routine, intense	erosion
maintain gully crossings	routine, intense	erosion
maintain drainage dips	routine, intense	erosion
fallen tree removal	routine	trailway
brush cutting	Routine	trailway
slope re-vegetation	intense	trailway, erosion
maintain rock/log retaining wall/barriers	intense	erosion, trailway,structure maintenance
construct rock/lock retaining wall or barrier	intense	erosion, trailway, structure maintenance

Activity	Level of Maintenance	Concern
bridge maintenance	intense	erosion, structure maintenance

Trail operation and maintenance may include:

- □ Replacement or moving of trail segments (to improve trail function, for resource protection or other management needs), (less than 500 feet of trail), if potential effects to stream channels are reduced (i.e. by moving trails away from stream channels, wetlands etc.) is being proposed. Repair, removal, and installation of culverts, or bridges, and the replacement of trails, bridges and related facilities that have deteriorated to the point of being unsafe and/or representing a hazard to users, or are obliterated by floods, fires, landslides etc. may occur. Most trail bridges are removed by hand. Generally, this consists of removing unusable materials and replacing them with new materials. Bridge repair and replacement can include stream fording by forest personnel. Equipment such as a crane or helicopter may be used to remove/install both prefabricated metal bridges and wooden structures. Installation of a bridge or culvert to reduce or eliminate effects to listed fish species may also occur. Bridges may be native stringer, laminate, or prefabricated metal. Armoring may occur outside edge of trail with logs or rock to inhibit erosion. Stream fords may also be armored.
- □ Construction of puncheon or corduroy structures over bogs, or small streams, or placement of culverts to direct water under trail tread may occur. Culverts will be used in intermittent, perennial, and non fish-bearing streams. Culverts would be plastic, metal, or constructed from available rock. Culverts would be placed by hand. Plastic or metal culverts would be short (a little over trail width), entail minor excavation for placement, and be covered first with rock, then native material. Culvert replacement would also be done by hand and entail removal of cover and fill material, placement of fill material where it would not enter the stream, may include minor excavation for placement of new culvert, and covering culvert first with rock, then native material.
- □ Trail operation and maintenance may also include use of motorized equipment (i.e. chainsaws, ATV's, trailcat, bobcat) to transport equipment and materials, or to assist in trail construction. (Only on motorized trails, for non-motorized trails personnel must carry or use pack animals to bring in supplies)

- ***Bridge Construction.—***Types of bridges that may be constructed include native stringer, laminate, and prefabricated metal. Laminate and prefabricated metal bridges would be placed on keystone block or pressure-treated wooden abutments. Native stringer bridges may be placed on either treated or pressure-treated wooden abutments. All treated wood used shall be produced and used in compliance with "Best Management Practices for the use of wood in aquatic and other sensitive environments" (Western Wood Preservers Institute, 2006). Although treated wood does contain chemicals that are potentially toxic, studies indicate that there are no measurable impacts on aquatic organisms if the wood is properly treated and installed (Lebow and Tippie, 2001).

  Native stringer bridge construction: These bridges are constructed by hand, with hand tools such as chainsaw, shovel, axe, and hammer. Log stringers for these bridges are generally attained near the bridge site, but will not be from RCAs. Other materials such as abutments and decking may be packed or flown in. Generally, construction steps may include hand placement of abutments on each side of stream, placing log ends side by side on abutments with logs spanning the stream, attaching logs to abutments and attaching decking to top of logs, and construction of ramp or step up to bridge from trail.

  Laminate bridge construction: These bridges are also constructed by hand, with hand tools such as chainsaw, shovel, axe, and hammer. Materials such as abutments and decking may be packed or flown in. Generally, construction steps include placement of abutments on each side of stream (usually keystone block or pressure-treated wood), placement of planks on edge between abutments (usually 2 x 10s or 2 x 12s) , additional

planks of varying lengths are nailed to initial planks (i.e., side to side) with joints offset until desired width is reached. Decking and edge rail are then attached to the top of the laminated planks.

Prefabricated metal construction: These engineered bridges are generally done under contract. These bridges often require both hand and machinery work using tools such as shovel, chainsaw, and helicopter or crane. Generally, construction steps include placement of abutments on each side of the stream (usually keystone block), and placement of bridge using a crane or helicopter.

Some stream fording may occur with each of these types of construction depending on site conditions. Often with laminate construction there is little or no stream fording, as people and materials will cross on boards laid spanning the stream. One or two native stringers can sometimes be placed without entering the stream, and once in place can be used for crossing during the remaining construction.

REQUIRED MITIGATION:

General

- Ground disturbing activities within LRMP riparian buffer strips will be fully mitigated by applying a "high" level of soil erosion mitigation measures which can include water control devices such as silt fence or straw bales, erosion control matting, seed, mulch, fertilizer and placement of woody debris.
- Both a journey level hydrologist and fisheries biologist must agree to the decision to replacing or relocating more than 500 feet of trail that has the potential to affect stream channels and the new location.
- During bridge construction, mechanized equipment will be restricted to operation on streambanks, and may not enter streams, lakes etc. without approval from a journey level fisheries biologist.
- Seeding will be done with certified weed free native seed mixes.
- Bridge construction or other ground disturbing activities potentially affecting habitat for listed fishes will be completed when effects to listed fishes can be minimized. A journey level fisheries biologist will be consulted to determine appropriate timing.
- Planned trail, recreation and administrative site work will be presented to the level one team annually.
- All treated wood used shall be produced and used in compliance with "Best Management Practices for the use of wood in aquatic and other sensitive environments" (Western Wood Preservers Institute, 2006).

Administrative facilities *(airstrips, Forest Service work stations, and recreation sites)*

- Maintenance and repair or replacement of structures that requires replacement, improvement, or installation of water and/or septic systems would meet applicable State Department of Environmental Quality and District of Health requirements. Only existing facilities and water developments are covered by this action.

Trail

- Conduct fish habitat (riparian and stream channel condition) surveys of streamside trails. Develop and implement recommendations for Annual Trail Maintenance Management Plans.
- Side casting of soil/sediment from trails directly into stream channels or within a deliverable distance will not occur.
- Rolling dips and/or waterbars will be placed as needed in newly constructed and existing trails, and near bridge crossings as needed to minimize water travel lengths and erosion.
- To dissipate surface runoff, place woody debris (>3in. diam.) perpendicular to the downhill end of rolling dips and/or waterbars.

- Route trails away from crossings to minimize length of trail sections perpendicular to streams that may direct sediment toward streams.
- Place rolling dips/waterbars such that water and material potentially moving down trails is directed off the trail and filtered by intervening vegetation.
- Reinstall culverts in fish-bearing streams in a manner that allows fish passage. As necessary, FishXing or similar software may be used to determine culvert specifications required for fish passage. Stream gravels and cobbles will not be 'borrowed' from any RCA. where it would affect WCIs. Culvert installation or replacement will follow guidelines for culvert replacement found in the federal actions road management and watershed and fish habitat improvements and maintenance.
- Stream fords will be designed to allow passage of all aquatic organisms and lifestages, and not be located in potential fish spawning areas. The Forest identifies stream fords where damage is occurring and evaluates options for mitigating any resource damage that is occurring. Stream fords are prioritized according to type and volume of use, with horse trails and motorized trails receiving the highest priority for mitigation. Potential mitigations include installation of a bridge or culvert, armoring of potential erosion sites, placement of stepping stones and logs, or re-routing of the trail to a less sensitive location. Mitigation method is determined by the natural materials available on-site and the amount and type of use. If a section of trail has numerous resource problems then the section is re-routed and the old tread is rehabilitated

Bridge Construction

- Bridge design and construction will meet LRMP standards and guidelines.
- Minimize sediment entering streams by: using silt-fence, or straw bales between abutments and stream, by avoiding abutment construction, or by using keystone blocks or native rock type material that avoid generating erosion/sedimentation. Minimize stream fording as much as is practical.
- Install bridge abutments well outside of active stream channel. Fisheries biologist or hydrologist will determine the extent of active stream channel.
- If native stringers must be taken from RCAs, they will be removed by hand from separate locations. Generally 3 to 5 trees are needed for native stringer bridges.
- Where practical, construct short approach inclines on ends of bridges to prevent water movement from trail onto bridge.

Motorized Equipment

- Mechanized equipment (i.e., bobcat, trailcat, etc.) may ford streams with the approval of a fisheries biologist. Mechanized equipment, must be free of any petroleum or hydraulic leaks and must be serviced outside the LRMP (or LRMP) buffers.
- Fuel for motorized equipment will be transported in US DOT approved containers.
- Refueling of motorized equipment will occur as far from streams as is practicable, and on ground where a fuel spill would be easily contained. Spill containment equipment will be available.

I. FEDERAL ACTION: TRAVEL PLAN

PURPOSE AND NEED: To permit travel on the Forest until December 31, 2017 by issuing a travel plan and to achieve regulation of human access on the Forest to protect resources and provide for appropriate public travel..

LOCATION: The Payette National Forest portion of the Main Salmon River Southwest Section 7 watershed

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001
- NMFS: August 8, 2001

DESCRIPTION: Summer motorized travel would be limited to designated roads, trails, and parking areas. This is a change from activities that were permitted during the 2001 consultation because of road and trail motorized use was permitted on some areas of the Forest. Refer to Table 7. Travel on foot and riding livestock is permitted Forest-wide. Motorized use on trails is limited to those so designated by the Forest (Figure 3) and for 100 feet off the travel-way in order to facilitate camping. Motorized use on roads is also limited to roads so designated (Figure 4) and for 300 feet off the roadway to facilitate camping. The action described in 2001 would be modified by a decision based on an analysis being conducted (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]). The change from the baseline in this action is approximated in this BA by Alternative E (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]). Under this federal action degradation of some watersheds would occur in the long term because of anticipated increases in motorized use on roads and trails over time. Alternatives that lessen the rate of long term degradation are beneficial compared to no change, and are therefore considered to be consistent with Forest Plan standards and guidelines. The federal action is consistent with the Forest Plan because proposed activities (such as closure of areas to cross-country motor vehicle use) would reduce the anticipated rate of degradation compared to doing nothing. The federal action makes no changes to travel by horse or foot, but off-road or off-trail use of motorized vehicles is changed (Table 7).

Table 7.—Changes in motorized use by watershed under Alternative E of the proposed new Travel Plan compared to the baseline conditions.

Pathways & Indicators	Approximate change from baseline conditions in acres open to motorized use (for substrate embeddedness) or miles of roads and trails (for stream bank condition)
Middle Salmon-Indian Creek, California Creek, Middle Salmon-Bear Cr., Middle Salmon-Carey Cr.	
Substrate Embeddedness	Open acres decrease by 16429
Stream bank Condition	Decrease by 2.9 mi.
Upper Warren Creek, Middle Warren Creek, Lower Warren Creek	
Substrate Embeddedness	Open acres decrease by 23048
Stream bank Condition	Decrease by 1.4 mi.
Little French Creek, Lower French Creek	
Substrate Embeddedness	Open acres decrease by 2684
Stream bank Condition	Decrease by 5.7 mi.
Elkhorn Creek	
Substrate Embeddedness	Open acres decrease by 157
Stream bank Condition	Decrease by 0.7 mi.
Partridge Creek	
Substrate Embeddedness	No change
Stream bank Condition	No change
Lake Creek	
Substrate Embeddedness	No change
Stream bank Condition	No change

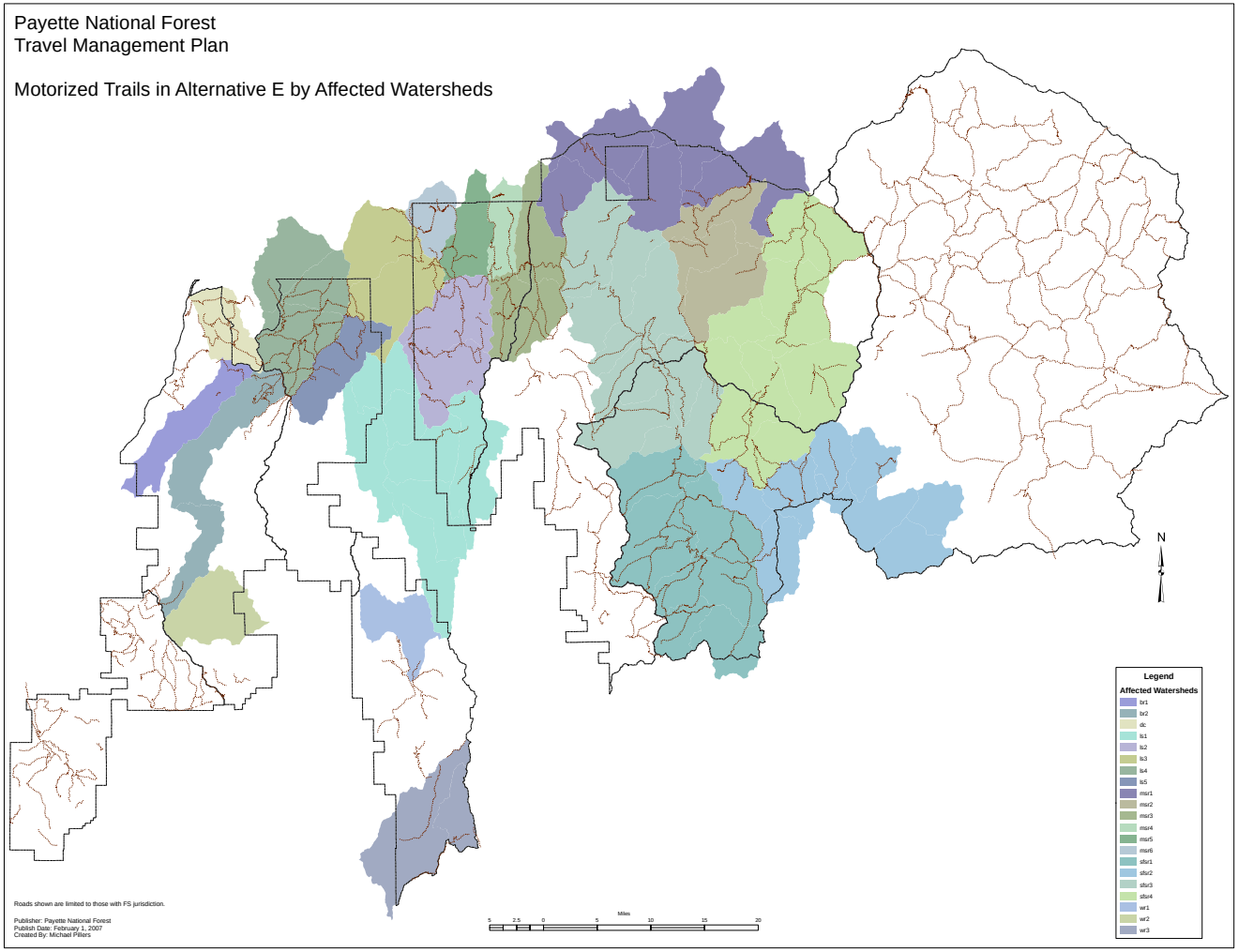

Figure 3.—Trails under Payette National Forest jurisdiction with motorized use.

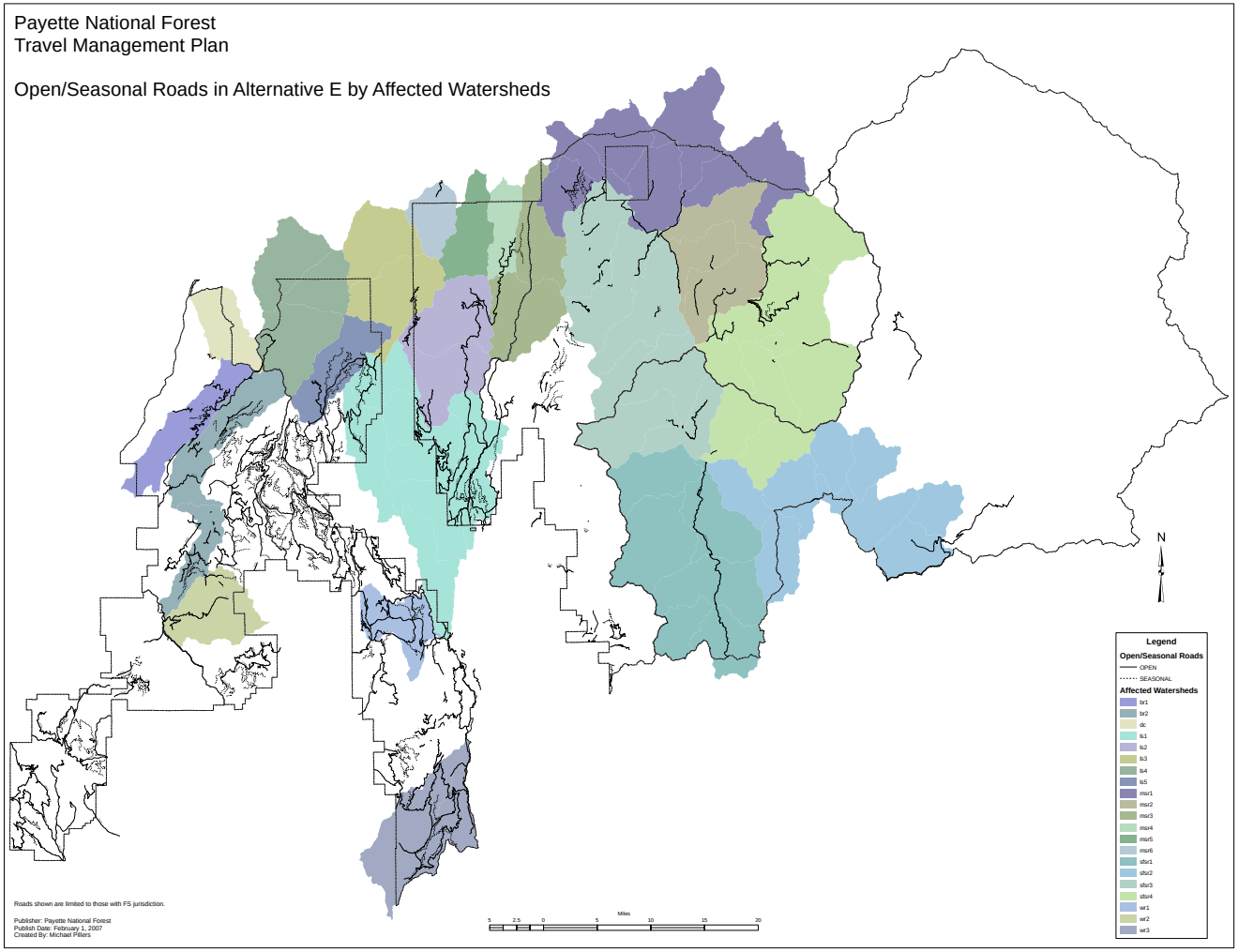

Figure 4.—Roads under Payette National Forest jurisdiction with motorized use.

REQUIRED MITIGATION:

The interdependent actions of "Road Management" and "Trails, Recreation, and Administrative Site Operation and Maintenance" reduce adverse effects of authorizing travel on roads and trails on the Forest; also, see the description of those actions and their effects. The Travel Plan action has specific mitigation measures, and Project Design Features (PDFs) include Best Management Practices (BMPs, Appendix C of Travel Plan on CD2: \Support Documents\Travel Plan [in Travel Plan.zip]), identified design features, and Forest Plan Management Requirements (Table 2-27 of Travel Plan on CD2: \Support Documents\Travel Plan [in Travel Plan.zip]) that must be included to protect listed species. This action has the following features in the MSSW Section 7 watershed incorporated in the action as project design features.

Project Design Features

Project design features (PDFs) include Best Management Practices (BMPs) (see Appendix C) standards operating procedures (SOPs), identified design features (below), and Forest Plan Management Requirements (Table 2-27) that must be included to protect Forest resources. PDFs are part of all action alternatives.

- The Payette National Forest would continue to support programs and publications that provide information, education, and training on travel access.
- The Payette National Forest would follow National direction for signing and maps. The Forest Service plans to develop a standard national format for motor vehicle use maps. These maps will be available at local Forest Service offices and, as soon as practicable, on Forest Service web sites. The Forest Service plans to issue additional travel management guidance in its sign standards handbook to ensure consistent messages and use of standard interagency symbols.
- Any roads being converted to trails and new motorized trails would be subject to the following features. (Note: new routes are those on which no designated use has occurred in the past. Reconstructed roads and trails are defined as roads or trails that would be designated on previously unauthorized or closed system roads that would now be open to public travel.)

    - Before a new or previously unauthorized road or trail is constructed, reconstructed, or open for use, a cultural resources survey and evaluation would be completed and concurrence received from the Idaho State Historic Preservation Office so that no impacts would occur to cultural resource sites. Although most routes have been inventoried and cleared for use, a Programmatic Agreement or Memorandum of Agreement may be used to ensure all cultural resource requirements are met.
    - Before a new or previously unauthorized road or trail is constructed, reconstructed, or open for use, a rare plants survey and evaluation would be completed and necessary protection measures enacted so that no unacceptable impacts would occur to rare plants, or impacts would be mitigated.
    - Before a new or reconstructed route is made available for use a Hydrologist or Soil Scientist would complete an ATV Trail Condition Assessment to identify problems and to establish a baseline for future monitoring. The assessment would include a standardized classification system, a GPS location, and documentation in a GIS database.
    - New trails or roads would be designed to meet the minimal trail or road standard as defined by the USDA Forest Service Standard Specifications for Construction of Trails, EM-7720-102; or the FSH 7700 Roads USDA Forest Service Handbook for roads.
    - Reroute trails where water management structures cannot function or be properly maintained, or where trails cross soils and sites poorly suited for motorized use. Reclaim abandoned trail alignment by physical closure, installation of water management structures, de-compacting the abandoned travelway, and pulling of available slash onto the abandoned trail.
    - Construct and maintain water management features (such as waterbars, grade dips, rolling dips, culverts, sheet drains, check dams, ditches or bridges) as determined by a Forest Service hydrologist and /or fisheries biologist. Aquatic organism passage requirements would be

developed based on a new interdisciplinary approach to create stream simulation (CD2: \Support Documents\Roads\stream_crossing_design [in Roads.zip]).

- When rerouting of poorly located trail is not feasible, improve the trail surfaces so they will support use without unacceptable resource impacts. Improvement techniques include replacing or capping unsuitable soils including fills with geotextiles, gravel, corduroy, wood matrix, puncheon, porous pavement panels, or matting.
- Include measures to prevent the spread of noxious weeds such as: uses of weed-free gravel or soil, use of weed-free hay or straw, and prompt re-vegetation of areas of disturbed soil.
- Avoid removing snags and potential snags when constructing or reconstructing roads and trails whenever practical. Hazard trees that are a threat to public safety may be removed.

In addition to the project design features, BMPs are included in the action. Those BMPs (Table 38) are included in order to minimize adverse effects to listed fish species where they occur.

Table 8.—Watershed related BMPS are included in the action in order to minimize adverse effects to listed fish species where they occur. This table is a summary from the measures defined in the Environmental Impact Statement.

BMP Description	Purpose or Objective	Effectiveness and IFPA Compliance
SWCP 11.05 - Wetlands analysis and evaluation.	Maintain wetland functions and avoid adverse soil and water resource impacts associated with the destruction or alteration of wetlands, bogs, and wet meadows.	HIGH. IFPA Rule 030: 08c
SWCP 11.07, 11.11 - Oil spill contingency plan. Petroleum storage, delivery facilities, and management.	Prevent contamination of soil and water resources resulting from leaking delivery systems and storage facilities.	HIGH. IFPA Rules 060: 02a, b, c
SWCP 11.09 - Management by closure to use.	Exclude activities that could result in damages to facilities or degradation of soil and water resources.	HIGH. IFPA Rule 040: cii, di, dii, eiii, eiv
SWCP 11.14 - Management of snow survey sites.	Protect snow courses and related data sites from effects by land management activities.	HIGH. No related IFPA rules.
SWCP 13.04 - Revegetation of surface-disturbed areas.	Protect soil productivity and water quality by minimizing soil erosion.	MODERATE. IFPA Rule 030: 04c, 05a, 05b
SWCP 14.05, 15.05 - Protection of unstable areas. Slope stabilization and prevention of mass failures.	Identify and protect unstable areas so as to avoid triggering mass movements and resultant erosion and sedimentation.	HIGH. IFPA Rule 3.d.ii
SWCP 14.17, 15.3, 15.19 - Stream channel protection. Controlling in-channel excavation. Stream bank protection.	Protect natural stream flows and streamside vegetation by maintaining unobstructed passage of stream flows and by reducing sediments and other stream pollutants from entering.	HIGH. IFPA Rule 030: 05a, 040: 04a thru d
SWCP 15.02 - General guidelines for the location and design of roads and trails.	Locate and design roads and trails with minimal soil and water resource impacts while considering all design criteria.	MODERATE. IFPA Rule 030: 03b, c; 04a 040: 02a thru h
SWCP 15.03 - Road and trail erosion control plan.	Prevent, limit, and mitigate erosion and sedimentation through timely implementation of erosion control practices prior to and during ground-disturbing activities.	MODERATE. IFPA Rule 040: 03c, f, hi.
SWCP 15.06 - Mitigation of surface erosion and stabilization of slopes.	Minimize soil erosion and sedimentation from road cut slopes, fill slopes, and travelways during and after construction.	MODERATE. IFPA Rule 040: 03a thru j.
SWCP 15.07 - Control of permanent road drainage.	Minimize the erosive effects of concentrated water and the degradation of water quality through proper design and construction of road drainage systems and control structures.	MODERATE. IFPA Rule 040: 03 and 04.
SWCP 15.08 - Pioneer road construction.	Minimize sediment production and mass wasting associated with pioneer road construction.	MODERATE. IFPA Rule 040: 02
SWCP 15.09 - Timely erosion control measures for incomplete roads and stream crossings.	To minimize accelerated erosion and sedimentation from disturbed ground created by ongoing incomplete projects.	MODERATE. IFPA Rule 040: 03a, b, f, I
SWCP 15.10, 15.18 - Control of road construction excavation and sidecast. Disposal of right-of-way and roadside debris.	Reduce sedimentation from unconsolidated excavated and sidecast material and construction slash caused by road construction, reconstruction, or maintenance.	HIGH. IFPA Rule 040: 04a
SWCP 15.11 - Servicing and refueling of equipment.	Prevent contamination of water from accidental spills of fuels, lubricants, bitumens, raw sewage, wash water, and other harmful materials.	HIGH. IFPA Rule 060: 02a, b, c

BMP Description	Purpose or Objective	Effectiveness and IFPA Compliance
SWCP 15.14 - Diversion of flows around construction sites.	Minimize downstream sedimentation by ensuring that all stream diversions are carefully planned.	HIGH. IFPA Rule 040: 03e
SWCP 15.16 - Bridge and culvert installation (disposition of surplus material).	Minimize sedimentation and turbidity resulting from excavation for in-channel structures.	HIGH. IFPA Rule 040: 03b, d, e
SWCP 15.17 - Regulation of borrow pits, gravel sources, and quarries.	Minimize sediment production from borrow pits, gravel sources, and quarries, and limit channel disturbances in those gravel sources suitable for development in floodplains.	HIGH. IFPA Rule 040: 03g
SWCP 15.21 - Maintenance of roads.	Conduct regular preventive maintenance operations to avoid deterioration of the road surface and minimize disturbance to water quality and fish habitat.	MODERATE. IFPA Rules 040: 04a, b.
SWCP 15.23 - Traffic control during wet periods.	Reduce the potential for road surface disturbance during wet weather and reduce sedimentation probability.	MODERATE. IFPA Rule 040: 03.i
SWCP 15.24 - Snow removal controls.	Minimize impacts of snowmelt on road surfaces and embankments and reduce the probability of sediment production resulting from snow removal operations.	MODERATE. IFPA Rule 040: 05a, b
SWCP 15.27 - Trail maintenance and rehabilitation.	Minimize soil erosion and water quality problems resulting from trail erosion.	HIGH. No related rules

Division of Environmental Quality (DEQ)

Idaho Department of Health and Welfare DEQ is responsible for the overall coordination and implementation of the state's nonpoint source programs. Implementation of the Nonpoint Source Management Program is accomplished through interagency coordination with local, state, and federal natural resource agencies. The nonpoint source programs are implemented with assistance from public advisory committees, which provide continuous feedback on the direction and acceptability of the nonpoint source control strategy.

The nonpoint source control strategy is based on the feedback loop concept. BMPs are the backbone of this control program. A process for site-specific application of BMPs is developed under each nonpoint source program, and monitoring is used to evaluate the effectiveness of the BMPs. Changes to BMPs are recommended when they do not support the beneficial uses; monitoring continues to ensure that the revised practices are adequate (The 1992 Idaho Water Quality Status Report, Idaho Department of Health and Welfare, DEQ, December 1992). The nonpoint source program places emphasis on the following actions:

- Building on the strength of existing nonpoint programs, such as agriculture and forestry;
- Focusing evaluation and monitoring techniques on beneficial use assessments and BMP effectiveness;
- Creating public awareness and support through information, education, and citizen participation;
- Institutionalizing the feedback loop components in state and federal agency programs using the Clean Water Act requirements; and
- Integrating the nonpoint source control program with implementation of the Antidegradation Policy.

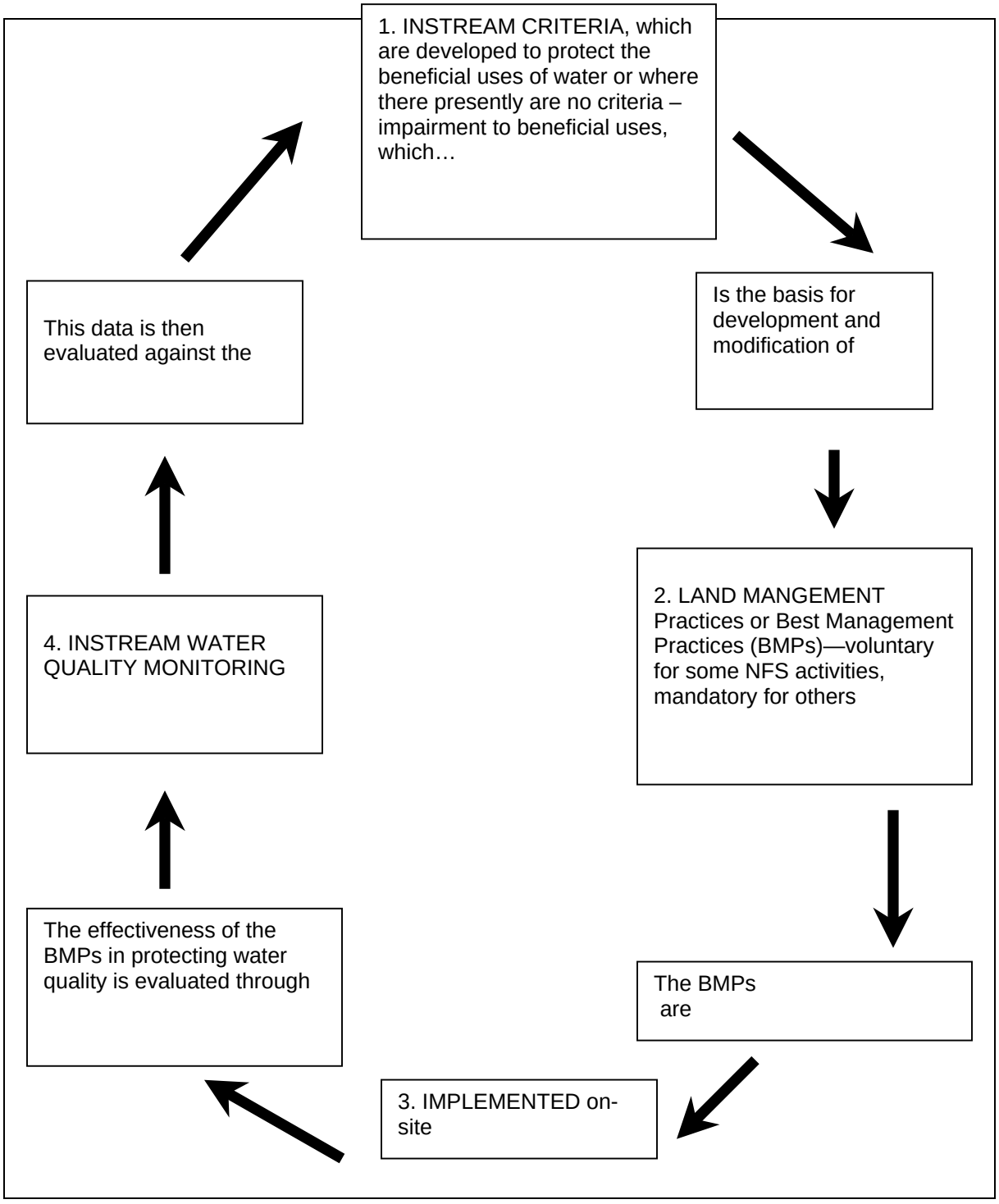

Figure 4.—Feedback loop for BMPs associated with the Travel Plan.

J. FEDERAL ACTION: GRAZING ALLOTMENTS

PURPOSE AND NEED: The purpose of this activity is to continue permitted livestock grazing on National Forest System lands until December 31, 2017.

LOCATION**:** This action is dispersed throughout all analysis areas in the MSSW Section 7 watershed (except Warren).

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001
- NMFS: August 9, 2001

DESCRIPTION: The action consists of permitting grazing by authorized permittees in several allotments in the MSSW Section 7 watershed. All of these permits have received previous concurrence (Nelson and Burns 2001). The Annual Operating Instructions (AOIs – see specific CD citations below) describe season of use, permitted numbers and head months, and trailing patterns. The allotments are grazed in accordance with LRMP. Specific descriptions are provided below.

The Payette National Forest (PNF) annually monitors the effects of grazing, by both sheep and cattle, on allotments within anadromous watersheds. Fisheries and range personnel annually monitor water temperature, streambank disturbance, streambed substrate, and riparian/upland utilization. Another study, green line ecological status and stability rating, is performed every 3 to 5 years and is used to determine long-term condition of the riparian area. Annual monitoring reports from both of these efforts are submitted to the Level 1 Team. Water temperature and streambed substrate monitoring takes into account all of the activities of the watershed upstream of the monitoring site, whether it is grazing, timber harvest, recreation, mining or other management-related disturbance. The resulting data reflect the cumulative effects due to management and natural causes. In contrast, streambank disturbance, upland/riparian utilization and green line monitoring are intended to monitor the direct effects of livestock and wildlife grazing. Monitoring occurs each grazing season by PNF range and fisheries personnel. Monitoring standards, timing of monitoring, modification recommendations, data, and trends are provided in annual range monitoring reports (Nelson 2006, Zurstadt and Bonaminio 2005, Zurstadt 2004, 2003). A summary of monitoring data is provided in Section V.A.5. (*Direct and Indirect Effects of Grazing*).

Chinook salmon were first listed under the ESA in 1992 and initial consultations determined that grazing management in watersheds tributary to the Salmon River was “Likely to Adversely Affect” (LAA) the species and issued a Biological Opinion (BO) (NMFS 1993). Subsequently, modifications have been made to the Forest’s grazing management in watersheds supporting Chinook salmon and this monitoring program was instituted. Based on these efforts, NMFS has concurred with “May Affect Not Likely To Adversely Affect” (NLAA) determinations for grazing activities on the PNF in watersheds containing threatened Snake River spring/summer and endangered fall Chinook salmon and Snake River steelhead (O. mykiss), which were listed under ESA in 1997. These concurrence letters (NMFS 2001a,b) were based on the requirement that we continue the monitoring, which is designed to evaluate the effects of the imposed mitigations mentioned above, and revision of the PNF LRMP reaffirmed this requirement in standard TEST02 (USFS 2003,pg. III-11). Although listing of Chinook salmon was the initial trigger for this program, consultations on Columbia River bull trout (Salvelinus confluentus) with the USFWS in these watersheds have also resulted in concurrence with NLAA determinations pending, in part, continued monitoring (USFWS 2001a,b).

The range monitoring program, including fisheries data collection, began in 1993. The Forest’s fisheries biologists and range conservationists determined site locations that potentially best reflected areas influenced by livestock. Additionally, sites were added in 1996 as part of monitoring requirements outlined in updated biological assessments. All sites have had grazing in the past or are currently grazed and grazing could occur in the future at any of the sites; thus, continued monitoring of these sites is assured.

Soulen Sheep Allotments (Hershey–Lava, Josephine, and Little French Creek)

Soulen Allotments MYOP: (CD1: \Support Documents\AOIs\Soulen MYOP_95-00.pdf), Soulen Allotments AOI:(CD1: \Support Documents\AOIs\Soulen-AOP_99.pdf), Little French Creek MYOI: (CD1: \Support Documents\AOIs\Little French MYOI.pdf))

This action involves grazing up to 10,000 sheep on 11 allotments permitted to the Soulen Livestock Company and used in concert from 10 July through 15 October; this BA considers only three of these allotments that are wholly or partly located in the Main Salmon SW Section 7 watershed. The allotments are managed in conjunction with one another and sheep are moved among them as described in the Annual Operating Provisions. The Little French Creek Allotment was rested from livestock use from 1989 through 1999, due to past excessive livestock use. The intent of the closure was to allow the area to revegetate naturally and for streambanks to stabilize. Beginning in 2000, this allotment has been used for up to two weeks between July 10 and September 15, with mitigations in place to ensure continued habitat improvement.

The Federal action includes continued, limited use of the Little French Creek allotment by a band of sheep currently permitted to Soulen. Annual use is authorized with Annual Operating Instructions. Above the point where Trail 348 crosses Little French Creek, use is limited to the east half of the Little French Creek Allotment upslope from the stream. Below the Trail 348 crossing, use is limited to the west half of the Little French Creek Allotment, upslope from the stream. Watering would be done from side tributaries, not Little French Creek (Pete Grinde, Range Specialist, New Meadows RD, personal communication). This use would adhere to guidelines previously established for other allotments. Sheep would be moved through from one of the neighboring allotments permitted to Soulen Livestock Company according to the existing rotation schedule. Use will be limited to two weeks between mid-July and mid-September.

The Hershey-Lava allotment is located within tributaries of western Elkhorn, and eastern Partridge drainages. Elkhorn Creek supports listed Chinook salmon in lower reaches off-Forest, and Partridge Creek supports bull trout only in upper reaches; no other listed species are potentially affected by this allotment. The Josephine allotment is located in upper southeast tributaries to upper French Creek, which do not support listed species or cutthroat trout. The Little French allotment is located within upper Little French Creek, which does not support listed species or cutthroat trout.

Carlson S&G Allotments (Shorts Bar, French Creek, Bear Pete, and Marshall Mountain)

- CD1: \Support Documents\AOIs\Carlson MYOP 98-02.pdf)

This action involves grazing approximately 2500 ewes with lambs on all allotments permitted to the Carlson Livestock Company from 7 July through 7 October; two of these (Bear Pete, Marshall Mountain) also have portions in the South Fork Salmon River Section 7 watershed. The northeast portion of the Marshall Mountain allotment drains into the Main Salmon River, and the rest of the allotment drains into the Secesh drainage. The west half of the Bear Pete allotment drains into the Main Salmon River and the east half drains into the South Fork of the Salmon River. The allotments are managed in conjunction with one another and sheep are rotated among them as described in the AOP; in addition, sheep are trailed through PNF lands that are not included in any allotment.

The Shorts Bar allotment is located within tributaries of western Partridge Creek, and Lake Creek. Bull trout are present in upper Partridge Creek, and Chinook salmon, steelhead, and cutthroat trout have been documented in lower Partridge Creek at the confluence with the main Salmon River. Bull trout and steelhead have been documented in Lake Creek.

The French Creek allotment is located within lower Little French, south and middle-western tributaries to French Creek, and upper Elkhorn Creek. Bull trout, Chinook salmon, and steelhead have been documented in lower reaches (non-FS) of French Creek. Chinook salmon have been documented in

lower Elkhorn Creek. The Little French allotment is located within upper Little French Creek, which does not support any listed fish species or cutthroat trout.

The Bear Pete allotment is located within eastern – middle French Creek and tributaries, and upper Fall Creek. Bull trout, Chinook salmon, and steelhead have been documented in lower reaches (non-FS) of French Creek. Fall Creek supports bull trout, and Chinook salmon and steelhead at the mouth.

The Marshall Mountain allotment is located in upper California Creek, which supports bull trout in upper reaches, and steelhead at the mouth.

REQUIRED MITIGATION:

General Measures

Several mitigation measures are specified as LRMP Standards in all allotments to protect aquatic resources. These include:

- TEST25 - Mitigate, through avoidance, the adverse effects of livestock access or activities that may result in trampling of redds or disturbance of spawning or reproductive staging of ESA listed fish species
- RAST02 -Limit livestock trailing, bedding, watering, and other handling to those areas and times that maintain or allow for restoration of beneficial uses and native and desired non-native fish habitat.
- RAST03 - New water developments, corrals, and other handling or loading facilities shall not be located within RCAs, unless it can be demonstrated that these facilities maintain or allow for restoration of beneficial uses and native and desired non-native fish habitat.
- RAST04 - Livestock salting will be prohibited in RCAs
- RAST07 - Only annual once-over sheep grazing will be allowed, with the exception of designated sheep driveways, travel routes, or where specifically authorized.

These measures are specified for all sheep grazing allotments to maintain or improve aquatic resources:

- Adjust grazing practices to maintain or improve inland and anadromous fish resources and fish habitat.
- Salt is not to be placed in meadows or bottoms, where livestock congregate and should be placed no less than 0.25 miles from water.
- Once over grazing equivalent to 30% allowable use in riparian and upland areas.
- One time watering per location.
- One time bedding per location.
- Permitted grazing can be modified based on range utilization and monitoring studies.
- Grazing around all high mountain lakes is prohibited.
- Newly-identified bull trout spawning areas will be compared to known sheep stream crossing areas and conflicts identified and resolved (this has been completed for known bull trout spawning areas. See annual range monitoring reports Nelson (2006), Zurstadt and Bonaminio (2005), Zurstadt (2004, 2003).

During bull trout surveys conducted since 2000, spawning was not occurring at the time and in the areas where sheep were crossing streams. Spawning occurs after the sheep have moved through the stream crossing areas (Nelson 2006, Zurstadt and Bonaminio 2005, Zurstadt 2004, 2003). Sheep crossing sites are described in annual range monitoring reports (Nelson 2006, Zurstadt and Bonaminio 2005, Zurstadt 2004, 2003). Sheep crossing sites are located in streams that are smaller and higher-gradient than those where Chinook salmon spawning typically occurs; no known sheep crossing sites are located in known Chinook salmon spawning areas (Nelson 2006] Zurstadt and Bonaminio 2005, Zurstadt 2004, 2003).

Additional Mitigation for the Bear Pete Allotment

- Grazing will not occur within the RCA of East Fork Fall Creek and sheep will only cross the East Fork of Fall Creek on the Studebaker Saddle Road crossing.

Additional Mitigation for the Little French Creek Allotment

- PNF personnel will monitor sheep use in Little French Creek and document results of monitoring.
- Monitor sideslopes to determine if accelerated erosion is occurring due to sheep grazing.

K. FEDERAL ACTION: OUTFITTER AND GUIDES.

PURPOSE AND NEED: The permitting of commercial outfitter/guides to operate on National Forest System Land.

This consultation covers the permits through December 31, 2017, even though the life of the permit may extend beyond that. If a permit has expired or if permits expire before December 31, 2017, this consultation covers reissuance of the permits until December 31, 2017, as long as the effects are within the scope of this BA.

LOCATION: Warren Outfitters operates primarily in the Warren Creek analysis area, with one reserve camp and three spur camps. Ace Outfitter has a reserve camp in the Partridge Creek drainage, and it does not have a previous concurrence record (CD2: \Support Documents\SUPs\ace_outfitter.pdf [in SUPs.zip]). Maps of assigned camps are at CD2: \Support Documents\SUPs\outfitter_permit_boundaries2006.pdf (in file SUPs.zip).

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001.
- NMFS: August 9, 2001.

DESCRIPTION: Pony Creek Outfitters (previously known as Warren Creek Outfitters) was previously described in Nelson and Burns (2001) (CD2: \Support Documents\SUPs\warren outfitters.pdf [in SUPs.zip]). This operator conducts an outfitting and guiding operation for hunting, fishing, camping, backpacking, and trail rides. The operator is permitted to conduct these activities from 1 June to 1 October each year. Camps are located in Warren Creek (not in RCA of any stream), Republican Flat (dry camp), and Jordan Creek (upper headwaters of Jordan Creek, tributary to Richardson Creek).

The permit for Ace Outfitters is administered by the Slate Creek District of the Nez Perce National Forest. The outfitter provides fall big game hunting along the Lake Creek trail system and also hunts in the Marshall Mountain area (CD2: \Support Documents\SUPs\ace outfitter.pdf [in SUPs.zip]). The assigned camp is in the headwaters of a tributary of upper Partridge Creek.

Annual inspections have shown no noncompliance problems with permits (Colter Pence, Former Recreation Manager, McCall Ranger District, PNF, personal communication). A recent inspection report for Pony Creek Outfitters Warren base camp is on file at the PNF SO.

REQUIRED MITIGATION: Required mitigation from Wagoner and Burns (2001) included adopting LRMP standards for Riparian Conservation Areas (RCAs) in the SFSR Section 7 Watershed. The default RCAs are minimum no-activity riparian buffers of 300 feet on both sides of all fish bearing streams and lakes, 150 feet on permanently flowing non-fish bearing streams and lakes and most wetland, and 100 feet buffer zones along intermittent streams. Recent inspections have found minor problems (see above).

Additional Mitigation

- annually inspect permitted campsite(s).
- check camps to see that

    - □ they are meeting LRMP standards
    - □ if they are causing detrimental sediment delivery, or adversely impacting riparian vegetation
    - □ if there are potential adverse effects to fish or fish habitat at the site(s).

- camps may be in RCAs; but should monitoring find a camp may negatively affect fish or fish habitat, changes will be made in coordination with a fisheries biologist to eliminate the problem or reduce effects to a negligible level.
- determine whether permit conditions are being met.
- if there are potential adverse effects, consultation will be reinitiated.
- if Guides or Outfitters fail to follow the mitigations, the Level 1 team will be notified.
- the Forest will annually educate outfitters and guides about ways to avoid adverse effects to listed fishes.

L. FEDERAL ACTION: WATER DIVERSION SPECIAL USE PERMIT

PURPOSE AND NEED: Ongoing administration of an existing permit to Warren Heights allowing permittee to operate, maintain, and repair existing water diversions for domestic and irrigation purposes.

This consultation covers the Warren Heights spring water diversion until LRMP revision. If the permit has expired or if the permits expire before LRMP revision, this consultation covers reissuance of the permits until LRMP revision.

LOCATIONS: The development is in the Warren townsite area.

DATES OF PREVIOUS CONCURRENCE:

- USFWS: none
- NMFS: none

DESCRIPTION:

Warren Heights has a permit to divert domestic use water (less than 0.1 cfs) from a spring, the permit covers 0.08 acres. The spring diversion is located within the Warren townsite and is on the opposite side of the airstrip from Warren Creek (CD2: \Support Documents\SUPs\warren_heights.pdf [in SUPs.zip]). The diversion consists of a 1,000 gallon buried wooden collection box at the water source, approximately 700 feet of buried 2" plastic pipe connected to an above-ground concrete block control-valve concrete box. An inspection in 2001 reports a screened intake with no erosion. The nearest fish-bearing water is mainstem Warren Creek.

V. Analysis of Potential Effects

A. General Effects of Management Disturbances

1. Direct and Indirect Effects of Logging from Small Sales, Green and Salvage

Potential effects to fish and their habitats are principally related to increased sedimentation from land disturbance and alteration of riparian communities. When sediment production exceeds a stream's ability to transport it, the amount of fine sediments increase on and within stream substrates. Salmonid populations are typically negatively correlated with the amount of fine sediment in stream substrate (Chapman and McLeod, 1987). Spawning area quality is affected because egg deposition and survival are reduced when sediment fills the interstitial spaces between gravels, preventing the flow of oxygen and the flushing of metabolic wastes. Emerging fry and aquatic insects can also be trapped and smothered by sediment deposition in the gravels. Rearing areas are diminished as sediment fills pools and other areas. Sedimentation of deep pools and coarse substrate used for rearing and over wintering limits the space available for fish. Bell (1986) cited a study in which salmonids did not move in streams where the suspended sediment concentration exceeded 4,000 mg/L because of a landslide. Newly emerged fry appear to be more susceptible to even moderate turbidity than older fish. Turbidity in the 25-50 NTU range (equivalent to 125-275 mg/L of bentonite clay) reduced growth and caused more young salmon and steelhead to emigrate from laboratory streams than did clear water (Sigler, et al. 1984).

Stream channel habitat components are highly dependent upon the configuration of the bed and banks of the stream channel. Perpetuating the physical, vegetative, and biological processes that maintain stream channel configuration is a necessity. Human-induced disturbance and geoclimatic factors often produce different stream/riparian characteristics than would geoclimatic factors alone. The result can be a stream that no longer performs its physical functions of floodplain access, water table maintenance, and sediment transport. The aquatic habitat variables associated with the physical functioning of a stream (pool/riffle ratio, pool size, undercut, woody debris) may not be adequate to support viable fish populations (Bull 1979; Heede 1980).

Use of roads is an integral part of all logging operations. Roads can affect streams directly by accelerating erosion and sediment loading, altering channel morphology, and by changing the runoff characteristics of watersheds. These processes interact to cause secondary changes in channel morphology (Furniss et al. 1991). All of these changes can affect fish habitat. The bare, compacted soils on roads exposed to rainfall and runoff are a potential source of surface erosion. Roads and ditches form pathways for sediment transport to stream channels (Chamberlin et al. 1991). Roads are constructed, reconstructed, and maintained in the watershed for general traffic use and in conjunction with timber harvest and other activities.

Riparian areas are a component of functioning aquatic ecosystems. Protection of these areas is often accomplished by delineating riparian areas and restricting or prohibiting management activities within these zones (Forest Ecosystem Management Assessment Team, 1993). This approach allows for the maintenance of current and future sources of large, woody material, intact riparian vegetation communities, and functional ecological processes of temperature (water, air, and soil) regulation and buffer strip functioning.

Logging and salvage within buffer strips reduce their ability to contribute large wood to streams (Bryant 1980; Bisson et al. 1987) and can have other effects. Logging might occur due to noncompliance as described for the environmental baseline, or under special provisions for miscellaneous products. Increased water temperature can often be traced to removal of shade-producing vegetation along streams and smaller tributaries that supply cold water to fish-bearing streams (Beschta et al. 1987). A distinct microclimate is maintained along stream channels, created by cold air drainage and the presence of turbulent surface waters (Chen 1991). In the Oregon Coast Range and western Cascade Mountains, riparian buffers of 100 feet or more have been reported to provide as much shade as undisturbed late succession/old growth forests (Steinblums 1977). Many effects of riparian vegetation on streams decrease with increasing distance from the stream bank (McDade et al. 1990) and are influenced by the

degree of channel constraint and floodplain development (Sedell et al. 1987). The effectiveness of buffer strips along constrained channels to deliver large wood is low at distances greater than approximately one tree height away from the channel. Wind throw, an important contributor of large woody material to streams, is driven by riparian topography. Streams with steep V-shaped topography have the ability to deliver leaf and other particulate organic matter to streams, the amount of which declines at distances greater than approximately one-half tree height away from the channel (Forest Ecosystem Assessment Team, 1993).

Within riparian and/or landslide prone areas, buffers, called RCAs, are identified to protect streams from non-channelized sediment inputs, act as source of wood, and provide other necessary ecosystem functions (USFS 2003). These RCAs have been shown to be wide enough to prevent non-channelized sediment from reaching fish-bearing streams. These RCAs minimize the likelihood of non-channelized flow reaching any stream and becoming channelized flow. Broderson (1973), Belt et al. (1992), Ketcheson and Megahan (1990), Burroughs and King (1989), and Swift (1986) generally concluded that 200-300 foot riparian filter strips are effective at protecting streams from sediment from non-channelized flow. All RCAs are required to be mapped on the ground and specific standards and guidelines applied.

Standard RCA widths are:

- ***Perennial streams.—***300-foot slope distance from ordinary high water mark, or flood-prone width, or two site-potential tree heights, whichever is greatest.
- ***Intermittent streams.—***150-foot slope distance from the ordinary high water mark, or flood-prone width or one site-potential tree height, whichever is greatest.
- ***Ponds, lakes, reservoir, and wetlands.—***150-foot slope distance from the ordinary high water mark, or outer edge of seasonally saturated soils, outer edge of riparian vegetation, or one site-potential tree height, whichever is greatest.

Landslide prone areas are excluded from harvest during the final unit layout.

2. Direct and Indirect Effects of Fire Management

There are three major components of the federal action that may have very different effects; those are:

1. Fire suppression, where the effects of the wildfire itself are not effects of the federal action.
2. Wildland fire use fires, where the decision is to take no federal action and the effects of the fire are a natural event.
3. Prescribed fire, where the effects of the fire are effects of the decision to burn under prescribed conditions.

Fire suppression effects are quite different from wildfire and prescribed burning because we consider only the management effects of suppression and not the fire itself. Effects of fire suppression and prescribed fire would be similar to observed effects of other prescribed burns and effects from wildfires that have been observed and studied. Those studies are described in the following section. These effects have been essentially natural, with no persistent adverse changes to fish habitat. Most observed prescribed burns have been spring burns, done during cool, moist conditions. Wildfires generally occur under warmer, drier conditions and burn with greater intensity than prescribed fires. The influence of fire on hydrology and water quality can be viewed as a continuum, with effects of prescribed burning at one extreme and wildfire at the other (Baker 1989). Even the effects of wildfire on fish habitat have been found to be essentially natural with no persistent effects. Intense wildfires, like those occurring after years of suppression, can alter fish habitat and the ecology of streams (Rieman et al. 1995; Minshall et al. 1989).

Fire Suppression

Studies of the effects to fish habitat from wildfire suppression show that they are not necessarily adverse when Payette National Forest fire suppression guidelines are applied. These studies confound the effects of the fire with the effects of the suppression action, so the effects of the suppression itself are expected to be far less than the total effects documented. The following discussion of monitoring results is for the confounded studies, after which we will describe other effects of fire suppression.

Monitoring by Idaho State University in the Rapid River and Big Creek watersheds on the Payette National Forest has shown that wildfires have essentially natural effects (Minshall et al. 1994). Overall, the physical and chemical habitat of study streams in the Big Creek and South Fork Salmon River watersheds has not been altered by either the Golden Fire of 1988 or the Chicken Fire of 1994 (Bowman and Minshall 1999).

Distinct changes in the benthic habitat characteristics did not occur in Big Creek tributaries influenced by wildfires that occurred in 1988 or 1991 (Royer et al. 1995). Major changes were not observed in the channel or substrate characteristics in Big Creek tributaries burned by the 1988 Golden Fire. Only minor year-to-year variation was observed in physical and chemical parameters. (Royer and Minshall 1996).

The heavy spring runoff in 1996 did not appear to scour burned streams in Big Creek to any great extent compared to control streams. (Royer et al. 1997). No substantial changes in water chemistry or measurements of physical habitat characteristics have been observed over nine years of study on Big Creek tributaries influenced by wildfire (Bowman et al. 1998, Bowman and Minshall 1999). The streams continue to show no discernable change related to burning by wildfire, and the studies support the hypothesis that fire would have no measurable long-term effects.

Minimal influence from the 1994 Chicken Fire was observed in South Fork Salmon River tributaries (Royer and Minshall 1996). Monitoring in South Fork Salmon River tributaries after wildfires that occurred in 1994 indicated that there were no immediate effects on the catchments studied and only small areas of intense wildfire impact in the catchments. Riparian areas were relatively undamaged and stream channels appeared stable (Royer and Minshall 1996). The Chicken Fire has not created unstable habitat conditions in Fritzer Creek. The physical and chemical habitat of streams studied in the South Fork Salmon River watershed has not been altered by the Chicken Fire (Bowman and Minshall 1999).

Sediment monitoring in the South Fork Salmon River and Chamberlain Creek showed that fine sediment in spawning areas did not show unnatural increases after the 1994 wildfires, or the floods that occurred in 1997 (data on file, Payette National Forest, Supervisor's Office, McCall, Idaho). The 1994 fires, coupled with other potentially destabilizing natural events including floods, hill slope failures, and extreme spring flows have not resulted in obvious deposition of fine sediments (Nelson et al. 1999).

The upper reaches of Chamberlain Creek were within the 1994 Chicken Fire Complex. Fine sediments were slightly elevated in 1996, but have generally declined since 1989. In the upper South Fork watershed, in spite of two large wildfires, high snow packs, and spring runoffs for three consecutive years, and widespread hill slope failures, streambed conditions have fluctuated but did not change significantly (Nelson et al. 1999). Similar results were found in the Secesh River watershed, where the entire Lake Creek area was within the Chicken Fire perimeter, but the trend in spawning conditions for anadromous fish appear to be improving, with decreasing amounts of fine sediment.

Post-fire BAER (Burned Area Emergency Rehabilitation) surveys conducted on the Payette National Forest after the 1994 wildfires found natural vegetation recovering by the following summer. Sprouting of vegetation was noted later in the fall of 1994, after the fire had passed through some areas. Burned trees, even in riparian areas are important sources of large woody debris. Large woody debris recruitment to streams was evident where moderate burn severities occurred after the 1994 wildfires (BAER reports, 1994).

It was estimated that only 5% of small streams within the Chicken Fire perimeter were affected by near total loss of riparian vegetation (Chicken BAER 1994). Burn intensities in riparian zones of the Chicken Fire varied from low to moderate-hot. Vegetation in these areas was already beginning to resprout by September 1994, and was expected to fully recover within two years (BAER reports, 1994). By the following summer, there was an excellent natural vegetation recovery response (Dave Kennell, Forest Hydrologist, personal communication). Abundant forbs and shrubs were evident.

The BAER report for the Corral Fire concluded that there would be no persistent effects to anadromous fish. A lack of burning was observed in riparian areas. Natural recovery patterns are expected to be sufficient to preclude long-term degradation of fish resources. Riparian vegetation was generally not much affected or only dried by the fire.

Lightning caused fires that were allowed to burn in the Selway-Bitterroot Wilderness were observed from 1979 to 1987. Despite the steep topography, very little soil movement was observed (Saveland and Bunting, no date).

Observations by fishery biologists and monitoring by Idaho State University and the Payette National Forest indicate that fish habitat is generally not adversely affected by wildfire, and any habitat changes are short-term. Even in other areas, the consequences of large fires are not as catastrophic as often anticipated (Rieman et al. 1995). The magnitude of effect varies widely because, on average, there are about 150 incidents/year on the Forest (most of which are initial attack) compared to a larger acreage burned on a more sporadic basis. Again, it is pointed out that monitoring of fire effects confound the effects of suppression and the effects of fire, such that the independent effects of the suppression action are expected to be far less than the documented combined effects.

Use of tractors, heavy equipment, and chainsaws can alter fish habitat to an extent similar to logging or other similar land disturbing activities. Chamberlain et al. (1991) summarized these types of effects to include changes in sedimentation and stream channel morphology. Potential effects from these sources should be reduced by adoption of guidelines requiring the use of minimum impact fire suppression techniques. The risk and reduction cannot be quantified. Although research in Yellowstone National Park (Schullery and Varley 1994; Gresswell 1993; Mahoney et al. 1993; Young and Bozek 1996) and central Idaho wilderness do not discriminate among sources of change to fish and habitat from fire versus suppression, the combined effects were well within the range of natural variation. Minimum impact suppression techniques were applied to many of the fires studied. This research shows that fish habitat and populations remain unchanged or only changed marginally under such circumstances and effects are negligible.

Norris et al. (1991) summarized the toxicity of various fire retardants. These chemicals are toxic to salmonids in some concentrations. A detailed description of the potential effects of retardants can be found in previous emergency consultation for the South Fork Salmon River (Faurot and Burns 2005a). Adoption of the guidelines will decrease the risk of effects from fire retardant. The risk and reduction cannot be quantified for various reasons documented in detail by Faurot and Burns (2005a), including such factors as the magnitude of material reaching fish, ameliorating water chemistry and quantity, and avoidance by fish. So long as the guideline to avoid applying retardant to streams is implemented effects are anticipated to be negligible.

Fuel can be toxic to salmonids (McKee and Wolf 1963), with the hydraulic fate of the fuel playing a large role in the resultant effects (Saha and Konar 1986). Risks associated with fuel are reduced by the guidelines requiring certain handling procedures. The risk and reduction cannot be quantified. In the past, there have been no instances where the guidelines resulted in observed effects to listed salmonids; therefore we conclude that the effects are negligible.

Location of fire camps and crews close to occupied fish habitat can directly affect salmon habitat or their behavior. David Burns (Forest Fish Biologist, personal communication) has observed that salmon move away from people. People can trample redds and fish mortality can result (Roberts and White 1992). Risk of these impacts is directly proportional to the number of people and their proximity to the salmon and habitat. The risk of these types of effects is reduced by the adoption of these guidelines. The risk and reduction cannot be quantified, but are expected to be negligible because of avoidance.

Prescribed Burns

Disturbance must be recognized as an integral component of any long-term freshwater habitat restoration strategy (Reeves et al. 1995). Historically, fires were a natural and an important part of the

disturbance regime for aquatic systems. Changes are often observed from wildfires after a large-scale hydrologic event (e.g., heavy rains and flooding), and are the result of the two natural events together. In the Oregon Coast Range, the frequency, size, and distribution of wildfires and landslides has been responsible for developing a range of channel conditions within and among watersheds (Reeves et al. 1995). Reeves et al. (1995) found that immediate impacts from intense wildfires followed by intense winter rainstorms include direct fish mortality, elimination of access to spawning and rearing sites, and temporary reduction or elimination of food sources. However, long term effects may be positive, related to landslides and debris flows that introduce large wood and sediment into channels and affect storage of these materials. The configurations of channel networks, the delivery, transport and storage of sediment and wood and the decomposition of woody debris interact to create, maintain, and distribute fish habitat. It is important to maintain and restore complex habitats across a network of streams and watersheds (Rieman and Clayton 1997).

Fish species present are not expected to be adversely affected by any disturbances to habitat resulting from the prescribed burning. Anadromous salmonid populations in the Pacific Northwest are well adapted to dynamic environments because of their high fecundity, mobility of juveniles, and straying adaptations (Reeves et al. 1995). Species such as bull trout and redband trout (steelhead) appear to be well adapted to pulsed disturbances such as those created by fire (Rieman and Clayton 1997). Rieman and Clayton (1997) recommend priority management activities that emphasize prescribed fire where depressed and small or isolated populations of sensitive species persist in landscapes at high risk of uncharacteristic wildfire. Successfully reestablishing more natural patterns and processes could lead to long-term restoration of more complex, productive aquatic habitats.

Prescribed fires are expected to have much lesser degree of effects than wildfires that burned in the Boise River basin in 1992 and 1994. Those fires were large, intense events that would probably have been rare historically (Rieman et al. 1995). Although these wildfires profoundly altered fish populations and habitat, the short-term recovery of bull trout and redband trout populations has been dramatic (Rieman et al. 1995). Broadly distributed habitats suitable for these fish during and after the fire provided for colonization. In an evolutionary sense, bull trout likely experienced disturbance patterns that included mixed or high intensity fires.

Outcome of future prescribed burning projects would be expected to be similar to that of past prescribed burns. Effects have been essentially natural, with no adverse changes to fish habitat. Most prescribed burns observed have been spring burns, done during cool, moist conditions. Observations of spring prescribed burning on the Payette National Forest has shown natural effects in riparian areas, or no observable evidence that fire had burned into riparian areas more than *de minimus* amounts (John Lund [retired], Mary Faurot and Dave Burns, Payette National Forest fisheries biologists, personal communications). Similar observations were made for spring prescribed burns on the Nez Perce National Forest (Gary Seloske, Nez Perce National Forest fishery biologist, personal communication).

Data were collected on pre- and post-burn under-story conifer mortality and fuel loading on two prescribed burns in the South Fork Salmon River watershed. On most study plots, the mortality of trees 7” dbh and smaller was 0-33%. Two plots (out of twelve) experienced 100% mortality of this under-story (the desired result). Five of the twelve plots did not burn at all, because, even though a prescribed fire “unit” is delineated, the fire does not burn every acre in the unit. Fuel loading (total downed woody fuel) was reduced by 12% and 15% on two plots, and was not reduced at all on a third plot (CD1: \Support Documents\Fire\Rx_Fire_Monitoring.pdf [in Fire.zip]).

Observations in the most concentrated area of tree mortality in the riparian corridor of the 1999 Rapid River fall prescribed burn revealed mortality in far less than 10% of mature riparian trees, with mortality as low as 1% for the entire riparian burn area. Observations of the 1999 under-burn in riparian areas dominated by grand fir in the Rapid River area documented mortality of mature trees as very low to low. Observations of riparian areas within the 1994 Rapid River burn show that the effects are invisible in the grand fir riparian areas. Observations of the 1990 burn show that effects of prescribed fire uphill of riparian areas are now invisible (this CD1: \Support

Documents\Fire\RapidRiverMay2004\RapidRiverMay2004 [in Fire.zip]). Study plots established in the late 1980s on the Camp Creek burn area to monitor post-fire soil movement found essentially no movement of soil (John Lund, Krassel District Fish Biologist [retired], personal communication).

Some effects of prescribed burning have also been described elsewhere. A fall prescribed fire, which covered 43% of a previously undisturbed ponderosa pine watershed in east-central Arizona, did not increase annual or seasonal stream flow significantly over a 6-year study period (Gottfried and DeBano 1989). Fire consumed little of the forest floor, although surface fuels were generally consumed. Baker (1989) found that prescribed burns in the Southwest usually have minimal hydrologic impact on watersheds because the surface vegetation, litter, and forest floor are only partially burned. If properly executed, prescribed burns will not significantly affect the integrated overland flow and stream flow regime of a watershed.

Impacts to riparian areas from prescribed burning are not expected to be so severe that stream temperatures would be affected. The majority of the acreage (about 80-90%) to be burned would be a low intensity under-burn. Over-story mortality of 2% and up to 15% is expected in burned areas. Observations of other prescribed burns indicate the percentages of over-story mortality would be even less in riparian areas. These low levels of canopy removal are not expected to cause increases in stream temperatures. Controlled burning that occurred in riparian areas would stimulate regeneration of some riparian species that may have become decadent due to fire exclusion, contributing to stream shading.

One intended effect of prescribed burning is to reduce the likelihood of large stand replacing wildfire. Previous prescribed burns reduced the amount and continuity of fuel available for large stand-replacing fires (Suzanne Acton, Former New Meadows District fuels specialist, personal communication, 2003). Large, stand-replacing fires might theoretically adversely affect the quality of habitat for the listed fish species, but this has not been shown by monitoring on the PNF (Minshall et al 1994; Bowman and Minshall 1999). Data collected on the PNF show no fine sediment deposition increase from either prescribed burns or wildfire (Nelson et al. 1999, 1996a, 1996b, 1997, 1998; Nelson and Burns 1999). Fish habitat is generally not adversely affected by wildfire, and changes to habitat that result from wildfire are considered natural. Field review of past Rapid River prescribed burns in 2000, 2001, and 2003 found that fire had burned in a mosaic pattern at varying intensities and severities in upland areas. Where burning had occurred in riparian areas it had also been in a mosaic pattern, had been of low intensity and severity as new under-story growth could be seen, had killed very few trees, and had virtually no impact on vegetation directly adjacent to streams (Dale Olson, PNF fisheries biologist, personal communication, 2003).

The National Marine Fisheries Service recognizes that the introduction of prescribed fire could have potential long-term benefits in restoring habitat functions in RHCAs (Biological Opinion for LRMPs, Chinook salmon, 1995). The Biological Opinion for LRMPs, steelhead (NMFS 1995b) added items under "Fire Management" to be implemented to reduce or avoid adverse effects to steelhead and listed salmon. These include maximizing the use of planned ignitions and natural prescribed fire to meet vegetation management objectives."

Effects of any holding action, action to reduce the spread, of prescribed fire are expected to be the same as described for fire suppression above. The same mitigation measures would apply for fire suppression, or holding actions on prescribed fire.

Effects of Mitigation Measures

Effects to stream temperature are mitigated in all actions to negligible levels where guidelines are followed. Stream temperature is largely controlled by shading. The density of the riparian canopy is a critical factor in determining heat input to a reach (Amaranthus et al. 1989). Stream temperatures increased by as much as 10 °C in headwater streams after high intensity wildfires in basins burned during the Silver Complex fire in southern Oregon (Amaranthus et al 1989). Stream shade went from 90% pre-fire to 30% post fire. Wildfire that burned moderately altered the thermal stability of South Fork

Salmon River streams compared to reference streams studied by Royer and Minshall (1997), but not to a degree that is likely to be ecologically significant. Return to pre-fire thermal regimes is expected as surrounding riparian vegetation recovers. Even in intensely burned areas, resprouting and increased canopy cover of riparian vegetation may occur over a few years following a fire (Rieman et al. 1995; BAER reports 1994). Severe wildfires that consume all the vegetation in small catchments are expected to have a greater impact on stream temperatures than those found in the study of South Fork streams (Royer and Minshall 1997); therefore, limitations on ignitions for back burns, burnouts, and planned ignitions should be effective mitigation.

Fish being sucked up into pumps or impinged on improperly screened pump foot-valves, retardant or fuel spills entering streams and causing fish mortality, LWD removed from streams during fireline construction, sedimentation from un-rehabilitated fireline, redd trampling during stream fording, and disturbance of spawning Chinook salmon or bull trout are examples of how this action can potentially affect fishes and/or habitat. The federal action discussion above, provides direction such as properly screening pumps, not dropping retardant in RCAs or streams, containing fuel, proper handling or use of chemicals, not removing RCA trees unless they present a hazard, rehabilitating disturbed areas (e.g., fireline, helispots, camps), to address potential effects.

Properly screening pumps (i.e, with 3/32" mesh screen) will prevent fish from being impinged or entrained. Not dropping retardant in streams, following direction for containment of fuels, and use of other chemicals (foams) will keep contaminants from entering streams and causing fish mortality. Not removing trees felled within RCAs will reduce soil disturbance and potential sediment moving to streams as well as provide stream cover and diversity, shade, sediment filtering, allochthonous material, and other benefits depending on where the trees lie. Rehabilitation of disturbed areas such as fireline, camps, staging areas, and helibases will serve to stabilize those areas and limit sediment entering streams. In addition, direction to see that fire personnel are briefed and familiar with fire management guidelines in this BA, and oversight and continued education/briefing of fire personnel on fires by resource advisors will be implemented. This action is expected to have negligible effects due to implementation of mitigation measures and guidelines, continued education of fire personnel, and use of resource advisors.

3. Direct and Indirect Effects of Noxious Weed Treatment

Chemical Control

As part of the aquatic analysis for herbicide application, a risk quotient was developed for each herbicide product that may be used to treat noxious weeds on the PNF (Tables 9, 11). The risk quotient was calculated from a no adverse effect level, or safety factor, divided by an "Expected Environmental Concentration" (EEC). The EEC, expressed in parts per million (ppm), was derived from a direct application of the active ingredient to an acre pond (one-foot deep) using the maximum rate specified on the label (Urban and Cook 1986). The EEC is an extreme level that is unlikely to occur during implementation and should be viewed as a worst-case situation. The risk quotient provides a reference from which a possible worst-case situation can be viewed. If the risk quotient is greater than 10, the level of concern is categorized as "Low". If the risk quotient is between one and 10, the level of concern is Moderate. If the risk quotient is less than one, the level of concern is High. Levels of Concern were used to develop mitigative prescriptions for stream buffers (see "Required Mitigation" in Federal Action). Spray card monitoring on the stream banks have shown that buffers have been effective in preventing sprayed herbicides from reaching streams (Pete Grinde, Payette NF Weed Coordinator, McCall, ID, personal communication).

Roadside spraying introduces the risk of contaminating ditches, which could in turn deliver herbicide into streams. The following mitigation measures should reduce, but probably will not eliminate, this risk:

- No spraying would occur when wind velocity exceeds 8 miles per hour; no spraying would occur if precipitation is occurring or is imminent (within 3 hours);

- Only very low risk, “aquatic-approved” chemicals (e.g. glyphosate-Rodeo®) could be used within 50 feet of open water, where hydrophilic or riparian plants are present, and/or where surface material is obvious recent deposition of sediment of any diameter(s).

Table 9.—Worksheet for assessing risk quotient values and levels of concern associated with herbicide applications for aquatic species. EPA risk definitions and safety factors are assumed to be current, and were used in the NOAA draft BO for the Effects of Treatment of Noxious Weeds under the Frank Church River of No Return Wilderness Management Plan (NMFS 2007 CD1: \Support Documents\BAs\LOCs\noaa_weeds_bo_07.pdf)

Methodology for Determining Level of Concern	Example using 2,4-D
Maximum application rate (known constant based on label rates)	3 lb ai/ac (pounds active ingredient per acre)
EEC - Estimated Environmental Concentration (from Urban and Cook table cited based on direct application to a pond 1 acre-foot in volume) measured in ppb (parts per billion), and converted to ppm (parts per million)	at 3 lb ai/ac, in 1 acre-foot water, the EEC = 1103 ppb or 1.103 ppm
Toxicity - the 96-hour LC_{50} (a standard test) for a specific aquatic species. The LC_{50} is the concentration of a toxicant that causes mortality in 50% of the test organisms under a specific set of conditions.	LC_{50} = 250 mg/L (milligrams per liter), or = 250 ppm (testing conducted with rainbow trout)
Safety Factor - A divisor applied to the toxicity value to establish a concentration below which risk is acceptable (as determined by EPA). For endangered aquatic species, EPA uses 1/20 of the LC_{50} value.	1/20 of the LC_{50} = 12.5 ppm (250 ppm x 1/20 = 12.5 ppm)
The EPA has determined that there is a presumption of unacceptable risk to endangered aquatic species if the EEC > 1/20 LC_{50}. Conversely, if the EEC < 1/20 LC_{50}, the application rate used to calculate the EEC should not result in an unacceptable risk to endangered aquatic species.	For the 2,4-D amine, where: EEC = 1.103 ppm at 3 lb ai/ac maximum application rate 1/20 the LC_{50} = 12.5 ppm EEC is < 1/20 of the LC_{50}
Because of some of the concerns associated with this level of concern (risk) analysis (see Table in the text) and because the EPA does not define a magnitude of risk of endangered species, especially when the EEC < 1/20 LC_{50}, a gradual “level of concern” scale was developed based on how close the EEC value is to the 1/20 LC_{50}. The 1/20 LC_{50} value is divided by the EEC value and the quotient represents the level of concern for a given herbicide. The level of concern scale is as follows: If the 1/20 LC_{50} ÷ EEC is a quotient of >10, the level of concern is low. If the 1/20 LC_{50} ÷ EEC is a quotient of >1 but <10, the level of concern is moderate. If the 1/20 LC_{50} ÷ EEC is a quotient of <1, the level of concern is high.	For 2,4-D amine: 1/20 the LC_{50} = 12.5 ppm EEC = 1.103 ppm 12.5 ppm ÷1.103 ppm = 11 Since the quotient is >10, the level of concern is low.

Table 10.—Risk quotient values and aquatic level of concern assessment for chemical products used by the PNF.

Active ingredient and soil half life (range) in days	Product name and EPA Registration Number	Typical Application Rate (lb/ai/acre[a])	Label-Maximum Application Rate (lb/ai/acre)	EEC (ppm)	Toxicity 96-hr. LC_{50} (mg/L)	Safety Factor 1/20 LC_{50} (ppm)	Species Tested	Highly Volatile[b]	Quotient Value (1/20 LC_{50}/EEC) and Level of Concern
Clopyralid	Transline® 62719-259	0.5	0.5	0.184	103	5.2	Rainbow trout	No	28 Low
Glyphosate 47 (21-60)	Rodeo® 524-323	1.0	3.75	1.379	>1000	50	Rainbow trout	No	36 Low
Metsulfuron methyl 120 (14-180)	Escort®	1.5 oz (0.094 lb/ac)	2.0 oz	0.046	>150	7.5	Rainbow trout	No	163 Low
Picloram 90 (20-277)	Tordon™ 22K 62719-6	0.5	1[c]	0.368	5.5-19.3	0.965	Rainbow trout	No	2 Moderate
2,4-D 10(2-16) amine	Weedar® 64 264-2AA	1.0	3	1.103	250	12.5	Rainbow trout	No	11 Low
Dicamba	Banvel®	0.25-4.0	4.0	1.47	>1000	50	Rainbow trout	No	34 Low
Imazapic	Plateau®	0.06-0.2	0.75	0.276	>100	5.0	Rainbow trout	No	18 Low

[a] The application rates are those commonly used on the PNF.
[b] Mostly inferred from NMFS (2007) which states that "[n]o highly volatile herbicides are approved for use within the FC-RONRW"; these herbicides were all approved.
[c] Maximum rate per acre of picloram is 1 lb; rates may be higher for smaller portions of the acre, but the total use on the acre cannot exceed 1 lb ai/ac/year.

The basic toxicology of the herbicides to be used is presented in Table 11. This information is summarized primarily from NMFS (2007, CD1: \Support Documents\BAs\LOCs\noaa_weeds_bo_07.pdf), except that the bioaccumulation information was summarized from the FC-RONRW noxious weed treatment final BA (USFS 2003, CD1: \Support Documents\BAs\Other\FCRONRW_Final_Weeds_BA.pdf).

Table 11.—Toxicology profile of commonly used herbicides on the PNF.

Toxicology	Transline™	Rodeo®	Escort®	Tordon™	Weedar®	Banvel®	Plateau®
	Clopyralid	Glyphosate	Metsulfuron–methyl	Picloram	2,4-D Amine 4	Dicamba	Imazapic
Rainbow Trout (LC_{50}, mg/L)	103	140	>150	19.3	250	28	>100[a]
Level of Concern for Aquatic Species	Low	Low	Low	Moderate	Low	Low	Low
Daphnia (LC_{50}, mg/L)	232 - 350	780 - 930	>12.5[b]	68.3	184[c]	<11	>100
Bioaccumulates[d]	No	No	No	No	No	No	No
Persistent in Soil[e]	Moderately	No	Moderately	Moderately	Moderately	No	Yes
Mobile in Soil[f]	Yes	No	No	Yes	Moderately	Yes	Yes

[a] Not reported for rainbow trout, but NMFS (2007) suggests this value may be appropriate for most fish species.
[b] Ahrens (1994, CD1: \Support Documents\Toxicity\escort.pdf).
[c] USFS (2006, CD1: \Support Documents\Toxicity\093006_24d.pdf)
[d] Taken verbatim from USFS (2003).
[e] Derived from "Soil Half Life" in Table 4 of NMFS (2007).
[f] Derived from "Pesticide Movement Rating" in Table 4 of NMFS (2007).

Effects of chemical control were evaluated using indicators from the effects matrices (Appendix 3) as follows:

Local population indicators.—Sub-lethal effects to listed fish and their food sources are probable, therefore adverse effects are expected from this action. Herbicide runoff, volatilization, and drift are the

primary mechanisms of off-target movement of chemicals. Off-target movement can result in unintended injury to nontarget species, and contamination of surface waters. Volatilization would be minimized with the use of nonvolatile herbicide formulations (2,4-D amines are much less volatile than 2,4-D esters for example) and avoiding application of herbicides during hot days. Herbicide drift would be minimized with the use of nozzles with large orifices that produce large spray droplets, using drift control agents, and spraying during calm conditions. Ground application minimizes drift because spray nozzles can be in close proximity to target species and to the ground. Restrictions on the use of non-persistent herbicides in close proximity to water, where riparian or hydrophilic plants are present, and where surface material is obvious recent deposition (Table 12, below), would reduce risks associated with herbicides moving into surface waters or leaching into ground water.

Table 12.—Buffers, maximum wind speed, application methods, and herbicide restriction associated with aquatic habitats, riparian areas, and wetland resources on the PNF.

Buffer	Maximum Wind Speed	Herbicide Application Method	Herbicides Authorized
>50 feet from open water	8 mph	All propsed methods (Ground spraying, hand spraying, wicking, wiping)	Picloram, Clopyralid, Metsulfuron methyl, 2,4,D amine, Dicamba, Imazapic, Glyphosate
<50 feet from open water, where riparian or hydrophilic plants are present, and/or where surface material is obvious recent deposition of sediment of any diameter(s)	8 mph	All proposed methods (Ground spraying, hand spraying, wicking, wiping)	Glyphosate (Rodeo®) ("aquatic approved" herbicides) only

Given the exposure, toxicity, and indirect effect information described following this section for proposed chemicals, sub-lethal effects to listed fish and their food sources are probable, therefore adverse effects are expected from this action. The risk of toxic effects from the proposed action depends primarily on the likelihood that herbicides enter water, the toxicity of the herbicide formulation, and the duration and concentration of herbicides once they reach the water. The risks vary considerably among treatment areas, ranging from virtually no risk in upland areas that lack stream channels and have well-developed soils, to low -moderate risks in areas adjacent to streams, on alluvial deposits composed largely of gravels and sand, and where large amounts of herbicides are applied.

Some potential risks of the action are unknown where information concerning sublethal effects and effects of inert ingredients in the herbicide formulations is lacking or incomplete. Sublethal effects associated with the herbicides used in the proposed action include reductions in reproductive success, weight loss, physiological effects (endocrine system, blood chemistry, liver function, etc.), and reductions in growth, prey capture ability, and swimming ability, all of which are associated with reduced survival. Information available on sublethal effects of all herbicides proposed for use is incomplete for some chemicals and completely lacking for others. Few herbicide formulations have been thoroughly tested for sublethal effects on salmon or steelhead. There are no field studies available that evaluated potential effects of the herbicides used in the proposed action on aquatic productivity or invertebrate prey species found in Idaho streams. Consequently, the extent and likelihood of harmful sublethal effects from the proposed action from sublethal exposures and changes to the invertebrate prey base are unknown, but cannot be discounted.

If herbicides enter water in an appreciable amount, they could adversely affect listed salmon and steelhead through lethal or sublethal effects of exposure to the herbicide or other additives in the product formulation, alteration of the food web, or loss of riparian vegetation from contact with herbicides. The action includes numerous features and safeguards that minimize the likelihood of appreciable water contamination, such as relatively small and scattered treatment areas, ground-based application, low amounts of chemical application, and application methods that reduce the likelihood of water contamination through wind drift or runoff, and restriction of herbicides used near water to those that

have relatively low toxicity to aquatic organisms. Available water quality monitoring by the USFS for past weed treatments are limited, but suggest that safeguards similar to those in the proposed action are likely limiting the occurrence of water contamination and the concentrations of chemicals when water contamination occurs (NMFS 2007). Buffers are a key safeguard and are evaluated for each herbicide as follows:

- **Tordon™ (picloram):** all proposed application methods may be used; but only more than 50 feet from open water, where hydrophilic or riparian plants are not present, and where no surface material is obvious recent deposition of sediment of any diameter(s)
- **Transline™ (clopyralid):** all proposed application methods may be used; but only more than 50 feet from open water, where hydrophilic or riparian plants are not present, and where no surface material is obvious recent deposition of sediment of any diameter(s)
- **Escort® (metsulfuron–methyl:** all proposed application methods may be used; but only more than 50 feet from open water, where hydrophilic or riparian plants are not present, and where no surface material is obvious recent deposition of sediment of any diameter, where hydrophilic or riparian plants are not present, and where no surface material is obvious recent deposition of sediment of any diameter(s)
- Weedar® **(2,4-D amine):** all proposed application methods may be used; but only more than 50 feet from open water, where hydrophilic or riparian plants are not present, and where no surface material is obvious recent deposition of sediment of any diameter(s)
- **Banvel® (dicamba):** all proposed application methods may be used; but only more than 50 feet from open water, where hydrophilic or riparian plants are not present, and where no surface material is obvious recent deposition of sediment of any diameter(s)
- **Plateau® (imazapic):** all proposed application methods may be used; but only more than 50 feet from open water, where hydrophilic or riparian plants are not present, and where no surface material is obvious recent deposition of sediment of any diameter(s)
- **Rodeo® (glyphosate):** all proposed application methods may be used; this chemical is approved by the EPA for aquatic use and may be used up to the waters edge, where hydrophilic or riparian plants are present, and where surface material is obvious recent deposition of sediment of any diameter(s)

Buffers should reduce the risk of adverse effects to listed aquatic species, their prey, and non-target riparian vegetation from spray drift or herbicide runoff. Buffer zones have been used previously to minimize (not eliminate) potential effects of herbicides to aquatic resources. In the North Fork Payette River watershed, buffer zones of 50 to 100 feet were used to protect from spraying designed to control weeds and undesirable conifers (Bull Trout CD1: \Support Documents\NEPA\BEs\North Fork Payette River\NFPR be1.pdf). Spray card monitoring on the stream banks has shown that buffers have been effective in preventing sprayed herbicides from reaching streams (Pete Grinde, Payette NF Weed Coordinator, McCall, ID, personal communication).

Risks were evaluated for an accidental direct spraying of a pond (Tables above). Streams are the most likely habitat types to be treated under the proposed action and due to the moving water and resultant dispersal of any contaminate combined with project design criteria that minimize potential exposure, the pond evaluation is considered an overestimate of any likely conditions on the ground. According to risk calculations for realistic (typical) exposures, risks to aquatic species are low to moderate for all herbicides proposed for use (Tables above). Use of appropriate buffers along bodies of water and avoidance of spraying on windy days minimizes risk. Risks from accidental direct spraying of a water body of an herbicide mixture into a water body exist, but the probability of either event occurring is low.

Fuel and herbicide transportation, storage, and emergency spill plans would be developed and implemented to reduce the risk of an accidental spill which may occur from the use of large amounts of fuel and/or herbicides. A catastrophic spill of fuels or herbicides reaching waters with listed species would have potential for significant adverse effects; however, the probability for such an event to occur is negligible.

Characteristics of Proposed Herbicides.—This section, which discusses in detail the chemical, biological, and ecological properties of the herbicides to be used was taken directly from NMFS (2007, CD1: \Support Documents\BAs\LOCs\noaa_weeds_bo_07.pdf), though the format has been changed slightly. We have not provided, and likely not have, the individual citations in this section, except for the SERA risk assessment documents (produced by Syracuse Environmental Research Associates, Inc. for USFS) on CD1 in folder ..\Support Documents\Toxicity:

Picloram

Exposure.—Picloram is highly soluble in water, readily leaches through soil, and is resistant to biotic and abiotic degradation processes with a field half-life of 20 to 300 days. Ismail and Kalithasan (1997) found that picloram moves rapidly out of the top 2 inches of soil with a half-life of about 4 to 10 days. Somewhat longer half-lives of 13 to 23 days have been reported by Krzyszowska et al. (1994) who also noted that picloram is degraded more rapidly under anaerobic than aerobic conditions and also degrades more rapidly at lower application rates. Generalized estimates of peak levels of picloram in water ranged from 0.012 mg/L in sandy soil to 0.025 mg/L in clay soil, when applied at an application rate of 0.45 kg acid equivalents (a.e.) per acre, and modeled as transport directly into a pond (SERA 2003a). Water concentrations expected from the proposed action would likely be far less than the concentrations modeled in SERA (2003a).

SERA (2003a) identified a peak estimated rate of contamination of ambient water associated with the normal application of picloram at 0.05 (0.01 to 0.2) mg a.e./L at an application rate of 1 lb a.e./ac. Typical application rates for picloram in the proposed action range from 0.125-0.5 lb a.e./ac, with a maximum label rate of 1 lb a.e./ac. At the maximum application rate of 1 lb. a.e./L, the expected levels of picloram in ambient water, using the worst-case scenario in the BA and generalized modeling in SERA (2003a), picloram concentrations would likely be well below levels causing death in rainbow trout. Considering the fact that chemicals from the proposed action that reach a stream would be more dilute in running water in comparison to a pond, and that application of picloram would not occur within 50 feet of any stream, it is unlikely that picloram will reach water in an amount causing outright mortality in the majority of locations where the herbicide will be used. The most likely scenario where picloram will enter the stream is where weeds are treated on floodplains with a high water table and highly permeable soils.

Toxicity.—The proposed action includes the use of Tordon 22K, which contains picloram as the active ingredient, and also contains the inert ingredients potassium hydroxide, ethoxylated cetyl ether, alkyl phenol glycol ether, and emulsified silicone oil. Toxic assays of the product formulation are not available. Rainbow trout exposed to picloram in 96-hour exposures have an LC_{50} from about 0.8 mg/L to about 20 mg/L, while chronic studies using reproductive or developmental parameters for trout report no-effect levels of 0.55 mg/L and adverse effects levels of 0.88 mg/L (SERA 2003a). Presmolt stages of coho salmon exposed to sublethal concentrations of picloram in freshwater were found to have a 70% higher mortality rate in the smolt stage when the fish were later exposed to seawater (Lorz et al. 1979).

Most of the potential sublethal effects for picloram have not been investigated in regard to toxicological endpoints that are important to the overall health and fitness of salmonids (e.g., growth, life history, mortality, reproduction, adaptability to environment, migration, disease, predation, population viability). Sublethal effects concentrations reported in the literature vary. Woodward (1979) found that picloram concentrations greater than 0.61 mg/L decreased growth of cutthroat trout and a similar finding was reported by Mayes (1984). Maximum exposure concentrations not affecting survival and growth of cutthroat trout ranged from 290 to 48 µg/L in Woodward's (1979) study. Picloram concentrations modeled as the worst-case scenario in the BA would approach or exceed the thresholds identified by Woodward (1979) where salmonid growth and survival may be affected. Tests with the early life-stages of rainbow trout showed that picloram concentrations of 0.9 mg/L reduced the length and weight of rainbow trout larvae, and concentrations of 2 mg/L reduced survival of the larval fish (Mayes et al. 1987). Woodward

(1976), in a study of lake trout, found that picloram reduced fry survival, weight, and length at concentrations of 0.04 mg/L, and that the rate of yolk sac absorption and growth of lake trout fry was reduced in flow-through tests at concentrations as low as 0.35 mg/L. These effects were observed at herbicide concentrations that may be encountered from the proposed action. Yearling coho salmon exposed to 5 mg/L of picloram for 6 days suffered “extensive degenerative changes” in the liver and wrinkling of cells in the gills (EPA 1979).

Indirect Effects on Aquatic Organisms.—Although picloram is toxic to salmonids, it is not as toxic to *Daphnia* or algae at the same concentrations. In *Daphnia* the reported acute (48-hour) LC_{50} value is 68.3 (63 to 75) mg/L. Chronic studies using reproductive or developmental parameters in *Daphnia* report a no-effect level of 11.8 mg/L and an adverse effect level of 18.1 mg/L (SERA 2003a).

The toxicity of picloram to aquatic plants varies substantially among different species. Based on the available toxicity bioassays, the most sensitive species is *Navicula pelliculosa*, a freshwater diatom, with an EC_{50} (i.e., the concentration causing 50% inhibition of a process for growth) of 0.94 mg a.e./L and a No-Observable-Effect Concentration (NOEC) of 0.23 mg a.e./L. The least sensitive aquatic plants appear to be from the genus *Chlorella* (another group of freshwater algae), with EC_{50} values greater than 160 mg a.e./L. Macrophytes appear to have a sensitivity that is in the upper range of that seen in algae, with a reported EC_{50} of 164 mg a.e./L in duckweed (SERA 2003a).

Given the information reported above, the proposed action is unlikely to cause adverse effects to zooplankton and algae; however, the potential for adverse effects to aquatic invertebrates other than *Daphnia* is unknown.

Effects on Non-Target Plants.—While most grasses are resistant to picloram, it is highly toxic to many broad-leafed plants. Picloram is persistent in the environment, and may exist at levels toxic to plants for more than a year after application at normal rates. In normal applications, non-target plants may be exposed to chemical concentrations many times the levels that have been associated with toxic effects. Spray drift has been shown to kill crops a short distance away from the area being treated. Under the proposed action, picloram will not be used within 50 feet of water, or within 100 feet of water if winds exceed 5 mph. These precautionary measures greatly reduce the likelihood that the action will result in any significant loss of non-target riparian vegetation. Picloram's mobility allows it to pass from the soil to nearby, non-target plants. It can also move from target plants, through roots, down into the soil, and into nearby non-target plants. Since picloram will not be used within 50 feet of live water, riparian shrubs, forbs, and saplings will not be exposed to picloram. Large riparian trees with roots that extend beyond the 50-foot streamside zone may be injured by picloram; however, beyond occasional injury to mature trees, no appreciable changes in riparian trees are likely to occur.

2,4-D (amine salt only)

Exposure.—The herbicide 2,4-D is available in a variety of chemical forms with different toxicities to fish. The products identified in the proposed action contain the amine salt form, which has the lowest toxicity among the various 2,4-D formulations. The worst-case exposure scenario modeled for 2,4-D in the BA estimated maximum concentrations to be from 2.2 to 2.7 mg/L. The herbicide 2,4-D is highly soluble in water, but it rapidly degenerates in most soils, and is rapidly taken up in plants. 2,4-D ranges from being mobile to highly mobile in sand, silt, loam, clay loam, and sandy loam (USFS 1995a). Consequently, 2,4-D may readily contaminate surface waters when rains occur shortly after application, but is unlikely to be a ground-water contaminant due to the rapid degradation of 2,4-D in most soils and rapid uptake by plants. Most reported 2,4-D ground-water contamination has been associated with spills or other large sources of 2,4-D release. 2,4-D may remain active for 1 to 6 weeks in the soil and will degrade to half of its original concentration in several days (USFS 1995a). Soils high in organic matter will bind 2,4-D

the most readily. 2,4-D is degraded in soil by microorganisms and degradation is more rapid under warm, moist conditions.

Transport of 2,4-D into rivers by storm runoff is likely to occur from rain events within or shortly following the spray season, based on documented studies. Out of 32 stream samples collected downstream from helicopter application of 2,4-D, 2,4-D was found in all samples collected and in highest concentrations following a rainstorm the day after the spraying (Rashin and Graber 1993). In a national study of surface water quality, 2,4-D was found in 19 of 20 basins sampled throughout the United States (USGS 1998).

Toxicity.—Weedar 64 and Amine 4 are the 2,4-D formulations proposed for use. Both products contain roughly 53% inert ingredients that are not identified on the label. Toxicity assays are reported for the active ingredients only; consequently, the actual toxicity to fish is unknown for exposure to Weedar 64 or Amine 4. In rainbow trout, tests of the 2,4-D dodecyl/tetradodecyl amine salt on several life stages yielded LC_{50}s of 3.2 mg/L for fingerlings, 1.4 mg/L for swim-up fry, 7.7 mg/L for yolk-sac fry, and 47 mg/L for eggs (USFWS 1980). For Chinook salmon in the fingerling stage, tests of the dodecyl/tetradodecyl amine salt yielded a 96-hour LC_{50} of 4.8 mg/L and at the yolk-sac stage, a 96-hour LC_{50} yielded 2.9 mg/L (USGS 2001). Based on the exposure modeling in the BA and reported lethal assays, 2,4-D contamination from the proposed action could reach or exceed the lowest LC_{50} under the worst case scenario, while remaining at slightly one-half or less of the lowest concentration reported for sublethal effects.

Most of the potential sublethal effects from exposure to 2,4-D have not been investigated for endpoints important to the overall health and fitness of salmonids. Exposure to 2,4-D has been reported to cause changes in schooling behavior, red blood cells, reduced growth, impaired ability to capture prey, and physiological stress (NIH 2002; Gomez 1998; Cox 1999). Exposure to the 2,4-D amine salt at a concentration of 5 mg/L reduces the ability of rainbow trout to capture food (Cox 1999). 2,4-D can combine with other pesticides and have a synergistic effect, resulting in increased toxicity. For example, combining 2,4-D with picloram damages the cells of catfish (*Ictalurus spp.*) gills, although neither individual pesticide has been found to cause this damage (Cox 1999). Little et al. (1990) examined behavior of rainbow trout exposed for 96 hours to sublethal concentration of 2,4-D amine and observed inhibited spontaneous swimming activity and swimming stamina.

Indirect Effects on Aquatic Organisms.—The SERA (1998) report suggests that amine and acid formulations have relatively low toxicity to aquatic invertebrates and aquatic plants, although the effects are highly variable. Insect larvae are most susceptible to adverse effects, while zooplankton are the least susceptible (Sarkar 1991). Acute toxicity tests exposing the cladoceran, *Simocephalus vetulus*, to the sodium salt of 2,4-D show complete mortality following 96 hours of exposure to concentrations ranging from 0.5 to 5.0 mM (Kaniewska-Prus 1975). Using a molecular weight of 221 for 2,4-D acid, these levels correspond to 0.1105 to 1.105 grams a.e./L. The EPA (1989) reported for the dimethylamine salt, a LC_{50} for grass shrimp of 0.2 mg/L. SERA (1998) concluded that some species of aquatic algae are sensitive to concentrations of approximately 1 mg/L 2,4-D; however, low levels of the compound may stimulate algal growth in some species. Ester formulations have much greater toxicity, but are not proposed for use in this action.

Glyphosate (Rodeo formulation only)

Exposure.—Glyphosate strongly binds to most soils, but dissolves easily in water. Glyphosate remains unchanged in the soil for varying lengths of time, depending on soil texture and organic matter content. The half-life of glyphosate can range from 3 to 130 days (USFS 1995b). Soil microorganisms break down glyphosate and the potential for leaching is low due to the soil adsorption. However, glyphosate can move into surface water when the soil particles to which it is bound are washed into streams or rivers (EPA 1993). Studies examined glyphosate residues in surface water after forest application in British Columbia with and without no-spray streamside

zones. With a no-spray streamside zone, very low concentrations were sometimes found in water and sediment after the first heavy rain (USFS 1995b). Although glyphosate is chemically stable in pure aqueous solutions, it is degraded relatively fast by microbial activity, and water levels are further reduced by the binding of glyphosate to suspended soil particulates in water and dispersal (SERA 2003b).

After an aerial application of Roundup at a rate of 1.8 lb a.i./ac in British Columbia streams that were intentionally oversprayed, maximum concentrations of glyphosate reached 0.16 mg/L and rapidly dissipated to less than 0.04 mg/L after 10 minutes. After a storm event, peak concentrations in stream water were less than 0.15 mg/L, rapidly dissipating to less than 0.02 mg/L before the end of the storm event (Feng et al. 1990, Kreutzweiger et al. 1989). At the same application rate, another Canadian study noted maximum stream concentrations of 0.109 to 0.144 mg/L, occurring 7 to 28 hours after aerial application. Similar results were noted in a study conducted in Oregon (Newton et al. 1984). Maximum water levels in streams reached 0.27 mg/L following repeated helicopter applications directly across a small stream at an application rate of 2.9 lbs/ac. Peak concentrations of glyphosate under the proposed action are likely to be lower than these examples of helicopter spraying, since the herbicides will be applied by hand. As reviewed by Neary and Michael (1996), some applications have resulted in much lower concentrations in streams, in the range of 0.003 to 0.007 mg/L per lb applied (Neary and Michael 1996, Table 11, p. 253). The highest residues were associated with sediments, indicating that they were the major sink for glyphosate. Residues were noted throughout a 171-day monitoring period. Suspended sediment is not a major mechanism for glyphosate transport in rivers, but glyphosate sprayed in road ditches or other drainage structures could readily be transported as suspended sediment and cause acute exposures following rain events.

Toxicity.—Glyphosate is available in a variety of formulations with different toxicities to fish. The primary hazards to fish appear to be from acute exposures to the more toxic formulations, where the toxicity is likely caused by surfactants rather than the active ingredient. Only the Rodeo formulation, which lacks surfactants, is proposed for use. At the typical application rate of 2 lbs a.e./ac, the hazard quotients for the more toxic formulations at the upper ranges of plausible exposure indicate that the LC_{50} values for these species will be not reached or exceeded under worst-case conditions (SERA 2003b). Reported tests of glyphosate (technical grade or formulations without surfactants) toxicity to fish for 24 to 96 hour LC_{50} values range from approximately 10 mg/L at a pH of 6, to >200 mg/L at a pH of 10 (Smith and Oehme 1992; EPA 1993). Technical glyphosate acid (parent compound) is “practically nontoxic” to fish. The 96-hour LC_{50} for technical grade glyphosate in rainbow trout ranges from 1.3 mg/L (USGS 2002), to a range of 86 to 140 mg/L reported in SERA (2003b). The results of a rainbow trout yolk-sac 96-hour LC_{50} static bioassay ranged from 3.4 to 5.3 mg/L (USGS 2002).

The use of less toxic formulations result in acute hazard quotients that do not approach a level of concern (LOC) for any species. Nonetheless, the hazard quotient of 0.08 for sensitive species at an application rate of 2 lbs/acre is based on an LC_{50} value rather than a sublethal assay or NOEC. Thus, the use of glyphosate near bodies of water where sensitive species of fish may be found (i.e., salmonids) should be conducted with substantial care to avoid contamination of surface water. Concern for potential effects on salmonids is augmented by the potential effects of low concentrations of glyphosate on algal populations (SERA 2003b).

Information on sublethal effects of glyphosate is available for many of the endpoints important to the overall health and fitness of salmonids and, of those reported, glyphosate appears to carry a low risk for sublethal effects (SERA 2003b).

Indirect Effects on Aquatic Organisms.—Glyphosate is highly toxic to all types of terrestrial plants and is used to kill floating and emergent aquatic vegetation. Glyphosate does not appear to have similar toxicity to algae. Glyphosate is considered by EPA to be “slightly toxic” to aquatic invertebrates (SERA 2003b). LC_{50} values of 780 and 930 mg/L have been reported for *Daphnia*.

Hildebrand et al. (1980) found that Roundup treatments at concentrations up to 220 kg/ha did not significantly affect the survival of *Daphnia* or its food base of diatoms under laboratory conditions. In addition, Simenstad et al. (1996) found no significant differences between benthic communities of algae and invertebrates on untreated mudflats and mudflats treated with Rodeo. It appears that under most conditions, rapid dissipation from aquatic environments of even the most toxic glyphosate formulations prevents build-up of herbicide concentrations that would be lethal to most aquatic species (Tu et al. 2001).

Clopyralid

Exposure.—Clopyralid's half-life in the environment averages 1 to 2 months and ranges up to 1 year. It is degraded almost entirely by microbial metabolism in soils and aquatic sediments. Clopyralid is not degraded by sunlight or hydrolysis. Similar to picloram, clopyralid is highly soluble in water, does not bind to soil particles, is not readily decomposed in some soils, and may leach into ground water. Clopyralid is extremely stable in anaerobic sediments, with no significant decay noted over a one year period (Hawes and Erhardt-Zabik 1995; Tu et al. 2001). Because clopyralid does not bind readily with sediments, it is likely to disperse in flowing waters, and remain at progressively lower concentrations as it moves downstream. The clopyralid half-life ranges from 8 to 40 days (Tu et al. 2001). Clopyralid is stable in water over a pH range of 5 to 9 (Woodburn 1987) and the rate of hydrolysis in water is extremely slow, with a half-life of 261 days (Concha and Shepler 1994).

Because Clopyralid does not bind tightly to soil it has a high potential for leaching. While clopyralid will leach under conditions that favor leaching, such as sandy soil, a sparse microbial population, and high rainfall, the potential for leaching or runoff is functionally reduced by the relatively rapid microbial degradation of clopyralid in soil (e.g. Baloch-Haq et al. 1993; Bergstrom et al. 1991; Bovey and Richardson 1991). A number of field lysimeter studies and the long-term field study by Rice et al. (1997) indicate that leaching and subsequent contamination of ground water are likely to be minimal. This conclusion is also consistent with a short-term monitoring study of clopyralid in surface water after aerial application (Leitch and Fagg 1985).

SERA (2003c) estimated peak rates of contamination of ambient water associated with the normal application of clopyralid to be 0.02 (0.005 to 0.07) mg a.e./L at an application rate of 1 lb a.e./ac. For longer-term exposures, average estimated rate of contamination of ambient water associated with the normal application of clopyralid is 0.007 (0.001 to 0.013) mg a.e./L at an application rate of 1 lb a.e./ac.

Toxicity.—Little information is reported for toxic effects of Clopyralid. Clopyralid is available in two forms (acid and amine salt) which have different toxicities to fish. Transline, which is the product identified in the proposed action, uses the monoethanolamine salt of clopyralid, which appears to have very low toxicity, compared to the acid formulation present in some other products. Toxicity of the acid formulation of clopyralid for a 96-hour LC_{50} is reported in SERA (2003c) to be 103 mg a.e./L, using an unspecified life stage of rainbow trout. Similarly, Tu et al. (2001) reported LC_{50}s for steelhead of 104 mg/L. For the monoamine salt form used in the proposed action, SERA (2003c) reported a 96-hour LC_{50} of 700 mg a.e./L. No longer-term toxicity studies are available on the toxicity of clopyralid to fish eggs or fry (SERA 2003c). No information is available on sublethal effects.

The material safety data sheet for Transline indicates the product contains roughly 60% inert ingredients that include polyglycol 26-2, which is a surfactant that belongs to a class of chemicals sometimes referred to as alkylphenol ethoxylates. Alkylphenol ethoxylates are generally much more toxic to fish than clopyralid, with estrogenic and growth effects in trout observed at concentrations on the order of 1 to 10 ppb (µg/L) (Bakke 2003).

Indirect Effects on Aquatic Organisms.—Toxic effects on aquatic invertebrates are reported only for *Daphnia*, which has an LC_{50} of 350 mg a.e./L for the monoamine salt and 232 mg a.e./L for

the acid LC_{50} (SERA 2003c). If other invertebrates respond similarly to *Daphnia*, then lethal effects on aquatic invertebrates are unlikely.

Aquatic plants are more sensitive to clopyralid than fish or aquatic invertebrates (SERA 2003c). From information reported in SERA (2003c) it appears that there could be potential losses in primary productivity from algae killed by clopyralid, based on an EC_{50} for algae of 6.9 mg/L. However, concentrations lethal to algae are unlikely to occur unless clopyralid is directly added to water, or if a rainfall washes the chemical into a stream shortly after it is applied.

Imazapic

Exposure.—A study by Ta (1994) identified a soil half-time of 113 days. Tu et al. (2001) reported a similar average soil half-life of 120 days, and is primarily degraded by soil microbial metabolism. Imazapic is moderately persistent in soils, and has not been found to move laterally with surface water (generally moving only 6 to 12 inches laterally but can leach to depths of 18 inches in sandy soils). Although the extent to which imazapic is degraded by sunlight is believed to be minimal when applied to terrestrial plants, it is rapidly degraded by sunlight in aqueous solutions (half-life of 1 to 2 days). Imazapic is water soluble and is not degraded hydrolytically in aqueous solutions (Tu et al. 2001).A study by Ta (1994) identified a soil half-time of 113 days. Tu et al. (2001) reported a similar average soil half-life of 120 days, and is primarily degraded by soil microbial metabolism. Imazapic is moderately persistent in soils, and has not been found to move laterally with surface water (generally moving only 6 to 12 inches laterally but can leach to depths of 18 inches in sandy soils). Although the extent to which imazapic is degraded by sunlight is believed to be minimal when applied to terrestrial plants, it is rapidly degraded by sunlight in aqueous solutions (half-life of 1 to 2 days). Imazapic is water soluble and is not degraded hydrolytically in aqueous solutions (Tu et al. 2001).

Simulations of imazapic were conducted for both clay, loam, and sand at annual rainfall rates from 5 to 250 inches and the typical application rate of 0.0624 lb a.e./ac (SERA 2004a). Based on the modeling, under arid conditions (i.e., annual rainfall of about 10 inches or less), no runoff is expected and degradation, not dispersion, accounts for the decrease of imazapic concentrations in soil. At higher rainfall rates, plausible offsite movement of imazapic may result in runoff losses that range from about 1% to 45% of the application rate, depending primarily on the amount of rainfall rather than differences in soil type. In very arid environments substantial contamination of water is unlikely. In areas with increasing levels of rainfall, exposures to aquatic organisms are more likely to occur. Thus, the anticipated concentrations in ambient water encompass a very broad range, 0.00003 to 0.0114 mg/L, depending primarily on differences in rainfall rates (SERA 2004a).

SERA (2004a) estimated peak concentrations of imazapic in contamination water to be 0.0005 mg/L (0.00005 to 0.01) mg a.e./L per 1 lb a.e./ac, for an annual rainfall of 50 inches. For longer-term exposures, average estimated rate of contamination of ambient water associated with the normal application of imazapic is 0.00002 mg a.e./L (0.00001 to 0.00003 mg a.e./L) at an application rate of 1 lb a.e./ac.

Toxicity.—Imazapic is available in acid and ammonium salt forms. Platueau, which is proposed for use, is formulated with the ammonium salt, which is less toxic than acid formulations. Fish appear to be relatively insensitive to imazapic exposures, with LC_{50} values >100 mg/L for both acute toxicity and reproductive effects. In acute toxicity studies, all tested species (channel catfish, bluegill, sunfish, trout, and sheepshead minnow) evidenced 96-hour LC_{50} values of >100 mg/L. The low toxicity of imazapic to fish is probably related to a very low rate of uptake of this compound by fish. In a 28-day flow-through assay, the bioconcentration of imazapic was measured at 0.11 L/kg (Barker and Skorsynski 1998) indicating that the concentration of imazapic in the water was greater than the concentration of the compound in fish. Barker and Skorsynski (1998) observed no effects on reproductive parameters in a 32-day egg and fry study using fathead minnow.

No studies are reported in the SERA assessment (2004a) for sublethal effects of imazapic to listed fish. Barker and Skorsynski (1998) observed no effects on reproductive parameters in a 32-day egg and fry study using fathead minnow. Even though imazapic itself appears to be only moderately toxic to fish, based on the LC_{50}, Plateau contains roughly 76% inert ingredients that are not identified by the manufacturer. With many herbicides, the inert ingredients may be more toxic to fish and other aquatic organisms than the active ingredient. While toxicity tests are reported for imazapic, there is no apparent information regarding the toxicity to salmon and trout for the product formulation in Plateau, which includes imazapic and unspecified inert ingredients. Consequently, the toxic effects of salmon or trout exposure to Plateau are unknown.

Indirect Effects on Aquatic Organisms.—Relatively little information is available indicating the effects of imazapic on aquatic organisms in the natural environment. No adverse effects to *Daphnia* or mysid shrimp were observed at nominal concentrations of imazapic of up to 100 mg/L in 96-hour studies (SERA 2004a); however, the report did not specify if the analysis included any sublethal endpoints. Effects of imazapic on aquatic plants are highly variable. *Lemna gibba*, a freshwater macrophyte, is the most sensitive aquatic plant reported in the literature, with an EC25 value based on decreased frond counts of 0.00423 mg/L. Algaes were less sensitive than macrophytes (reported LC_{50} values > 0.045 mg/L), and responses included both growth inhibition and growth stimulation (SERA 2004a).

Dicamba

Exposure.—In soil, dicamba is very mobile because it binds poorly to most soils. Dicamba is also readily soluble in water, so its transport is influenced by precipitation. At low rainfall rates, dicamba dissipation had a half time of approximately 20 days. At high rainfall rates using modeled runs, virtually all the dicamba was washed from the soil. As detailed in SERA (1995), the environmental fate of dicamba has been extensively studied. In general, dicamba is very mobile in most soil types, with the only reported exception being peat, to which dicamba is strongly adsorbed (Grover and Smith 1974). For many soil types, the extent of soil adsorption is positively correlated with and can be predicted from the organic matter content and exchangeable acidity of the soil (Johnson and Sims 1993). In a monitoring study by Scifres and Allen (1973), dicamba levels in the top 6 inches of soil dissipated at a rate of approximately 22% per day over the first two weeks following application, with a soil half-life of 3.3 days. After 14 days no dicamba was detected, with the limit of detection of 0.01 µg/g, in the top 6 inches of soils. Residues at all depths were less than 0.1 µg/g. The rates of dissipation in clay and loam were essentially identical.

Available monitoring data indicate that ambient water may be contaminated with dicamba after standard applications of the product. The range of average to maximum dicamba levels in water, reported in a monitoring study by Waite et al. (1992), are from 0.1 to 0.4 µg/L. SERA (1995) characterized the water concentration of dicamba in a severe spill as approximately 10 mg/L, which could result in some fish mortality.

SERA (1995) concluded that ambient concentrations of dicamba in water will vary considerably, depending on various site-specific conditions. The maximum level reported in ambient surface water is 37 µg/L, 5 hours after direct aerial spraying of a stream with dicamba at a rate of 1 lb/acre (Norris and Montgomery 1975). Because the proposed action will not be applying dicamba by this method maximum concentrations of dicamba are likely to be lower. Monitored levels of dicamba in water, caused by rights-of-way management were reported by (Muir and Grift 1987) to be 0.12 to 5.48 µg/L

Toxicity.—The product proposed for use (Banvel) is formulated with the dimethylamine salt, with roughly 60% inert ingredients that include an unspecified amount of ethylene glycol. Ethylene glycol has much lower toxicity to fish than dicamba. Available information on the toxicity of Banvel to fish is limited to assays using only the active ingredient; consequently, the toxicity of

Banvel to listed fish is unknown. There is wide variation in the reported acute toxicity of dicamba to fish, with 24-hour LC_{50} values ranging from 28 mg/L to more than 500 mg/L. Most laboratory assays in SERA (1995) reported LC_{50} values >100 mg/L. In bluegill sunfish, the standard 96-hour LC_{50} is 600 mg/L, but when the herbicide was adsorbed onto vermiculite, the LC_{50} dropped to around 20 mg/L (USFS 1984). In a study by Lorz et al. (1979), yearling coho mortality was observed at 0.25 mg/L during a seawater challenge test which simulates their migration from rivers to the ocean. An LC_{50} of 28 mg/L in trout was reported by Johnson and Finley (1980). Little is known about effects on fish other than acute toxicity.

Indirect Effects on Aquatic Organisms.—The range of toxicity values of dicamba to aquatic invertebrates suggests wide variation among species. Consequently, available assays provide little insight about the toxicity of dicamba to invertebrate species consumed by listed salmon and steelhead. Seed shrimp, glass shrimp, and fiddler crabs are killed by concentrations over 100 mg/L, while *Daphnia* and amphipods are killed by concentrations in the range of 3.9 to 11 mg/L (Cox 1994). The low end of this range is several orders of magnitude higher than water concentrations observed by Waite et al. (1992), but within the range of concentrations SERA (1995) described for a moderate to severe spill.

Sublethal effects on aquatic invertebrates are unknown. The only endpoints that have been examined are acute lethal responses for aquatic animals (LC_{50} values) and growth inhibition in unicellular algae (EC_{50} values). Algae species are much more sensitive to dicamba than fish (SERA 1995).

Metsulfuron–methyl

Exposure.—Metsulfuron-methyl is generally active in the soil. It is usually absorbed from the soil by plants. The adsorption of metsulfuron-methyl to soil varies with the amount of organic matter present in the soil, and with soil texture and pH. Adsorption to clay is low. The half-life of metsulfuron-methyl can range from 120 to 180 days (in silt loam soil). There are major areas of uncertainty and variability in assessing potential levels of exposure in soil. In general, metsulfuron-methyl absorption to a variety of different soil types will increase as the pH decreases (i.e., the soil becomes more acidic). The persistence of metsulfuron-methyl in soil is highly variable, and reported soil half-lives range from a few days to several months, depending on factors like temperature, rainfall, pH, organic matter, and soil depth. Off-site movement of metsulfuron-methyl is governed by the binding of metsulfuron-methyl to soil, the persistence in soil, as well as site-specific topographical, climatic, and hydrological conditions.

Metsulfuron-methyl will degrade faster under acidic conditions, and in soils with higher moisture content and higher temperature (Extoxnet 1996). Soil microorganisms break down metsulfuron-methyl to lower molecular weight compounds under anaerobic conditions. Metsulfuron-methyl in the soil is broken down to nontoxic and non-herbicidal products by soil microorganisms and chemical hydrolysis. Metsulfuron-methyl dissolves easily in water. There is a potential for metsulfuron-methyl to contaminate ground waters at very low concentrations. Metsulfuron-methyl readily leaches through silt loam and sand soils.

Metsulfuron-methyl environmental fate and transport simulations reported in SERA (2004b) were conducted for clay and sand at annual rainfall rates ranging from 5 to 250 inches and the typical application rate of 0.02 lb ai/ac. In sand or clay under arid conditions (i.e., annual rainfall of about 10 inches or less), there is no percolation or runoff and the rate of decrease of metsulfuron-methyl concentrations in soil is attributable solely to degradation rather than dispersion. At higher rainfall rates, plausible concentrations in soil range as high as 0.007 mg/L and, under a variety of conditions, concentrations of 0.0005 mg/L and greater may be anticipated in the root zone for appreciable periods of time. Metsulfuron-methyl exposure to aquatic species is affected by the same factors that influence terrestrial plants, except the directions of the impact are reversed. In very arid environments (i.e., where the greatest persistence in soil is expected) substantial contaminations of water is unlikely. In areas with increasing levels of rainfall, toxicologically

significant exposure to aquatic plants is more likely to occur. As summarized in SERA (2004b), peak water levels of about 0.003 to 0.006 mg/L can be anticipated under worst case conditions at rainfall rates of 25 to 50 inches per year after a single application.

Toxicity.—Metsulfuron-methyl is non-lethal to fish at the peak concentrations likely to be encountered by listed salmon and steelhead and peak concentrations are many orders of magnitude lower than the concentrations where various sublethal effects were observed in rainbow trout. Metsulfuron-methyl does not bioaccumulate in fish. The lowest concentration at which mortality was observed in any species of fish is 100 mg/L for rainbow trout; however, in the same study, no mortality was observed in fish exposed to 1000 mg/L (Hall 1984). SERA (2004b) concluded that mortality is not likely to occur in fish exposed to metsulfuron-methyl concentrations less than or equal to 1000 mg/L.

Debilitating sublethal effects (erratic swimming, rapid breathing, and lying on the bottom of the test container) were observed by Muska and Hall (1982) after exposure to 150 mg/L for 24 hours. In tests with rainbow trout, no significant long-term effects (90-day exposure) were observed by Kreamer (1996) on hatch rate, last day of hatching, first day of swim-up, larval survival, and larval growth at concentrations up to 4.7 mg/L. Concentrations greater than 8 mg/L resulted in small but significant decreases in hatching and survival of fry.

The metsulfuron-methyl product used in the proposed action is Escort, which contains 40% inert ingredients that include Sodium naphthalene sulfonate-formaldehyde condensate; a mixture of a sulfate of alkyl carboxylate and sulfonated alkyl naphthalene, sodium salt; polyvinyl pyrrolidone, trisodium phosphate, and sucrose (NCAP 2006). There is insufficient information on the toxicity of napthelene-based surfactants and polyvinyl pyrrolidone to fish to determine the impact on fish. All of these ingredients are commonly used in household cleaning products or as food additives. Polyvinyl pyrrolidone is marketed as a disinfectant for fish aquaria and treatment of certain fish infections; consequently, the product is not likely to be toxic to listed trout at environmental concentrations encountered in the proposed action. Because the amount of each of the various inert chemicals in Escort and the toxicity of some of the inert ingredients are unknown, there is no assurance that the proposed action will avoid toxic effects to listed fish if fish are exposed to the product in any appreciable amount.

Indirect Effects on Aquatic Organisms.—Toxicity studies on aquatic invertebrates are reported only for *Daphnia*, which for acute exposure, a 48-hour NOEC for immobility of 420 mg/L is used. For chronic exposures, the NOEC of 17 mg/L for growth inhibition is used, although higher chronic NOECs, ranging from 100 to150 mg/L, have been reported for survival, reproduction and immobility (SERA 2004b). The only effect reported by Hutton (1989) in a 21-day *Daphnia* study was a decrease in growth at concentrations as low as 5.1 mg/L, but decreased growth at concentrations less than 30 mg/L was not statistically significant. In aquatic invertebrates, decreased growth appears to be the most sensitive endpoint. Wei et al. (1999) report that neither metsulfuron-methyl nor its degradation products are acutely toxic to *Daphnia* at concentrations that approach the solubility of the compounds in water at pH 7. Although the results of *Daphnia* studies suggest that metsulfuron-methyl is relatively non-toxic to invertebrates, toxic effects concentrations for different invertebrate species often vary widely, as seen in several herbicides reviewed in this Opinion. Consequently, given the limited data available on invertebrate effects, there is insufficient information to draw any conclusion about the toxicity of metsulfuron-methyl on invertebrates consumed as prey by listed salmon and steelhead.

There are substantial differences in sensitivity to effects of metsulfuron-methyl among algal species, but all EC_{50} values reported in SERA (2004b) are above 0.01 mg/L, and some values are substantially higher. Toxicity in algae increases with lower pH, most probably because of decreased ionization leading to more rapid uptake. At a concentration of 0.003 mg/L, metsulfuron-methyl was associated with a 6 to16% inhibition (not statistically significant) in algal growth rates for three species but stimulation of growth was observed in *Selenastrum*

capricornutum and the aquatic macrophyte, duckweed (SERA 2004b). Wei et al. (1998; 1999) assayed the toxicity of metsulfuron-methyl degradation products in *Chlorella pyrenoidosa* and found that the acute toxicity of the degradation products was about two to three times less than that of metsulfuron-methyl itself in a 96-hour assay. One field study cited in SERA (2004b) on the effects of metsulfuron-methyl in algal species found that concentrations of metsulfuron-methyl as high as 1 mg/L are associated with only slight and transient effects on plankton communities in a forest lake.

All watershed condition indicators.—Removal of solid stands of vegetation by chemical treatment may result in short-term, insignificant increases in surface erosion that would diminish as vegetation reoccupies the treated site. The speed of site vegetation and the plant composition of the new vegetation would depend on the persistence and selectivity of the herbicide used. Chemical control of noxious weeds is expected to result in negligible adverse effects to sediment yield. Risk for effects to non-target vegetation are lowest with wicking, backpack or hand operated sprayers.

Channel condition, water quality, and habitat condition Indicators.—Spraying of "long-lived" persistent herbicides (e.g. Tordon) would not be authorized within 50 feet of any live waters. This would reduce risks associated with residual herbicides that persist in the soil and continue to affect newly emerging plants or sprouting perennial shoots. Restrictions on the use of non-persistent herbicides in close proximity to water would reduce risks associated with herbicides moving into surface waters or leaching into ground water. Only aquatic-approved herbicides (glyphosate - Rodeo®) would be authorized for use within 50 feet of live waters or where hydrophilic or riparian plants are present, or where surface material is obvious recent deposition of sediment of any diameter(s). Ground based herbicide application would result in reduction of noxious weeds within riparian areas and along stream banks. Negligible effects to stream bank stability are expected. A reduction of noxious weeds in riparian areas and along stream banks could benefit native plant species and result in improved stream bank stability and riparian condition. Negligible and unmeasurable effects that are attributed to chemical control are expected to occur to water temperature, large woody debris, streambank condition, sediment, and related features. Chemical control is expected to have adverse effects to water contamination, but risk will be reduced because of the buffers which would be used along riparian areas and due to the use of special guidelines for ground based herbicide application within riparian areas and along live waters. These include:

- The Weed Coordinator will map and identify buffers, methods of application, and herbicide restrictions that may be required for the project,
- No herbicide storage, mixing or post-application cleaning would be authorized within RCAs (100 feet of any live waters). Mixing and loading operations must take place in an area where an accidental spill would not contaminate a stream or body of water before it could be contained.
- No spraying of herbicides other than glyphosate (Rodeo®) would be authorized within 50 feet of any live waters, where hydrophilic or riparian plants are present, and where surface material is obvious recent deposition of sediment of any diameter(s)
- Only very low risk, or "aquatic-approved" chemicals (glyphosate-Rodeo®) could be used within 50 feet of open water, where hydrophilic or riparian plants are present, and where surface material is obvious recent deposition of sediment of any diameter(s).

Implementation of hazardous materials (fuel and herbicide) transportation, storage, and emergency spill plans would result in a low risk for hazardous material contamination (fuels and herbicides) of ground water and surface water.

Manual Control

In manual treatments workers primarily would cut plants off above ground level; pull, grub, or dig out plant root systems. The scope of this is very low for the amount of acreage treated annually. However, noxious weed control benefits are very high for treating sensitive areas (i.e. riparian areas, special status plant populations, developed recreation sites), dispersed recreation sites, remote areas, and spot control of individual plants and small patches.

Watershed condition indicators.—Minor soil and vegetation disturbance would occur from the small amount of manual noxious weed control conducted annually. This would result in negligible sediment effects. This method is very target specific and would have a negligible effect on riparian habitats. Beneficial effects would be expected from the reduction of noxious weeds encroaching on and invading riparian areas, wetlands, and streams.

Channel condition, water quality, and habitat condition indicators.—Minor soil and vegetation disturbance would occur within riparian areas and along stream banks from manual noxious weed control. Any adverse impact to sediment and stream bank stability is expected to be negligible because prescribed buffers will result in only a minor area of disturbance.. A reduction of noxious weeds in riparian areas and along stream banks would benefit native plant species and improve stream bank stability and riparian condition. No adverse effects attributed to manual control are expected to occur to these indicators because the area affected is small (less than 25 acres per Section 7 watershed), and because prescribed buffers will minimize the amount of riparian areas and plants that are affected..

Biological Control

Biological methods of vegetation treatment use living organisms to selectively suppress, inhibit, or control herbaceous and woody vegetation. This method is viewed as one of the more natural processes because it requires the proper management of plant-eating organisms and precludes the use of mechanical devices, chemical treatments, or burning of undesired vegetation. Biological weed control activities include the release of insect agents that are parasitic to target noxious weeds. This activity includes the collection of beetles/insects, development of colonies for collection, transplanting parasitic beetles/insects, and supplemental stocking of populations. Development of biological control insect colonies (nursery sites) for collection purposes would often not have active weed control, because these sites would be managed for propagation of insects. Controlling the host noxious weed species would reduce the insects food supply and cause a decline in the numbers of these beneficial insects that would be available for transplanting efforts.

Watershed condition indicators.—This method is very target specific and would have no adverse effect on riparian species. Beneficial effects would be expected from the reduction of noxious weeds encroaching on and invading riparian areas, wetlands, and streams.

Channel condition, water quality, and habitat condition indicators.—A reduction of noxious weeds in riparian areas and along stream banks would benefit native plant species and improve riparian condition. No adverse effects attributed to biological control are expected to occur to water temperature, suspended sediment, deposited sediment, or from water contamination.

Rehabilitation, Seeding, Plantings – Mechanical Control

After weeds are controlled on a site it is beneficial to establish desirable vegetation that would compete with noxious weeds and restrict or prevent additional infestations. These treatments may involve ground or aerial application of seeds. Mechanical treatment is normally limited to raking by hand, or ATV drawn drag rake.

Watershed condition indicators.—Broadcast seeding (aerial or ground) would result in no short-term adverse effects to watershed condition indicators. Long-term benefits would occur from establishment of desirable vegetation that would reduce adverse erosion and sediment.

Channel condition, water quality, and habitat condition indicators.—A reduction of noxious weeds and establishment of desirable vegetation would reduce potential for future noxious weed encroachment into riparian areas. No adverse effects attributed to rehabilitation and/or use of mechanical equipment would occur to water temperature, suspended sediment, deposited sediment, or from water contamination. Potential for increased erosion/sediment is considered negligible and would be undetectable in live waters. Long-term benefits from reduced erosion/sediment would occur from establishment of desirable vegetation.

Cumulative Effects

It is reasonably certain that on-going herbicide application programs implemented by other federal, state, county and private land managers/owners that have been conducted within the proposed action area are likely to continue. The full scope of their programs is not known to the PNF. The State of Idaho, Counties, Idaho Transportation Department has in the past and continues to conduct an active spray program for controlling noxious weeds. At this time it is difficult to determine the amount of total herbicide use by federal, state, and county agencies and private landowners within a particular watershed.

Other land management activities which are reasonably certain to continue into the future, and which may affect implementation of the proposed action at some level include livestock grazing, agriculture, timber harvest, road and other facilities maintenance, recreation, prescribed fire, emergency fire rehabilitation, and other surface-disturbing activities. These actions, which take place on other federal, state and private lands within the proposed action area, may actually contribute to the need to maintain or increase current levels of noxious weed treatment for many years into the future. The USFS (and presumably other federal and state agencies) manage lands with goals to maintain and enhance natural resources, which would include mitigating actions that should be conducive to preventing or reducing weed infestations. As such, implementation of this proposed action in addition to other land management activities is not expected to contribute significantly to a continuing need to treat noxious weeds at site-specific locations into the future. Proper implementation and monitoring of all land management activities is expected to have a beneficial effect to the long-term treatment of noxious weeds. The levels of types of activities that take place on private lands and their impact to the PNF's ability for long-term noxious weed control, is unknown. It is reasonable to expect that the cumulative effects of private land management activities, as with other federal and state activities, would be as various as the landowners and the lands being managed. However, in the absence of cooperative agreements between federal/state and private landowners, it is expected that activities on private lands, particularly on lands upstream, adjacent, and intermingled with public lands, would continue to present challenges to weed management for the PNF.

4. Direct and Indirect Effects of Petroleum Products

Should fuel or other petroleum products enter live water, they would affect water quality and invertebrates and would directly affect the listed fish, should petroleum products come in contact with them. Fuels and other petroleum products can directly poison salmonids and their aquatic invertebrate food source. Fuels and petroleum products are moderately to highly toxic to salmonids, depending on concentrations and exposure time (Gutsell 1921, and Allen and Dawson 1961). Free oil and emulsions can adhere to gills and interfere with respiration, and heavy concentrations of oil can suffocate fish (McKee and Wolf 1963). Evaporation, sedimentation, microbial degradation, and hydrology act to determine the fate of fuels entering fresh water (Saha and Konar 1986). Sources of mortality to the listed fish from the types of effects described above can be density independent.

Fuel-related mitigation keeps fuels as far as possible from live water, and includes measures to reduce the likelihood of uncontained spills. The risk of fuel-related effects are reduced to very low levels because of these factors.

5. Direct and Indirect Effects of Grazing

The effects of grazing on fish habitat can include altered stream banks and riparian areas, which can result in sediment loading, increased water temperatures, and altered water tables and flow regimes (Platts 1991). Increased sediment from grazing is usually the result of bank trampling, overused trail crossings and overgrazed riparian areas. The threshold level at which fines begin to adversely affect the emergence and survival of salmonid embryos is somewhere between 10-15% (particle diameter less than 6.3 mm) and 20% (particle diameter including 6.3 mm) (Irving and Bjornn 1984).

Increased water temperatures can result from the removal of stream bank vegetation that provides shade, and from shallow, slow-moving reduced water flows through open stream areas.
Salmonid species do not usually persist in waters where maximum temperatures consistently exceed 22º C, although they can withstand brief periods of temperatures as high as 25º C if nighttime cooling occurs (Behnke and Zarn 1976).

Grazing prescriptions such as rest rotation and deferred rotation, especially if improvements occur across the watershed, have fair to good stream rehabilitation potential (Platts 1991, Kondolf 1993). A recent 7-year study compared cattle grazing prescriptions and effect to impacted riparian areas (Myers and Swanson 1995). The study showed that deferred rotation grazing allowed much improvement of aquatic and riparian habitats, but the improvement was limited by the presence of roads, which apparently added sediment to the streams. Deferred rotation grazing in the absence of roads produced the second most improvement, and complete rest showed the most improvement. Pool habitat recovery lagged substantially behind improvements in bank stability and cover (Myers and Swanson 1995). No similar study has been conducted for sheep, but the general relationship between livestock grazing, riparian effects, and impacts to fish habitat is assumed to be similar for this analysis. A 30% utilization strategy in riparian areas provides stream bank protection and reduced sediment delivery to streams (Clary and Webster 1989). Rest-rotation systems can degrade previously ungrazed streams, and one year's rest can allow vegetation growth that subsequently attracts heavy grazing (Platts and Nelson 1985).

6. Effects of Sediment on Salmonids

Removal of vegetation, mechanical disturbance, and topographic alteration increase the erodibility of forest soils and, consequently, both the amount of soil available for transport and the likelihood of transport downslope and into streams. Once in streams, fine sediments (most frequently regarded as those smaller than 6.3mm in particle diameter) may be transported further downstream or deposited in slow water areas and behind obstructions, locally altering fish habitat conditions. In particular, fine sediment has been shown to fill the interstitial spaces among larger streambed particles, which can eliminate the living space for various microorganisms, aquatic macroinvertebrates, and juvenile fish. Potential problems associated with excessive sediment have long been recognized for a variety of salmonid species and at all life stages, from possible suffocation and entrapment of incubating embryos (Coble 1961, Phillips et al. 1975, Hausle and Coble 1976, McCuddin 1977, Cederholm and Salo 1979, Peterson and Metcalfe 1981, Irving and Bjornn 1984, Tagart 1984, Reiser and White 1988) through loss of summer rearing and overwintering cover for juveniles (Bjornn et al. 1977; Kelley and Dettman 1980; Hillman et al. 1987; Griffith and Smith 1993), to reduced availability of invertebrate food for resident adults (Tebo 1955; Nuttall 1972; Cederholm and Lestelle 1974; Bjornn et al. 1977; Alexander and Hansen 1986).

B. Direct and Indirect Effects from Federal Actions

1. Miscellaneous forest products – All Analysis Areas

Reduced shade and availability of recruitable LWD, ground disturbance yielding sediment delivery, and a fuel spill contaminating waters, are potential effects of Miscellaneous Forest Product activities. In general, refueling equipment, fuel storage, and activities that could disturb soil and vegetation will not occur within LRMP RCA buffers; therefore, effects to WCI's will be negligible. Public contact and education through signing will help minimize illegal removal of firewood from RCA's. Activities within LRMP RCA buffers will only occur after a journey level fisheries biologist and hydrologist has insured that all of the mitigations described in the Federal action are followed. If followed the mitigations will insure that effects from activities in RCA's will be negligible because trees that could provide shade or LWD will not be removed and activities that could create measurable sediment delivery would not be allowed. Due to similarities in the mechanism and timing of effects miscellaneous forest products harvest and mistletoe control and precommercial thinning are described in the same effects matrix (Appendix 3).

2. Mistletoe control and precommercial thinning – All Analysis Areas

Reduced availability of recruitable LWD, reduced stream shading, ground disturbance yielding sediment delivery, or a fuel spill contaminating waters are potential effects of mistletoe control and pre-commercial thinning activities. Negligible effect on recruitable LWD or stream shading will occur because activities will not occur in RCAs unless both a fisheries biologist and hydrologist agree that trees removed do not provide shade to a stream and that trees removed are not needed to meet the WCI for future LWD recruitment. No measurable sediment delivery from this action is expected because should activity occur in RCAs, riparian vegetation must exist for effective sediment filtering, and disturbance that may generate

sediment will be minimized by mitigation to not remove trees that would impact stream banks, to keep vehicles on existing open roads, and to not fall or bring trees across road cutslopes. Negligible risk of petroleum contamination is expected because refueling and fuel storage will occur outside RCAs where should a spill occur it could be dealt with well before entering a stream. Due to similarities in the mechanism and timing of effects miscellaneous forest products harvest and mistletoe control and pre-commercial thinning are described in the same effects matrix (Appendix 3).

3. FIRE MANAGEMENT ACTVITIES – ALL ANALYSIS AREAS

See "Direct and Indirect Effects of Fire", Section V.A.2., above.

4. FISH HABITAT AND RIPARIAN SAMPLING – ALL ANALYSIS AREAS

The potential negligible effects of this action are related to disturbance of fish or eggs from turbidity or direct disturbance. The potential area for these effects is localized around the areas where surveyors are working. The required mitigation measures are intended to prevent these effects from occurring to WCIs in areas occupied by listed fish or eggs (Appendix 3). The fish habitat surveys involve walking in streams, which presents the possibility of personnel trampling redds, resulting in mortality or suspension of fine sediments but these effects are mitigated by training and avoidance. Where listed or sensitive fish species are present, short-term displacement from normal activities, such as feeding or breeding, is expected when personnel are present. However, these displacements are judged biologically negligible because of the extremely short duration of disturbance. Aquatic invertebrate sampling and sediment sampling procedures (core sampling, % fines, and free matrix) can all disturb fish and or resuspend sediments that could affect downstream redds. Any sediment that is generated is expected to settle out within the prescribed buffer distance (one stream width or within one habitat unit of any redd). The buffers are also judged to be effective in eliminating any potential harassment of adjacent fish. Because sampling will not occur closer than one stream width or one habitat unit, the potential for adverse effects are avoided as sediment is expected to settle out within that distance.

5. WATERSHED IMPROVEMENTS AND MAINTENANCE – ALL ANALYSIS AREAS

These actions are designed and expected to cause short and long term improvements in habitat conditions, such as fish barrier removal, increase in large woody debris, riparian planting, streambank stabilization, and reduction in sediment delivery. Mitigations described in the Federal actions will insure that any temporary degrading effects from these actions are negligible. For example, erosion control measures that have proven effective in capturing and storing sediment on the Payette National Forest, and restrictions on use of mechanized equipment within RCA buffers will insure that any soil, streambank, or streambed disturbance and associated sediment delivery to the stream channel is temporary and minimal so that effects to listed fishes are negligible. Furthermore, a journey level fisheries biologist will insure that activities do not proceed if there is potential for more than negligible effects to individual listed fish, or their eggs. In Appendix 3 the effects of watershed and habitat improvements and maintenance are combined with the fish habitat and riparian sampling because they have similar negligible to improving effects. Due to similarities in the mechanism and timing of effects (especially for sediment) watershed and habitat improvements and maintenance and fish habitat and riparian sampling are described in the same effects matrix (Appendix 3).

6. NOXIOUS WEED MANAGEMENT – ALL ANALYSIS AREAS

The effects of this action are described above in the section describing general noxious weed treatment effects (Section V.A.3.).

7. ROAD MANAGEMENT – ALL ANALYSIS AREAS

The primary mechanism of effect from the road management action is sediment delivery to stream channels. When mitigations are followed, many road management activities such as graveling, water barring, dust abatement, blading, and replacement of plugged or damaged culverts, will result in less erosion and a reduction in sediment delivery to stream channels compared to not taking these road management actions. This is especially true with expected future increases in public travel on Forest roads. Specific mitigation that will insure sediment delivery is negligible includes erosion control on disturbed or exposed soil, restrictions on sidecasting material while blading or plowing snow, designing proper road surface drainage, proper maintenance of ditches, and for some actions mandatory approval

by a journey level fisheries biologist, hydrologist, and in some instances the Level 1 team. A specific instance where the Level 1 team must approve an activity is if earth disturbance occurs, such as culvert replacement, in streams with listed fishes. This will give the Level 1 team the opportunity to insure the effects of these actions are not adverse. In all cases where road management activities run the risk of disturbing listed fishes in the immediate area (i.e., harassment, redd destruction) a fisheries biologist must first approve the activity by documenting the presence or absence of listed fishes, which reduces the likelihood of disturbance of listed fishes to negligible levels. With restrictions on removal of downfall and felled hazard trees from RCAs and direction to minimize brushing, along with the relative rarity that these actions occur, the effects from these actions on listed fishes or designated critical habitat will be negligible. Other mechanisms of effect include chemical contamination from salts used for dust abatement, and fuel spills. Due to restrictions on storing fuel or refueling equipment within RCAs, and requirements for containment, the chance of fuel contaminants reaching listed fishes is minor. Dust-abatement additives such as $MgCl_2$ are not likely to reach water with listed fishes because of the strong tendency to bind to the road surface thereby minimizing displacement. Furthermore, effects would be negligible due to the low toxicity at the concentrations that may be expected (see e.g., Heffner 1996). In addition, spill containment is required; therefore, the likelihood of spilled dust abatement chemicals reaching streams with listed fishes is negligible.

Road management, trail maintenance and recreation and administrative site operation and maintenance and the travel plan are interdependent Federal actions; therefore, they will be discussed collectively in the effects matrix (Appendix 3).

8. TRAILS, RECREATION AND ADMINISTRATIVE SITE OPERATION AND MAINTENANCE – ALL ANALYSIS AREAS

This action and the travel plan Federal action are interdependent and therefore they will be discussed collectively in the effects matrix (Appendix 3).

Sediment delivery as a result of trail work or facility maintenance and repair is the primary potential effect of this activity. Potential exposure to petroleum products or other water contamination is also a concern, as is providing for passage of aquatic organisms at stream crossings.

Applying erosion control measures such as straw bales, erosion control matting, silt fence, seeding, and mulching on disturbed areas will serve to minimize sediment movement from disturbed areas and speed re-vegetation and soil stability. Measures implemented during trail maintenance or construction such as not sidecasting soils where they can be delivered to streams, placement of waterbars and rolling dips to move water off trails and into vegetation where sediment can be filtered, minimizing trail length perpendicular to stream crossings which may direct sediment toward streams, placing woody debris below rolling dips and waterbars to dissipate water flow and minimize erosion and sediment movement, and constructing short inclines to bridges to inhibit sediment movement onto bridge and eventually into streams are measures expected to minimize sediment entry into streams. Minimal sediment delivery associated with culvert placement/replacement is expected due to measures such as placing erosion control prior to other activities to catch sediment that may move, removing and storing fill material where it won't be delivered to limit sediment sources, and seeding and mulching site to speed site re-vegetation and stabilization.

Petroleum products from mechanized equipment presents the potential for water contamination. To minimize potential for effects due to petroleum contamination, mechanized equipment must have no oil or fuel leaks, equipment must be serviced outside RCAs, fuel for equipment will be stored outside RCAs in US DOT approved containers, and refueling of motorized equipment will occur as far from streams as is practicable, and on ground where a fuel spill would be easily contained. Spill containment equipment will be available. These measures are expected to minimize the potential for petroleum contamination and effects on listed fishes by and ensuring equipment is clean when near streams, and by having spill containment equipment available and putting distance between fuel/oil sources and waters thus providing the means and area for spill containment. Also, a journey level fisheries biologist will approve equipment fording to ensure machines are clean, and that fording occurs at times and places to minimize effects on listed fishes.

Wood preservative chemicals that may leach from materials used for bridges, raised trail treads etc. may also contaminate waters. Because all treated wood used shall be produced and used in compliance with "Best Management Practices for the use of wood in aquatic and other sensitive environments" (Western Wood Preservers Institute, 2006), and research has found that there are no measurable impacts on aquatic organisms if the wood is properly treated and installed, negligible effects are expected.

Minimal risk of sewage contamination is expected because most toilets used are vault style which are impermeable and do not leak into surrounding soils, and any replacement of septic systems will meet applicable DEQ and District of Health requirements.

At new and rebuilt trail culverts and fords, passage for aquatic organisms and all life stages will be provided for by using available tools (such as software) to determine necessary culvert specifications, (i.e., size, grade etc.), and placement of substrate as needed. In addition, to avoid effects to spawning fishes, fords will not be located where there is spawning habitat.

Overall, this action is expected to yield negligible effects on listed fishes or their habitat due to implementation of the above mitigation measures to minimize sediment delivery, minimize potential for petroleum or other chemical contamination, and provide for aquatic organism passage (Appendix 3).

9. TRAVEL PLAN – MIDDLE MAIN ANALYSIS AREA

a. California, Carey, Fall Creeks.

Potential effects of this action are: increased sedimentation in streams due to motorized and non-motorized use at road and trail stream crossings, increased chances of petroleum spills, and physical harm to eggs that may be present in redds at fords and elsewhere. Soils on roads and trails at stream crossings can be delivered as sediment to streams via wind, water, and tires at fords. As described above (section V. A. 6.), this additional sediment can reduce habitat quality and adversely affect incubating eggs, and petroleum products can directly poison salmonids and their aquatic invertebrate food source (section V. A. 4.). Mortality of listed fish eggs (adverse effect) can occur should redds be trampled or driven over. Trampling can occur due to any foot or horse use in streams, including use from anglers, swimmers, people floating in watercraft, people hiking, and similar activities. There are approximately 51 road crossings and 13 stream trail crossings in the Middle Main analysis area, of which an unknown number are fords. About 90 percent of these trail crossings are assumed to be fords (Clem Pope, Recreation Manager, Payette NF, McCall, ID). Fording frequently occurs in spawning habitat because these are often the easiest places to cross a stream. Roberts and White (1992), found that twice-daily wading throughout trout egg development killed up to 96% of trout eggs and pre-emergent fry, while a single wading just before hatching killed up to 43% of eggs.

Under the new travel plan action, no motorized cross-country travel will be allowed. The reduction in fording and soil disturbance in RCAs (compared to baseline) associated with restricting motorized cross-country travel will improve the sediment and substrate embeddedness WCIs by only negligible amounts because travel across streams will still occur on authorized motorized routes, and existing areas of erosion are not remedied with the action. For this analysis area, the number of acres open to cross-country travel will be reduced by 16,429 acres, compared to the previous travel plan. Project Design Features and Best Management Practices (BMPs) will reduce sediment delivery during reroute or reconstruction of previously unauthorized routes. Specific examples of Project Design Features and BMPs to reduce sediment delivery are part of the Road and Trail Maintenance federal actions and include: construction and maintenance of water management structures such as waterbars, rolling dips, and bridges; reclamation of abandoned trails, and designing reroutes to meet current Forest Service standards. Over time, increasing public use of roads and trails and related increases in sediment yield will degrade the sediment and substrate embeddedness WCIs in the short and long term. Because of the proximity of listed fish and critical habitat to roads and/or trails in this analysis area, increases in sediment due to travel plan actions are expected to have adverse effects.

The streambank condition WCI has two definitions for this analysis. For the Travel Plan EIS (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]) analysis, miles of road and trail authorized for motorized use were used as an index of streambank condition, with the assumption that the number of stream crossings would increase with mileage. In the Middle Salmon-Indian analysis area, streambank condition related to the number of road and trail crossings will be improved because total mileage of roads and trails will be reduced by 2.9 miles. For the LRMP WCI definition of streambank condition, there will be a temporary improvement when cross country motorized travel is restricted due to a reduction in the amount of fording and soil disturbance in RCAs. In the short and long term, streambank condition at existing crossings will degrade with increased public use. Road and trail maintenance activities (with related mitigations) that reduce erosion and sediment delivery to stream channels will decrease the magnitude of degrading effects to sediment, substrate, and streambank condition WCIs from expected increases in public use, but will not alter the general increasing trend. Disturbance history and regime, and RCA WCIs will improve with the restriction on motorized cross-country travel.

Motorized recreation is the most likely source of petroleum contamination with this action. Because motorized trails ford streams directly adjacent to occupied habitat, and roads also occur adjacent to and cross streams, a fuel spill in these areas is likely to result in adverse effects to listed fishes.

Adverse effects to listed fishes such as harassment or redd trampling are also likely to occur from fording streams on foot, horseback, or other non-motorized travel, as mentioned above.

10. TRAVEL PLAN – WARREN ANALYSIS AREA

Potential effects of this action are: increased sedimentation in streams due to motorized and non-motorized use at road and trail stream crossings, increased chances of petroleum spills, and physical harm to eggs that may be present in redds at fords and elsewhere. Soils on roads and trails at stream crossings can be delivered as sediment to streams via wind, water, and tires at fords. As described above (section V. A. 6.), this additional sediment can reduce habitat quality and adversely affect incubating eggs, and petroleum products can directly poison salmonids and their aquatic invertebrate food source (section V. A. 4.). Mortality of listed fish eggs (adverse effect) can occur should redds be trampled or driven over. Trampling can occur due to any foot or horse use in streams, including use from anglers, swimmers, people floating in watercraft, people hiking, and similar activities. There are approximately 71 road crossings and 31 stream trail crossings in the Warren analysis area, of which an unknown number are fords. About 90 percent of these trail crossings are assumed to be fords (Clem Pope, Recreation Manager, Payette NF, McCall, ID, personal communication). Fording frequently occurs in spawning habitat because these are often the easiest places to cross a stream. Roberts and White (1992), found that twice-daily wading throughout trout egg development killed up to 96% of trout eggs and pre-emergent fry, while a single wading just before hatching killed up to 43% of eggs.

Under the new travel plan action, no motorized cross-country travel will be allowed. The reduction in fording and soil disturbance in RCAs (compared to baseline) associated with restricting motorized cross-country travel will improve the sediment and substrate embeddedness WCIs by only negligible amounts because travel across streams will still occur on authorized motorized routes, and existing areas of erosion are not remedied with the action. For this analysis area, the number of acres open to cross-country travel will be reduced by 23,048 acres, compared to the previous travel plan. Project Design Features and Best Management Practices (BMPs) will reduce sediment delivery during reroute or reconstruction of previously unauthorized routes. Specific examples of Project Design Features and BMPs to reduce sediment delivery are part of the Road and Trail Maintenance federal actions and include: construction and maintenance of water management structures such as waterbars, rolling dips, and bridges; reclamation of abandoned trails, and designing reroutes to meet current Forest Service standards. Over time, increasing public use of roads and trails and related increases in sediment yield will degrade the sediment and substrate embeddedness WCIs in the short and long term, except within the Lake Creek drainage, which has no roads and will be maintained in the short and long term. Because of the proximity of listed fish and critical habitat to roads and/or trails in this analysis area, increases in sediment due to travel plan actions are expected to have adverse effects.

The streambank condition WCI has two definitions for this analysis. For the Travel Plan EIS (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]) analysis, miles of road and trail authorized for motorized use were used as an index of streambank condition, with the assumption that the number of stream crossings would increase with mileage. In the Warren analysis area, streambank condition related to the number of road and trail crossings will be improved because total mileage of roads and trails will be reduced by 1.4 miles. For the LRMP WCI definition of streambank condition, there will be a temporary improvement when cross country motorized travel is restricted due to a reduction in the amount of fording and soil disturbance in RCAs. In the short and long term, streambank condition at existing crossings will degrade with increased public use. Road and trail maintenance activities (with related mitigations) that reduce erosion and sediment delivery to stream channels will decrease the magnitude of degrading effects to sediment, substrate, and streambank condition WCIs from expected increases in public use, but will not alter the general increasing trend. Disturbance history and regime, and RCA WCIs will improve with the restriction on motorized cross-country travel.

Motorized recreation is the most likely source of petroleum contamination with this action. Because motorized trails ford streams directly adjacent to occupied habitat, and roads also occur adjacent to and cross streams, a fuel spill in these areas is likely to result in adverse effects to listed fishes.

Adverse effects to listed fishes such as harassment or redd trampling are also likely to occur from fording streams on foot, horseback, or other non-motorized travel, as mentioned above.

11. TRAVEL PLAN – LOWER MAIN ANALYSIS AREA

a. French, Elkhorn, Partridge, Lake Creeks.

Potential effects of this action are: increased sedimentation in streams due to motorized and non-motorized use at road and trail stream crossings, increased chances of petroleum spills, and physical harm to eggs that may be present in redds at fords and elsewhere. Soils on roads and trails at stream crossings can be delivered as sediment to streams via wind, water, and tires at fords. As described above (section V. A. 6.), this additional sediment can reduce habitat quality and adversely affect incubating eggs, and petroleum products can directly poison salmonids and their aquatic invertebrate food source (section V. A. 4.). Mortality of listed fish eggs (adverse effect) can occur should redds be trampled or driven over. Trampling can occur due to any foot or horse use in streams, including use from anglers, swimmers, people floating in watercraft, people hiking, and similar activities. There are approximately 50 road crossings and 73 stream trail crossings in the French and Elkhorn drainages of the Lower Main Analysis Area, of which an unknown number are fords. There are no road crossings and 26 stream trail crossings in the Partridge and Lake drainages of the Lower Main Analysis Area, of which an unknown number are fords. About 90 percent of these trail crossings are assumed to be fords (Clem Pope, Recreation Manager, Payette NF, McCall, ID). Fording frequently occurs in spawning habitat because these are often the easiest places to cross a stream. Roberts and White (1992), found that twice-daily wading throughout trout egg development killed up to 96% of trout eggs and pre-emergent fry, while a single wading just before hatching killed up to 43% of eggs.

Under the new travel plan action, no motorized cross-country travel will be allowed. The reduction in fording and soil disturbance in RCAs (compared to baseline) associated with restricting motorized cross-country travel will improve the sediment and substrate embeddedness WCIs by only negligible amounts because travel across streams will still occur on authorized motorized routes, and existing areas of erosion are not remedied with the action. For this analysis area, the number of acres open to cross-country travel will be reduced by 2,841 acres in the French and Elkhorn drainages, compared to the previous travel plan (no change in acreage for the Partridge and Lake Creek drainages). Project Design Features and Best Management Practices (BMPs) will reduce sediment delivery during reroute or reconstruction of previously unauthorized routes. Specific examples of Project Design Features and BMPs to reduce sediment delivery are part of the Road and Trail Maintenance federal actions and include: construction and maintenance of water management structures such as waterbars, rolling dips, and bridges; reclamation of abandoned trails, and designing reroutes to meet current Forest Service standards. Over time, increasing public use of roads and trails and related increases in sediment yield will degrade the sediment and substrate embeddedness WCIs in the short and long term, except within

the Lake and Partridge drainages, which have no road crossings and will be maintained in the short and long term. Because of the proximity of listed fish and critical habitat to roads and/or trails in this analysis area, increases in sediment due to travel plan actions are expected to have adverse effects.

The streambank condition WCI has two definitions for this analysis. For the Travel Plan EIS (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]) analysis, miles of road and trail authorized for motorized use were used as an index of streambank condition, with the assumption that the number of stream crossings would increase with mileage. In the French and Elkhorn potions of the Lower Main analysis area, streambank condition related to the number of road and trail crossings will be improved in French Creek because total mileage of roads and trails will be reduced by 5.7 miles, and will be maintained in the other drainages because there is little change in total mileage. For the LRMP WCI definition of streambank condition, there will be a temporary improvement when cross country motorized travel is restricted due to a reduction in the amount of fording and soil disturbance in RCAs. In the short and long term, streambank condition at existing crossings will degrade with increased public use. Road and trail maintenance activities (with related mitigations) that reduce erosion and sediment delivery to stream channels will decrease the magnitude of degrading effects to sediment, substrate, and streambank condition WCIs from expected increases in public use, but will not alter the general increasing trend. Disturbance history and regime, and RCA WCIs will improve with the restriction on motorized cross-country travel.

Motorized recreation is the most likely source of petroleum contamination with this action. Because motorized trails ford streams directly adjacent to occupied habitat, and roads also occur adjacent to and cross streams, a fuel spill in these areas is likely to result in adverse effects to listed fishes.

Adverse effects to listed fishes such as harassment or redd trampling are also likely to occur from fording streams on foot, horseback, or other non-motorized travel, as mentioned above.

12. GRAZING ALLOTMENTS – LOWER MAIN AND MIDDLE MAIN ANALYSIS AREAS

a. Soulen Allotments (Hershey-Lava, Little French, Josephine), Carlson Allotments (Marshall Mountain Allotment, Bear Pete Allotment, Shorts Bar Allotment, French Creek Allotment)

The potential general effects of this action are discussed above under General Effects (V.A.5). Avoidance of access or other activities that may disturb redds or other reproductive behavior will prevent trampling of eggs and adverse effects on spawning or staging. Mitigations restrict livestock salting locations, trailing, bedding, watering, and development of water sources, corrals, and other handling facilities, to locations that will not degrade WCIs such as shade providing riparian vegetation and streambank stability.; therefore, effects to listed species and critical habitat will be negligible. Sheep are trailed along roads and well away from streams, therefore, any effects to listed species and critical habitat would be negligible. Once-over grazing limits designed not to degrade WCI's make more than negligible effects to listed species and critical habitat unlikely. In general, riparian utilization data indicate livestock use has been limited to allowable levels and therefore effects to listed species and critical habitat are likely limited to negligible levels (Nelson 2006, Zurstadt and Bonaminio 2005, Zurstadt 2004, 2003). If future monitoring (range monitoring, MIS monitoring) indicates a degrading trend or the presence of sheep in the vicinity of spawning areas, grazing practices will be modified to avoid more than negligible effects.

Monitoring Results.—Monitoring results of grazing allotments are presented here because future effects of the federal action are expected to be similar to these results.

The 2006 Fisheries—Range Monitoring Report (Nelson 2006) summarizes approximately 13 years of sediment and temperature monitoring at fixed sites in grazed watersheds (the actual length of monitoring records varies among sites) (site maps are included with monitoring reports – Nelson 2006). In general, deleterious effects on salmonid habitat conditions from grazing were not evident, and most trends appeared to be in the direction of improving conditions; more detail is available in the annual monitoring report (Nelson 2006).

Current trends and current conditions in these indices do not show that current grazing (identical to that proposed through 2017) degrades salmonid habitat conditions. In most cases, sediment conditions are favorable for salmonid species. Temperatures are typically satisfactory or higher than referred for anadromous species but often unfavorable for bull trout as defined by LRMP WCIs.

Elkhorn Creek, Upper Site (W053).
Recent cobble embeddedness values (i.e., over the past five years) were generally in the range that would suggest the appropriate function for the SFSR watershed (< 24% for a single estimate), which may be appropriate in this largely granitic watershed. Cobble embeddedness values would be FR using LRMP thresholds. Embeddedness actually seems to be increasing over the past five years. Free matrix values were always above 17% (the "Functioning at Risk" [FR] limit for SFSR watersheds) and often above 27%, which would comport with FA in the SFSR.

Temperatures have consistently been sufficiently high (7d AMAX > 15°C) to warrant assigning this site to the "Functioning at Unacceptable Risk" (FUR) category for temperature with respect to bull trout rearing, though bull trout have not been found in this stream above the mouth.

Fall Creek, Lower Site (W067)
Cobble embeddedness has generally been high, and recent values were generally in the range that would suggest that sediment conditions are "Functioning at Unacceptable Risk" (FUR) relative to criteria for SFSR watershed, which may be appropriate in this granitic watershed as well.

Temperatures have consistently been sufficiently high to exceed the "Functioning Appropriately" (FA) limit for bull trout rearing (7d AMAX > 12°C) and have recently risen to the FUR level. Bull trout occur in the vicinity of this site and upstream in East Fork Fall Creek. The monitoring record is sufficient to model temperature trends.

French Creek, Klip Creek Site (W033)
Embeddedness levels were consistently moderate to high, often exceeding 32%, but fluctuated considerably from year to year. A recent five-year mean of 27.4%, however, would garner an FA rating for the SFSR and may be appropriate here, as well; default LRMP WCIs would yield at least an FR rating for being over 20%. Free matrix counts were very low at the beginning of the record, but have increased to a moderately acceptable level (> 17%) in three of the past four years. There were no temperature data for this site.

French Creek, Boundary Site (W046)
Cobble embeddedness have been high, but recent measurements suggest that the conditions are near what would be considered appropriate function for the SFSR and, possibly, for this largely granitic watershed as well (in fact, the eastern boundary of this watershed is part of the same granitic formation as the western edge of the Lake Creek watershed that provided control sites for developing the SFSR sediment WCIs). Free matrix counts were generally low (< 17%) early in the record but have increased recently and functional condition also appears to be consistent with a determination that would follow from embeddedness levels.

Temperatures have consistently been sufficiently high to exceed the FUR limit for bull trout rearing (7d AMAX > 15°C) and for anadromous species (7d AMAX > 17.7°C [migration] and > 15.5°C [spawning and rearing]). While bull trout have only been credibly documented at the mouth of French Creek, we believe that Chinook and steelhead occasionally spawn upstream of this site.

Little French Creek, Nameless Site (W043)
Embeddedness levels were low at the beginning of the record but exceeded 32% in 2004 and 2005 (FUR). Free matrix counts have generally been relatively high (> 17%) and frequently at or above 27%.

This seems slightly inconsistent with the cobble embeddedness measurements, but potential trends seem consistent. There were no temperature data for this site.

13. Outfitter and Guides – Warren Analysis Area, and Partridge Creek

Potential stock and human impacts to riparian areas, pollution of streams by human and animal waste, removal of riparian vegetation, and ground disturbance leading to sediment delivery are concerns associated with this activity, especially with O&Gs with assigned camps. All of these concerns are documented on annual assigned camp inspection forms (on file at PNF SO). Past inspections have found minor and major problems, such as moving a corral or outhouse that was too close to a small tributary, or creating an off-site water trough for horses to remedy a small area of bank trampling, tree cutting within RCAs, and extensive erosion from facilities located too close to streams (Clem Pope, Payette NF Recreation Manager, personal communication). These problems are a consequence of non-compliance with the permits, and not the result of the Federal Actions as stated. Because mitigation includes continued annual inspections, and problems are required to be remedied before operation continues, and because problems have been demonstrated to have been remedied, negligible effects are expected from this action.

Fish and redd disturbance from fording of streams is also a potential concern with this activity, as O&Gs use some fords that could provide habitat for listed species. There is no information available on the extent of O&G fording, or the proportion of fords that are in listed species habitat compared to the proportion of fords not in listed species habitat. There is also no information to allow discernment of the effects of fording by O&Gs from the effects of fording by the non-outfitted general public.

Effects of fording by the non-outfitted general public are addressed in the Travel Plan federal action, and are considered negative. The evaluation of effects at fords considered in the Travel Plan was unable to discern effects of fording by O&Gs from fording by the general public, however direct negative effects of fording by the non-outfitted general public have been documented (Draft Travel Plan, USFS 2006). No direct effects to fish or redds have been documented where known fording by O&Gs has been evaluated. Further, O&Gs and their clients comprise a smaller population of users, both human and stock, than does the “non-outfitted general public”. Any potential negative effects from O&Gs and their clients, should they be documented, would collectively be of lesser magnitude than those of the “non-outfitted general public”.

Because mitigation measures avoid negative effects of sediment delivery, riparian disturbance, and pollution, and because no documentation exists discerning adverse effects of general-public fording from O&G fording, O&G actions are considered to have negligible effects on listed fish species and critical habitat.

14. Water diversion SUP – Warren Analysis Area

a. Effects Related to all Diversions

The three potential effects of water diversion special use permits are: direct disturbance due to entrainment, sediment deposition, and reduction of habitat area due to removal of water.

Potential effects of these actions are related to direct disturbance by entrainment into diversions and to sediment deposition. The potential area for these effects is around the points of diversion and immediately downstream. The required mitigation measures are intended to prevent these effects from occurring to WCIs in areas occupied by listed fish or eggs.

The diversions include small impoundments, pipes and/or ditches which could entrain fish, resulting in mortality or displacement of fish into unsuitable habitats. However, these effects are mitigated by screening (3/32” mesh) requirements. Screening of diversions with a mesh size of 3/32” has been shown to mitigate entrainment of Chinook salmon juveniles (NMFS 1996). PNF inspections of water diversions have documented general compliance with this measure (CD2: \Support Documents\SUPs\MFSR_Inspections.pdf [in SUPs.zip]). Monitoring has shown that generally, when permittees have been informed about noncompliance on this issue, screening has been implemented

(Kathy Nash, PNF SUP coordinator, McCall Ranger District, McCall, ID, personal communication). Where mitigation measures have been implemented, they have been effective. Because screening with 3/32" mesh has been scientifically reported to be effective in mitigating entrainment of fish, and because PNF monitoring has shown that this mitigation measure has been implemented successfully, the potential for adverse effects is avoided as diversions are not expected to entrain fish.

The existence, maintenance (by hand), and/or reconstruction of diversion equipment (by hand) could cause erosion of streambanks due to ground disturbance. Erosion could also occur due to leakage or washout of diversion equipment. The streambank erosion could result in sediment deposition downstream of diversions. However, these effects are mitigated by requirements for erosion control during maintenance and construction of diversion equipment, and for diversions being maintained in proper working order. Inspections of water diversions have documented general compliance with these measures. Monitoring has shown that generally, when permittees have been informed about noncompliance on this issue, mitigation measures have been implemented and effects have been reduced (Kathy Nash, PNF SUP coordinator, McCall Ranger District, McCall, ID, personal communication). Sediment deposition from ground disturbance or from inadequately maintained diversions is judged to be biologically negligible because of the rarity of its occurrence in inspection reports, because of the small size of the diversions and their associated maintenance requirements, and because of the short duration of maintenance and/or construction actions. The mitigation measures of erosion control and equipment maintenance are judged to be effective in eliminating "more than negligible" quantities of sediment deposition on downstream fish habitat. Because mitigation measures have been shown to be effective, the potential for adverse effects is avoided as sediment is not expected to be delivered in "more than negligible" quantities.

Other potential effects include the reduction of habitat area for listed fish and eggs due to removal of water from affected streams. For this diversion, modeled effects are expected to be negligible because the amount of flow withdrawn (less than 0.1 cfs from a groundwater spring) by the diversion is negligible, compared to the amount of water and habitat in the affected stream (mainstem Warren Creek).

C. Cumulative Effects, State and Private

Cumulative effects are effects of State or private activities that are reasonably certain to occur in the watershed where the Federal action occurs. Ongoing and future actions on State and private land that are reasonably certain to occur are: mining on patented land, subdivision and residential development of private land, water diversions/withdrawals, tourist/guest ranch businesses, recreational use, and road construction, maintenance and use.

The MSSW subwatershed has several parcels of private land as well as several State school sections (undeveloped) and other Fish and Game owned land. This land is minimally developed, and further development is likely to occur at a slow rate, if at all. All of the private land could be subject to further subdividing. Private land owners are entitled to the right of reasonable access under the Alaska National Interest Lands Conservation Act (ANILCA). Risk of cumulative effects in the Main Salmon SW Section 7 Watershed as a whole was judged to be Moderate in Nelson and Burns (2001). Future actions on non-Federal land could result in local, site-specific impacts to some habitat indicators. Cumulative effects are expected to maintain or improve the existing environmental baseline at the watershed scale.

D. Combined Effects, Including Interrelated and Interdependent Federal Actions

Travel plan and Noxious Weed Management actions are expected to have adverse effects on WCIs. Other actions maintain or improve, or have negligible effect on each of the population and habitat WCIs considered in the environmental baseline. The combined effect of these actions will be to maintain or improve most WCIs, except those WCIs adversely affected by Travel Plan and Noxious Weed Management (see Appendix 3).

VI. MITIGATION MEASURES

All mitigation measures have been incorporated into the federal actions.

VII. MONITORING AND EVALUATION

All monitoring and evaluation has been incorporated into the federal actions.

VIII. DETERMINATIONS

Table 13.—Determinations for federal actions in the MSSW Section 7 watershed. All determinations are valid until LRMP revision.

Federal Action	Listed Species or Critical Habitat				
	Chinook, Steelhead	Chinook Critical Habitat	Steelhead Critical Habitat	Bull Trout	Cutthroat Trout
Miscellaneous Forest Products	NLAA	NLAA	NLAA	NLAA	NLLL
Mistletoe Control and Precommercial Thinning	NLAA	NLAA	NLAA	NLAA	NLLL
Fire Management Activities	NLAA	NLAA	NLAA	NLAA	NLLL
Fish Habitat and Riparian Sampling	NLAA	NLAA	NLAA	NLAA	NLLL
Watershed and Fish Habitat Improvement and Maintenance	NLAA	NLAA	NLAA	NLAA	NLLL
Noxious Weed Management	LAA	LAA	LAA	LAA	NLLL
Road Management Trails, Recreation and Administrative Site Operation and Maintenance Travel Plan	LAA	LAA	LAA	LAA	NLLL
Water Diversion SUPs (Warren Heights)	NLAA	NLAA	NLAA	NLAA	NLLL
Outfitter and Guides	NLAA	NLAA	NLAA	NLAA	NLLL
Grazing Allotments	NLAA	NLAA	NLAA	NLAA	NLLL

NOTE: See Acronyms and Abbreviations (Appendix 4) for explanation of species and determination acronyms.

A. RATIONALE

All actions were screened for effects to individual habitat elements using the WCI tables (Appendix 3). Actions were determined "Not Likely to Adversely Affect" the listed species or critical habitat because population characteristics or habitat elements would either be maintained, improved, or not affected by the actions. Actions were determined " Likely to Adversely Affect" the listed species or critical habitat because population characteristics or habitat elements would be degraded by the actions. The determinations are based on the scope of activities described in the plans of operation, project plans, or other supporting documents for each project. This includes the implementation of all mitigation measures that are a part of the action. Adverse effects are expected for the Travel Plan, some Water Diversion SUPs, and Noxious Weed Management actions.

1. MISCELLANEOUS FOREST PRODUCTS

The considered action is **not likely to adversely affect** listed species or critical habitat and **may affect individuals, but is not likely to lead to listing** of cutthroat trout. These activities are expected to yield negligible effects to fish and/or their habitat because required mitigation measures address fuel handling, and preclude actions in RCAs unless both a journey level hydrologist and fisheries biologist agree that required mitigations are met. For a complete discussion of effects see sections V.A. through F. above.

2. MISTLETOE CONTROL AND PRE-COMMERCIAL THINNING

The considered action is **not likely to adversely affect** listed species or critical habitat and **may affect individuals, but is not likely to result in a trend toward federal listing** of cutthroat trout. These activities are expected to yield negligible effects to fish and/or their habitat because required mitigation measures address fuel handling, and preclude actions in RCAs unless both a hydrologist and fisheries biologist agree that required mitigations are met. For a complete discussion of effects see sections V.A. through F. above.

3. FIRE MANAGEMENT ACTIVITIES

The considered action is **not likely to adversely affect** listed species or critical habitat and **may affect individuals, but is not likely result in a trend toward federal listing** of cutthroat trout. To address potential effects, the federal action provides direction such as screening pumps, not dropping retardant in RCAs or streams, containing fuel, proper handling and use of chemicals, not removing RCA trees unless

they present a hazard, and rehabilitating disturbed areas (e.g., fireline, helispots, camps). In addition, direction will be implemented to assure that fire personnel are briefed and familiar with fire management guidelines in this BA, and that oversight and continued education/briefing is provided to fire personnel by resource advisors. This action is expected to have only negligible effects due to implementation of mitigation measures and guidelines, continued education of fire personnel, and use of resource advisors. For a complete discussion of effects see section V.A.2.

4. Fish Habitat and Riparian Sampling

The considered action is **not likely to adversely affect** listed species or critical habitat and **may affect individuals, but is not likely to result in a trend toward federal listing** of cutthroat trout. Required mitigation measures are intended to prevent adverse to listed fishes or eggs. Fish displacements due to personnel presence are judged to be biologically negligible because of the extremely short duration of disturbance. Sediment that is generated due to sampling is expected to settle out within the prescribed buffer distance (one stream width or within one habitat unit of any redd). Buffers are also judged to be effective in eliminating any potential harassment of adjacent fish. For a complete discussion of effects see sections V.A. through F. above.

5. Watershed and Fish Habitat Improvements and Maintenance

The considered action is **not likely to adversely affect** listed species or critical habitat and **may affect individuals, but is not likely to result in a trend toward federal listing** of cutthroat trout because the species and habitat criteria will be maintained or improved. Mitigations described in the Federal action will insure that any temporary degrading effects are negligible. Restrictions on use of mechanized equipment within RCA buffers will insure that any soil, streambank, or streambed disturbance and associated sediment delivery to the stream channel is temporary and minimal so that effects to listed fishes are negligible. Furthermore, a journey level fisheries biologist will insure that activities do not proceed if there is potential for more than negligible effects to individual listed fish, or their eggs. For a complete discussion of effects see sections V.A. through F.

6. Noxious Weed Management

The considered action is **likely to adversely affect** listed species or critical habitat and **may affect individuals, but is not likely to result in a trend toward federal listing** of cutthroat trout. Mitigation measures are expected to minimize effects, but sub-lethal effects to listed fish and their food sources are probable, therefore adverse effects are expected from this action. For a complete discussion of effects see section IV.F.

7. Road Management, Trails, Recreation, and Administrative Site Operation and Maintenance, and Travel Plan

Because these actions are interrelated and interdependent with each other, and the Travel Plan action has been determined to be likely to adversely affect listed fishes or critical habitat, these actions are determined to be **likely to adversely affect** listed species or critical habitat and **may affect individuals, but are not likely to result in a trend toward federal listing** of cutthroat trout. For the Travel Plan, proximity of listed fishes and critical habitat to roads and/or trails in this analysis area, and decreases in streambank stability due to use and increased use of existing trails, road, and fords are expected to have adverse effects. Adverse effects to listed fishes such as harassment or redd trampling are also likely to occur from fording streams on foot, horseback, or other non-motorized travel. On their own, the Road Management and Trails actions are expected to have negligible effects on listed fishes and critical habitat due to mitigation measures that address sediment delivery and removal of LWD from RCAs, minimize potential for petroleum or other chemical contamination, and provide for aquatic organism passage. In addition, where these activities run the risk of affecting or disturbing listed fishes in the immediate area (i.e., harassment, redd destruction, sediment effects) a fisheries biologist must first approve the activity. For a complete discussion of effects see sections V.A. through F.

8. Grazing Allotments

The considered action is **not likely to adversely affect** listed species or critical habitat and **may affect individuals, but is not likely to result in a trend toward federal listing** of cutthroat trout. Due to

watering and fording in only areas without listed fishes or with no spawning habitat, only negligible effects on spawning listed fish are expected. Mitigation measures that include utilization standards, salting areas, handling facilities, trailing, once only grazing, and use of bedding and watering sites ensure that only negligible effects result from this action on listed fishes and critical habitat. For a complete discussion of effects see sections V.A. through F.

9. OUTFITTERS AND GUIDES

The considered action is **not likely to adversely affect** listed species or critical habitat and **may affect individuals, but is not likely to result in a trend toward federal listing** of cutthroat trout. Negligible effects from camp use are expected because past problems have been identified and remedied, and annual inspections will continue to see that camps are meeting LRMP standards and that changes are made should there be potential effects to fish or fish habitat. To reduce the risk of redd trampling or other effects, training to avoid adverse effects will be provided to outfitters and guides. For a complete discussion of effects see sections V.A. through F.

10. WATER DIVERSION SUP (WARREN HEIGHTS)

The water diversion SUP action is ***not likely to adversely affect*** listed species or habitat and **may affect individuals, but are not likely to result in a trend toward federal listing** of cutthroat trout. The diversion would be negligible compared to the subsequent small change in weighted useable area required for all life stages of cutthroat trout, bull trout, Chinook salmon, and steelhead because the amount of habitat that would change from the withdrawal of less than 0.1 cfs from a spring is immeasurable, even at low flows, in mainstem Warren Creek.

IX. REFERENCES

A. PREVIOUS BAS

Previous BAs were previously provided on the Bull Trout CD (PNF 1998), but are identified here for reference.

VOLUME 1: **WAGONER, L.,** and D. C. Burns. 1993. Biological Assessment for the potential effects of managing the Payette National Forest in Main Salmon River Tributaries (Little Salmon River to South Fork Salmon River) on Snake River spring/summer Chinook salmon, Volume 1: Timber Harvest and Associated Activities. USDA Forest Service, Payette National Forest, McCall, Idaho. 43p.

VOLUME 2: **WAGONER, L.**, L. Jacobson, and D. C. Burns. 1993. Biological assessment for potential effects of managing the Payette National Forest in Main Salmon River Tributary watersheds on Snake River spring/summer Chinook salmon, Volume 2: Engineering 1994-2000 Road Maintenance Activities. USDA Forest Service, Payette National Forest, McCall, Idaho. 21p.

VOLUME 3: **JACOBSON, L.** and D. C. Burns. 1994. Biological assessment for potential effects of managing the Payette National Forest in Main Salmon River Tributary watersheds on Snake River spring/summer Chinook salmon, Volume 3: Special Uses 1993-1994. USDA Forest Service, Payette National Forest, McCall, Idaho. 27p.

VOLUME 4: **JACOBSON, L.** and D. C. Burns. 1994. Biological assessment for potential effects of managing the Payette National Forest in Main Salmon River Tributary watersheds on Snake River spring/summer Chinook salmon, Volume 4: 1994 Ongoing and Proposed Mining and Associated Activities. USDA Forest Service, Payette National Forest, McCall, Idaho. 48p.

VOLUME 5: **JACOBSON, L.** and D. C. Burns. 1994. Biological assessment for potential effects of managing the Payette National Forest in Main Salmon River Tributary watersheds on Snake River spring/summer Chinook salmon, Volume 5: Ongoing Miscellaneous Forest Products and the Proposed Warren Bunkhouse. USDA Forest Service, Payette National Forest, McCall, Idaho. 24p.

VOLUME 6: **UBERUAGA, R. D.** and D. C. Burns. 1995. Biological assessment for potential effects of managing the Payette National Forest in the Main Salmon River Section 7 watershed on Snake River spring/summer and fall Chinook salmon, Volume 6: Main Salmon Tributaries Fires Salvage Projects. USDA Forest Service, Payette National Forest, McCall, Idaho. 26p.

VOLUME 7: **JACOBSON, L. K.** and D. C. Burns. 1996. Biological assessment for potential effects of managing the Payette National Forest in the Main Salmon River Section 7 watershed on Snake River spring/summer and fall Chinook salmon, Volume 7: Road Use Agreements in the Warren Creek Subwatershed. USDA Forest Service, Payette National Forest, McCall, Idaho. 9p.

VOLUME 8: **FAUROT, M.** and D. C. Burns. 1996. Biological assessment for the potential effects of managing the Payette National Forest in the Main Salmon River watershed on Snake River spring/summer and fall Chinook salmon, Volume 8: Marshall Mountain, Shorts Bar, Bear Pete and French Creek allotments 1996-2005 and Josephine, Hershey/Lava and Little French Creek sheep allotments 1996-2000. USDA Forest Service, Payette National Forest, McCall, Idaho. 28p.

VOLUME 9: **UBERUAGA, R. D.** and D. C. Burns. 1996. Biological assessment for potential effects of managing the Payette National Forest in the Main Salmon River Section 7 watershed on Snake River spring/summer and fall Chinook salmon, Volume 9: Freight Landing Timber Sale. USDA Forest Service, Payette National Forest, McCall, Idaho. 20p.

VOLUME10: **WALKER, K.** and D. C. Burns. 1997. Biological assessment for potential effects of managing the Payette National Forest in the Main Salmon River Section 7 watershed on Snake River spring/summer and fall Chinook salmon and Snake River summer steelhead trout, Volume 10: Carey Creek Prescribed Burn. USDA Forest Service, Payette National Forest, McCall, Idaho. 18p.

VOLUME 11: **WALKER, K.** and D. C. Burns. 1997. Biological assessment for potential effects of managing the Payette National Forest in the Main Salmon River Tributary watersheds on Snake River spring/summer and fall Chinook salmon and Snake River summer steelhead trout, Volume 11: Rescue Mine Amended Plan of Operations 1997. USDA Forest Service, Payette National Forest, McCall, Idaho. 18p.

VOLUME 12: **WALKER, K.**, D. Hogen, and D.C. Burns. 1998. Biological assessment for potential effects of managing the Payette National Forest in the Main Salmon River Tributary watersheds on Snake River spring/summer and fall Chinook salmon and Snake River summer steelhead trout, Volume 12: Ongoing activities. USDA Forest Service, Payette National Forest, McCall, Idaho. 23p. (plus appendices).

VOLUME 13: **WALKER, K.**, D. Hogen, and D.C. Burns. 1998. Biological assessment for the potential effects of managing the Payette National Forest in Main Salmon River Tributary Watersheds (SW) Volume 13 and Main Salmon River Tributary Watersheds (SE) Volume 6B on Columbia River Bull Trout. Ongoing activities. USDA Forest Service, Payette National Forest, McCall, Idaho. 26p. (plus appendices).

VOLUME 14: **WAGONER, L.** and D.C. Burns. 1999. Biological Assessment for the Potential Effects of Managing the Payette National Forest in the Main Salmon River Tributaries Section 7 Watershed on Snake River spring/summer Chinook salmon, Snake River steelhead, and Columbia River bull trout. Volume 14**:** Proposed activities in the Warren Creek, Lake Creek, and California Creek subwatersheds. August 1999. USDA Forest Service, Payette National Forest, McCall, Idaho. 87p.

VOLUME 15: **NELSON, R. L.** and D.C. Burns. 2001. Biological Assessment for the Potential Effects of Managing the Payette National Forest in the Main Salmon River Tributaries Section 7 Watershed on Snake River spring/summer Chinook salmon, Snake River steelhead, and Columbia River bull trout. Volume 15: Ongoing and New Actions. June 2001. USDA Forest Service, Payette National Forest, McCall, Idaho. 235 p.

VOLUME 16: **WAGONER, L**. and D. C. Burns. 2003. Biological Assessment for the Potential Effects of Managing the Payette National Forest in the Main Salmon River Tributaries Section 7 Watershed on Snake River spring/summer Chinook salmon, Snake River steelhead, and Columbia River bull trout. Volume 16**:** Proposed Big Four mineral exploration in the Warren Creek analysis area. June 2003. USDA Forest Service, Payette National Forest, McCall, Idaho. 47 p.

VOLUME 17: **ZURSTADT, CALEB** and D. C. Burns. 2005. Biological Assessment for the Potential Effects of Managing the Payette National Forest in the Main Salmon River Tributaries Section 7 Watershed on Snake River spring/summer Chinook salmon, Snake River steelhead, and Columbia River bull trout and Biological Evaluation for Westslope Cutthroat trout. Volume 17**:** Lucky Ben Mine Access Road Construction and Arlise Gulch Road Obliteration. May 2005. USDA Forest Service, Payette National Forest, McCall, Idaho. 67p.

VOLUME 18: **FAUROT, MARY** and D. C. Burns. 2005. Biological Assessment for the Potential Effects of Managing the Payette National Forest in the Main Salmon River SW (Volume #18) and the South Fork Salmon River (Volume # 27) Section 7 Watersheds on Snake River Spring/Summer and Fall Chinook salmon, Snake River Steelhead, and Columbia River Bull Trout and Biological Evaluation for Westslope Cutthroat Trout. Volume 18**:** Burgdorf Road Management and Inactive/Abandoned Mine Site Reclamation. August 2005. USDA Forest Service, Payette National Forest, McCall, Idaho. 104p.

B. LITERATURE CITED

AHRENS, W.H. 1994. Herbicide Handbook, Seventh Edition. Weed Science Society of America, publisher. ISBN #10-911733-18-3**.**

- CD1: \Support Documents\Toxicity\escort.pdf

ALEXANDER, G. R.; Hansen, E.A. 1986. Sand bedload in a brook trout stream. North American Journal of Fisheries Management 6:9-13.

ALLEN, M.B., and E.Y. Dawson. 1961. Production of antibacterial substances by benthic tropical marine algae. Journal of Bacteriology. 79.459.

AMARANTHUS, M., H. Jubas, and D. Arthur. 1989. Stream shading, summer stream flow, and maximum water temperature following intense wildfire in headwater streams. USDA Forest Service Gen. Tech. Rep. PSW-109.

BAER REPORTS. 1994. Burned Area Emergency Rehabilitation reports for the Blackwell/Corral, Corral, and Chicken Complex wildfires. Payette National Forest.

BAILEY, L., H. Clouser, and J. Melbo. 1994a. Carey Creek subwatershed riparian inventory. Unpublished report. U.S. Department of Agriculture, Forest Service, Payette National Forest, McCall, Idaho. 28p.

BAILEY, L., S. Taubel, and J. Melbo. 1994b. Rabbit Creek subwatershed riparian inventory. Unpublished report. U.S. Department of Agriculture, Forest Service, Payette National Forest, McCall, Idaho. 28p.

BAKER, M. 1989. Hydrologic and water quality effects of fire. Pgs. 31-42 In: Effects of fire management. Tucson, AZ. USFS, Rocky Mountain Forest and Range Experiment Station, 1990.

BEHNKE, R. J., and M. Zarn. 1976. Biology and management of threatened and endangered western trout. USDA Forest Service. General Tech. Report. RM-28. 45 pp.

BELL, M. C. 1986. Fisheries handbook of engineering requirements and biological criteria. U.S. Army Corps of Engineers, Office of the Chief of Engineers, Fish Passage Development and Evaluation Program, Portland, Oregon.

BELT, G.H., J. O'Laughlin, and T.Merrill. 1992. Design of Forest Riparian Buffer Strips for the Protection of Water Quality: Analysis of Scientific Literature. Idaho Forest, Wildlife, and Range Policy Group Report. No. 8.

BESCHTA, R.L., R.E. Bilby, G.W. Brown, L.B. Holtby, and T.D. Hofstra. 1987. Stream Temperature and Aquatic Habitat: Fisheries and Forestry Interactions. Pages 191-232 *in* Salo and Cundy (1987).

BISSON, ET AL. 1987. Large woody debris in forested streams in the Pacific Northwest: past, present, and future. In: Salo, E. O.; Cundy, T. W., eds. Streamside management: forestry and fishery interactions. Contribution Number 57. Seattle, WA: University of Washington, Institute of Forest Resources. 143-190.

BJORNN, T.C.; Brusven, M.A.; Molnau, M.P.; Milligan, J.H.; R.R. Klamt, Chacho, E.; Schaye, C. 1977. Transport of granitic sediment in streams and its effects on insects and fish. Moscow , ID: University of Idaho, College of Forestry, Wildlife and Range Sciences, Bulletin 17. 43p.

BOWMAN, K., T. Royer, and G.W. Minshall. 1998. Monitoring the range of ecological variability in burned and unburned streams of the Frank Church 'River of No Return' Wilderness during 1997. Stream Ecology Center, Dept. Biol. Sciences. Idaho State University, Pocatello Idaho. 30pp.

BOWMAN, K. and G.W. Minshall. 1999. Assessment of biota and habitat in tributaries of Big Creek and the South Fork Salmon River, Payette National Forest. Stream Ecology Center, Dept. Biol. Sciences. Idaho State University, Pocatello Idaho. 42pp.

BRODERSON, J.M. 1973. Sizing buffer strips to maintain water quality. M.S.Thesis. University of Washington. Seattle.

BRYANT, M. D. 1980. Evolution of large, organic debris after timber harvest: Maybeso Creek, 1949 to 1978. General Technical Report PNW-101. USDA Forest Service.

BULL, W. B. 1979. Threshold of Critical Power in Streams. Geological Society of America Bulletin, Part I, v.90, p453-463. May 1979.

BURNS, D.C, M. Faurot, D. Hogen, M. McGee, R. Nelson, D. Olson, L. Wagoner, and C. Zurstadt. 2005. Bull Trout Populations on the Payette National Forest. USDA Forest Service, Payette National Forest, McCall, Idaho. 104p.

BURROUGHS, E.R. and J.G. King. 1989. Reduction of Soil Erosion on Forest Roads. Res. Paper INT-264. Ogden, UT: INT Forest and Range Experiment Station, USDA Forest Service, 21p.

BURTON, T., B. Norman, G. Ketcheson, H. Hudak, W. Little, W. Grow, T.M. Collins, A.H, Winward, D. Duff, and H. Forsgren. 1992. Integrated riparian evaluation guide. Ogden UT: USDA, Forest Service, Intermountain Region

CEDERHOLM, C.S.; Lestelle, L.C. 1974. Observations on the effects of landslide siltation on salmon and trout resources of the Clearwater River, Jefferson County, Washington 1972-73. Final report FRI-UW-7404. Seattle, WA: University of Washington, Fisheries Research Institute.

CEDERHOLM, C.S.; Salo, E.O. 1979. The effects of logging road landslide siltation on the salmon and trout spawning gravels of Stequaleho Creek and the Clearwater River Basin, Jefferson County, Washington, 1971-1978. Final Rep. FRI-UW-7915, part III. Seattle, WA: University of Washington, Fisheries Research Institute. 99p.

CHAMBERLAIN, T. W., R. D. Harr, and F. H. Everest. 1991. Timber harvesting, silviculture, and watershed processes. *In:* Influences of forest and rangeland management on salmonid fishes and their habitats. W. Meehan, ed. American Fisheries Society Special Publication 19:181-205.

CHAPMAN, D.W. and K.P. McLeod. 1987. Development of criteria for sediment in the Northern Rockies Ecoregion. EPA contract 68-01-6986. Boise, ID. Don Chapman Consultants, INC. 279 pp.

CHEN, J. 1991. Edge effects: microclimatic pattern and biological responses in old-growth Douglas-fir forests. Seattle, WA: University of Washington. 174 p. Ph.D. dissertation.

CLARY, W.P., and B.F. Webster. 1989. Managing grazing of riparian areas in the Intermountain Region. General Technical Report INT-263. Ogden, UT: U.S. Department of Agriculture. Forest Service, Intermountain Research Station.

COBLE, D.W. 1961. Influence of water exchange and dissolved oxygen in redds on survival of steelhead embryos. Transactions of the American Fisheries Society. 90:469-474.

DUGAW, DAX, Jeremiah Heitke, Greg Kliewer, and Boyd Bouwes. 2005. Payette National Forest Annual Summary Report 2001-2004 Effectiveness Monitoring Program for Streams and Riparian Areas Within the Upper Columbia River Basin. PIBO Effectiveness Monitoring Program Staff. 105p.

EUBANKS, S. T. 1980. Full-restoration method for closing spur roads. Journal of Forestry 78:644-645.

FOREST ECOSYSTEM MANAGEMENT ASSESSMENT TEAM. 1993. Forest Ecosystem Management: an Ecological, Economic, and Social Assessment. USGPO, Washington, D.C.

FURNISS, M. J., T. D. Roelofs, and C. S. Lee. 1991. Road construction and maintenance. In: Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats. Chapter 8 In: W. Meehan, ed. Influences of forest and rangeland management on salmonid fishes and their habitats. Special Publication 19:207-296. American Fisheries Society, Bethesda, Maryland.

FAUROT, MARY and D.C. Burns. 2005. Biological Assessment for the potential effects of managing the Payette National Forest in the South Fork Salmon River section 7 watershed on Snake River spring/summer and fall Chinook salmon, Snake River steelhead, and Columbia River bull trout and Biological Evaluation for Westslope Cutthroat Trout. Emergency: Nick Fire Retardant Drop. USDA Forest Service, Payette National Forest, McCall, Idaho. 25p.

GRESSWELL, R.E. 1993. Relative Effects of Fire and Anthropogenic Perturbations on Yellowstone Cutthroat Trout in Yellowstone Lake. In: Agenda and Abstracts, The Ecological Implications of Fire in Greater Yellowstone. Yellowstone N.P. Wyoming. p.17.

GOTTFRIED, G., and L. DeBano. 1990. Streamflow and water quality responses to preharvest prescribed burning in an undisturbed ponderosa pine watershed. Effects of fire management of Southwestern natural resources, proc. of the symposium: Nov. 15-17 1989. USDA—Forest Service, Rocky Mountain Forest and Range Experiment Station, Tucson, Arizona.

GRIFFITH, J.S.; Smith, R.W. 1993. Use of winter concealment cover by juvenile cutthroat and brown trout in the south fork of the Snake River, Idaho. North American Journal of Fisheries Management. 13:823-830.

GUTSELL, J.S. 1921. Danger to fisheries from oil and tar pollution of water. Bureau of Fisheries, Doc. 910, Appendix to Report of U.S. Commission of Fisheries.

HAUSLE, D.A.; Coble, D.W. 1976. Influence of sand in redds on survival and emergence of brook trout (*Salvelinus fontinalis*). Transactions of the American Fisheries Society. 105:57-63.

HEEDE, B. H. 1980. Stream Dynamics : An Overview for Land Managers. Gen. Tech. Rpt. RM-72. Rocky Mountain Forest and Experiment Station. Forest Service. USDA.

HEFFNER, K. 1996. Water quality effects of three dust abatement compounds. U.S. Department of Agriculture, Forest Service, Idaho Panhandle National Forests, Sandpoint Ranger District, Sandpoint, Idaho. 7p.

- CD1: \Support Documents\reports\DustAbatement.pdf (in file Reports.zip)

HOGEN, D.M. 2002. Spatial and temporal distribution of bull trout *Salvelinaus confluentus,* in the upper East Fork South Fork Salmon River watershed, Idaho. MS thesis. Moscow, ID: University of Idaho, College of Graduate Studies. 200p.

HILLMAN, T.W.; Griffith, J.S.; Platts, W.S. 1987. Summer and winter habitat selection by juvenile Chinook salmon in a highly sedimented Idaho stream. Transactions of the American Fisheries Society. 116:185-195.

HURLEY, M.M. 1996. A report on the basin wide survey of tributaries of the Salmon River, South Fork Salmon River and Secesh River. Unpublished report in partial fulfillment of contract 53-256-4-24 on file, USDA Forest Service, Payette National Forest, McCall, Idaho. 71p (plus appendices).

IRVING, J. S., and T. C. Bjornn. 1984. Effects of substrate size composition on survival of kokanee salmon and cutthroat and rainbow trout. Idaho Fish and Game Technical Report 84-6, pp 21.

KELLEY, D.W.; Dettman, D.H. 1980. Relationships between streamflow, rearing habitat, substrate conditions, and juvenile steelhead populations in Lagunitas Creek, Marin County, 1979. Unpublished report prepared for Marin Municipal Water District. Sacramento, CA: D.W. Kelley, Aquatic Biologist.

KETCHESON, G.L. and W.F. Megahan. 1990. Sediment deposition on slopes below roads in the Idaho Batholith. Unpublished report, USDA Forest Service, Intermountain Forest and Range Experiment Station, Boise, ID. 16p.

KONDOLF, G.M. 1993. Lag in stream channel adjustment to livestock exclosure, White Mountains, California. Restoration Ecology 2:226-230.

LEBOW, S.T. and M. Tippie. 2001. Guide for minimizing the effect of preservative-treated wood on sensitive environments. USDA Forest Service General Technical Report, FPL-GTR-122.

MCCUDDIN, M.E. 1977. Survival of salmon and trout embryos and fry in gravel-sand mixtures. M.S. thesis. Moscow, ID: University of Idaho. 30p.

MCDADE, M.H., F.J. Swanson, W.A. McKee, J.F. Franklin, and J. Van Sickle. 1990. Source distances for coarse woody debris entering small streams in western Oregon and Washington. Canadian Journal of Forest Research 20:326-330.

MCKEE, J.E., and H.W. Wolf. 1963. Water Quality Criteria. Publication No. 3-A. The Resources Agency of California. State Water Resources Control Board. Sacramento, California. 548p.

MAHONEY, D.L., R.D. Jones, L.R. Keading, and D.G. Carty. 1993. Qualitative Assessment of Stream Fisheries in Yellowstone National Park Following the 1988 Forest Fires. In: Agenda and Abstracts, The Ecological Implications of Fire in Greater Yellowstone. Yellowstone N.P., Wyoming. p.20.

MEEHAN, W.R.; Bjornn,T.C.. 1991. Salmonid Distributions and Life Histories. American Fisheries Society Special Publication. 19: 47-82.

MINSHALL, G. W., J. Brock, and J. Varley. 1989. Wildfires and Yellowstone's stream ecosystems. Bioscience Vol. 39 No. 10., November 1989. pp 707-715.

MINSHALL, G.W., C. Robinson, and T. Royer. 1994. Biomonitoring results from wilderness streams in Idaho. Stream Ecology Center, Dept. Biol. Sciences. Idaho State University, Pocatello, Idaho. 32pp.

MYERS, T.J., and S. Swanson. 1995 Impact of Deferred Rotation Grazing on Stream Characteristics in Central Nevada: A Case Study. North American Journal of Fisheries Management: 15(2):428-439.

NELSON, R. L. 2006. Payette National Forest Fisheries — Range Monitoring Report Sediment, Riparian, And Temperature Monitoring, 1993-2005. USDA Forest Service, Payette National Forest, McCall, Idaho. 69p.

NELSON, R.L.; Burns, D.C. 2005. Developing appropriate sediment–related watershed condition indicators for national environmental policy act analyses and biological assessments in the South Fork Salmon River basin. Unpublished report. McCall, ID: U.S. Department of Agriculture, Forest Service, Payette National Forest. 101p.

NELSON, R.L., L.J. Wagoner, D.C. Burns, J. Lund, and M. Faurot. 1996. Deposition of Fine Sediment in Selected Streams on the Payette National Forest, Idaho. Report of Sediment Trends and Monitoring Efforts 1983-1995. Trends in Cobble Embeddedness, Free Matrix Particles, and Surface Fines in Relation to Mining Areas in the East Fork South Fork Salmon River and Big Creek Watersheds. Unpublished Report. Payette National Forest.

NELSON, R.L., L.J. Wagoner, D.C. Burns, D.D. Newberry, and J. Lund. 1997. Deposition of Fine Sediment in Tributaries of the Salmon River on the Payette and Boise National Forests, Idaho; Report of Sediment Trends and Monitoring Efforts, 1977-1996. Payette National Forest, McCall, ID. 200 pp.

NELSON, R.L., D.C. Burns, D.D. Newberry. 1998. Spawning Area Sediment Trends in the South Fork Salmon River, Payette and Boise National Forests. March 1998. U.S. Forest Service, Payette National Forest, McCall, ID. 33p.

NELSON, R., D.C. Burns, D.D. Newberry, and M. Faurot. 1999. Deposition of fine sediment in the South Fork Salmon River and Chamberlain Creek watersheds, Payette and Boise National Forests, Idaho. Report of sediment trends from core sampling, 1966-1998. Intragravel conditions in spawning areas. Payette National Forest, McCall, Idaho.

NELSON, R.L., and D.C. Burns. 1999. Deposition of fine sediment in the Salmon River Watershed, Payette and Boise National Forests, Idaho. Interstitial conditions in Salmon River Tributaries. Report of sediment trends from cobble embeddedness and free matrix sampling, 1981-1998. Payette National Forest, McCall, Idaho.

NELSON, R., D.C. Burns, D.D. Newberry, and K. Ketchu. 2004. Deposition of fine sediment in the Salmon River Watershed, Payette and Boise National Forests, Idaho. Statistical Summary of Intragravel Monitoring, 1975-2003, and Photographic Summary of South Fork Salmon River Changes Since 1966. Payette National Forest, McCall, Idaho. 186p.

NMFS. 2007**.** Endangered Species Act – Section 7 Consultation Biological Opinion & Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation. Effects of Treatment of Noxious Weeds in the Frank Church-River of No Return Wilderness Management – Salmon-Challis, Boise, Payette, Nez Perce and Bitterroot National Forests. USDI National Marine Fisheries Service, Northwest Region, Seattle, WA. 75p.

- CD1: \Support Documents\BAs\LOCs\noaa_weeds_bo_07.pdf

NMFS. 2003. Endangered Species Act Section 7 Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation U.S. Forest Service Noxious Weed Control Program in the Salmon River Drainage Idaho, Valley, Adarns, and Custer Counties, Idaho. USDI National Marine Fisheries Service, Northwest Region, Seattle, WA. 86 p.

NMFS. 2001. Letter of concurrence on South Fork Salmon River Section 7 Watershed Biological Assessments on Ongoing and Proposed Projects and Programs on the Payette National Forest (17 Actions).

NMFS. 1997. Fish Screening Criteria for Anadromous Salmonids. Portland, Oregon.

NMFS. 1995. Biological Opinion. Land and resource management plans for the Boise, Challis, Nez Perce, Payette, Salmon, Sawtooth, Umatilla, and Wallowa-Whitman National Forests. NMFS Northwest Region. (Chinook salmon)

NORRIS, L. A., H. W. Lorz, and S. V. Gregory. 1991. Forest chemicals. Chapter 7 In: W. Meehan, ed. Influences of forest and rangeland management on salmonid fishes and their habitats. Special Publication 19:207-296. American Fisheries Society, Bethesda, Maryland.

NUTTALL, P.M.; 1972. The effects of sand deposition upon the macroinvertebrate fauna of the River Camel, Cornwall. Freshwater Biology. 2:181-186.

OLSON, DALE and D.C. Burns. 2003. Biological Assessment for the potential effects of managing the Payette National Forest in the Little Salmon River section 7 watershed on Snake River spring/summer and fall Chinook salmon, Snake River steelhead, and Columbia River bull trout and Biological Evaluation for Westslope Cutthroat Trout. Volume 17: Middle Little Vegetation Management Project, Brown Creek Timber Sale Goose Creek Watershed Projects Rapid River Prescribed Burn. June 2003. USDA Forest Service, Payette National Forest, McCall, Idaho. 184p.

OVERTON, C.K., J.D. McIntyre, R. Armstrong, S.L. Whitwell, and K.A. Duncan. 1995. User's guide to fish habitat: descriptions that represent natural conditions in the Salmon River basin. General Technical Report INT-GTR-322. USDA Forest Service, Intermountain Research Station, Ogden, Utah. 142p.

OVERTON, C.K., S.P. Wollrab, B.C. Roberts, and M.A. Radko. 1997. R1/R4 (Northern/Intermountain Regions) Fish and Fish Habitat Standard Inventory Procedures Handbook. USDA Forest Service. Intermountain Research Station. General Technical Report. INT-GTR-346.

PETERSON, R.H., Metcalfe, J.L. 1981. Emergence of Atlantic salmon fry from gravels of varying composition: a laboratory study. Canadian Technical Report of Fisheries and Aquatic Sciences 1020. St. Andrews, NB: Department of Fisheries and Oceans, Fisheries and Environmental Sciences, Biological Station. 15p.

PHILLIPS, R.W., R.L. Lantz, and E.W. Claire. 1975. Some effects of gravel mixtures on emergence of coho salmon and steelhead fry. Transactions of the American Fisheries Society. 104:461-466.

PLATTS, W.S., and R. L. Nelson. 1985. Impacts of rest-rotation grazing on streambanks in a forested watershed in Idaho. North American Journal of Fisheries Management 5: 547-556.

PLATTS, W.S. 1991. Livestock grazing. In: Influences of forest and rangeland management on salmonid fishes and their habitats. W. Meehan, ed. American Fisheries Society Special Publication 19:389-423.

RALEIGH, R. 1995. Warren Creek drainage stream inventory report. Unpublished report. Raleigh Consultants, Council, ID. Unnumbered pages.

REEVES, G. et al. 1995. A disturbance-based ecosystem approach to maintaining and restoring freshwater habitats of evolutionarily significant units of anadromous salmonids in the Pacific Northwest. American Fisheries Society symposium. 17:334-349. Bethesda MD.

RIESER, D.W.; White, R.G. 1988. Effects of two sediment size-classes on survival of steelhead and Chinook salmon eggs. North American Journal of Fisheries Management 8:432-437.

RIEMAN, B. et al. 1995. Does wildfire threaten extinction for salmonids? Responses of redband trout and bull trout following recent large fires on the Boise National Forest. Proceedings: first conference on fire effects on rare and endangered species and habitats, Coeur d'Alene ID, Nov. 1995. Internatl. Assn. Wildland Fire. pp 47-57.

RIEMAN, B., and J. Clayton. 1997. Wildfire and native fish: issues of forest health and conservation of sensitive species. Fisheries, Vol.22, No.11. American Fisheries Society, Bethesda MD.

ROBERTS, B., and R.G. White. 1992. Effects of Angler Wading on Survival of Trout Eggs and Preemergent Fry. No. Am. Jour. Fish. Mgmt. 12:450-459.

ROYER, T., C. Robinson, and G. W. Minshall. 1995. Influence of wildfire on selected streams in the Payette National Forest. Stream Ecology Center, Dept. Biol. Sciences. Idaho State University, Pocatello, Idaho. 35pp.

ROYER, T., and G.W. Minshall. 1996. Habitat and biotic conditions during 1995 in streams influenced by wildfire. Stream Ecology Center, Dept. Biol. Sciences. Idaho State University, Pocatello, Idaho. 41pp.

ROYER, T., G.W. Minshall, and K. Bowman. 1997. Assessment of habitat and biota in tributaries of Big Creek and the South Fork Salmon River, Payette National Forest. Stream Ecology Center, Dept. Biol. Sciences. Idaho State University, Pocatello, Idaho. 46pp.

ROYER, T. and G.W. Minshall. 1997. Temperature patterns in small streams following wildfire. Arch. Hydrobiol. 140:2:237-242.

SAHA, M.K., and S.K. Konar. 1986. Chronic Effects of Crude Petroleum on aquatic Ecosystem. Environ. Ecol. 4:506-510.

SANDERS, B. 1998. Payette National Forest hazard/risk assessment for ponderosa pine dominated fire regimes. USDA Forest Service, Payette National Forest, unpublished report, McCall, Idaho. 20p (plus appendix).

SAVELAND, J., and S. Bunting. no date. Fire effects in ponderosa pine forests. University of Idaho, Moscow ID.

SCHULLERY, P., and J.D. Varley. 1994. Fires and Fish, The Fate of Yellowstone Waters Since 1988. Trout. Spring. Arlington, VA p.16-23.

SEDELL, J. R., F.H. Everest, and D.R. Gibbons. 1987. Streamside vegetation management for aquatic habitat. In: Proceedings, national silvicultural workshop - silviculture for all resources. U.S. Forest Service, Timber Management, Washington, D.C. 115-125.

SIGLER, J. W., T. C. Bjornn, and F. H. Everest. 1984. Effects of chronic turbidityon density and growth of steelhead and coho salmon. Transactions of the American Fisheries Society 113:142-150.

STEINBLUMS, I. 1977. Streamside bufferstrips: survival, effectiveness, and design. Corvallis, OR: Oregon State University. 181 p. M.S. thesis.

SWIFT, L. W. 1986. Filter Strip Widths for Forest roads in the Southern Appalacians. Southern Journal of Applied Forestry. 10(1): 27-34.

STELLE, W. JR. 2000. Letter of Concurrence. Re: Consultation on Canuk Mine. Portland, OR: U.S. Department of the Interior, National Marine Fisheries Service. 2p.

TAGART, J.V. 1984. Coho salmon survival from egg deposition to emergence. In: Walton, J.M.; Houston, D.B. eds. Proceedings of the Olympic Wild Fish Conference. Port Angeles, WA.

TEBO, L.B., JR.; 1955. Effects of siltation, resulting from improper logging, on the bottom fauna of a small trout stream in the southern Appalachians. Progressive Fish-Culturist. 17:66-70.

URBAN, D. J., and J. N. Cook. 1986. Ecological Risk Assessment. Hazard Evaluation Division Standard Procedure. Washington, D.C. Office of Pesticide Programs, US EPA, EPA-54019-83-001.

USFS. 2006. 2,4-D Human health and ecological risk assessment. Final report. USDA Forest Service, Arlington, Virginia. Unnumbered pages.

- CD1: \Support Documents\Toxicity\093006_24d.pdf

USFS. 2003. Southwest Idaho Ecogroup Boise, Payette, and Sawtooth National Forests Revised Land and Resource Management Plans and EIS.

USFS. 2000. Flathead National Forest Noxious and Invasive Weed Control Environment Assessment.

USFWS. 2001. Letter of concurrence, biological assessments for ongoing activities. Boise, ID: United States Department of the Interior, Fish and Wildlife Service, Columbia River Basin Ecoregion, Snake River Basin Office. 2p.

WEAVER, W. D., D. Hagans, and M. A. Madej. 1987. Managing forest roads to control cumulative erosion and sedimentation effects. Pages 119-124 In Proceedings, California watershed management conference. University of California, Wildland Resources Center Report 11, Berkeley, CA.

WESTERN WOOD PRESERVERS INSTITUTE, Wood Preservation Canada, Southern Pressure Treaters" Associates, and Timber Piling Council. 2006. Best management practices for the use of treated wood in aquatic and other sensitive environments.

YOUNG, M.K., and M.A. Bozek. 1996. Postfire Impacts on Coarse Woody Debris and Adult Trout in Northwestern Wyoming Streams. In: Agenda and Abstracts, The Ecological Implications of Fire in Greater Yellowstone. Yellowstone N.P. Wyoming. p.43

ZURSTADT, CALEB. 2004. 2003 Payette National Forest Fisheries-Range Monitoring Report. USDA Forest Service, Payette National Forest, McCall, Idaho. 121p.

ZURSTADT, CALEB and G. Bonaminio. 2005. 2004 Payette National Forest Fisheries-Range Monitoring Report. USDA Forest Service, Payette National Forest, McCall, Idaho. 74p.

X. APPENDICES

A. APPENDIX 1. FEDERAL ACTIONS SUMMARY

Table 14.—Federal Actions in the Main Salmon SW Section 7 watershed (Lower Main. Middle Main, and Warren Creek, analysis areas) and their status. For actions that were completed as of 2001, see Nelson and Burns (2001).

Volume & Title	Author & Year	Federal Action & Mitigation that was Incomplete or Ongoing in Wagoner and Burns 2001	Status	Effect
1. Ongoing Timber Harvest	Wagoner and Burns 1993	Timber harvest and mitigation	Complete	Effects mitigated to negligible levels
2. Road Maintenance	Wagoner, Jacobson, and Burns 1993	Road maintenance activities that prevent resource damage	Ongoing	Potential adverse effects from lack of road maintenance.
3. Special Uses	Jacobson and Burns 1994	Various special uses administration	Ongoing	See Vol. 15
4. Ongoing and Proposed Mining	Jacobson and Burns 1994	Shamrock claim Gold Eagle Reclam	No activity Complete	None Removal of ground disturbing effects related to historical mining
5. Misc. Forest Products, Warren Bunkhouse	Jacobson and Burns 1994	Small harvests, limited activity in RCAs	Ongoing	Mitigation designed to prevent adverse effects
6. Fire Salvage	Uberuaga and Burns 1995	Timber harvest plus mitigation to include erosion control measures, road closures, rehab areas of ground disturbance	Complete	No adverse effects
7. Warren Creek Watershed Road Use	Jacobson and Burns 1995	Road use agreements Fuel storage and handling restrictions to reduce chance of spills	Complete	Reduced chance of spills
8. Various S&G Allotments	Faurot and Burns 1996	Allotment management, plus mitigation that reduces band size, reduces forage utilization levels, and avoids riparian areas	Ongoing	Mitigated to negligible level. Annual range monitoring has not shown adverse effects.
9. Freight Landing Timber Sale	Uberuaga and Burns 1996	Project never completed	Dropped	None
10. Carey Creek Rx Fire	Walker and Burns 1997a	Rx Burn plus mitigation : no ground disturbing machinery on site, no fire line, use of existing roads only	Complete	Potential effects were mitigated to negligible levels
11. Rescue Mine Amended Operating Plan	Walker and Burns 1997b	Erosion control, water management, road maintenance, fuel containment	Ongoing	Mitigation designed to prevent adverse effects.
12. Ongoing Activities (Steelhead, Chinook)	Walker, Hogen, and Burns 1998a	See Volume 15, where most of these activities were consulted on again	Ongoing	Mitigation designed to prevent adverse effects. Potential adverse effects from lack of road maintenance. Annual range monitoring has not shown adverse effects.
13. Ongoing Actions (Bull trout)	Walker, Hogen, and Burns 1998b	See Volume 15, where most of these activities were consulted on again	Ongoing	Mitigation designed to prevent adverse effects. Potential adverse effects from lack of road maintenance. Annual range monitoring has not shown adverse effects.
14. Canuk Amendment, Various Proposed Actions	Wagoner and Burns 1999	Fuel containment, limited scope and timeframe	Completed	No adverse effects observed

Volume & Title	Author & Year	Federal Action & Mitigation that was Incomplete or Ongoing in Wagoner and Burns 2001	Status	Effect
15. Ongoing Forest Actions	Nelson and Burns (2001)	Fish Habitat and Riparian Sampling	Ongoing	Effects mitigated to negligible
		Miscellaneous Forest Products	Ongoing	Localized areas have documented effects of reduced LWD in RCAs due to illegal firewood harvest
		Mistletoe Control and PreCommercial Thinning	Ongoing	Site-specific critieria for RCA buffers has prevented any documented adverse effects
		Road Management	Ongoing	Effects mitigated to negligible
		Noxious Weed Control	Ongoing	Effects mitigated to negligible
		Trails, Rec and Admin Site O&M	Ongoing	Trail maintenance has reduced erosion in specific locations. Existing adverse effects due to trail crossings have not been systematically inventoried, and ford-related impacts are ongoing.
		Travel Plan	Ongoing	Existing adverse effects due to road and trail crossings have not been systematically inventoried, and ford-related impacts are ongoing. Off-road access has caused documented adverse effects to stream channels. Some specific mitigation items have been completed (see Env. Baseline in this BA)
		Watershed Improvements and Maintenance	Ongoing	Localized areas of rehabilitation and long-term reductions in sediment delivery and improved hydrologic function.
		Wildland Fire Suppression	Ongoing	Effects have been mitigated to negligible
		Soulen and Carlson Allotments	Ongoing	No evidence of adverse effects (Zurstadt 2004, 2003 Range Monitoring Report). Some specific mitigation items have been completed (see Env. Baseline in this BA)
		Warren Outfitters	Ongoing. Sold to Pony Ck Outfitters	No adverse effects
		Beaverdam Mining Claim	Closed – Plan of Operations	Effects have been mitigated to negligible
		Canuk Mine	Completed	Effects have been mitigated to negligible
		Shamrock Placer Exploration, Reclamation	Completed	Effects have been mitigated to negligible
16. Big Four Mine	Wagoner and Burns 2003	Big Four mine approval of operation for exploration and development Erosion control, water management, fuel containment, restrictions on activities in RCAs, construction of a temporary log bridge, inspection for fish and redds in Mayflower Creek before work occurs.	Closed-not implemented	None
17. Lucky Ben Mine	Zurstadt and Burns 2005	Access road construction and Arlise Gulch road obliteration	Not yet initiated	None
18. Burgdorf	Faurot and	Mine reclamation, road	Not yet initiated	None

Volume & Title	Author & Year	Federal Action & Mitigation that was Incomplete or Ongoing in Wagoner and Burns 2001	Status	Effect
Roads	Burns 2005	obliteration, road-to-trail conversion		

B. APPENDIX 2. ENVIRONMENTAL BASELINE MATRICES

1. LOWER MAIN ANALYSIS AREA (EXCLUSIVE OF FRENCH CREEK)

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th-level HU, Payette NF portion Elkhorn, Partridge, Lake Creek drainages
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA- Lower Main Analysis Area (exclusive of French Creek)		

Pathways & Indicators	Population and Environmental Baseline Desired Condition	Baseline Condition	Discussion of Baseline and Current Condition
Local Population Character (Bull trout only)			
Local Population Size	Mean total local population size or local habitat capacity more than several thousand individuals. Adults in local population > 500. All life stages are represented within the local population.	**FR** **PJ**	Lake Creek contains bull trout and suitable habitat but has not been extensively surveyed for them. Two bull trout were found in the second reach (near Box Canyon to the West Fork Lake Creek confluence) during the 1992 BLM survey, and one bull trout was caught by PNF personnel using hook and line during 1997. Brook trout were observed in a 2002 survey of lower Lake Creek. We do not have sufficient data to know much about bull trout population dynamics in the analysis area, but the small size of the system, its inherent instability, and the presence of brook trout suggests lowered bull trout viability (Burns et al. 2005). In 2005, three 100 m surveys were conducted on Lake Creek starting 0.5 miles above the forest boundary and ending 2 miles above the boundary. No bull trout were observed but two brook trout were observed in the highest reach (2005 unpublished data, PNF Supervisors Office). In Partridge Creek no bull trout were positively identified in a 1994 survey, but one fish "with tan spots" was noted that may have been a bull trout (unpublished data on file, PNF Supervisor's Office, McCall, ID). In 1997, upper areas of Partridge Creek were surveyed from Hell Creek upstream, and bull trout as large as 7 inches (178mm) were noted during this survey; no brook trout were seen. One bull trout was observed near the mouth in a 2002 survey. Again, we do not have sufficient data to know much about bull trout population dynamics in the analysis area, but its potential is probably similar to that of Lake Creek (Burns et al. 2005). In 2005, two 100 m reaches were surveyed upstream of Hell Creek, the uppermost site was the only one snorkeled. No fish were observed in this reach (2005 unpublished data, PNF Supervisors Office). Surveys were conducted in 1994 and 1995, but bull trout have not been documented in Elkhorn Creek. There are natural barriers a short distance upstream of the mouth, but additional surveys of headwaters areas are warranted because resident bull trout are often found above barriers (Meehan and Bjornn 1991) and we have found them above substantial waterfalls in the Brownlee Reservoir Section 7 watershed and above Whimstick Creek (Burns et al. 2005).
Growth and Survival	Local population has the resilience to recover from temporary or short-term disturbances (e.g., catastrophic events, etc.) or local population declines within 1 to 2 generations (5-10 years). The local population is characterized as increasing or stable. At least 10 years of data support this estimate.	**FR** **PJ**)	See above. - If "...a trend cannot be confirmed, a local population will be considered at risk until enough data is available to accurately determine its trend" (from definition of Functioning at Risk in LRMP App. B, Table B-1
Life History Diversity and Isolation	The migratory form is present and the local populations are in close proximity to each other. Migratory corridors and rearing habitat (lake or larger river) are in good to excellent condition for the species. Neighboring local populations are large with high likelihood of producing surplus individuals or straying adults that will mix with other local populations.	**FR** **PJ**	Natural barriers restrict upstream movements into Elkhorn Creek. It also has many very steep reaches that may not be regarded complete barriers but certainly limit movement. Fluvial bull trout from the East Fork SFSR (EFSFSR) have been found in the Main Salmon River (Hogen 2002); it is unclear whether fluvial fish spawn in this area even though they exist downstream. In most cases, migratory individuals probably cannot reach resident populations in any streams except Lake Creek, and Partridge Creek (though bull trout have not been documented), because the others have barrier falls near their mouths. Overall, we know very

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th-level HU, Payette NF portion Elkhorn, Partridge, Lake Creek drainages
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA- Lower Main Analysis Area (exclusive of French Creek)		

Pathways & Indicators	Population and Environmental Baseline Desired Condition	Baseline Condition	Discussion of Baseline and Current Condition
			little about biological integrity and life history expression, but small fish size suggests predominantly resident populations with little genetic exchange. Brook trout are found in Lake and Elkhorn Creeks, which likely reduces viability through competition and hybridization (Burns et al. 2005).
Persistence and Genetic Integrity	Connectivity is high among multiple (5 or more) local populations with at least several thousand fish each. Each of the relevant local populations has a low risk of extinction. The probability of hybridization or displacement by competitive species is low to nonexistent.	**FR** **PJ**	In most cases, bull trout populations in this watershed are little affected by specific anthropogenic actions but biological integrity has probably been compromised by brook trout invasion. Overall, the bull trout in this watershed seem likely to have no more than moderate viability, or intermediate to other watersheds on the PNF (Burns et al. 2005).
Water Quality			
Temperature	**Bull trout:** 7-day average maximum temperature in a reach during the following life history stages: Incubation: 2-5°C or 35.6-41.0°F Rearing: 4-12°C or 39.2-53.6°F Spawning: 4-9°C or 39.2-48.2°F Also temperatures do not exceed 15°C or 59.0°F in areas used by adults during migration (no thermal barriers) **Chinook/steelhead**: 7-day average minimum. Spawning, rearing and migration: 50-57°F (10-13.9°C)	FUR D	Unpublished data on file at PNF, SO, McCall, ID Lake Creek 2004: 16.1 FUR Bull trout, FR Chinook/ Steelhead Elkhorn Creek 2004: 20.2 FUR Nelson 2006: Elkhorn FUR In 2003, water temperatures in Elkhorn, French, and Fall Creek exceeded State of Idaho standards for salmonid spawning, but the long-term trends do not appear to differ substantially from the non-grazed control sites. Elkhorn Creek site W053 was added to the range monitoring program in 1996. In 1994, wildfire burned parts of this watershed, including the riparian area at this site. With a major part of the stream's canopy cover burned, maximum stream temperatures are consistently above 20 °C. Additional monitoring is needed to assess long-term trends in temperature; however the trend in the available data does not appear to differ substantially from the control sites (Zurstadt 2003, Range Monitoring Report).
Intragravel Quality (in areas of spawning and incubation for anadromous fishes) **"Sediment" WCI has been replaced by new theory in Nelson and Burns 2005**	**Revised WCI for PNF, Nelson and Burns 2005** High intragravel quality is indicated by: (a) 5-year mean fines < 6.3 mm concentrations at depth of 28% or less with no more than two years between 28% and 36%. OR (b) 5-year mean fines < 6.3 mm concentrations at depth between 28% and 36% with a decreasing trend	See Interstitial Sediment Deposition, below	Intragravel quality data is not available for this analysis area
Chemical Contaminants and/or Nutrients	Low levels of chemical contamination from agricultural, industrial, and other sources; no excess nutrients, no 303(d) water quality limited water bodies.	FA PJ	No known chemical contamination from agricultural, industrial or other sources are known to occur within the watershed (personal observation).
Habitat Access			
Physical Barriers	Any man-made barriers present in watershed allow upstream and downstream fish passage at all flows.	FA PJ	Elkhorn Creek has a substantial waterfall downstream of the Forest boundary which is thought to limit migration in most years (unpublished data on file, PNF

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th-level HU, Payette NF portion Elkhorn, Partridge, Lake Creek drainages
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA- Lower Main Analysis Area (exclusive of French Creek)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
			Supervisor's Office, McCall). There are no known anthropogenic barriers.
Habitat Elements			
Interstitial Sediment Deposition (all listed fished in tributary systems) **"Substrate Embeddedness" WCI has been replaced by new theory in Nelson and Burns 2005**	Revised WCI for PNF, Nelson and Burns 2005 Adequate interstitial space is indicated by: (a) Any single measured mean embeddedness value less than or equal to 24%. OR (b) Any single mean free matrix count over 27% OR (c) A five-year mean measured cobble embeddedness level of 32% or less OR (d) A five-year mean free matrix count of 17% or more	FR (Elkhorn) D,PJ FA (Lake, Partridge) PJ	Nelson 2006: Elkhorn FA Zurstadt and Bonaminio 2005: this is not a mean value for 2004 2004 Elkhorn Ck site FM=26%, CE=26% FR There is significant evidence for a long-term downward trend in embeddedness at the Elkhorn Creek site (Zurstadt 2004, 2003 Range Monitoring Report). Surface fines from Lake, Partridge (unpublished data on file at PNF SO) used for this evaluation because no embeddedness or free matrix data was available.
Large Woody Debris	> 20 pieces per mile, > 12 inches in diameter, > 35 feet length; and adequate sources of large woody debris for both long and short-term recruitment in RCAs.	FR D	Unpublished data on file at PNF SO from 2005 100-m surveys: Lake Ck Reach 1 (0.5 mile upstream of Forest Boundary): 0/100m. Reach 2 (0.5 miles upstream of Reach 1): 2/100m = 33/mi Reach 3 (1.0 miles upstream of Reach 1): 1/100m=16/mi Partridge Ck Reach 1, 2: 1/100m = 16/mi FA in Nelson and Burns (2001).

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th-level HU, Payette NF portion Elkhorn, Partridge, Lake Creek drainages
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA- Lower Main Analysis Area (exclusive of French Creek)		

	Population and Environmental Baseline		
Pathways & Indicators	**Desired Condition**	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Pool Frequency	**Bull trout:** Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment. Large woody debris recruitment standards for functioning appropriately (above) are met and pool frequency in a reach closely approximates: Wetted Width (m.) / Number of Pools/100 m 0-2: 2.4 2-3: 3.7 3-5: 3.0 5-6: 2.4 6-9: 1.4 9-11: 1.1 11-12: 0.6 12-20: 0.6 20-30: 0.2 **Chinook/steelhead:** Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment. Large woody debris recruitment standards for functioning appropriately (above) are met and pool frequency in a reach closely approximates: Channel Width (m.) / Number of Pools/100 m 0-2: 11.4 2-3: 6.0 3-5: 4.3 5-6: 3.5 6-8: 2.9 8-15: 1.6 15-23: 1.4 23-30: 1.1	FA D	Unpublished data on file at PNF SO from 2005 100-m surveys: Lake Creek Reach 1 : 8/100m, mean width=4.0m Reach 2 : 8/100m, mean width=4.2m Partridge Ck Reach 1-2 : 6/100m, mean width=4.8-5.0m FA in Nelson and Burns (2001).
Pool Quality	Each reach has many large pools > 3.28 feet (1 meter deep). Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment.	FA D	See above
Off-Channel Habitat	Watershed has many ponds, oxbows, backwaters, and other off-channel areas with cover; side channels are low energy areas.	FR PJ	Unpublished data on file at PNF SO, McCAll, ID: Lake and Partridge Creeks 100-m survey 2005 report: Very confined stream channels (naturally). Few off-channel areas.
Refugia	**Bull trout:** Habitats capable of supporting strong and significant local populations are protected and are well distributed and connected for all life stages and forms of the species. **Chinook/steelhead:** Habitat refugia exist and are adequately buffered (e.g., by intact riparian conservation areas); existing refugia are sufficient in size, number, and connectivity to maintain viable populations or sub-population	**FR** **PJ**	"Natural barriers restrict upstream movements into Elkhorn Creek. It also has many very steep reaches that may not be regarded complete barriers but certainly limit movement. Fluvial bull trout from the East Fork SFSR (EFSFSR) have been found in the Main Salmon River (Hogen 2002); it is unclear whether fluvial fish spawn in this area even though they exist downstream. In most cases, migratory individuals probably cannot reach resident populations in any streams except Lake Creek, and Partridge Creek (though bull trout have not been documented), because the others have barrier falls near their mouths" (Burns et al. 2005).

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th-level HU, Payette NF portion Elkhorn, Partridge, Lake Creek drainages
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA- Lower Main Analysis Area (exclusive of French Creek)		

	Population and Environmental Baseline		
Pathways & Indicators	**Desired Condition**	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Channel Condition and Dynamics			
Width/Maximum Depth Ratio	≤10	FA D	Unpublished data on file at PNF SO (FBase output) 2005 100m-surveys Lake 6.1-7.2 Partridge 6.9-9.6
Streambank Condition	>90% of any stream reach has stable banks relative to the percent of inherent stable streambanks associated with a similar unmanaged stream system.	FA D	Unpublished data on file at PNF SO: 100m-survey 2005, FBas output. Mean percentages: Partridge Creek 100%. Lake Creek 100% Some RCA concerns were noted in unpublished riparian surveys for Partridge Creek (1998) (on file at PNF SO). See Disturbance History WCI.
Floodplain Connectivity	Within RCAs, floodplains and wetlands are hydrologically linked to the main channel; overbank flows occur and maintain wetland/floodplain functions; and riparian vegetation succession.	**FR** **PJ**	Some RCA concerns were noted in unpublished riparian surveys for Partridge Creek (1998) (on file at PNF SO). See Disturbance History WCI. FR in Nelson and Burns (2001)
Flow/Hydrology			
Change in Peak/Base Flows	Watershed hydrograph indicates peak flow, base flow, and flow timing characteristics comparable to an undisturbed watershed of a similar size, geomorphology and climatology.	FR PJ	Analysis area has been moderately disturbed in ways that could cause change in peak/base flows (personal observation). FR in Nelson and Burns (2001).
Change in Drainage Network	Zero or minimum change in active channel length correlated with human caused disturbance.	**FR** **PJ**	Analysis area has been moderately disturbed in ways that could cause change in drainage network (personal observation). FR in Nelson and Burns (2001)
Watershed Conditions			
Road Density and Location	Total road density < 0.7 miles/square mile of subwatershed, no roads within RCAs.	FR D	Road density for the Lower Main (SalmonRiver-Partridge) analysis area is 0.4 mi/sq. mi overall, with 0.3 mi/sq. mi in RCAs (CD1: \Support Documents\Maps\total_roads.pdf). These values include the French Creek driainage.
Disturbance History	< 15% ECA (entire watershed) with no concentration of disturbance in areas with landslide or landslide prone areas, and/or refugia, and/or RCAs.	FR PJ	ECA for the Salmon River-Partridge analysis area is 21% (CD1: \Support Documents\Maps\eca_lsp.pdf). This value includes the French Creek drainage. Nelson et al. (2004) state: "We cannot confirm that even high ECA, as estimated on the PNF to date, has any observable effect on salmonid habitat." Moderate amount of timber harvest in Partridge and Elkhorn Creek (Nelson and Burns (2001)), concentration of disturbance in RCA due to flooding and dam blowout in lower Lake Creek. Unpublished Riparian Survey of Partridge Creek 1998, on file at PNF SO **Nonsystem ORV trail** off Trail 508 to Hard Butte and Upper Twin Lake. This area has extensive ORV damage in almost all the inlets, wetlands and outlets of the three headwater lake drainages.

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th-level HU, Payette NF portion Elkhorn, Partridge, Lake Creek drainages
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA- Lower Main Analysis Area (exclusive of French Creek)		

	Population and Environmental Baseline		
Pathways & Indicators	**Desired Condition**	**Baseline Condition**	**Discussion of Baseline and Current Condition**
			Trail 347: Cattle and ORV damage above Stream 29 and at the stream crossing is severe extensive sedimentation, eroded banks, bare slopes, and rutting. **Grazing concerns**: Streams show extensive cattle grazing impacts between 7000' el. where streambanks are sloughing and trampled. Gullying, rilling, and sedimentation were observed here, also eroded banks, headcuts, large amounts of disturbance species, and bare sideslopes. Channel stability rated fair to poor.
Riparian Conservation Areas	The riparian conservation areas within the subwatershed(s) have historic and occupied refugia for listed, sensitive or native/desired nonnative fish species which are present and provide: adequate shade, large woody debris recruitment, sediment buffering, connectivity, and habitat protection and connectivity to adequately minimize adverse effects from land management activities (>80% intact). All vegetative components are within desired conditions identified in Appendix A of the Forest Plan. RCA functions and processes are intact, providing resiliency from adverse affects associated with land management activities. Conditions fully support habitat for aquatic species.	**FR** **PJ**	Unpublished data on file at PNF SO: "Recruitable wood was present on the steep slopes [of Partridge Creek]". Concentration of disturbance in RCA due to flooding and dam blowout in lower Lake Creek. See disturbance history WCI for description of RCA concerns in Partridge Creek. LWD and sediment WCIs are not functioning appropriately.
Disturbance Regime	Disturbance resulting from land management activities are negligible or temporary. Streamflow regimes are appropriate to the local geomorphology, potential vegetation and climatology resulting in appropriate high quality habitat and watershed complexity that provide refugia and rearing space for all life stages or multiple life-history forms. Ecological processes are within historical ranges.–Resiliency of habitat to recover from land management disturbances is high.	FR PJ	Lower elevations have a road paralleling the stream from the mouth to the PNF boundary(personal observation). Many motorized trails are within RCAs, with adverse effects noted in Disturbance History WCI. Streambank condition, Interstitial Sediment, and temperature are not functioning appropriately (see above). See WCIs above
Integration of Species and Habitat Conditions **Chinook, steelhead, bull trout, westslope cutthroat trout**	Habitat quality and connectivity among local populations is high. The migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival and growth are consistent with pristine habitat. The local population has the resilience to recover from short-term disturbance within one to two generations (5 to 10 years). The local population is fluctuating around an equilibrium or is growing.	**FR** **PJ**	Habitat quality is not FA for temperature, sediment. No data to determine population trends.

2. *FRENCH CREEK*

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	5th HU: French Creek 1707060209-01
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – French Creek (part of Lower Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** <u>**See PNF LRMP App B, Table B-1 for complete definitions of conditions**</u>	**Discussion of Baseline and Current Condition**
Local Population Character (Bull trout only)			
Local Population Size	Mean total local population size or local habitat capacity more than several thousand individuals. Adults in local population > 500. All life stages are represented within the local population.	**FR** **PJ**	Surveys conducted in 1992 and 1995 found bull trout present in French Creek below the falls (BLM data on file, PNF Supervisor's Office) and near the mouth (Veach 1995). The lowermost falls on French Creek provide at least a partial barrier to fish movement upstream from the Salmon River, though there have been isolated reports of Chinook salmon above the barrier that may be able to ascend the falls when flows are low (Uberuaga 1992). Brook and redband trout are common above the falls in French Creek and several tributaries (including Little French Creek). Brook trout are common in Little French Creek (personal observation Rodger Nelson, Fisheries Biologist, PNF) (Burns et al. 2005).
Growth and Survival	Local population has the resilience to recover from temporary or short-term disturbances (e.g., catastrophic events, etc.) or local population declines within 1 to 2 generations (5-10 years). The local population is characterized as increasing or stable. At least 10 years of data support this estimate.	FR PJ	See above.
Life History Diversity and Isolation	The migratory form is present and the local populations are in close proximity to each other. Migratory corridors and rearing habitat (lake or larger river) are in good to excellent condition for the species. Neighboring local populations are large with high likelihood of producing surplus individuals or straying adults that will mix with other local populations.	FR PJ	Most of the tributary systems in MSSW exhibit substantial natural fragmentation as well as some more recent fragmentation from anthropogenic actions. Natural barriers restrict upstream movements into Little French Creek and French Creek. It also has many very steep reaches that may not be regarded complete barriers but certainly limit movement. Fluvial bull trout from the East Fork SFSR (EFSFSR) have been found in the Main Salmon River (Hogen 2002); it is unclear whether fluvial fish spawn in this area even though they exist downstream. In most cases, migratory individuals probably cannot reach resident populations in any streams because of barrier falls near their mouths. Overall, we know very little about biological integrity and life history expression, but small fish size suggests predominantly resident populations with little genetic exchange. Brook trout are widely distributed however, which likely reduces viability through competition and hybridization (Burns et al. 2005)
Persistence and Genetic Integrity	Connectivity is high among multiple (5 or more) local populations with at least several thousand fish each. Each of the relevant local populations has a low risk of extinction. The probability of hybridization or displacement by competitive species is low to nonexistent.	FR PJ	In most cases, bull trout populations in this watershed are little affected by specific anthropogenic, but biological integrity has probably been compromised by brook trout invasion. Overall, the bull trout in this watershed seem likely to have no more than moderate viability, or intermediate to other watersheds on the PNF (Burns et al. 2005).

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	5th HU: French Creek 1707060209-01
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – French Creek (part of Lower Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** <u>**See PNF LRMP App B, Table B-1 for complete definitions of conditions**</u>	**Discussion of Baseline and Current Condition**
Water Quality			
Temperature	**Bull trout:** 7-day average maximum temperature in a reach during the following life history stages: Incubation: 2-5°C or 35.6-41.0°F Rearing: 4-12°C or 39.2-53.6°F Spawning: 4-9°C or 39.2-48.2°F Also temperatures do not exceed 15°C or 59.0°F in areas used by adults during migration (no thermal barriers) **Chinook/steelhead**: 7-day average maximum. Spawning, rearing and migration: 50-57°F (10-13.9°C)	**FUR** **D**	Unpublished data (7 d avg max) on file at PNF Supervisor's Office, McCall, ID: French Creek Lower PNF Boundary Site 18.6 degrees Centigrade In 2003, water temperatures in French Creek exceeded State of Idaho standards for salmonid spawning, but the long-term trends do not appear to differ substantially from the non-grazed control sites (Nelson 2006, Zurstadt 2004, 2003 Range Monitoring Report).
Intragravel Quality (in areas of spawning and incubation for anadromous fishes) **"Sediment" WCI has been replaced by new theory in Nelson and Burns 2005**	Revised WCI for PNF, Nelson and Burns 2005 High intragravel quality is indicated by: (a) 5-year mean fines < 6.3 mm concentrations at depth of 28% or less with no more than two years between 28% and 36%. OR (b) 5-year mean fines < 6.3 mm concentrations at depth between 28% and 36% with a decreasing trend.	See Interstitial Sediment Deposition, below	Intragravel quality data is not available for this analysis area
Chemical Contaminants and/or Nutrients	Low levels of chemical contamination from agricultural, industrial, and other sources; no excess nutrients, no 303(d) water quality limited water bodies.	FA PJ	No known chemical contamination from agricultural, industrial or other sources are known to occur within the watershed (personal observataion).
Habitat Access			
Physical Barriers	Any man-made barriers present in watershed allow upstream and downstream fish passage at all flows.	FA PJ	French Creek has a substantial waterfall downstream of the Forest boundary which is thought to limit migration in most years (unpublished data on file, PNF Supervisor's Office, McCall). There are no known anthropogenic barriers.

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	5th HU: French Creek 1707060209-01
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – French Creek (part of Lower Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** **See PNF LRMP App B, Table B-1 for complete definitions of conditions**	**Discussion of Baseline and Current Condition**
Habitat Elements			
Interstitial Sediment Deposition (all listed fished in tributary systems) **"Substrate Embeddedness" WCI has been replaced by new theory in Nelson and Burns 2005**	Revised WCI for PNF, Nelson and Burns 2005 Adequate interstitial space is indicated by: (a) Any single measured mean embeddedness value less than or equal to 24%. OR (b) Any single mean free matrix count over 27% OR (c) A five-year mean measured cobble embeddedness level of 32% or less OR (d) A five-year mean free matrix count of 17% or more	FUR D	Nelson 2006: Klip site FA, Boundary site FA, Little French site FUR Zurstadt and Bonaminio 2005 (these are not 2004 mean values): 2004 French Ck site W033. FM=11%, CE=34% FUR 2004 French Ck site W046. FM=16%, CE=30% FUR 2004 Little French site. FM=26%, CE=33% FUR "Little French Creek does not currently appear to be a source of fine sediment into French Creek, unless the sediment is not readily stored at W043 and instead passes downstream into French Creek " (Zurstadt 2004). Increased sediment from trail use within the watershed was noted in a 2002 unpublished riparian survey (on file at PNF SO). See specific descriptions below under Disturbance History WCI.
Large Woody Debris	> 20 pieces per mile, > 12 inches in diameter, > 35 feet length; and adequate sources of large woody debris for both long and short-term recruitment in RCAs.	FA D	Unpublished data on file at PNF SO from 2005 survey of 1 100-m reach: 15 pieces/100m. FA in Nelson and Burns (2001).

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	5th HU: French Creek 1707060209-01
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – French Creek (part of Lower Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** **See PNF LRMP App B, Table B-1 for complete definitions of conditions**	**Discussion of Baseline and Current Condition**
Pool Frequency	**Bull trout:** Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment. Large woody debris recruitment standards for functioning appropriately (above) are met and pool frequency in a reach closely approximates: Wetted Width (m.) / Number of Pools/100 m 0-2: 2.4 2-3: 3.7 3-5: 3.0 5-6: 2.4 6-9: 1.4 9-11: 1.1 11-12: 0.6 12-20: 0.6 20-30: 0.2 **Chinook/steelhead:** Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment. Large woody debris recruitment standards for functioning appropriately (above) are met and pool frequency in a reach closely approximates: Channel Width (m.) / Number of Pools/100 m 0-2: 11.4 2-3: 6.0 3-5: 4.3 5-6: 3.5 6-8: 2.9 8-15: 1.6 15-23: 1.4 23-30: 1.1	FA D	Unpublished data on file at PNF SO from 2005 survey of 1 100-m reach: 5 pools/100m, avg. width=4.1m. FA in Nelson and Burns (2001). Dugaw et al. 2005. 2001-2004 Annual Summary Report for the Effectiveness Monitoring Program for Streams and Riparian Areas within the Upper Columbia River Basin: Little French: 28 pools/mile=5 pools/100m, width=11m
Pool Quality	Each reach has many large pools > 3.28 feet (1 meter deep). Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment.	FA PJ	See above
Off-Channel Habitat	Watershed has many ponds, oxbows, backwaters, and other off-channel areas with cover; side channels are low energy areas.	FA PJ	Off channel habitat has probably been affected by historic grazing (personal observation).
Refugia	**Bull trout:** Habitats capable of supporting strong and significant local populations are protected and are well distributed and connected for all life stages and forms of the species. **Chinook/steelhead:** Habitat refugia exist and are adequately buffered (e.g., by intact riparian conservation areas); existing refugia are sufficient in size, number, and connectivity to maintain viable populations or sub-population	**FR** **PJ**	Burns et al. 2005: "Most of the tributary systems in MSSW exhibit substantial natural fragmentation as well as some more recent fragmentation from anthropogenic actions. Natural barriers restrict upstream movements into Little French Creek and French Creek. It also has many very steep reaches that may not be regarded complete barriers but certainly limit movement." Sediment degradation noted in above WCIs

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	5th HU: French Creek 1707060209-01
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – French Creek (part of Lower Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** <u>**See PNF LRMP App B, Table B-1 for complete definitions of conditions**</u>	**Discussion of Baseline and Current Condition**
Channel Condition and Dynamics			
Width/Maximum Depth Ratio	≤10	FA D, PJ	FBase output from unpublished data on file at PNF SO, McCAll, ID: French Creek 100-m survey 2005 8.8-10.3 Width/mean depth = FUR in Nelson and Burns (2001)
Streambank Condition	>90% of any stream reach has stable banks relative to the percent of inherent stable streambanks associated with a similar unmanaged stream system.	FA D	Unpublished FBase output data on file at PNF SO, McCAll, ID: French Creek 100-m survey 2005 report: 98-99% FA Stability concerns were noted in unpublished riparian surveys (2002) (on file at PNF SO). See Disturbance History WCI below. FA in Nelson and Burns (2001)
Floodplain Connectivity	Within RCAs, floodplains and wetlands are hydrologically linked to the main channel; overbank flows occur and maintain wetland/floodplain functions; and riparian vegetation succession.	**FR** **PJ**	RCA concerns were noted in unpublished riparian surveys (2002) (on file at PNF SO). See Disturbance History WCI below. FR in Nelson and Burns (2001)
Flow/Hydrology			
Change in Peak/Base Flows	Watershed hydrograph indicates peak flow, base flow, and flow timing characteristics comparable to an undisturbed watershed of a similar size, geomorphology and climatology.	FR PJ	Analysis area has been moderately disturbed but is largely roadless (personal observation). FR in Nelson and Burns (2001).
Drainage Network Increase	Zero or minimum change in active channel length correlated with human caused disturbance.	**FR** **PJ**	Analysis area has been moderately disturbed but is largely roadless (personal observation). FR in Nelson and Burns (2001).
Watershed Conditions			
Road Density and Location	Total road density < 0.7 miles/square mile of subwatershed, no roads within RCAs.	FR PJ	Road densities are low overall in the analysis area, but lower elevations have a road paralleling the stream from the mouth to the PNF boundary. Many motorized trails are within RCAs, with adverse effects noted in Disturbance History WCI, below. Road density for an area including the French, Elkhorn, Partridge, and Lake drainages is 0.4 mi/sq.mi, with 0.3 mi/sq.mi in RCAs (CD1: \Support Documents\Maps\total_roads.pdf).
Disturbance History	< 15% ECA (entire watershed) with no concentration of disturbance in areas with landslide or landslide prone areas, and/or refugia, and/or RCAs.	FR PJ	ECAs for the French Creek drainage ranged from 20-37% during LRMP revision (PNF WARS database, USFS 2003 PNF). Disturbances that could change ECA since then have been minimal. ECA for an area including French, Elkhorn, Partridge, and Lake drainages is 21% (CD1: \Support Documents\Maps\eca_lsp.pdf However, Nelson et al. (2004) state, "We cannot confirm that even high ECA, as estimated on the PNF to date, has any observable effect on salmonid habitat." The following concerns were noted in unpublished riparian surveys (2002) (on file at PNF SO): **East tribs to Little French Creek**: "The narrow riparian area (15') was trampled in the 7080' el. area. Bare soil areas and a few small gullies were noted at 7500' el. below Center Ridge. Area of Concern 4e is located where Forest Trail 504 crosses this channel. Motorcycles had rutted the channel (15' long ruts). Area of

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	5th HU: French Creek 1707060209-01
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – French Creek (part of Lower Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	Baseline Condition See PNF LRMP App B, Table B-1 for complete definitions of conditions	Discussion of Baseline and Current Condition
			Concern 7a is located in this tributary drainage where the trail intercepts the stream and motorized vehicles had rutted stream channels". **North tribs to Little French Creek**: "Area of Concern 2d1 is located on a small intermittent north tributary to Little French Creek on Trail 348 where sheep trampling has widened the channel. Sloughing banks were observed here 100' upstream and 50' downstream of the stream/trail crossing. Area of Concern 2c is located on Forest Trail 504 through north tributaries to Little French Creek below its junction with Trails 501 and 348 between 6700' and 6300' elevation. Three areas (6400', 6530', and 6730' el.) had motorcycle damage in riparian areas and stream crossings" **Klip Creek and tribs**: "Area of Concern 2o is motorcycle damage at 4 locations – 2 places on Bear Pete Trail 142: the stream crossing at 7750' el. (a mouse was seen swimming across the trail here) and in the wetland area north of this crossing; and 2 locations on the top of Pete Creek Trail 144: this trail section west of the headwater meadow could be rerouted to avoid wetlands. Area of Concern 3b is located at the Forest Trail 116 crossing where motorcycles have rutted, widened, and silted the stream (Porcupine Lake area). Sediment deposition was noted directly below the trail crossing of this south tributary" **North Creek**: "Area of Concern 2e1 along the Bear Pete Trail through Frosty Meadows and headwater channels north of the meadows. Motorized vehicles have damaged headwater streams (including the stream from the pond) and have left deep ruts through the meadow. Area of Concern 2b is located on the lower tributary at the trail crossing where motorized vehicles had rutted and silted the channel." **Center Creek:** "Areas of Concern 5b and 5c are located in this area where Forest Trail 504 crosses Center Creek, and spring areas to the southeast." **Upper French:"** Areas of Concern 2c1 and 2c2 are located in this area along Forest Trail 504. [Photo 21] shows an unprotected crossing on the southeast tributary to French Creek at 5900' el.; and [photo 22] shows one of a few unprotected crossings between the southeast tributary and Jackson Creek. Motorcycle activity has widened and silted these crossing areas. [Photos 23 & 24] show Area of Concern 2c3: trail damage on Forest Trail 116 along Jackson Creek. Here, horses and ORVs have eroded banks, and rutted and silted streams and the trailbed along a half mile or more of trail.
Riparian Conservation Areas	The riparian conservation areas within the subwatershed(s) have historic and occupied refugia for listed, sensitive or native/desired nonnative fish species which are present and provide: adequate shade, large woody debris recruitment, sediment buffering, connectivity, and habitat protection and connectivity to adequately minimize adverse effects from land management activities (>80% intact). All vegetative components are within desired conditions identified in Appendix A of the Forest Plan. RCA functions and processes are intact, providing resiliency from adverse affects associated with land management activities. Conditions fully support habitat for aquatic species.	FR PJ	RCA concerns were noted in unpublished riparian surveys (2002) (on file at PNF SO). See Disturbance History WCI. Lower elevations have a road paralleling the stream from the mouth to the PNF boundary (personal observation). Many motorized trails are within RCAs, with adverse effects noted in Disturbance History WCI. Streambank condition, Interstitial Sediment, and temperature are not functioning appropriately (see above). RCAs are probably 70-80% intact as this is largely a roadless area (personal observation).

Agency/Unit	Payette NF, McCall and New Meadows RD	HU Code and Name	5th HU: French Creek 1707060209-01
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – French Creek (part of Lower Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** <u>See PNF LRMP App B, Table B-1 for complete definitions of conditions</u>	**Discussion of Baseline and Current Condition**
Disturbance Regime	Disturbance resulting from land management activities are negligible or temporary. Streamflow regimes are appropriate to the local geomorphology, potential vegetation and climatology resulting in appropriate high quality habitat and watershed complexity that provide refugia and rearing space for all life stages or multiple life-history forms. Ecological processes are within historical ranges. Resiliency of habitat to recover from land management disturbances is high.	FR PJ	Lower elevations have a road paralleling the stream from the mouth to the PNF boundary (personal observation). Many motorized trails are within RCAs, with adverse effects noted in Disturbance History WCI. Streambank condition, Interstitial Sediment, and temperature are not functioning appropriately (see above).
Integration of Species and Habitat Conditions **Chinook, steelhead, bull trout, westslope cutthroat trout**	Habitat quality and connectivity among local populations is high. The migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival and growth are consistent with pristine habitat. The local population has the resilience to recover from short-term disturbance within one to two generations (5 to 10 years). The local population is fluctuating around an equilibrium or is growing.	FR PJ	Habitat quality is not FA for temperature, sediment, and streambank condition. No data to determine population trends (Burns et al. 2005).

3. MIDDLE MAIN ANALYSIS AREA (EXCLUSIVE OF FALL CREEK)

Agency/Unit	Payette NF, McCall RD	HU Code and Name	California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 [Fall Creek, also part of this analysis area, is analyzed in a separate table; see "Middle MainSalmon-(Fall Creek only) Environmental Baseline table", immediately following this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	4 6th level HUs
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA Middle Main Analysis Area (exclusive of Fall Creek)		

Pathways & Indicators	Population and Environmental Baseline Desired Condition	Baseline Condition	Discussion of Baseline and Current Condition
Local Population Character (Bull trout only)			
Local Population Size	Mean total local population size or local habitat capacity more than several thousand individuals. Adults in local population > 500. All life stages are represented within the local population.	**Functioning at Risk** **D** **PJ**	Data are not available to accurately assess total population size in the analysis area. The data that are available indicate that bull trout are present 1.at the mouth of California Creek (one bull trout (300-350mm) and 7 bull trout (>400mm) were observed at the mouth in 2002); and 2.about 12 miles upstream of the mouth, above the Union Creek confluence (several bull trout 100-200mm observed in 2001) (unpublished data on file PNF Supervisors Office 2001, 2002). The presence of abundant brook trout in the upper reaches may be limiting local population size (PJ). 100-m surveys in 2002 of Rabbit (lower 7 miles) Creek showed no bull trout in those locations (steelhead and cutthroat were observed at the mouth). A 100 m survey of Carey Creek (lower 2 miles) showed no bull trout in that location (Unpublished data on file PNF Supervisors Office 2005) (Burns et al. 2005).
Growth and Survival	Local population has the resilience to recover from temporary or short-term disturbances (e.g., catastrophic events, etc.) or local population declines within 1 to 2 generations (5-10 years). The local population is characterized as increasing or stable. At least 10 years of data support this estimate.	**Functioning at Risk** **PJ -**	There are not sufficient trend data to characterize growth and survival. If "…a trend cannot be confirmed, a local population will be considered at risk until enough data is available to accurately determine its trend" (from definition of Functioning at Risk in LRMP App. B, Table B-1)
Life History Diversity and Isolation	The migratory form is present and the local populations are in close proximity to each other. Migratory corridors and rearing habitat (lake or larger river) are in good to excellent condition for the species. Neighboring local populations are large with high likelihood of producing surplus individuals or straying adults that will mix with other local populations.	**Functioning at Risk** **PJ**	Fluvial bull trout were observed in 2002 at the mouth of California Creek, though it was noted that "seems unlikely that bull trout could migrate up this reach [about 1.5 miles upstream of the mouth] at low flow". A barrier to fish passage was noted about 980 feet above the mouth. A barrier to fish passage was noted about 7 miles upstream of the mouth of Rabbit Creek, though fish (steelhead and cutthroat) were only observed in the lower 1.5 miles. (unpublished data on file PNF Supervisors Office 2002). Some habitat fragmentation is likely in the upper portion of the analysis area from culverts and dredge piles. Populations of bull trout occur in neighboring drainages, such as Warren Creek and the SF Salmon River; however, the degree of bull trout movement between drainages in unknown. No bull trout have been reported from Carey Creek, but Hurley (1996) suggested that stream reaches that could not be investigated should be surveyed closely because there appeared to be sufficient suitable habitat for bull trout. However, Carey Creek is very steep over the lower several miles of its course, and would present a very serious challenge to dispersal upstream where there is better habitat. Much of the better habitat is on BLM land, and they have not found bull trout (Burns et al.2005)

Agency/Unit	Payette NF, McCall RD	HU Code and Name	California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 [Fall Creek, also part of this analysis area, is analyzed in a separate table; see "Middle MainSalmon-(Fall Creek only) Environmental Baseline table", immediately following this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	4 6th level HUs
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA Middle Main Analysis Area (exclusive of Fall Creek)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
			Burns et al. 2005: "In most cases, migratory individuals probably cannot reach resident populations in any streams except California Creek, Lake Creek, and Partridge Creek (though bull trout have not been documented), because the others have barrier falls near their mouths. Overall, we know very little about biological integrity and life history expression, but small fish size suggests predominantly resident populations with little genetic exchange. Brook trout are widely distributed however, being found in most streams (Fall Creek is only likely exception), which likely reduces viability through competition and hybridization."
Persistence and Genetic Integrity	Connectivity is high among multiple (5 or more) local populations with at least several thousand fish each. Each of the relevant local populations has a low risk of extinction. The probability of hybridization or displacement by competitive species is low to nonexistent.	**Functioning at Risk** **D** **PJ -**	Some habitat fragmentation is likely from culverts in upper reaches of the analysis area. Populations of bull trout occur in neighboring drainages, such as Warren Creek and the SF Salmon River; however, the degree of bull trout movement between drainages is unknown. Brook trout occur in California Creek. Burns et al. 2005: "Most of the tributary systems in MSSW exhibit substantial natural fragmentation as well as more recent fragmentation from anthropogenic actions. Natural barriers restrict upstream movements into Carey Creek, California Creek, and Rabbit Creek. They also have many very steep reaches that may not be regarded complete barriers but certainly limit movement. … Most other systems, with the probable exception of Maxwell Creek (a California Creek tributary) in the BLM mining area, actually have relatively low road densities and low natural sediment rates and natural disturbances probably overwhelm anthropogenic disturbances. In most cases, bull trout populations in this watershed are little affected by specific anthropogenic actions (Warren Creek is exceptional in this respect), but biological integrity has clearly been compromised by brook trout invasion. Overall, the bull trout in this watershed seem likely to have no more than moderate viability, or intermediate to other watersheds on the PNF."

Agency/Unit	Payette NF, McCall RD	HU Code and Name	California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 [Fall Creek, also part of this analysis area, is analyzed in a separate table; see "Middle MainSalmon-(Fall Creek only) Environmental Baseline table", immediately following this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	4 6th level HUs
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA Middle Main Analysis Area (exclusive of Fall Creek)		

Pathways & Indicators	Population and Environmental Baseline Desired Condition	Baseline Condition	Discussion of Baseline and Current Condition
Water Quality			
Temperature	**Bull trout:** 7-day average maximum temperature in a reach during the following life history stages: Incubation: 2-5°C or 35.6-41.0°F Rearing: 4-12°C or 39.2-53.6°F Spawning: 4-9°C or 39.2-48.2°F Also temperatures do not exceed 15°C or 59.0°F in areas used by adults during migration (no thermal barriers) **Chinook/steelhead**: 7-day average minimum. Spawning, rearing and migration: 50-57°F (10-13.9°C)	**Functioning at Risk** **PJ**	No stream temperatures have been recorded with continuously recording temperature loggers within the analysis area. Surveys of upper elevation reaches of California Creek show midday July water temperatures (handheld) of 8-11 degrees C. Surveys of lower elevation reaches of California and Rabbit Creeks show midday August temperatures of 9.5-14 degrees C (17 degrees C at the mouth of California, which is influenced by the Main Salmon River) (unpublished data on file, PNF Supervisors Office, 2001, 2002).In general temperatures exceeded the WCI desired conditions and are considered functioning at risk. No past activities have likely led to increases in stream temperatures by reducing shade except for the old jeep road along California Creek.
Sediment	**Intragravel Quality** **(in areas of spawning and incubation for anadromous fishes)** **"Sediment" WCI has been replaced by new theory in Nelson and Burns 2005** Revised WCI for PNF, Nelson and Burns 2005 High intragravel quality is indicated by: (a) 5-year mean fines < 6.3 mm concentrations at depth of 28% or less with no more than two years between 28% and 36%. OR (b) 5-year mean fines < 6.3 mm concentrations at depth between 28% and 36% with a decreasing trend.	See Interstitial Sediment, below	Data not available for Intragravel Quality in this Analysis area
Chemical Contaminants and/or Nutrients	Low levels of chemical contamination from agricultural, industrial, and other sources; no excess nutrients, no 303(d) water quality limited water bodies.	**Functioning Appropriately** **PJ** -	No known chemical contamination from agricultural, industrial, or other sources are known to occur within the analysis area (personal observation).
Habitat Access			
Physical Barriers	Any man-made barriers present in watershed allow upstream and downstream fish passage at all flows.	**Functioning Appropriately** **D -**	Steep gradients inhibit fish movement, but there are no known anthropogenic barriers (personal observation).

Agency/Unit	Payette NF, McCall RD	HU Code and Name	California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 [Fall Creek, also part of this analysis area, is analyzed in a separate table; see "Middle MainSalmon-(Fall Creek only) Environmental Baseline table", immediately following this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	4 6th level HUs
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA Middle Main Analysis Area (exclusive of Fall Creek)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Habitat Elements			
Interstitial Sediment Deposition (all listed fished in tributary systems) **"Substrate Embeddedness" WCI has been replaced by new theory in Nelson and Burns 2005**	Revised WCI for PNF, Nelson and Burns 2005 Adequate interstitial space is indicated by: (a) Any single measured mean embeddedness value less than or equal to 24%. OR (b) Any single mean free matrix count over 27% OR (c) A five-year mean measured cobble embeddedness level of 32% or less OR (d) A five-year mean free matrix count of 17% or more	FR PJ	The substrate is predominantly cobble and boulder-sized rocks (unpublished data on file, PNF Supervisors Office, 1995, 2001, 2005). Cobble embeddedness has not been measured within the analysis area. Sheep trampling in upper California Creek near California Lake has caused sloughing banks and increased sedimentation (unpublished Riparian Inventories 2002,on file at PNF SO).
Large Woody Debris	> 20 pieces per mile, > 12 inches in diameter, > 35 feet length; and adequate sources of large woody debris for both long and short-term recruitment in RCAs.	**Functioning Appropriately –** **D**	Unpublished data on file at Payette NF Supervisors Office, 2001: Union and upper California Creeks have more than 20 pieces per mile, and a "high volume of LWD, numerous aggregates and many large trees (burned) fitting PACFISH measurement requirements; few root wads; many large burned trees in stream, and "massive amounts of burned LWD in stream, including PACFISH trees. A 2005 100m reach survey of Carey Creek yielded the estimate of 29 pieces per mile placing the lower section of Carey Creek at FR (unpublished FBase data on file, PNF Supervisors Office).

Agency/Unit	Payette NF, McCall RD	HU Code and Name	California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 [Fall Creek, also part of this analysis area, is analyzed in a separate table; see "Middle MainSalmon-(Fall Creek only) Environmental Baseline table", immediately following this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	4 6th level HUs
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA Middle Main Analysis Area (exclusive of Fall Creek)		

	Population and Environmental Baseline		
Pathways & Indicators	**Desired Condition**	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Pool Frequency	**Bull trout:** Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment. Large woody debris recruitment standards for functioning appropriately (above) are met and pool frequency in a reach closely approximates: Wetted Width (m.) / Number of Pools/100 m 0-2: 2.4 2-3: 3.7 3-5: 3.0 5-6: 2.4 6-9: 1.4 9-11: 1.1 11-12: 0.6 12-20: 0.6 20-30: 0.2 **Chinook/steelhead:** Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment. Large woody debris recruitment standards for functioning appropriately (above) are met and pool frequency in a reach closely approximates: Channel Width (m.) / Number of Pools/100 m 0-2: 11.4 2-3: 6.0 3-5: 4.3 5-6: 3.5 6-8: 2.9 8-15: 1.6 15-23: 1.4 23-30: 1.1	**Functioning Appropriately** **D**	Unpublished data on file at Payette NF Supervisors Office, 2001: California Creek: 26 slow habitat units (assumed to be pools) per 629 meters surveyed in Reach 1 of California Creek (just below confluence with Union Creek), or 4.1 pools per 100m. Reach 1 has an average width of 5.7 m. Union Ck: (Reach #, # slow habitat units surveyed/reach length, mean reach width) R1 5/101m, 4.1 meters wide R2 9/106m, 5.8 meters wide R3 7/106m, 4.5 meters wide R4 5/119m, 6.2 meters wide Carey Creek: R1 9/108.6, 4.2 meters wide
Pool Quality	Each reach has many large pools > 3.28 feet (1 meter deep). Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment.	**Functioning Appropriately** **D**	Unpublished data on file at Payette NF Supervisors Office (2002): California Creek (lower) (2002): "pools clogged with wood of all shapes". Rabbit Creek (2002): Much smaller stream, no note of reduction in pool volume by fine sediment
Off-Channel Habitat	Watershed has many ponds, oxbows, backwaters, and other off-channel areas with cover; side channels are low energy areas.	**Functioning Appropriately** **D**	Unpublished data on file at Payette NF Supervisors Office (2001, 2005): Braided channels were evident in lower gradient reaches of California Creek, few off-channel habitats were seen in Union Creek. Lateral habitats and one side channel were recorded in 100 m reach survey of Carey Creek .
Refugia	**Bull trout:** Habitats capable of supporting strong and significant local populations are protected and	**Functioning at Risk**	Refuge areas are limited because of high stream gradients.

Agency/Unit	Payette NF, McCall RD	HU Code and Name	California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 [Fall Creek, also part of this analysis area, is analyzed in a separate table; see "Middle MainSalmon-(Fall Creek only) Environmental Baseline table", immediately following this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	4 6th level HUs
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA Middle Main Analysis Area (exclusive of Fall Creek)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
	are well distributed and connected for all life stages and forms of the species. **Chinook/steelhead:** Habitat refugia exist and are adequately buffered (e.g., by intact riparian conservation areas); existing refugia are sufficient in size, number, and connectivity to maintain viable populations or sub-population	**PJ**	
Channel Condition and Dynamics			
Width/Maximum Depth Ratio	≤10	**Functioning Appropriately** **D**	Unpublished FBase data on file at Payette NF Supervisors Office 2005): Carey Creek (reach 1) 5.7
Streambank Condition	>90% of any stream reach has stable banks relative to the percent of inherent stable streambanks associated with a similar unmanaged stream system.	**Functioning Appropriately** **D**	Unpublished FBase data on file at Payette NF Supervisors Office (2001): Carey Creek: 99.7% mean bank stability
Floodplain Connectivity	Within RCAs, floodplains and wetlands are hydrologically linked to the main channel; overbank flows occur and maintain wetland/floodplain functions; and riparian vegetation succession.	**Functioning Appropriately** **PJ**	Floodplain connectivity is acceptable , there are few actions that would have degraded this indicator (personal observation).
Flow/Hydrology			
Change in Peak/Base Flows	Watershed hydrograph indicates peak flow, base flow, and flow timing characteristics comparable to an undisturbed watershed of a similar size, geomorphology and climatology.	**Functioning Appropriately** **PJ -**	There are no current flow data for the analysis area, there are few actions that would have degraded this indicator(personal observation).
Drainage Network Increase	Zero or minimum change in active channel length correlated with human caused disturbance.	**Functioning Appropriately** **PJ**	There are few actions that would have degraded this indicator(personal observation).
Watershed Conditions			
Road Density and Location	Total road density < 0.7 miles/square mile of subwatershed, no roads within RCAs.	**Functioning at Risk** **D**	Road density for the analysis area is 1.0 mi/sq mi , with 1.4 mi/sq mi within RCAs (CD1: \Support Documents\Maps\total_roads.pdf). These values do include the Fall Creek 6th HU, which has a very high road density of 2.3 miles/sq. mi.(Caleb Zurstadt, PNF Fisheries Biologist, Council RD, personal communication).
Disturbance History	< 15% ECA (entire watershed) with no concentration of disturbance in areas with landslide	**Functioning at Risk**	Localized areas have high road densities and historic mining disturbance within RCAs (Jim Fitzgerald,

Agency/Unit	Payette NF, McCall RD	HU Code and Name	California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 [Fall Creek, also part of this analysis area, is analyzed in a separate table; see "Middle MainSalmon-(Fall Creek only) Environmental Baseline table", immediately following this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	4 6th level HUs
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA Middle Main Analysis Area (exclusive of Fall Creek)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
	or landslide prone areas, and/or refugia, and/or RCAs.	**D**	McCall District hydrologist, McCall, ID, personal communication; ECA is 23% for the analysis area (CD1: \Support Documents\Maps\eca_lsp.pdf). This value includes the Fall Creek drainage. Nelson et al. (2004) state: "We cannot confirm that even high ECA, as estimated on the PNF to date, has any observable effect on salmonid habitat."
Riparian Conservation Areas	The riparian conservation areas within the sub watershed(s) have historic and occupied refugia for listed, sensitive or native/desired nonnative fish species which are present and provide: adequate shade, large woody debris recruitment, sediment buffering, connectivity, and habitat protection and connectivity to adequately minimize adverse effects from land management activities (>80% intact). All vegetative components are within desired conditions identified in Appendix A of the Forest Plan. RCA functions and processes are intact, providing resiliency from adverse affects associated with land management activities. Conditions fully support habitat for aquatic species.	**Functioning Appropriately** **PJ**	There are few actions that would have degraded this indicator.
Disturbance Regime	Disturbance resulting from land management activities are negligible or temporary. Stream flow regimes are appropriate to the local geomorphology, potential vegetation and climatology resulting in appropriate high quality habitat and watershed complexity that provide refugia and rearing space for all life stages or multiple life-history forms. Ecological processes are within historical ranges.–Resiliency of habitat to recover from land management disturbances is high.	**Functioning Appropriately** **D** - **PJ** -	Roads and other development have occurred in the upper portion of the analysis area. Ecological processes appear to be within historical ranges (see other WCI that are Functioning at Risk), and resiliency of habitat to recover from land management disturbances is probably high ((personal observation).
Integration of Species and Habitat Conditions **Chinook, steelhead, bull trout, westslope cutthroat trout**	Habitat quality and connectivity among local populations is high. The migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival and growth are consistent with pristine habitat. The local population has the resilience to recover from short-term disturbance within one to two generations (5 to 10 years). The local population is fluctuating around an equilibrium or is growing.	**Functioning Appropriately** **D** -	Most WCIs are FA, none are FUR. Mining, road construction, and other activities have minimally altered fish habitat and connectivity. Chinook do not occur within the upper analysis area. Bull trout have been observed in upper and lower California Creek. Westslope cutthroat trout have been observed in the analysis area. Population trends are unknown (Burns et al. 2005).

4. FALL CREEK

Agency/Unit	Payette NF, McCall RD	HU Code and Name	17060207-08-07 Fall Creek 6th HU [California, Maxwell, Rabbit, and Carey Creeks, also part of this analysis area, are analyzed in a separate table; see "Middle Main (California-Maxwell-Rabbit-Carey) Environmental Baseline table", immediately preceding this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 6th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA - Fall Creek (part of Middle Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Local Population Character (Bull trout only)			
Local Population Size	Mean total local population size or local habitat capacity more than several thousand individuals. Adults in local population > 500. All life stages are represented within the local population.	**Functioning at Risk** **D** **PJ**	Data are not available to accurately assess total population size in the Fall Creek analysis area. The local population habitat capacity has been altered by mining, road construction, and other activities (Hurley 1996; Nelson and Burns (2001); (Burns et al 2005).
Growth and Survival	Local population has the resilience to recover from temporary or short-term disturbances (e.g., catastrophic events, etc.) or local population declines within 1 to 2 generations (5-10 years). The local population is characterized as increasing or stable. At least 10 years of data support this estimate.	**Functioning at Risk** **PJ**	There are not sufficient trend data to characterize growth and survival. PNF LRMP 2003: " if a trend cannot be confirmed, a local population will be considered at risk until enough data is available to accurately determine its trend."
Life History Diversity and Isolation	The migratory form is present and the local populations are in close proximity to each other. Migratory corridors and rearing habitat (lake or larger river) are in good to excellent condition for the species. Neighboring local populations are large with high likelihood of producing surplus individuals or straying adults that will mix with other local populations.	**Functioning at Unacceptable Risk** **D** **PJ**	Migrants cannot return to the analysis area because of the barrier falls near the mouth of Fall Creek. The local population is isolated to a small watershed, but the total number of individual bull trout is unknown. The occupied habitat is further fragmented and isolated by a barrier culvert (Hurley 1996; Burns et al 2005).
Persistence and Genetic Integrity	Connectivity is high among multiple (5 or more) local populations with at least several thousand fish each. Each of the relevant local populations has a low risk of extinction. The probability of hybridization or displacement by competitive species is low to nonexistent.	**Functioning at Unacceptable Risk** **D**	The population of bull trout in the Fall Creek analysis area is isolated from downstream populations (in Salmon River) of bull trout by falls near the mouth of Fall Creek. The bull trout population and habitat in upper Fall Creek is not accessible to bull trout downstream of the barrier culvert. Brook trout have not been observed (Hurley 1996; Burns et al. 2005).

Agency/Unit	Payette NF, McCall RD	HU Code and Name	17060207-08-07 Fall Creek 6th HU [California, Maxwell, Rabbit, and Carey Creeks, also part of this analysis area, are analyzed in a separate table; see "Middle Main (California-Maxwell-Rabbit-Carey) Environmental Baseline table", immediately preceding this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 6th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA - Fall Creek (part of Middle Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Water Quality			
Temperature	**Bull trout:** 7-day average maximum temperature in a reach during the following life history stages: Incubation: 2-5°C or 35.6-41.0°F Rearing: 4-12°C or 39.2-53.6°F Spawning: 4-9°C or 39.2-48.2°F Also temperatures do not exceed 15°C or 59.0°F in areas used by adults during migration (no thermal barriers) **Chinook/steelhead**: 7-day average minimum. Spawning, rearing and migration: 50-57°F (10-13.9°C)	**Bull trout rearing and spawning Functioning at Risk** **Chinook/steelhead spawning, rearing and migration Functioning at Unacceptable Risk** **D**	**Nelson 2006: FUR** **Bull trout Rearing** Fall Creek (mouth) Range of 7-day avg. max temperature from 1998 – 2004: 17.9 – 19.2°C EF Fall (RD 592 crossing) Range of 7-day avg. max temperature from 1998 – 2004: 11.0 – 12.5°C (unpublished data on file, PNF Supervisors Office) **Bull trout Spawning** Fall Creek (mouth) Range of 7-day avg. max temperature from 1998 – 2004: 14.0 – 16.0°C EF Fall (RD 592 crossing) Range of 7-day avg. max temperature from 1998 – 2004: 8.5 – 11.0°C (unpublished data on file, PNF Supervisors Office) **Chinook/steelhead** Fall Creek (mouth) Range of 7-day avg. max temperature from 1998 – 2004: 17.9 – 19.2°C (unpublished data on file, PNF Supervisors Office)
Intragravel Quality (in areas of spawning and incubation for anadromous fishes) **"Sediment" WCI has been replaced by new theory in Nelson and Burns 2005**		See Interstitial Sediment WCI	Intragravel quality data is not available for this analysis area
Chemical Contaminants and/or Nutrients	Low levels of chemical contamination from agricultural, industrial, and other sources; no excess nutrients, no 303(d) water quality limited water bodies.	**Functioning Appropriately** **PJ**	No known chemical contamination from agricultural, industrial or other sources are known to occur within the watershed. There are no 303d listed streams (personal observation of Caleb Zurstadt, Council RD fish biologist, PNF) .
Habitat Access			
Physical Barriers	Any man-made barriers present in watershed allow upstream and downstream fish passage at all flows.	**Functioning at Unacceptable Risk** **D**	There is a culvert where FS Road 592 crosses EF Fall Creek that blocks all upstream movement of fish at all flows. The barrier fragments occupied bull trout habitat (Hurley 1996; unpublished data on file, PNF Supervisors Office).

Agency/Unit	Payette NF, McCall RD	HU Code and Name	17060207-08-07 Fall Creek 6th HU [California, Maxwell, Rabbit, and Carey Creeks, also part of this analysis area, are analyzed in a separate table; see "Middle Main (California-Maxwell-Rabbit-Carey) Environmental Baseline table", immediately preceding this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 6th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA - Fall Creek (part of Middle Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Habitat Elements			
Interstitial Sediment Deposition (all listed fished in tributary systems) **"Substrate Embeddedness" WCI has been replaced by new theory in Nelson and Burns 2005**	Revised WCI for PNF, Nelson and Burns 2005 Adequate interstitial space is indicated by: (a) Any single measured mean embeddedness value less than or equal to 24%. OR (b) Any single mean free matrix count over 27% OR (c) A five-year mean measured cobble embeddedness level of 32% or less OR (d) A five-year mean free matrix count of 17% or more	FUR D	Nelson 2006: ce FUR, fm FUR 1999-2004 cobble embeddedness mean= 33.5% Sufficient data are not available for statistical analysis of trends in embeddedness; however there appears to be a downward trend in the graphical display of data through time. 1998-2004 (no data 2002) free matrix mean = 12.5% Sufficient data are not available for statistical analysis of trends in free matrix particles; however there does not appear to be an upward or downward trend in the graphic display of data. (Zurstadt and Bonaminio 2005, unpublished data on file, PNF Supervisors Office)
Large Woody Debris	> 20 pieces per mile, > 12 inches in diameter, > 35 feet length; and adequate sources of large woody debris for both long and short-term recruitment in RCAs.	**Functioning Appropriately** **D**	Quantities of LWD are greater than those given in the INCD (greatest value 14.8 per 100m), and are above the desired values provided for the default WCI. Surveyed reaches in Fall Creek and East Fork Fall Creek (Hurley 1996) show LWD frequencies of about 274 pieces per mile (INCD size class) (17 pieces per 100m). Surveyed reaches in EF Fall Creek (2005 survey) show frequencies of 291 pieces (default WCI size class) per mile (18.1 per 100m) (unpublished data on file, PNF Supervisors Office) Default WCI size class = LWD >10.6 m in length and 0.3 m in diameter. LWD as defined in R1/R4 fish and fish habitat inventory protocol (Overton et al. 1997) and Idaho Natural Conditions Database (Overton et al. 1995).

Agency/Unit	Payette NF, McCall RD	HU Code and Name	17060207-08-07 Fall Creek 6th HU [California, Maxwell, Rabbit, and Carey Creeks, also part of this analysis area, are analyzed in a separate table; see "Middle Main (California-Maxwell-Rabbit-Carey) Environmental Baseline table", immediately preceding this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 6th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA - Fall Creek (part of Middle Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Pool Frequency	**Bull trout:** Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment. Large woody debris recruitment standards for functioning appropriately (above) are met and pool frequency in a reach closely approximates: Wetted Width (m.) / Number of Pools/100 m 0-2: 2.4 2-3: 3.7 3-5: 3.0 5-6: 2.4 6-9: 1.4 9-11: 1.1 11-12: 0.6 12-20: 0.6 20-30: 0.2 **Chinook/steelhead:** Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment. Large woody debris recruitment standards for functioning appropriately (above) are met and pool frequency in a reach closely approximates: Channel Width (m.) / Number of Pools/100 m 0-2: 11.4 2-3: 6.0 3-5: 4.3 5-6: 3.5 6-8: 2.9 8-15: 1.6 15-23: 1.4 23-30: 1.1	**Functioning Appropriately** **D**	Pool frequencies in Fall Creek and EF Fall Creek are greater than mean values for similar channels documented in the INCD, and exceed the default WCI values for bull trout. INCD greatest value 3.8 per 100m Fall Creek mean 2.9 pools per 100m (Hurley 1996) EF Fall mean 5.4 pools per 100m (unpublished data on file, PNF Supervisors Office 2004, 2005)
Pool Quality	Each reach has many large pools > 3.28 feet (1 meter deep). Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment.	**Functioning at Risk** **D**	Pool frequency is functioning appropriately (see above); however there are few pools with > 1 m maximum depth in the drainage (Hurley 1996; unpublished data on file, PNF Supervisors Office). The lack of deep pools may be in part due to the small size of the drainage and the steep gradient. LWD provides abundant cover (functioning appropriately); however, temperature and sediment WCIs are functioning at risk.
Off-Channel Habitat	Watershed has many ponds, oxbows, backwaters, and other off-channel areas with cover; side channels are low energy areas.	**Functioning at Risk** **PJ**	Data are not available for the number of ponds, oxbows, backwaters, and other off-channel habitat. Due to the high average gradient of the drainage side channels are likely to be high-energy areas. Any lack of off-channel habitat it likely more a function of the naturally high gradient than management activities (personal observation of Caleb Zurstadt, Council RD Fish Biologist, PNF).
Refugia	**Bull trout:** Habitats capable of supporting strong and significant local populations are protected and are well distributed and connected for all life stages	**Bull Trout** **Functioning at Unacceptable Risk**	Bull trout in the analysis area are isolated above the barrier falls near the mouth of Fall Creek, and the occupied habitat upstream of the falls is further fragmented by

Agency/Unit	Payette NF, McCall RD	HU Code and Name	17060207-08-07 Fall Creek 6th HU [California, Maxwell, Rabbit, and Carey Creeks, also part of this analysis area, are analyzed in a separate table; see "Middle Main (California-Maxwell-Rabbit-Carey) Environmental Baseline table", immediately preceding this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 6th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA - Fall Creek (part of Middle Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
	and forms of the species. **Chinook/steelhead:** Habitat refugia exist and are adequately buffered (e.g., by intact riparian conservation areas); existing refugia are sufficient in size, number, and connectivity to maintain viable populations or sub-population	**Chinook/steelhead Functioning at Risk** **D**	a barrier culvert (Hurley 1996; Nelson and Burns (2001); Burns et. al 2005)). Chinook and steelhead spawning and rearing habitat is restricted to the lower ~300 m of Fall Creek (Hurley 1996; unpublished data on file, PNF Supervisors Office). The natural barrier falls eliminates the potential for refugia upstream in the analysis area. Other refugia is available outside of the analysis area (Nelson and Burns (2001)).
Channel Condition and Dynamics			
Width/Maximum Depth Ratio	≤10	**Functioning at Risk** **D**	Width/Maximum depth documented in Hurley (1996) are slightly above values for similar channels in INCD.
Streambank Condition	>90% of any stream reach has stable banks relative to the percent of inherent stable streambanks associated with a similar unmanaged stream system.	**Functioning Appropriately** **D**	Streambank stability is > 90% in the analysis area (Hurley 1996; unpublished data on file, PNF Supervisors Office).
Floodplain Connectivity	Within RCAs, floodplains and wetlands are hydrologically linked to the main channel; overbank flows occur and maintain wetland/floodplain functions; and riparian vegetation succession.	**Functioning Appropriately** **D**	Riparian inventories do not indicate that channel entrenchment or other moderate alterations to floodplain connectivity have occurred (Bailey et al. 1994a, b; unpublished riparian inventories 2004, on file at PNF SO).
Flow/Hydrology			
Change in Peak/Base Flows	Watershed hydrograph indicates peak flow, base flow, and flow timing characteristics comparable to an undisturbed watershed of a similar size, geomorphology and climatology.	**Functioning Appropriately** **D**	Data from fish habitat and riparian inventories do not indicate altered peak flow, base flow and/or flow timing relative to an undisturbed watershed of similar size geomorphology and climatology. Bank stability is high (see streambank condition WCI) and riparian inventories indicate almost all streams are in generally stable condition (Hurley 1996; unpublished data on file, PNF Supervisors Office; Bailey et al. 1994a, b; unpublished riparian inventories 2004, PNF McCall RD).
Change in Drainage Network	Zero or minimum change in active channel length correlated with human caused disturbance.	**Functioning at Risk** **D**	Fish habitat and riparian inventories indicate that some past mining activities have straightened the stream channel in isolated areas, but the total amount of altered channel is low relative to the analysis area (Bailey et al. 1994a, b. Unpublished riparian inventories, on file at PNF SO).
Watershed Conditions			
Road Density and Location	Total road density < 0.7 miles/square mile of subwatershed, no roads within RCAs.	**Functioning at Unacceptable Risk** **D**	Total road density is 2.30 miles/square miles and there are a total of 4.97 miles within RCAs for the Fall Creek drainage (from preliminary analysis for Fall Creek Fuels Reduction BA by Caleb Zurstadt, PNF Fisheries Biologist, Council RD). Motorized vehicle damage was documented in the headwater wetlands, at the tributary/trail crossing, and in seep areas along the trail south of the wetlands (unpublished riparian surveys 2002, on file at PNF SO). Road density for the entire Middle Salmon-Sheep analysis area (including the Fall Creek drainage) is 1.0 mi/sq mi, with 1.4 mi/sq mi within RCAs (CD1: \Support Documents\Maps\total_roads.pdf).
Disturbance History	< 15% ECA (entire watershed) with no concentration of disturbance in areas with landslide or landslide prone areas, and/or refugia, and/or RCAs.	**Functioning at Risk** **D, PJ**	ECA for Fall Creek was 26% during LRMP revision (PNF WARS database, USFS 2003 PNF). Disturbances that could change ECA since then have been minimal ECA is 23% for the entire Middle Salmon-Sheep analysis area, including the Fall

Agency/Unit	Payette NF, McCall RD	HU Code and Name	17060207-08-07 Fall Creek 6th HU [California, Maxwell, Rabbit, and Carey Creeks, also part of this analysis area, are analyzed in a separate table; see "Middle Main (California-Maxwell-Rabbit-Carey) Environmental Baseline table", immediately preceding this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 6th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA - Fall Creek (part of Middle Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
			Creek drainage (CD1: \Support Documents\Maps\eca_lsp.pdf). Nelson et al. 2004: " We cannot confirm that even high ECA, as estimated on the PNF to date, has any observable effect on salmonid habitat. This suggests that estimated ECA on the PNF says little about the potential for affected streams to support salmonids. We cannot determine whether there is some threshold value above which habitat conditions would be unacceptably altered…".
Riparian Conservation Areas	The riparian conservation areas within the subwatershed(s) have historic and occupied refugia for listed, sensitive or native/desired nonnative fish species which are present and provide: adequate shade, large woody debris recruitment, sediment buffering, connectivity, and habitat protection and connectivity to adequately minimize adverse effects from land management activities (>80% intact). All vegetative components are within desired conditions identified in Appendix A of the Forest Plan. RCA functions and processes are intact, providing resiliency from adverse affects associated with land management activities. Conditions fully support habitat for aquatic species.	**Functioning at Risk** **D** **PJ**	Riparian inventories within the analysis area indicate that channel conditions are stable and riparian vegetation is generally estimated to be mid to late seral (Bailey et al. 1994a, b; unpublished data on file, PNF Supervisors Office). Roads, and past mining activities have altered RCAs; however, RCA functions and processes, such as shade, LWD recruitment, and sediment buffering are still generally intact Hurley 1996; unpublished data on file, PNF Supervisors Office). Conditions generally support habitat for aquatic species, however natural barriers limit the analysis area potential as refugia (see Refugia WCI).

Agency/Unit	Payette NF, McCall RD	HU Code and Name	17060207-08-07 Fall Creek 6th HU [California, Maxwell, Rabbit, and Carey Creeks, also part of this analysis area, are analyzed in a separate table; see "Middle Main (California-Maxwell-Rabbit-Carey) Environmental Baseline table", immediately preceding this table]
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 6th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA - Fall Creek (part of Middle Main Analysis Area)		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Disturbance Regime	Disturbance resulting from land management activities are negligible or temporary. Streamflow regimes are appropriate to the local geomorphology, potential vegetation and climatology resulting in appropriate high quality habitat and watershed complexity that provide refugia and rearing space for all life stages or multiple life-history forms. Ecological processes are within historical ranges.–Resiliency of habitat to recover from land management disturbances is high.	**Functioning at Risk** **D** - **PJ**	Scour events, debris torrents, or catastrophic fire have not been documented in the analysis area and if they were to occur they would likely be localized events (personal observation of Caleb Zurstadt, Council RD fish biologist, PNF). Some ecological processes have been altered by management activities (see WCIs above). Management activities that could contribute to disturbance (e.g. roads) are distributed throughout the analysis area.
Integration of Species and Habitat Conditions **Chinook, steelhead, bull trout, westslope cutthroat trout**	Habitat quality and connectivity among local populations is high. The migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival and growth are consistent with pristine habitat. The local population has the resilience to recover from short-term disturbance within one to two generations (5 to 10 years). The local population is fluctuating around an equilibrium or is growing.	**Steelhead/Chinook** **Functioning at Risk** **Bull trout** **Functioning at Unacceptable Risk** **D** **PJ**	Steelhead and Chinook are restricted to the lower ~300 m of Fall Creek. The significance of spawning and rearing habitat in Fall Creek to the overall population of steelhead and Chinook is unknown (personal observation of Caleb Zurstadt, Council RD fish biologist, PNF). Environmental factors outside of the analysis are more likely to have a significant affect on population trends. The bull trout population within the analysis area is fragmented by a natural barrier near the mouth of Fall Creek and by a culvert in EF Fall Creek. Connectivity among the local population has been altered and will not improve under current management (i.e. barrier culvert remains in place). Data are lacking to assess how local populations have fluctuated with normal environmental events; however barriers would prevent colonization if natural or anthropogenic disturbance led to extirpation of bull trout within the analysis area (Burns et al. 2005).

5. WARREN CREEK – WARREN CREEK ANALYSIS AREA

Agency/Unit	Payette NF, McCall RD	HU Code and Name	Warren Creek 5th HU 1707060207-09
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – Warren Creek Analysis Area		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** <u>See PNF LRMP App B, Table B-1 for complete definitions of conditions</u>	**Discussion of Baseline and Current Condition**
Local Population Character (Bull trout only)			
Local Population Size	Mean total local population size or local habitat capacity more than several thousand individuals. Adults in local population > 500. All life stages are represented within the local population.	**Functioning at Risk** **D** **PJ**	Data are not available to accurately assess total population size in the Warren Creek analysis area. The data that are available indicate that bull trout are most abundant in Schissler, Guard, Slaughter, and Mayflower Creeks, and occur infrequently in other portions of the analysis area. Surveys indicate that it is likely that there are > 50 adults present. The local population habitat capacity has been altered by mining, water diversions, road construction, and other activities (Raleigh 1995; Nelson and Burns (2001), Burns et al. 2005).
Growth and Survival	Local population has the resilience to recover from temporary or short-term disturbances (e.g., catastrophic events, etc.) or local population declines within 1 to 2 generations (5-10 years). The local population is characterized as increasing or stable. At least 10 years of data support this estimate.	**Functioning at Risk** **PJ -**	There are not sufficient trend data to characterize growth and survival.
Life History Diversity and Isolation	The migratory form is present and the local populations are in close proximity to each other. Migratory corridors and rearing habitat (lake or larger river) are in good to excellent condition for the species. Neighboring local populations are large with high likelihood of producing surplus individuals or straying adults that will mix with other local populations.	**Functioning at Risk** **PJ**	It is not known if fluvial bull trout migrate from the Salmon River into the Warren Creek analysis area. Raleigh (1995) does not discuss the observation of large, potentially fluvial, bull trout. All bull trout observed in 2002, and 2003 surveys were ≤ 300 mm in length (unpublished data on file PNF Supervisors Office). Some habitat fragmentation is likely in the upper portion of the analysis area from culverts and dredge piles. Populations of bull trout occur in neighboring drainages, such as California Creek and the SF Salmon River; however, the degree of bull trout movement between drainages in unknown (Burns et al. 2005).
Persistence and Genetic Integrity	Connectivity is high among multiple (5 or more) local populations with at least several thousand fish each. Each of the relevant local populations has a low risk of extinction. The probability of hybridization or displacement by competitive species is low to nonexistent.	**Functioning at Risk** **D** **PJ**	Some habitat fragmentation is likely in the upper portion of the analysis area from culverts and dredge piles. Populations of bull trout occur in neighboring drainages, such as California Creek and the SF Salmon River; however, the degree of bull trout movement between drainages is unknown. Brook trout occur in all streams where bull trout have been observed, and occur throughout much of the rest of Warren Creek analysis area.

Agency/Unit	Payette NF, McCall RD	HU Code and Name	Warren Creek 5th HU 1707060207-09
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – Warren Creek Analysis Area		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** <u>See PNF LRMP App B, Table B-1 for complete definitions of conditions</u>	**Discussion of Baseline and Current Condition**
Water Quality			
Temperature	**Bull trout:** 7-day average maximum temperature in a reach during the following life history stages: Incubation: 2-5°C or 35.6-41.0°F Rearing: 4-12°C or 39.2-53.6°F Spawning: 4-9°C or 39.2-48.2°F Also temperatures do not exceed 15°C or 59.0°F in areas used by adults during migration (no thermal barriers) **Chinook/steelhead**: 7-day average minimum. Spawning, rearing and migration: 50-57°F (10-13.9°C)	**Functioning at Unacceptable Risk** **D**	In 2001, stream temperatures were recorded with continuously recording temperature loggers at seven locations within the analysis area. In general temperatures exceeded the WCI desired conditions. At the mouth of Warren Creek, the 7-day avg. max was 30.1 (data on file at PNF SO). Mayflower was the exception, where stream temperatures were at the WCI desired condition. Past activities, such as dredge mining, and road construction within RCAs, has likely led to an increase in stream temperatures by reducing shade, and increasing the width to depth ratio (Zurstadt and Burns 2005).
Intragravel Quality (in areas of spawning and incubation for anadromous fishes) **"Sediment" WCI has been replaced by new theory in Nelson and Burns 2005**	Revised WCI for PNF, Nelson and Burns 2005 High intragravel quality is indicated by: (a) 5-year mean fines < 6.3 mm concentrations at depth of 28% or less with no more than two years between 28% and 36%. OR (b) 5-year mean fines < 6.3 mm concentrations at depth between 28% and 36% with a decreasing trend.	See Interstitial Sediment Deposition, below	Intragravel quality data is not available for this analysis area
Chemical Contaminants and/or Nutrients	Low levels of chemical contamination from agricultural, industrial, and other sources; no excess nutrients, no 303(d) water quality limited water bodies.	**Functioning at Risk** **PJ** -	Water quality has been degraded through mining, logging, and other activities (Wagoner and Burns 1993; Nelson and Burns (2001).
Habitat Access			
Physical Barriers	Any man-made barriers present in watershed allow upstream and downstream fish passage at all flows.	**Functioning at Risk** **D**	At least four culverts in the analysis area have been identified as potential fish passage barriers (Culvert inventory on file at the PNF Supervisors Office). In some tributaries, such as Smith Creek, dredge piles in the stream channel may hinder or block fish passage (Raleigh 1995, unpublished data on file, PNF Supervisors Office).

Agency/Unit	Payette NF, McCall RD	HU Code and Name	Warren Creek 5th HU 1707060207-09
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – Warren Creek Analysis Area		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** **See PNF LRMP App B, Table B-1 for complete definitions of conditions**	**Discussion of Baseline and Current Condition**
Habitat Elements			
Interstitial Sediment Deposition (all listed fished in tributary systems) **"Substrate Embeddedness" WCI has been replaced by new theory in Nelson and Burns 2005**	Revised WCI for PNF, Nelson and Burns 2005 Adequate interstitial space is indicated by: (a) Any single measured mean embeddedness value less than or equal to 24%. OR (b) Any single mean free matrix count over 27% OR (c) A five-year mean measured cobble embeddedness level of 32% or less OR (d) A five-year mean free matrix count of 17% or more	FR PJ	Gravel is typically the dominant substrate in the analysis area (Raleigh 1995). Cobble embeddedness has not been measured directly, however, the high surface fines estimates (Raleigh 1995) indicate that embeddedness may be high as well.
Large Woody Debris	> 20 pieces per mile, > 12 inches in diameter, > 35 feet length; and adequate sources of large woody debris for both long and short-term recruitment in RCAs.	**Functioning at Unacceptable Risk** **D** -	Survey data show very low frequencies of LWD in Warren Creek, but better in some tributaries. Quantities of LWD are often below levels given in the INCD, and are below the desired values provided for the default WCI. Past activities, such as dredge mining, road construction within RCAs, and logging has likely led to reduced quantities of LWD. In areas where stream channels flow through dredge piles, or along roads, future potential for LWD recruitment is limited. The WCI is considered functioning at unacceptable risk due to a general lack of LWD and the existence of many areas with reduced potential for recruitment. (Raleigh 1995; unpublished 2001 data on file, PNF Supervisors Office)

Agency/Unit	Payette NF, McCall RD	HU Code and Name	Warren Creek 5th HU 1707060207-09
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – Warren Creek Analysis Area		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** <u>**See PNF LRMP App B, Table B-1 for complete definitions of conditions**</u>	**Discussion of Baseline and Current Condition**
Pool Frequency	**Bull trout:** Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment. Large woody debris recruitment standards for functioning appropriately (above) are met and pool frequency in a reach closely approximates: Wetted Width (m.) / Number of Pools/100 m 0-2: 2.4 2-3: 3.7 3-5: 3.0 5-6: 2.4 6-9: 1.4 9-11: 1.1 11-12: 0.6 12-20: 0.6 20-30: 0.2 **Chinook/steelhead:** Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment. Large woody debris recruitment standards for functioning appropriately (above) are met and pool frequency in a reach closely approximates: Channel Width (m.) / Number of Pools/100 m 0-2: 11.4 2-3: 6.0 3-5: 4.3 5-6: 3.5 6-8: 2.9 8-15: 1.6 15-23: 1.4 23-30: 1.1	**Functioning Appropriately** **FA**	2001 survey data on file at PNF SO (not FBase output, these calculations were taken from Zurstadt and Burns 2005) Warren 3.7 pools/100m@5.2m width Steamboat 4.8 pools@5.5m width Mayflower 5.2 pools@1.8m width Stratton 11.1 pools@1.7m width Slaughter 15.1 pools@3.9m width Dugaw et al. 2005. 2001-2004 Annual Summary Report for the Effectiveness Monitoring Program for Streams and Riparian Areas within the Upper Columbia River Basin: Steamboat = 14/100m, avg width=7.6m Stratton = 17/100m, avg width = 6m Warren = 8/100m, avg width = 5.6m
Pool Quality	Each reach has many large pools > 3.28 feet (1 meter deep). Pools have good cover and cool water, and only minor reduction of pool volume by fine sediment.	**Functioning at Risk** **D**	Deep pools (> 1 m deep) are generally lacking, and temperature and LWD WCI's are not functioning appropriately. Temperatures are cooler and LWD more abundant in the tributaries; however deep pools remain scarce (Zurstadt and Burns 2005).
Off-Channel Habitat	Watershed has many ponds, oxbows, backwaters, and other off-channel areas with cover; side channels are low energy areas.	**Functioning at Risk** PJ	Extensive dredge mining has most likely reduced the number of oxbows, backwaters, and other off-channel areas with cover. Off-channel area may exist in dredged areas; however, fish cover has likely been reduced from loss of riparian vegetation, undercut banks, LWD, and other natural features (personal observation of Caleb Zurstadt, Council RD fish biologist, PNF).
Refugia	**Bull trout:** Habitats capable of supporting strong and significant local populations are protected and are well distributed and connected for all life stages and forms of the species.	**Functioning at Risk** **D**	Fish habitat and RCA vegetation in some areas has been altered significantly by dredge mining, roads, and other development (Bailey 1994a,b; Raleigh 1995). Habitat connectivity in the upper portion of the analysis area has been fragmented by culverts, dredge piles, and water diversions. The extent of bull trout migration in the analysis area is unknown. The potential of the analysis area as refugia for

Agency/Unit	Payette NF, McCall RD	HU Code and Name	Warren Creek 5th HU 1707060207-09
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – Warren Creek Analysis Area		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** <u>See PNF LRMP App B, Table B-1 for complete definitions of conditions</u>	**Discussion of Baseline and Current Condition**
	Chinook/steelhead: Habitat refugia exist and are adequately buffered (e.g., by intact riparian conservation areas); existing refugia are sufficient in size, number, and connectivity to maintain viable populations or sub-population	**PJ -**	Chinook salmon and steelhead is probably limited by the steep gradient near Salmon River and the limited amount of suitable spawning habitat upstream (Nelson and Burns (2001)).
Channel Condition and Dynamics			
Width/Maximum Depth Ratio	≤10	**Functioning at Risk** **D**	There are some areas in Warren Creek and Steamboat Creek where both wetted width to maximum depth and wetted width to depth ratios are well above INCD values and WCI desired conditions (unpublished 2001 surveys on file at PNF SO, Zurstadt and Bonaminio 2005). In other streams in the analysis area wetted width to maximum depth ratio and wetted width to depth ratios are generally similar to INCD values and wetted width to maximum depth ratios are at the WCI desired condition of < 10. **-** (Raleigh 1995; unpublished data on file, PNF Supervisors Office)
Streambank Condition	>90% of any stream reach has stable banks relative to the percent of inherent stable streambanks associated with a similar unmanaged stream system.	**Functioning at Risk** **D**	Streambank stability was > 90% in the analysis area in 1995 (Raleigh 1995), 86-100% in 2001 (unpublished data on file at PNF SO). Dugaw et al. 2005. 2001-2004 Annual Summary Report for the Effectiveness Monitoring Program for Streams and Riparian Areas within the Upper Columbia River Basin: Steamboat = 81% Stratton = 91% Warren = 88%
Floodplain Connectivity	Within RCAs, floodplains and wetlands are hydrologically linked to the main channel; overbank flows occur and maintain wetland/floodplain functions; and riparian vegetation succession.	**Functioning at Risk** **D**	Effects to stream channels and riparian areas from historic and current mining activities noted in inventories. **–** (Bailey 1994a,b. Unpublished riparian inventories, PNF McCall RD)
Flow/Hydrology			
Change in Peak/Base Flows	Watershed hydrograph indicates peak flow, base flow, and flow timing characteristics comparable to an undisturbed watershed of a similar size, geomorphology and climatology.	**Functioning at Risk** **PJ -**	There are no current flow data for the analysis area. Increase in drainage network is likely due to historic mining activities including dredging, and hydraulic mining. Some evidence of altered peak flow, base flow, and/or flow timing relative to an undisturbed watershed of similar size geomorphology and climatology" (definition of Functioning at Risk from LRMP App. B, Table B-1).
Drainage Network Increase	Zero or minimum change in active channel length correlated with human caused disturbance.	**Functioning at Risk** **D**	Effects to stream channels and riparian areas from historic and current mining activities noted in inventories (Bailey 1994a,b. Unpublished riparian inventories, PNF McCall RD).

Agency/Unit	Payette NF, McCall RD	HU Code and Name	Warren Creek 5th HU 1707060207-09
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – Warren Creek Analysis Area		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** **See PNF LRMP App B, Table B-1 for complete definitions of conditions**	**Discussion of Baseline and Current Condition**
Watershed Conditions			
Road Density and Location	Total road density < 0.7 miles/square mile of subwatershed, no roads within RCAs.	**Functioning at Risk** **D**	Road densities are 1.2 mi/sq. mi for the analysis area, with 2.3 mi/sq. mi in RCAs (CD1: \Support Documents\Maps\total_road.pdf) Within the Warren Creek analysis area there are a total of 26 mi (42 km) of roads within RCAs, with the greatest mileage in upper Warren Creek analysis area (data from Watershed and Aquatic Recovery Strategy database on file, PNF Supervisors Office). - (unpublished data on file, PNF Supervisors Office)
Disturbance History	< 15% ECA (entire watershed) with no concentration of disturbance in areas with landslide or landslide prone areas, and/or refugia, and/or RCAs.	**Functioning at Risk** **D**	Overall, ECA is 9% (Support Documents\Maps\eca_lsp.pdf). Roads amd mining disturbance are concentrated in riparian areas.
Riparian Conservation Areas	The riparian conservation areas within the subwatershed(s) have historic and occupied refugia for listed, sensitive or native/desired nonnative fish species which are present and provide: adequate shade, large woody debris recruitment, sediment buffering, connectivity, and habitat protection and connectivity to adequately minimize adverse effects from land management activities (>80% intact). All vegetative components are within desired conditions identified in Appendix A of the Forest Plan. RCA functions and processes are intact, providing resiliency from adverse affects associated with land management activities. Conditions fully support habitat for aquatic species.	**Functioning at Risk** **D** **PJ**	Streambanks in the analysis area are generally stable, but development, and dredge mining on Warren Creek has altered riparian ecosystems extensively in certain areas (Bailey 1994a,b; Raleigh 1995; unpublished data on file, PNF Supervisors Office) leading to loss of shade, LWD recruitment, and sediment buffering capabilities.

Agency/Unit	Payette NF, McCall RD	HU Code and Name	Warren Creek 5th HU 1707060207-09
Fish Species Present	Chinook, steelhead, bull trout	Spatial Scale of this Matrix	One 5th level HU
(Anad. Sp.) Population:		Subpopulation:	
Core Area (Bull Trout)		Local Population	
Management Actions	2006 Ongoing BA – Warren Creek Analysis Area		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition** **See PNF LRMP App B, Table B-1 for complete definitions of conditions**	**Discussion of Baseline and Current Condition**
Disturbance Regime	Disturbance resulting from land management activities are negligible or temporary. Streamflow regimes are appropriate to the local geomorphology, potential vegetation and climatology resulting in appropriate high quality habitat and watershed complexity that provide refugia and rearing space for all life stages or multiple life-history forms. Ecological processes are within historical ranges. Resiliency of habitat to recover from land management disturbances is high.	**Functioning at Risk** **D** **PJ**	Dredge mining, roads, and other development have primarily occurred in the upper portion of the analysis area (Raleigh 1995; unpublished data on file, PNF Supervisors Office). Less disturbance resulting from land management activities occurs in the tributaries to Warren Creek and in lower portions of the analysis area.
Integration of Species and Habitat Conditions **Chinook, steelhead, bull trout, westslope cutthroat trout**	Habitat quality and connectivity among local populations is high. The migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival and growth are consistent with pristine habitat. The local population has the resilience to recover from short-term disturbance within one to two generations (5 to 10 years). The local population is fluctuating around an equilibrium or is growing.	**Functioning at Risk** **D**	All WCIs are FR except for bank stability (FA), and LWD, which is functioning at unacceptable risk. Mining, road construction, and other activities have altered fish habitat and connectivity. Redband trout have been observed at a number of sites within the analysis area, but the extent of anadromy in the analysis area is unknown. Chinook salmon spawning and rearing appears to be limited to the lower 2-3 mi (3-5 km) of Warren Creek. Bull trout occur primarily in the upper elevation tributaries of the watershed, and brook trout occur throughout the watershed (Raleigh 1995; unpublished data on file, PNF Supervisors Office). The extent of migratory behavior in bull trout it unknown. Westslope cutthroat trout have been observed in the analysis area (Raleigh 1995; unpublished data on file, PNF Supervisors Office). As a result of habitat alteration from dredge mining and other activities survival and growth rates for steelhead, Chinook salmon, bull trout, and westslope cutthroat trout may have been reduced from those in the "best habitats", but population trends are unknown (Burns et al. 2005).

C. APPENDIX 3. EFFECTS MATRICES

1. MISCELLANEOUS FOREST PRODUCTS AND MISTLETOE/PRECOMMERCIAL THINNING

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Miscellaneous forest products and mistletoe/precommercial thinning – All analysis areas		

Pathways & Indicators	Effects of the Management Action(s) Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none Temporary	Short-term	Long-term	Discussion of Effects
Local Population Character					
Local Population Size **FR**	N	none	none	none	No influence
Growth and Survival **FR**	N	none	none	none	No influence
Life History Diversity and Isolation **FR except** **Fall Creek FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FR except** **Fall Creek FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FUR**	M	-*	-*	-*	Mitigations and LRMP standards that would apply for actions within RCA, such as pre-commercial thinning or miscellaneous forest product removal, will insure that any reduction in stream shade is negligible.
	M	-*	-*	-*	Mitigations and LRMP standards that would apply

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Miscellaneous forest products and mistletoe/precommercial thinning – All analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Intragravel Quality (Sediment) No data					for actions within RCAs, such as pre-commercial thinning or miscellaneous forest product removal, will insure that any sediment delivery related to the actions is temporary and negligible.
Chemical Contaminants and/or Nutrients FA except Warren Creek FR	M	-*	-*	-*	Mitigative restrictions concerning refueling in RCAs, fuel and chemical spill prevention and cleanup requirements, will reduce the likely hood of chemical contamination to negligible levels.
Habitat Access					
Physical Barriers FA except Fall Creek FUR	N	none	none	none	No influence
Habitat Elements					
Interstitial Sediment Deposition (Substrate Embeddedness) FR except French/Fall FUR Lake/Partridge FA	M	-*	-*	-*	Mitigations and LRMP standards that would apply for actions within RCAs, such as pre-commercial thinning or miscellaneous forest product removal, will insure that any sediment delivery related to the actions is temporary and negligible.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Miscellaneous forest products and mistletoe/precommercial thinning – All analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Large Woody Debris FA except Warren FUR	M	-*	-*	-*	Mitigations and LRMP standards that would apply for actions within RCA, such as pre-commercial thinning or miscellaneous forest product removal, will insure that any reduction of potential LWD recruitment is negligible. In some cases thinning encroaching conifers (e.g., grand fir) and moving the stand toward more historic conditions will improve the vigor of the remaining trees (e.g., ponderosa pine) which could accelerate recruitment of the larger size classes (>35 ft) of LWD.
Pool Frequency FA	N	none	none	none	No influence
Pool Quality FA except Warren, Fall FR	N	none	none	none	No influence
Off-Channel Habitat FR except Mid Main, French FA	N	none	none	none	No influence
Refugia FR except Fall FUR	N	none	none	none	No influence.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Miscellaneous forest products and mistletoe/precommercial thinning – All analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Channel Condition and Dynamics					
Width/Max Depth Ratio FA except Fall, Warren FR	N	none	none	none	No influence.
Streambank Condition FA except Warren FR	N	none	none	none	No influence.
Floodplain Connectivity FR except Fall, Mid Main FA	N	none	none	none	No influence.
Flow/Hydrology					
Change in Peak/Base Flows FR except Mid Main, Fall FA	N	none	none	none	Due to the small scale of the pre-commercial thinning, and miscellaneous forest product removal, there would be no influence on the WCI.
Drainage Network Increase FR except Mid Main FA	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location	N	none	none	none	No influence

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Miscellaneous forest products and mistletoe/precommercial thinning – All analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
FR except Fall FUR					
Disturbance History FR	M	-*	-*	-*	The small scale of the actions along with mitigations and LRMP standards that would apply for actions (inside and outside of RCAs) such as pre-commercial thinning, and miscellaneous forest product removal, will insure that any alterations of WCIs that contribute to disturbance history are negligible or an improvement (e.g., moving toward LRMP desired vegetation conditions).
Riparian Conservation Areas FR except Mid Main FA	M	-*	-*	-*	Mitigations and LRMP standards that would apply for actions within RCAs, such as pre-commercial thinning or miscellaneous forest product removal, will insure that any alterations of WCIs that influence RCAs are negligible or an improvement (e.g., moving toward LRMP desired vegetation conditions, or releasing deciduous understory by thinning encroaching conifers).
Disturbance Regime FR except Mid Main FA	M	-*	-*	-*	Mitigations and LRMP standards that would apply for actions, such as pre-commercial thinning, and miscellaneous forest product removal will insure that any alteration of WCIs that influence disturbance regime will be negligible or an improvement (e.g., moving toward LRMP desired vegetation conditions).

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Miscellaneous forest products and mistletoe/precommercial thinning – All analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Integration of Species and Habitat Conditions **FR except** **Mid Main FA** **Fall Creek FUR (For bull trout)**	M	-*	-*	-*	Mitigations and LRMP standards that would apply for actions, such as pre-commercial thinning, and miscellaneous forest product removal, will insure that any alterations of the WCIs listed above will be negligible or an improvement (e.g., moving toward LRMP desired vegetation conditions).

2. FIRE MANAGEMENT ACTIVITIES – ALL ANALYSIS AREAS

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fire Management Activities – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s) Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none Temporary	Short-term	Long-term	Discussion of Effects
Local Population Character					
Local Population Size **FR**	M	*-	*-	*-	Fire management activities are expected to have negligible effects on these WCIs due to: (1) proper screening of pumps to prevent fish being impinged or sucked into pumps, (2) leaving trees fallen in RCAs to keep benefits of LWD there (3) avoiding fish mortality from toxic chemicals by not dropping of retardant in streams, proper use of chemicals, and having fuel in containment, (4) fire personnel being briefed and familiar with fire guidelines, (5) fire guidelines will be applied to both wildland and prescribed fire, (6) resource advisors providing input on camp locations and layout, ongoing education of fire personnel about guidelines and resource concerns, continual monitoring of suppression actions and addressing problems.
Growth and Survival **FR**	M	*-	*-	*-	
Life History Diversity and Isolation **FR except** **Fall Creek FUR**	M	*-	*-	*-	
Persistence and Genetic Integrity **FR except** **Fall Creek FUR**	N	none	none	none	No influence.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fire Management Activities – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Water Quality					
Temperature **FUR**	M	*-	*-	*-	Prescribed fire that is allowed to back into RCAs, and fire line construction within RCAs would alter stream shade by a negligible amount in the temporary and short term. Monitoring has shown that large stand replacing wildfires have not adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Intragravel Quality (Sediment) **No data**	M	*-	*-	*-	Resource advisors will provide input for camp location and setup to minimize potential sediment delivery and effects on RCA filtering ability. Fire personnel will be briefed and become familiar with guidelines, specifically "every effort should be made to minimize sedimentation". Resource advisors provide information and oversight to help meet this guideline. Post-fire rehabilitation of fireline, camps or other areas where soils is disturbed would be expected to result in negligible temporary sediment delivery. Monitoring has shown that large stand replacing wildfires have not adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Chemical Contaminants and/or Nutrients **FA except**	M	*-	*-	*-	Negligible risk of chemical contamination expected because fire personnel will be briefed and familiarized with guidelines, guidelines include no dropping of retardant in streams, proper use of chemicals, and fuel containment. Also, ongoing education of fire personnel and oversight by

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fire Management Activities – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Warren Creek FR					resource advisors will serve to minimize deviations during suppression activities.
Habitat Access					
Physical Barriers FA except Fall Creek FUR	N	none	none	none	No influence
Habitat Elements					
Interstitial Sediment Deposition (Substrate Embeddedness) FR except French/Fall FUR Lake/Partridge FA	M	*-	*-	*-	Resource advisors will provide input for camp location and setup to minimize potential sediment delivery and effects on RCA filtering ability. Fire personnel will be briefed and become familiar with guidelines, specifically "every effort should be made to minimize sedimentation". Resource advisors provide information and oversight to help meet this guideline. Post-fire rehabilitation of fireline, camps or other areas where soils is disturbed would be expected to result in negligible temporary sediment delivery. Monitoring has shown that large stand replacing wildfires have not adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fire Management Activities – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Large Woody Debris FA except Warren FUR	M	*-	*-	*-	Trees may be fallen in RCAs during suppression activities. Negligible effect on this WCI is expected as number of trees fallen would be minor at the 6th field HU, and as per guidelines, trees would be left in RCAs. Prescribed fire that is allowed to back into RCAs, and fire line construction within RCAs could alter LWD recruitment by negligible amounts in the temporary and short term. Monitoring has shown that large stand replacing wildfires have not adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Pool Frequency FA	M	*-	*-	*-	Negligible effects on these WCIs are expected due to expected negligible effects on sediment and LWD WCIs.
Pool Quality FA except Warren, Fall FR	M	*-	*-	*-	Negligible effects on these WCIs are expected due to expected negligible effects on sediment and LWD WCIs.
Off-Channel Habitat FR except Mid Main, French FA	N	none	none	none	No influence is expected on this WCI because (1) as, per guidelines, trees fallen in RCAs will be left in RCAs, and (2) negligible effect on flows are expected as vegetation removed during suppression will be minor at the 6th HU scale, and as per guidelines, prescribed fire can not increase ECA above 15%,. In addition monitoring has shown that large stand replacing wildfires have not adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fire Management Activities – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
					Minshall 1999).
Refugia FR except Fall FUR	N	none	none	none	No influence.
Channel Condition and Dynamics					
Width/Max Depth Ratio FA except Fall, Warren FR	M	*-	*-	*-	Negligible effect on this WCI is expected due to expected effects on sediment & substrate & change in peak/base flow WCIs (this table).
Streambank Condition FA except Warren FR	M	*_	*-	*-	Negligible effects on this WCI are expected because fire personnel will be briefed and become familiar with guidelines, specifically "to expend every effort to minimize stream course disturbance", and resource advisors will provide information and oversight to help meet this guideline.
Floodplain Connectivity FR except Fall, Mid Main FA	N	none	none	none	No influence.
Flow/Hydrology					
Change in Peak/Base Flows FR except Mid Main, Fall FA	N	none	none	none	No influence is expected on this WCI because (1) as, per guidelines, trees fallen in RCAs will be left in RCAs, and (2) negligible effect on flows are expected as vegetation removed during suppression will be minor at the 6th HU scale, and as per guidelines, prescribed fire can not increase

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fire Management Activities – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
					ECA above 15%. In addition monitoring has shown that large stand replacing wildfires have not adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Drainage Network Increase FR except Mid Main FA	N	none	none	none	No influence.
Watershed Conditions					
Road Density and Location FR except Fall FUR	N	none	none	none	No influence
Disturbance History FR	M	*-	*-	*-	Negligible effect on this WCI expected as vegetation disturbance during suppression efforts, i.e., fireline, helispots, safety zones, etc. is relatively minor at the 6th HU scale, and these areas are rehabilitated. Prescribed fire that is allowed to back into RCAs, and fire line construction within RCAs expected to alter vegetation there by negligible amounts in the temporary and short term. Prescribed fire will not increase ECA above 15% in corresponding 6th level HUs. Prescribed fire would improve the WCI in the short and long term by moving vegetation towards the desired condition. Monitoring has shown that large stand replacing wildfires have not

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fire Management Activities – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
					adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Riparian Conservation Areas FR except Mid Main FA	M	*-	*-	*-	Depending on site-specific conditions, fire suppression can alter RCAs (move vegetation away from LRMP desired condition) by allowing encroachment of shade tolerant conifer species (e.g., grand fir), and suppressing deciduous understory, while prescribed fire can offset some of these effects. Prescribed fire that is allowed to back into RCAs, and fire line construction within RCAs would alter RCA vegetation by negligible amounts in the temporary and short term. In either case the small scale of prescribed fire and low frequency of wildfire in the analysis area along with mitigations make it unlikely that effects to RCAs would be more than negligible. Monitoring has shown that large stand replacing wildfires have not adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Disturbance Regime FR except Mid Main FA	M	*-	*-	*-	This action is expected to maintain watershed function and resiliency (i.e., ability to recover from land management disturbance). Negligible effect on vegetation as disturbance during suppression efforts, i.e., fireline, helispots, safety zones, etc. is relatively minor at the 6th HU scale, and these areas are rehabilitated. Prescribed fire mitigation to not increase ECA above 15% in corresponding 6th level HUs will be implemented. Prescribed fire would improve the WCI in the short and long term

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fire Management Activities – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
					by moving vegetation towards the desired condition. Monitoring has shown that large stand replacing wildfires have not adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Integration of Species and Habitat Conditions **FR except** **Mid Main FA** **Fall Creek FUR (For bull trout)**	M	*-	*-	*-	As fire management actions are expected to have no or negligible effect on all WCIs, negligible effects on listed fishes or critical habitat are also expected.

3. FISH HABITAT/RIPARIAN SAMPLING AND WATERSHED AND FISH HABITAT IMPROVEMENT AND MAINTENANCE – ALL ANALYSIS AREAS

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fish Habitat/Riparian Sampling and Watershed and Fish Habitat Improvement and Maintenance – All MSR analysis areas		

Pathways & Indicators	**Effects of the Management Action(s)** **Effects** **I=improve/D=degrade/M=maintain/N=no influence**	**Expected Trend - negative, + positive, * negligible, none** **Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Local Population Character					
Local Population Size **FR**	I	+	+	+	Watershed improvement projects that open up new habitat or reduce sediment delivery could increase local population size.
Growth and Survival **FR**	I	+	+	+	The actions that reduce sediment delivery could improve growth and survival.
Life History Diversity and Isolation **FR except** **Fall Creek FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FR except** **Fall Creek FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FUR**	I	+	+	+	Watershed and habitat improvement will decrease summer stream temperatures in some areas. Mitigations will maintain temperature in all other actions.
Intragravel Quality (Sediment) **No data**	M	-*	-*	-*	• There may be negligible amounts of temporary sediment delivery from habitat improvement, but actions, such as bank stabilization and road

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fish Habitat/Riparian Sampling and Watershed and Fish Habitat Improvement and Maintenance – All MSR analysis areas		

Pathways & Indicators	**Effects of the Management Action(s)** **Effects** **I=improve/D=degrade/M=maintain/N=no influence**	**Expected Trend** **- negative, + positive, * negligible, none** **Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
					obliteration with required mitigations, will decrease sediment delivery in the short and redistributed during fish habitat sampling, but there will be no net increase in sediment and the effect will be temporary and negligible. and long-term by a greater amount than any temporary increase. Sediment in the streambed may be stirred up
Chemical Contaminants and/or Nutrients **FA except** **Warren Creek FR**	M	-*	-*	-*	Restrictions concerning refueling in RCAs and spill prevention and cleanup requirements will reduce the likely hood of chemical contamination to negligible levels.
Habitat Access					
Physical Barriers **FA except** **Fall Creek FUR**	I	+	+	+	Removal or replacement of fish barriers, such as old culverts, will improve connectivity.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fish Habitat/Riparian Sampling and Watershed and Fish Habitat Improvement and Maintenance – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s) Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none Temporary	Short-term	Long-term	Discussion of Effects
Habitat Elements					
Interstitial Sediment Deposition (Substrate Embeddedness) FR except French/Fall FUR Lake/Partridge FA	M	-*	-*	-*	• There may be negligible amounts of temporary sediment delivery (which results in substrate embeddedness) from all actions described, but habitat improvements with required mitigations, will decrease sediment delivery in the short and long-term by a greater amount than any temporary increase. • Sediment in the streambed may be stirred up and redistributed during fish habitat sampling, but there will be no net increase in sediment and the effect will be temporary and negligible.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fish Habitat/Riparian Sampling and Watershed and Fish Habitat Improvement and Maintenance – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Large Woody Debris FA except Warren FUR	I	*-	*-	*-	Trees may be fallen in RCAs during suppression activities. Negligible effect on this WCI is expected as number of trees fallen would be minor at the 6th field HU, and as per guidelines, trees would be left in RCAs. Prescribed fire that is allowed to back into RCAs, and fire line construction within RCAs could alter LWD recruitment by negligible amounts in the temporary and short term. Monitoring has shown that large stand replacing wildfires have not adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Pool Frequency FA	M	*-	*-	*-	Negligible effects on these WCIs are expected due to expected negligible effects on sediment and LWD WCIs.
Pool Quality FA except Warren, Fall FR	M	*-	*-	*-	Negligible effects on these WCIs are expected due to expected negligible effects on sediment and LWD WCIs.
Off-Channel Habitat FR except Mid Main, French FA	N	none	none	none	No influence is expected on this WCI because (1) as, per guidelines, trees fallen in RCAs will be left in RCAs, and (2) negligible effect on flows are expected as vegetation removed during suppression will be minor at the 6th HU scale, and as per guidelines, prescribed fire can not increase ECA above 15%,. In addition monitoring has shown that large stand replacing wildfires have not adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fish Habitat/Riparian Sampling and Watershed and Fish Habitat Improvement and Maintenance – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
					Minshall 1999).
Refugia FR except Fall FUR	N	none	none	none	No influence.
Channel Condition and Dynamics					
Width/Max Depth Ratio FA except Fall, Warren FR	M	+	+	+	Watershed and habitat improvement may decrease width to max depth ratio in some areas. Mitigations will maintain width to max depth ratio in all other actions.
Streambank Condition FA except Warren FR	I	+	+	+	Watershed and habitat improvement may increase bank stability in some areas. Mitigations will maintain bank stability in all other actions.
Floodplain Connectivity FR except Fall, Mid Main FA	I	+	+	+	Watershed and habitat improvement such as RCA road obliteration may increase floodplain connectivity in some areas. Mitigations will maintain floodplain connectivity in all other actions.
Flow/Hydrology					
Change in Peak/Base Flows FR except Mid Main, Fall FA	I	+	+	+	Watershed and habitat improvement such as road obliteration may return peak and base flow to a more normative regime in some areas. Mitigations will maintain peak and base flow in all other actions.
Drainage Network Increase FR except	I	+	+	+	Watershed and habitat improvement such as road obliteration, and appropriate road and trail maintenance will improve hydrologic processes

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fish Habitat/Riparian Sampling and Watershed and Fish Habitat Improvement and Maintenance – All MSR analysis areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Mid Main FA					and diffuse the drainage network in some areas. Mitigations will maintain drainage network in all other actions.
Watershed Conditions					
Road Density and Location FR except Fall FUR	I	+	+	+	Watershed and habitat improvement, such as road obliteration, will reduce road density in some areas including RCAs. Mitigations will maintain road density all other actions.
Disturbance History FR	I	+	+	+	Watershed and habitat improvement, such as road obliteration, and removal of old culverts will cause a temporary disturbance, but will result in a short and long term decrease in anthropogenic disturbance. Mitigations will maintain disturbance history in all other actions.
Riparian Conservation Areas FR except Mid Main FA	I	+	+	+	Watershed and habitat improvement, such as road obliteration, or willow planting will restore RCA function (LWD recruitment, sediment buffering, root mass bank stabilization etc.) in some area. Mitigations will maintain road density all other actions.
Disturbance Regime FR except Mid Main FA	I	+	+	+	Watershed and habitat improvement, such as road obliteration in RCAs, and appropriate road and trail maintenance, will improve watershed resilience to disturbance. Mitigations will maintain the disturbance regime all other actions.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Fish Habitat/Riparian Sampling and Watershed and Fish Habitat Improvement and Maintenance – All MSR analysis areas		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects **I=improve/D=degrade/M=maintain/N=no influence**	**Expected Trend** **- negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
Integration of Species and Habitat Conditions **FR except** **Mid Main FA** **Fall Creek FUR (For bull trout)**	I	+	+	+	The actions with mitigations will improve, maintain or have no effect on all WCIs listed above; therefore, the integration of species and habitat conditions WCI will improve.

4. NOXIOUS WEEDS MANAGEMENT – ALL ANALYSIS AREAS

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Noxious Weeds Management		

Pathways & Indicators	Effects of the Management Action(s) Effects I=improve/D=degrade/M=maintain/ N=no influence	Expected Trend - negative, + positive, * negligible, none Temporary	Short-term	Long-term	Discussion of Effects
Local Population Character					
Local Population Size **FR**	N	none	none	none	No influence
Growth and Survival **FR**	D	-	-	-	Sub-lethal effects to listed fish and their food sources are probable
Life History Diversity and Isolation **FR except** **Fall Creek FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FR except** **Fall Creek FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FUR**	M	-*	-*	-*	Shade and subsequent loss of riparian vegetation due to chemical application is negligible due to buffers.
Intragravel Quality (Sediment) **No data**	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable increases in erosion and sedimentation.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Noxious Weeds Management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/ N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Chemical Contaminants and/or Nutrients **FA except** **Warren Creek FR**	D	-	-	-	Sub-lethal effects to listed fish and their food sources are probable
Habitat Access					
Physical Barriers **FA except** **Fall Creek FUR**	I	+	+	+	No influence
Habitat Elements					
Interstitial Sediment Deposition **(Substrate Embeddedness)** **FR except** **French/Fall FUR Lake/Partridge FA**	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable increases in erosion and sedimentation.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Noxious Weeds Management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/ N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Large Woody Debris FA except Warren FUR	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable increases in erosion and sedimentation.
Pool Frequency FA	N	none	none	none	No influence
Pool Quality FA except Warren, Fall FR	N	none	none	none	No influence
Off-Channel Habitat FR except Mid Main, French FA	N	none	none	none	No influence
Refugia FR except Fall FUR	N	none	none	none	No influence

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Noxious Weeds Management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/ N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Channel Condition and Dynamics					
Width/Max Depth Ratio FA except Fall, Warren FR	N	none	none	none	No influence
Streambank Condition FA except Warren FR	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable increases in erosion and sedimentation.
Floodplain Connectivity FR except Fall, Mid Main FA	N	none	none	none	No influence
Flow/Hydrology					
Change in Peak/Base Flows FR except Mid Main, Fall FA	N	none	none	none	No influence
Drainage Network Increase FR except Mid Main FA	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location	N	none	none	none	No influence

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-09 Warren Ck 5th HU 17060207-08 Middle Salmon-Sheep 5th HU (PNF only) 17060209-02 Salmon River-Partridge 5th HU (PNF only) 17060209-01 French Creek 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, 3 partial 5th HUs (PNF portions only)
Core Area (Bull Trout)		Local Population	
Management Actions	Noxious Weeds Management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/ N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
FR except Fall FUR					
Disturbance History FR	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable increases in erosion and sedimentation.
Riparian Conservation Areas FR except Mid Main FA	M	-*	-*	-*	Shade and subsequent loss of riparian vegetation due to chemical application is negligible due to buffers.
Disturbance Regime FR except Mid Main FA	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable decreases in landscape stability
Integration of Species and Habitat Conditions FR except Mid Main FA Fall Creek FUR (For bull trout)	D	-	-	-	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable changes in physical habitat, but sub-lethal effects to listed fish and their food sources are probable

5. ROAD MANAGEMENT, TRAILS, RECREATION, AND ADMINISTRATIVE SITE O&M, AND TRAVEL PLAN – MIDDLE MAIN ANALYSIS AREA

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-08 Middle Salmon-Sheep 5th HU (PNF only) California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 Fall 6th HU 170602070308
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. California, Carey, Fall Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan - MIDDLE Main ANALYSIS AREA		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects I=improve/D=degrade/M=maintain/N=no influence	**Expected Trend - negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
Local Population Character					
Local Population Size FR	D	-	-	-	• Fording streams on foot, horseback, or other non-motorized travel is likely to result in redd trampling and egg mortality, which would degrade the WCI. • Road management and trail maintenance will help reduce travel plan related sediment effects on local population size.
Growth and Survival FR	D	-	-	-	• Fording streams on foot, horseback, or other non-motorized travel is likely to result in redd trampling and egg mortality, which would degrade the WCI. • Road management and trail maintenance will help reduce travel plan related sediment effects on local population size.
Life History Diversity and Isolation FR except Fall Creek FUR	I	+	+	+	• Road management related removal or replacement of fish barriers, such as old culverts, will improve connectivity. • New or re-built trail culverts and fords will provide for aquatic organism passage.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-08 Middle Salmon-Sheep 5th HU (PNF only) California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 Fall 6th HU 170602070308
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. California, Carey, Fall Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan - MIDDLE Main ANALYSIS AREA		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects I=improve/D=degrade/M=maintain/N=no influence	**Expected Trend - negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
Persistence and Genetic Integrity FR except Fall Creek FUR	I	+	+	+	Road management related removal or replacement of fish barriers, such as old culverts, will improve connectivity. New or re-built trail culverts and fords will provide for aquatic organism passage.
Water Quality					
Temperature FUR	M	-*	-*	-*	• The travel plan will have no influence on temperature • Mitigations in the road management and trail maintenance actions preventing excessive brushing and other alternation of riparian vegetation will result in negligible effects on stream shade and temperature
Intragravel Quality (Sediment) No data	D	+*	-	-	• Restricting cross-country motorized travel will result in fewer incidences of motorized stream fording and driving in RCAs. At some point in the long term, sediment delivery from erosion on trails and roads related to increased motorized and non-motorized will surpass benefits from restricted travel. Road management and trail maintenance will help reduce travel plan related sediment effects at all time scales..
Chemical	M	+*	-*	-*	• As motorized travel increases there is a

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-08 Middle Salmon-Sheep 5th HU (PNF only) California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 Fall 6th HU 170602070308
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. California, Carey, Fall Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan - MIDDLE Main ANALYSIS AREA		

Pathways & Indicators	Effects of the Management Action(s) Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none Temporary	Short-term	Long-term	Discussion of Effects
Contaminants and/or Nutrients **FA**					negligible chance that petroleum could be spilled where roads and trails cross streams in motorized use areas. • Restrictions concerning refueling in RCAs and spill prevention and cleanup requirements will reduce the likely hood of chemical contamination during road management and trail maintenance activities. • Proper use of treated wood that meets BMPs will minimize potential for effects. The binding nature of dust-abatement salts, combined with restrictions on applications near waterways, low concentration of use and spill containment measures, reduce the likelihood of effects to negligible levels.
Habitat Access					
Physical Barriers **FA except** **Fall Creek FUR**	I	+	+	+	• Road management related removal or replacement of fish barriers, such as old culverts, will improve connectivity. New or re-built trail culverts and fords will provide for aquatic organism passage.
Habitat Elements					
Interstitial Sediment Deposition (Substrate	D	+*	-	-	• Restricting cross-country motorized travel will result in fewer incidences of motorized stream fording and driving in

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-08 Middle Salmon-Sheep 5th HU (PNF only) California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 Fall 6th HU 170602070308
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. California, Carey, Fall Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan - MIDDLE Main ANALYSIS AREA		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Embeddedness) FR except Fall FUR					RCAs. At some point in the long term sediment delivery from erosion on trails and roads related to increased motorized and non-motorized will surpass benefits from restricted travel. • Road management and trail maintenance will help reduce travel plan related substrate embeddedness effects at all time scales.
Large Woody Debris FA	M	-*	-*	-*	Mitigations will prevent more than negligible effects to LWD recruitment from road management and trail maintenance.
Pool Frequency FA	N	none	none	none	No influence
Pool Quality FA except Fall FR	M	+	-	-	• Restricting cross-country motorized travel expected to temporarily reduce sedimentation in pools due to less ground disturbance and fewer incidences of motorized stream fording and driving in RCAs. At some point sediment delivery from erosion on trails and roads related to increased motorized and non-motorized use will surpass benefits from restricted travel. Road management, and trail maintenance will

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-08 Middle Salmon-Sheep 5th HU (PNF only) California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 Fall 6th HU 170602070308
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. California, Carey, Fall Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan - MIDDLE Main ANALYSIS AREA		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects I=improve/D=degrade/M=maintain/N=no influence	**Expected Trend - negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
					reduce the travel plan related effects on pool quality.
Off-Channel Habitat FA except Fall FR	N	none	none	none	No influence
Refugia FR except Fall FUR	N	none	none	none	No influence

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-08 Middle Salmon-Sheep 5th HU (PNF only) California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 Fall 6th HU 170602070308
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. California, Carey, Fall Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan - MIDDLE Main ANALYSIS AREA		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects I=improve/D=degrade/M=maintain/N=no influence	**Expected Trend - negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
Channel Condition and Dynamics					
Width/Max Depth Ratio FA except Fall FR	D	+	-	-	• Travel plan related degradation of streambank condition will degrade width to max depth ratio at road and trail crossings. • Road and trail maintenance will reduce travel plan related degradation of streambank condition reducing effects to width/max depth ratio.
Streambank Condition (Travel Plan) FR	I	+*	+*	+*	Road/trail mileage decreases by 2.9 miles
Streambank Condition (LRMP) FA	D	+	-	-	• After a temporary improvement from restricting cross-country travel, the travel plan will result in short and long term degraded streambank condition where road and trails cross streams. • Road and trail maintenance will reduce travel plan related degradation of streambank condition.
Floodplain Connectivity FA except	D	+	-	-	• After a temporary improvement from restricting cross-country travel, the travel plan will result in short and long term degraded streambank condition where

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-08 Middle Salmon-Sheep 5th HU (PNF only) California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 Fall 6th HU 170602070308
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. California, Carey, Fall Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan - MIDDLE Main ANALYSIS AREA		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects I=improve/D=degrade/M=maintain/N=no influence	**Expected Trend - negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
					road and trails cross streams. **1 Road and trail maintenance will reduce travel plan related degradation of streambank condition.**
Flow/Hydrology					
Change in Peak/Base Flows FA	N	none	none	none	No influence
Drainage Network Increase FA except Fall FR	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location FR except Fall FUR	N	none	none	none	No influence
Disturbance History FR	I	+	+	+	Restricting cross-country motorized travel will result in fewer incidences of resource damage to landslide or landslide prone areas, and to RCAs.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-08 Middle Salmon-Sheep 5th HU (PNF only) California 6th HU 170602070306, Maxwell 6th HU 170602070307, Rabbit-Indian 6th HU 170602070304, Carey 6TH HU 170602070308 Fall 6th HU 170602070308
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. California, Carey, Fall Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan - MIDDLE Main ANALYSIS AREA		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Riparian Conservation Areas **FA except** **Fall FR**	I	+	+	+	Restricting cross-country motorized travel will result in fewer incidences of resource damage to RCAs Mitigations will minimize road management and trail maintenance related riparian disturbance to negligible levels.
Disturbance Regime **FR**	I	+	+	+	Restricting cross-country motorized travel will result in fewer incidences of resource damage across the landscape.
Integration of Species and Habitat Conditions **FA** **Fall Creek FUR (For bull trout)**	D	+	-	-	The travel plan will result in improvement to some WCIs and degrade others. Road management and trail maintenance will reduce some of the degrading effects of the travel plan.

6. ROAD MANAGEMENT, TRAILS, RECREATION, AND ADMINISTRATIVE SITE O&M, AND TRAVEL PLAN – WARREN ANALYSIS AREA

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-Warren 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. Warren Creek drainage
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Warren Analysis Area		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Local Population Character					
Local Population Size FR	D	-	-	-	• Fording streams on foot, horseback, or other non-motorized travel is likely to result in redd trampling and egg mortality, which would degrade the WCI. • Road management and trail maintenance will help reduce travel plan related sediment effects on local population size.
Growth and Survival FR	D	-	-	-	• Fording streams on foot, horseback, or other non-motorized travel is likely to result in redd trampling and egg mortality, which would degrade the WCI. • Road management and trail maintenance will help reduce travel plan related sediment effects on local population size.
Life History Diversity and Isolation FR	I	+	+	+	• Road management related removal or replacement of fish barriers, such as old culverts, will improve connectivity. • New or re-built trail culverts and fords will provide for aquatic organism passage.
Persistence and Genetic Integrity FR	I	+	+	+	Road management related removal or replacement of fish barriers, such as old culverts, will improve connectivity. New or re-built trail culverts and fords will provide

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-Warren 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. Warren Creek drainage
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Warren Analysis Area		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
					for aquatic organism passage.
Water Quality					
Temperature FUR	M	-*	-*	-*	• The travel plan will have no influence on temperature • Mitigations in the road management and trail maintenance actions preventing excessive brushing and other alternation of riparian vegetation will result in negligible effects on stream shade and temperature
Intragravel Quality (Sediment) No data	D	+*	-	-	• Restricting cross-country motorized travel will result in fewer incidences of motorized stream fording and driving in RCAs. At some point in the long term, sediment delivery from erosion on trails and roads related to increased motorized and non-motorized will surpass benefits from restricted travel. Road management and trail maintenance will help reduce travel plan related sediment effects at all time scales..
Chemical Contaminants and/or Nutrients FR	M	+*	-*	-*	• As motorized travel increases there is a negligible chance that petroleum could be spilled where roads and trails cross streams in motorized use areas. • Restrictions concerning refueling in RCAs and spill prevention and cleanup requirements will reduce the likely hood of chemical contamination during road management and trail maintenance activities.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-Warren 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. Warren Creek drainage
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Warren Analysis Area		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
					• Proper use of treated wood that meets BMPs will minimize potential for effects. The binding nature of dust-abatement salts, combined with restrictions on applications near waterways, low concentration of use and spill containment measures, reduce the likelihood of effects to negligible levels.
Habitat Access					
Physical Barriers FA except Fall Creek FR	I	+	+	+	• Road management related removal or replacement of fish barriers, such as old culverts, will improve connectivity. New or re-built trail culverts and fords will provide for aquatic organism passage.
Habitat Elements					
Interstitial Sediment Deposition (Substrate Embeddedness) FR	D	+*	-	-	• Restricting cross-country motorized travel will result in fewer incidences of motorized stream fording and driving in RCAs. At some point in the long term sediment delivery from erosion on trails and roads related to increased motorized and non-motorized will surpass benefits from restricted travel. • Road management and trail maintenance will help reduce travel plan related substrate embeddedness effects at all time scales.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-Warren 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. Warren Creek drainage
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Warren Analysis Area		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Large Woody Debris FUR	M	-*	-*	-*	Mitigations will prevent more than negligible effects to LWD recruitment from road management and trail maintenance.
Pool Frequency FA	N	none	none	none	No influence
Pool Quality FR	M	+	-	-	• Restricting cross-country motorized travel expected to temporarily reduce sedimentation in pools due to less ground disturbance and fewer incidences of motorized stream fording and driving in RCAs. At some point sediment delivery from erosion on trails and roads related to increased motorized and non-motorized use will surpass benefits from restricted travel. Road management, and trail maintenance will reduce the travel plan related effects on pool quality.
Off-Channel Habitat FR	N	none	none	none	No influence
Refugia FR	N	none	none	none	No influence

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-Warren 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. Warren Creek drainage
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Warren Analysis Area		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Channel Condition and Dynamics					
Width/Max Depth Ratio FR	D	+	-	-	• Travel plan related degradation of streambank condition will degrade width to max depth ratio at road and trail crossings. • Road and trail maintenance will reduce travel plan related degradation of streambank condition reducing effects to width/max depth ratio.
Streambank Condition (Travel Plan) FUR	I	+*	+*	+*	Road/trail mileage decreases by 1.4 miles
Streambank Condition (LRMP) FR	D	+	-	-	• After a temporary improvement from restricting cross-country travel, the travel plan will result in short and long term degraded streambank condition where road and trails cross streams. • Road and trail maintenance will reduce travel plan related degradation of streambank condition.
Floodplain Connectivity FR	D	+	-	-	• After a temporary improvement from restricting cross-country travel, the travel plan will result in short and long term degraded streambank condition where road and trails cross streams. **2 Road and trail maintenance will reduce travel plan related**

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-Warren 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. Warren Creek drainage
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Warren Analysis Area		

Pathways & Indicators	Effects of the Management Action(s)					
	Effects I=improve/D=degrade/M=maintain/N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects	
		Temporary	Short-term	Long-term		
					degradation of streambank condition.	
Flow/Hydrology						**N**
Change in Peak/Base Flows FR	N	none	none	none	No influence	
Drainage Network Increase FR	N	none	none	none	No influence	
Watershed Conditions						
Road Density and Location FR	N	none	none	none	No influence	
Disturbance History FR	I	+	+	+	Restricting cross-country motorized travel will result in fewer incidences of resource damage to landslide or landslide prone areas, and to RCAs.	
Riparian Conservation Areas FR	I	+	+	+	Restricting cross-country motorized travel will result in fewer incidences of resource damage to RCAs Mitigations will minimize road management and trail maintenance related riparian disturbance to negligible levels.	
Disturbance Regime FR	I	+	+	+	Restricting cross-country motorized travel will result in fewer incidences of resource damage across the landscape.	

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060207-Warren 5th HU (PNF only)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One 5th HU, PNF portion. Warren Creek drainage
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Warren Analysis Area		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects I=improve/D=degrade/M=maintain/N=no influence	**Expected Trend - negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
Integration of Species and Habitat Conditions FR	D	+	-	-	The travel plan will result in improvement to some WCIs and degrade others. Road management and trail maintenance will reduce some of the degrading effects of the travel plan.

7. ROAD MANAGEMENT, TRAILS, RECREATION, AND ADMINISTRATIVE SITE O&M, AND TRAVEL PLAN – LOWER MAIN ANALYSIS AREA

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One fifth HU Elkhorn Partridge, French, and Lake Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Lower Main Analysis Area		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects **I=improve/D=degrade/M=maintain/ N=no influence**	**Expected Trend** **- negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
Local Population Character					
Local Population Size **FR**	D	-	-	-	• Fording streams on foot, horseback, or other non-motorized travel is likely to result in redd trampling and egg mortality, which would degrade the WCI. • Road management and trail maintenance will help reduce travel plan related sediment effects on local population size.
Growth and Survival **FR**	D	-	-	-	• Fording streams on foot, horseback, or other non-motorized travel is likely to result in redd trampling and egg mortality, which would degrade the WCI. • Road management and trail maintenance will help reduce travel plan related sediment effects on local population size.
Life History Diversity and Isolation **FR**	I	+	+	+	• Road management related removal or replacement of fish barriers, such as old culverts, will improve connectivity. • New or re-built trail culverts and fords will provide for aquatic organism passage.
Persistence and Genetic Integrity **FR**	I	+	+	+	Road management related removal or replacement of fish barriers, such as old culverts, will improve connectivity. New or re-built trail culverts and fords will provide

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One fifth HU Elkhorn Partridge, French, and Lake Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Lower Main Analysis Area		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/ N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
					for aquatic organism passage.
Water Quality					
Temperature **FUR**	M	-*	-*	-*	• The travel plan will have no influence on temperature • Mitigations in the road management and trail maintenance actions preventing excessive brushing and other alternation of riparian vegetation will result in negligible effects on stream shade and temperature
Intragravel Quality **(Sediment)** **No data**	D	+*	-	-	• Restricting cross-country motorized travel will result in fewer incidences of motorized stream fording and driving in RCAs. At some point in the long term, sediment delivery from erosion on trails and roads related to increased motorized and non-motorized will surpass benefits from restricted travel. Road management and trail maintenance will help reduce travel plan related sediment effects at all time scales..
Chemical Contaminants and/or Nutrients **FA**	M	+*	-*	-*	• As motorized travel increases there is a negligible chance that petroleum could be spilled where roads and trails cross streams in motorized use areas. • Restrictions concerning refueling in RCAs and spill prevention and cleanup requirements will reduce the likely hood of chemical contamination during road management and trail maintenance activities.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One fifth HU Elkhorn Partridge, French, and Lake Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Lower Main Analysis Area		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects **I=improve/D=degrade/M=maintain/ N=no influence**	**Expected Trend - negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
					• Proper use of treated wood that meets BMPs will minimize potential for effects. The binding nature of dust-abatement salts, combined with restrictions on applications near waterways, low concentration of use and spill containment measures, reduce the likelihood of effects to negligible levels.
Habitat Access					
Physical Barriers **FA**	I	+	+	+	• Road management related removal or replacement of fish barriers, such as old culverts, will improve connectivity. New or re-built trail culverts and fords will provide for aquatic organism passage.
Habitat Elements					
Interstitial Sediment Deposition (Substrate Embeddedness) **Elkhorn FR** **Partridge, Lake FA** **French FUR**	D French, Elkhorn M Partridge, Lake	+*	-	-	• Restricting cross-country motorized travel will result in fewer incidences of motorized stream fording and driving in RCAs. At some point in the long term sediment delivery from erosion on trails and roads related to increased motorized and non-motorized will surpass benefits from restricted travel. • Road management and trail maintenance will help reduce travel plan related substrate embeddedness effects at all time scales.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One fifth HU Elkhorn Partridge, French, and Lake Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Lower Main Analysis Area		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects I=improve/D=degrade/M=maintain/ N=no influence	Expected Trend - negative, + positive, * negligible, none			Discussion of Effects
		Temporary	Short-term	Long-term	
Large Woody Debris FR	M	-*	-*	-*	Mitigations will prevent more than negligible effects to LWD recruitment from road management and trail maintenance.
Pool Frequency FA	N	none	none	none	No influence
Pool Quality FA	M	+	-	-	• Restricting cross-country motorized travel expected to temporarily reduce sedimentation in pools due to less ground disturbance and fewer incidences of motorized stream fording and driving in RCAs. At some point sediment delivery from erosion on trails and roads related to increased motorized and non-motorized use will surpass benefits from restricted travel. Road management, and trail maintenance will reduce the travel plan related effects on pool quality.
Off-Channel Habitat FR	N	none	none	none	No influence
Refugia FR	N	none	none	none	No influence

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One fifth HU Elkhorn Partridge, French, and Lake Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Lower Main Analysis Area		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects I=improve/D=degrade/M=maintain/ N=no influence	**Expected Trend - negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
Channel Condition and Dynamics					
Width/Max Depth Ratio FA	D	+	-	-	• Travel plan related degradation of streambank condition will degrade width to max depth ratio at road and trail crossings. • Road and trail maintenance will reduce travel plan related degradation of streambank condition reducing effects to width/max depth ratio.
Streambank Condition (Travel Plan) French, Elkhorn FUR Lake, Partridge FR	I – French M – Elkhorn, Partridge, Lake	+*	+*	+*	Road/trail mileage decreases by 5.7 milesin French Creek. Road mileage is unchanged or little changed in other drainages.
Streambank Condition (LRMP) FA	D	+	-	-	• After a temporary improvement from restricting cross-country travel, the travel plan will result in short and long term degraded streambank condition where road and trails cross streams. • Road and trail maintenance will reduce travel plan related degradation of streambank condition.
Floodplain Connectivity FR	D	+	-	-	• After a temporary improvement from restricting cross-country travel, the travel plan will result in short and long term degraded streambank condition where road and trails cross streams. **3 Road and trail maintenance will**

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One fifth HU Elkhorn Partridge, French, and Lake Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Lower Main Analysis Area		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects I=improve/D=degrade/M=maintain/ N=no influence	**Expected Trend - negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
					reduce travel plan related degradation of streambank condition.
Flow/Hydrology					
Change in Peak/Base Flows FR	N	none	none	none	No influence
Drainage Network Increase FR	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location FR	N	none	none	none	No influence
Disturbance History FR	I	+	+	+	Restricting cross-country motorized travel will result in fewer incidences of resource damage to landslide or landslide prone areas, and to RCAs.
Riparian Conservation Areas FR	I	+	+	+	Restricting cross-country motorized travel will result in fewer incidences of resource damage to RCAs Mitigations will minimize road management and trail maintenance related riparian disturbance to negligible levels.
Disturbance Regime FR	I	+	+	+	Restricting cross-country motorized travel will result in fewer incidences of resource damage across the landscape.

Agency/Unit	PNF McCall and New Meadows RD	HU Code and Name	17060209-02 Salmon River-Partridge Ck (5th)
Fish Species Present	Bull trout, chinook, steelhead, westslope cutthroat	Spatial Scale of this Matrix	One fifth HU Elkhorn Partridge, French, and Lake Creek drainages
Core Area (Bull Trout)		Local Population	
Management Actions	Road Management, Trails, Recreation, and Administrative Site I&M, and Travel Plan – Lower Main Analysis Area		

Pathways & Indicators	**Effects of the Management Action(s)**				
	Effects **I=improve/D=degrade/M=maintain/ N=no influence**	**Expected Trend** **- negative, + positive, * negligible, none**			**Discussion of Effects**
		Temporary	**Short-term**	**Long-term**	
Integration of Species and Habitat Conditions **FR**	D	+	-	-	The travel plan will result in improvement to some WCIs and degrade others. Road management and trail maintenance will reduce some of the degrading effects of the travel plan.

8. GRAZING ALLOTMENTS – LOWER MAIN AND MIDDLE MAIN ANALYSIS AREAS

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th 170602070306 California 6th 170602070307 Maxwell 6th 170602070304 Rabbit-Indian 6th 170602070308 Carey 6TH 17060207-08-07 Fall Creek 6th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	Approximately 3 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Grazing Allotments – Lower Main and Middle Main Analysis Area		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Local Population Character					
Local Population Size **FR**	M	-*	-*	-*	Because of sheep herding practices redd trampling would be negligible
Growth and Survival **FR**	M	-*	-*	-*	Because of sheep herding practices redd trampling would be negligible
Life History Diversity and Isolation **FR** **(FUR Fall)**	N	none	none	none	No influence
Persistence and Genetic Integrity **FR** **(FUR Fall)**	N	none	none	none	No influence
Water Quality					
Temperature **FUR** **FR Cal, Carey**	M	-*	-*	-*	Negligible because mitigations restrict livestock salting locations, trailing, bedding, watering, and development of water sources, corrals, and other handling facilities, to locations that will not degrade WCIs such as shade providing riparian vegetation and streambank stability.; therefore, effects to listed species and critical habitat will be negligible.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th 170602070306 California 6th 170602070307 Maxwell 6th 170602070304 Rabbit-Indian 6th 170602070308 Carey 6TH 17060207-08-07 Fall Creek 6th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	Approximately 3 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Grazing Allotments – Lower Main and Middle Main Analysis Area		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Sediment **Intragravel Quality** **NA**	M	-*	-*	-*	Occasional sheep trailing across RCAs will result in negligible amounts of sediment delivery from soil disturbance. Mitigations and restriction on use will minimize the effects. In general, deleterious effects on salmonid habitat conditions from grazing have not been evident, and most trends appear to be in the direction of improving conditions; more detail is available in the annual monitoring report (Nelson 2006). Current trends and current conditions in these indices do not show that current grazing (identical to that proposed through 2017) degrades salmonid habitat conditions. Long-term studies show improvement since changes in grazing practices about 1990 (Nelson 2006).
Chemical Contaminants and/or Nutrients **FA**	M	-*	-*	-*	Occasional sheep trailing across headwater stream channels will have a negligible influence on this WCI. Mitigations and restriction on use will minimize the effects. In general, deleterious effects on salmonid habitat conditions from grazing have not been evident, and most trends appear to be in the direction of improving conditions; more detail is available in the annual monitoring report (Nelson 2006). Current trends and current conditions in these indices do not show that current grazing (identical to that proposed through 2017) degrades salmonid habitat conditions (Nelson 2006).
Habitat Access					
Physical Barriers **FA** **(FUR Fall)**	N	none	none	none	No influence
Habitat Elements					
Substrate Embeddedness	M	-*	-*	-*	Occasional sheep trailing across headwater RCAs will result in negligible amounts of sediment delivery from soil disturbance.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th 170602070306 California 6th 170602070307 Maxwell 6th 170602070304 Rabbit-Indian 6th 170602070308 Carey 6TH 17060207-08-07 Fall Creek 6th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	Approximately 3 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Grazing Allotments – Lower Main and Middle Main Analysis Area		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Interstitial Sediment **FUR Fall, French** **FR Cal, Max, Rabbit, Carey** **FA SR-Partridge**					Mitigations and restriction on use will minimize the effects. . In general, deleterious effects on salmonid habitat conditions from grazing have not been evident, and most trends appear to be in the direction of improving conditions; more detail is available in the annual monitoring report (Nelson 2006). Current trends and current conditions in these indices do not show that current grazing (identical to that proposed through 2017) degrades salmonid habitat conditions. (Nelson 2006).
Large Woody Debris **FR SR- Partridge** **FA French, Cal, Max, Rabbit, Carey,**	N	none	none	none	No influence
Pool Frequency **FA**	N	none	none	none	No influence
Pool Quality **FA** **(FR Fall)**	N	none	none	none	No influence
Off-Channel Habitat **FR SR-Partridge, French, Fall** **FA French, Cal, Max, Rabbit, Carey**	N	none	none	none	No influence
Refugia **FR**	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th 170602070306 California 6th 170602070307 Maxwell 6th 170602070304 Rabbit-Indian 6th 170602070308 Carey 6TH 17060207-08-07 Fall Creek 6th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	Approximately 3 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Grazing Allotments – Lower Main and Middle Main Analysis Area		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
(FUR Fall BT)					
Channel Condition and Dynamics					
Width/MaxDepth Ratio FA (FR Fall)	N	none	none	none	No influence
Streambank Condition FA	M	-*	-*	-*	Streambank condition will continue to be altered occasional sheep trailing across headwater streams. Mitigations and restrictions on use will limit effects to negligible levels. In general, deleterious effects on salmonid habitat conditions from grazing have not been evident, and most trends appear to be in the direction of improving conditions; more detail is available in the annual monitoring report (Nelson 2006). Current trends and current conditions in these indices do not show that current grazing (identical to that proposed through 2017) degrades salmonid habitat conditions (Nelson 2006).
Floodplain Connectivity FR SR-Partridge, French FA Cal, Max, Rabbit, Carey, Fall	N	none	none	none	No influence
Flow/Hydrology					
Change in Peak/Base Flows FR SR-Partridge, French FA Cal, Max, Rabbit, Carey , Fall	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th 170602070306 California 6th 170602070307 Maxwell 6th 170602070304 Rabbit-Indian 6th 170602070308 Carey 6TH 17060207-08-07 Fall Creek 6th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	Approximately 3 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Grazing Allotments – Lower Main and Middle Main Analysis Area		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Drainage Network Increase FR SR-Partridge, French, FA Cal, Max, Rabbit, Carey	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location FR	N	none	none	none	No influence
Disturbance History FR	M	-*	-*	-*	Disturbance history will continue to be altered by livestock use. Mitigations and restrictions on use (e.g. once over grazing) will limit effects to negligible levels.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th 170602070306 California 6th 170602070307 Maxwell 6th 170602070304 Rabbit-Indian 6th 170602070308 Carey 6TH 17060207-08-07 Fall Creek 6th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	Approximately 3 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Grazing Allotments – Lower Main and Middle Main Analysis Area		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Riparian Conservation Areas FR SR-Partridge, French, FA Cal, Max, Rabbit, Carey	M	-*	-*	-*	RCA vegetation will remain altered from livestock use in RCAs. Mitigations and restrictions on use will limit effects to negligible levels. Avoidance of access or other activities that may disturb redds or other reproductive behavior will prevent trampling of eggs and adverse effects on spawning or staging. Mitigations restrict livestock salting locations, trailing, bedding, watering, and development of water sources, corrals, and other handling facilities, to locations that will not degrade WCIs such as shade providing riparian vegetation and streambank stability.; therefore, effects to listed species and critical habitat will be negligible. Once-over grazing limits designed not to degrade WCI's make more than negligible effects to listed species and critical habitat unlikely. In general, riparian utilization data indicate livestock use has been limited to allowable levels and therefore effects to listed species and critical habitat are likely limited to negligible levels (Nelson 2006, Zurstadt and Bonaminio 2005, Zurstadt 2004, 2003).
Disturbance Regime FR SR-Partridge, French, FA Cal, Max, Rabbit, Carey	M	-*	-*	-*	Disturbance regime will continue to be altered by livestock use. Mitigations and restrictions on use (once over grazing) will limit effects to negligible levels. Avoidance of access or other activities that may disturb redds or other reproductive behavior will prevent trampling of eggs and adverse effects on spawning or staging. Mitigations restrict livestock salting locations, trailing, bedding, watering, and development of water sources, corrals, and other handling facilities, to locations that will not degrade WCIs such as shade providing riparian vegetation and streambank stability.; therefore, effects to listed species and critical habitat will be negligible. Once-over grazing limits designed not to degrade WCI's make more than negligible effects to listed species and critical habitat unlikely. In general, riparian utilization data indicate livestock use has been limited to allowable levels and therefore effects to listed species and critical habitat are

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th 170602070306 California 6th 170602070307 Maxwell 6th 170602070304 Rabbit-Indian 6th 170602070308 Carey 6TH 17060207-08-07 Fall Creek 6th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	Approximately 3 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Grazing Allotments – Lower Main and Middle Main Analysis Area		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
					likely limited to negligible levels (Nelson 2006, Zurstadt and Bonaminio 2005, Zurstadt 2004, 2003).
Integration of Species and Habitat Conditions **FR SR-Partridge, French, Fall Ch/St** **FA Cal, Max, Rabbit, Carey**	M	-*	-*	-*	The mitigations and restrictions on use will limit the effects to negligible levels for all WCIs above. Avoidance of access or other activities that may disturb redds or other reproductive behavior will prevent trampling of eggs and adverse effects on spawning or staging. Mitigations restrict livestock salting locations, trailing, bedding, watering, and development of water sources, corrals, and other handling facilities, to locations that will not degrade WCIs such as shade providing riparian vegetation and streambank stability.; therefore, effects to listed species and critical habitat will be negligible. Once-over grazing limits designed not to degrade WCI's make more than negligible effects to listed species and critical habitat unlikely. In general, riparian utilization data indicate livestock use has been limited to allowable levels and therefore effects to listed species and critical habitat are likely limited to negligible levels (Nelson 2006, Zurstadt and Bonaminio 2005, Zurstadt 2004, 2003).

9. OUTFITTER AND GUIDES

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Warren Ck 5th 17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	Three 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Outfitter and Guides – Warren and Lower Main Analysis Areas		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Local Population Character					
Local Population Size **FR**	N	none	none	none	No influence
Growth and Survival **FR**	M	-*	-*	-*	If a client or guide crosses the stream on foot or with livestock there may some minor alteration of the stream bank leading to sediment delivery to the channel, but the amount of sediment and effects would be negligible. Recommendations to avoid spawning areas reduce the likelihood of effects to bull trout.
Life History Diversity and Isolation **FR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FR**	N	none	none	none	No influence
Water Quality					
Temperature **FUR**	N	none	none	none	No influence
Intragravel Quality **Sediment** **NA**	M	-*	-*	-*	If a client or guide crosses the stream on foot or with livestock there may some minor alteration of the stream bank leading to sediment delivery to the channel, but the amount of sediment and effects would be negligible.
Chemical Contaminants and/or Nutrients **Warren FR** **SRP FA**	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Warren Ck 5th 17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	Three 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Outfitter and Guides – Warren and Lower Main Analysis Areas		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Habitat Access					
Physical Barriers **Warren FR** **SRP FA**	N	none	none	none	No influence
Habitat Elements					
Interstitial Deposition **Substrate Embeddedness** **Warren FR** **SRP FA**	M	-*	-*	-*	If a client or guide crosses the stream on foot or with livestock there may some minor alteration of the stream bank leading to sediment delivery to the channel, but the amount of sediment and effects would be negligible. Recommendations to avoid spawning areas further reduce the likelihood of effects to bull trout.
Large Woody Debris **Warren FUR** **SRP FA**	N	none	none	none	No influence
Pool Frequency **FA**	N	none	none	none	No influence
Pool Quality **Warren FR** **SRP FA**	N	none	none	none	No influence
Off-Channel Habitat **FR**	N	none	none	none	No influence
Refugia **FR**	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest		HU Code and Name	17060209-02 Warren Ck 5th 17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat		Spatial Scale of this Matrix	Three 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries		Local Population	Main Salmon Southwest Tributaries
Management Actions	Outfitter and Guides – Warren and Lower Main Analysis Areas			

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Channel Condition and Dynamics					
Width/MaxDepth Ratio **Warren FR** **SRP FA**	M	-*	-*	-*	If a client or guide crosses the stream on foot or with livestock there may some minor alteration of the stream bank, but the effects would be negligible. Recommendations to avoid spawning areas further reduce the likelihood of effects to bull trout.
Streambank Condition **Warren FR** **SRP FA**	M	-*	-*	-*	If a client or guide crosses the stream on foot or with livestock there may some minor alteration of the stream bank, but the effects to bull trout would be negligible. Recommendations to avoid spawning areas further reduce the likelihood of effects to bull trout.
Floodplain Connectivity **FR**	N	none	none	none	No influence
Flow/Hydrology					
Change in Peak/Base Flows **FR**	N	none	none	none	No influence
Drainage Network Increase **FR**	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location **FR**	N	none	none	none	No influence
Disturbance History **FR**	M	-*	-*	-*	If a client or guide crosses an RCA on foot or with livestock there may some minor alteration of the vegetation, but the effects would be negligible. Recommendations to avoid spawning areas further reduce the likelihood of effects to bull trout.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Warren Ck 5th 17060209-02 Salmon River-Partridge Ck 5th 1707060209-01 French Creek 5th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	Three 5th HUs
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Outfitter and Guides – Warren and Lower Main Analysis Areas		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Riparian Conservation Areas FR	M	-*	-*	-*	If a client or guide crosses an RCA on foot or with livestock there may some minor alteration of the vegetation, but the effects would be negligible. Recommendations to avoid spawning areas further reduce the likelihood of effects to bull trout.
Disturbance Regime FR	N	none	none	none	No influence
Integration of Species and Habitat Conditions FR	M	-*	-*	-*	Effects to WCIs would be negligible to none.

10. WATER DIVERSION SUP – WARREN HEIGHTS

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Warren Ck 5th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	One 5th HU
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Outfitter and Guides – Warren and Lower Main Analysis Areas		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Local Population Character					
Local Population Size **FR**	M	-*	-*	-*	The amount diverted is considered to be negligible because the amount of habitat that would change from the withdrawal is unmeasurable in Warren Creek, even at low flows. Since habitat change would be unmeasurable, population size would be maintained
Growth and Survival **FR**	M	-*	-*	-*	The amount diverted is considered to be negligible because the amount of habitat that would change from the withdrawal is unmeasurable in Warren Creek, even at low flows. Since habitat change would be unmeasurable, growth and survival would be maintained
Life History Diversity and Isolation **FR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FR**	N	none	none	none	No influence
Water Quality					
Temperature **FUR**	N	none	none	none	No influence
Intragravel Deposition Sediment **NA**	M	-*	-*	-*	Negligible effects occur due to minor erosion and sediment generated by diversion facilities
Chemical Contaminants and/or Nutrients **FR**	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Warren Ck 5th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	One 5th HU
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Outfitter and Guides – Warren and Lower Main Analysis Areas		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Habitat Access					
Physical Barriers **FR**	M	-*	-*	-*	Streamflows from these diversions will not be enough to dewater streams to the extent that they develop passage barriers
Habitat Elements					
Interstitial Deposition **Substrate Embeddedness** **FR**	M	-*	-*	-*	Negligible effects occur due to minor erosion and sediment generated by diversion facilities
Large Woody Debris **FUR**	N	none	none	none	No influence
Pool Frequency **FA**	N	none	none	none	No influence
Pool Quality **FR**	N	none	none	none	No influence
Off-Channel Habitat **FR**	N	none	none	none	No influence
Refugia **FR**	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/MaxDepth Ratio **FR**	N	none	none	none	No influence
Streambank Condition **FR**	M	-*	-*	-*	Negligible effects occur due to minor erosion and sediment generated by diversion facilities

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	17060209-02 Warren Ck 5th
Fish Species Present	Chinook, Steelhead, Bull trout, Cutthroat	Spatial Scale of this Matrix	One 5th HU
Core Area (Bull Trout)	Main Salmon Southwest Tributaries	Local Population	Main Salmon Southwest Tributaries
Management Actions	Outfitter and Guides – Warren and Lower Main Analysis Areas		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Floodplain Connectivity FR	N	none	none	none	No influence
Flow/Hydrology					
Change in Peak/Base Flows FR	M	-*	-*	-*	Withdrawals from water diversions compared to the streams would not decrease flows more than negligibly
Drainage Network Increase FR	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location FR	N	none	none	none	No influence
Disturbance History FR	N	none	none	none	No influence
Riparian Conservation Areas FR	M	-*	-*	-*	Negligible effects occur due to minor erosion and sediment generated by diversion facilities
Disturbance Regime FR	N	none	none	none	No influence.
Integration of Species and Habitat Conditions FR	M	-*	-*	-*	The diversions will result in no effect to some WCIs and a negligible effects to others, maintaining this WCI.

D. APPENDIX 4. STANDARD ACRONYMS, ABBREVIATIONS, AND CONVERSIONS

1. ACRONYMS

a. General

AMP	Allotment Management Plan
AOP	Annual Operating Provisions
AUM	Animal Unit Month
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BMP	Best Management Practices
BNF	Boise National Forest
BO	Biological Opinion
BR	Brownlee Reservoir or Brownlee, a PNF ESA §7 Watershed
C&H	Cattle and horse, a grazing allotment use designation
CFR	Code of Federal Regulations
CWA	Clean Water Act
DC	Deep Creek, a PNF ESA §7 Watershed
DEIS	Draft Environmental Impact Statement
EFSFSR	East Fork South Fork Salmon River
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FCRONRW	Frank Church River Of No Return Wilderness
FDR	Forest Development Road
FEIS	Final Environmental Impact Statement
FH	Forest Highway
FT	Forest Trail
FONSI	Finding Of No Significant Impact
FR	Federal Register
HM	Head Months
HU	Hydrologic Unit, used in the form “Brownlee Reservoir 4th level hydrologic unit”
HUC	Hydrologic Unit Code, used in the form “the 4th level hydrologic unit code is 17050201”
IDE	Idaho Division of Environment
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game.
IDL	Idaho Department of Lands
IDWR	Idaho Department of Water Resources
INCD	Idaho Natural Conditions Database
IWWA	Inland West Watershed Assessment
LOC	Letter of Concurrence.
LRMP	Land and Resource Management Plan; also called Forest Plan
LSR	Little Salmon River, also used for the PNF ESA §7 Watershed of the same name
LWD	Large Woody Debris
MBF	Thousand Board Feet
MFSR	Middle Fork Salmon River
MFT	Middle Fork Tribs or Middle Fork Salmon River Tributaries, a PNF ESA §7 Watershed
MMBF	Million Board Feet
MSSE	Main Salmon SE or Main Salmon River Tributaries (Southeast: South Fork Salmon River to Middle Fork Salmon River), a PNF ESA §7 Watershed
MSSW	Main Salmon SW or Main Salmon River Tributaries (Southwest: Little Salmon River to South Fork Salmon River), a PNF ESA §7 Watershed
MYOP	Multi-Year Operating Plan

NFPR	North Fork Payette River, also used for the PNF ESA §7 Watershed of the same ame
NFS	National Forest System (e.g., NFS lands).
NMFS	National Marine Fisheries Service
NPNF	Nez Perce National Forest
NPT	Nez Perce Tribe
O&M	Operation and Maintenance
PNF	Payette National Forest
RA	Resource Area
RCA	Riparian Conservation Area
WCI	Riparian Management Objective
ROD	Record of Decision
RPA	Reasonable and Prudent Alternative
S&G	Sheep and goat, a grazing allotment use designation
SBT	Shoshone-Bannock Tribe
SFSR	South Fork Salmon River, also used for the PNF ESA §7 Watershed of the same name
SUP	Special Use Permit
TES	Threatened, endangered, sensitive
TS	Timber Sale
TSI	Timber Stand Improvement
USC	United States Code
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WFU	Wildland Fire Use
WR	Weiser River, also used for the PNF ESA §7 Watershed of the same name

b. Fish Species

BT	Columbia River bull trout (*Salvelinus confluentus*)
EB	Eastern brook trout (*Salvelinus fontinalis*)
LT	Lake trout (*Salvelinus namaycush*)
MS	Mottled sculpin (*Cottus bairdi*)
PL	Pacific lamprey (*Lampetra tridentata*)
RB	Redband trout (*Oncorhynchus mykiss gairdneri*)
RBT	Rainbow trout (*Oncorhynchus mykiss irideus*)
SP	Splake (*Salvelinus fontinalis x S. namaycush*)
SpCS	Spring chinook salmon (*Oncorhynchus tshawytscha*)
SpSCS	Spring/summer chinook salmon (*Oncorhynchus tshawytscha*)
SpSSFCS	Spring/summer and fall chinook salmon (*Oncorhynchus tshawytscha*)
SST	Snake River summer steelhead (*Oncorhynchus mykiss gairdneri*)
WCT	Westslope cutthroat trout (*Oncorhynchus clarki lewisi*)
YCT	Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*)

c. Determinations—Listed Species and Critical Habitat

LAA	May Affect, Likely to Adversely Affect
NE	No Effect
NLAA	May Affect, Not Likely to Adversely Affect

d. Determinations—Species and Critical Habitat Proposed for Listing

LJ	Likely to Jeopardize
LRDAM	Likely to Lead to Destruction or Adverse Modification
NLJ	Not Likely to Jeopardize
NLRDAM	Not Likely to Lead to Destruction or Adverse Modification

e. Determinations—Sensitive Species

LLL	Likely to Lead to Listing

NLLL Not Likely to Lead to Listing

2. ABBREVIATIONS

a. Units of Measure

ac	acre.
a.e./L	acid equivalents per liter.
ai/ac	active ingredient per acre.
ai/ac/year	active ingredient per acre per year.
cfs	cubic feet per second.
cms	cubic meters per second.
ft	feet.
ha	hectare.
hr	hour.
km	kilometer.
km ²	square kilometer.
lb	pound.
lb/ac	pounds per acre (alternatively lb/acre).
lb/ai/ac	pounds of active ingredient per acre.
m	meters.
mg/L	milligrams per liter.
:g	microgram.
:g/L	micrograms per liter.
mi	mile.
mi ²	square mile.
ppm	parts per million.

b. Toxicology

ai	Active ingredient.
a.e.	Acid equivalents.
EC_{50}	Toxicant concentration causing an observable effect in 50% of test organisms.
EEC	Estimated environmental concentration.
LC_{50}	Lethal concentration that kills half of a test population.
NOEC	No-observable-effect concentration.
NOEL	No-observable-effects limits.

3. CONVERSIONS

The following were used to convert between English and metric units of measure:

ac	= ha ∗ 2.4710
ha	= ac ∗ 0.4047
in	= cm ∗ 0.39
cm	= in ∗ 2.54
mi	= km ∗ 0.622
km	= mi ∗ 1.609
mi ²	= km² ∗ 0.386
km²	= mi² ∗ 2.589
mi/mi²	= km/km ² ∗ 1.609
km/km²	= mi/mi ² ∗ 0.622
cms	= cfs * 0.02832

NFPR	North Fork Payette River, also used for the PNF ESA §7 Watershed of the same ame
NFS	National Forest System (e.g., NFS lands).
NMFS	National Marine Fisheries Service
NPNF	Nez Perce National Forest
NPT	Nez Perce Tribe
O&M	Operation and Maintenance
PNF	Payette National Forest
RA	Resource Area
RCA	Riparian Conservation Area
WCI	Riparian Management Objective
ROD	Record of Decision
RPA	Reasonable and Prudent Alternative
S&G	Sheep and goat, a grazing allotment use designation
SBT	Shoshone-Bannock Tribe
SFSR	South Fork Salmon River, also used for the PNF ESA §7 Watershed of the same name
SUP	Special Use Permit
TES	Threatened, endangered, sensitive
TS	Timber Sale
TSI	Timber Stand Improvement
USC	United States Code
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WFU	Wildland Fire Use
WR	Weiser River, also used for the PNF ESA §7 Watershed of the same name

b. Fish Species

BT	Columbia River bull trout (*Salvelinus confluentus*)
EB	Eastern brook trout (*Salvelinus fontinalis*)
LT	Lake trout (*Salvelinus namaycush*)
MS	Mottled sculpin (*Cottus bairdi*)
PL	Pacific lamprey (*Lampetra tridentata*)
RB	Redband trout (*Oncorhynchus mykiss gairdneri*)
RBT	Rainbow trout (*Oncorhynchus mykiss irideus*)
SP	Splake (*Salvelinus fontinalis x S. namaycush*)
SpCS	Spring chinook salmon (*Oncorhynchus tshawytscha*)
SpSCS	Spring/summer chinook salmon (*Oncorhynchus tshawytscha*)
SpSSFCS	Spring/summer and fall chinook salmon (*Oncorhynchus tshawytscha*)
SST	Snake River summer steelhead (*Oncorhynchus mykiss gairdneri*)
WCT	Westslope cutthroat trout (*Oncorhynchus clarki lewisi*)
YCT	Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*)

c. Determinations—Listed Species and Critical Habitat

LAA	May Affect, Likely to Adversely Affect
NE	No Effect
NLAA	May Affect, Not Likely to Adversely Affect

d. Determinations—Species and Critical Habitat Proposed for Listing

LJ	Likely to Jeopardize
LRDAM	Likely to Lead to Destruction or Adverse Modification
NLJ	Not Likely to Jeopardize
NLRDAM	Not Likely to Lead to Destruction or Adverse Modification

e. Determinations—Sensitive Species

LLL	Likely to Lead to Listing

NLLL Not Likely to Lead to Listing

2. ABBREVIATIONS

a. Units of Measure

ac	acre.
a.e./L	acid equivalents per liter.
ai/ac	active ingredient per acre.
ai/ac/year	active ingredient per acre per year.
cfs	cubic feet per second.
cms	cubic meters per second.
ft	feet.
ha	hectare.
hr	hour.
km	kilometer.
km ²	square kilometer.
lb	pound.
lb/ac	pounds per acre (alternatively lb/acre).
lb/ai/ac	pounds of active ingredient per acre.
m	meters.
mg/L	milligrams per liter.
:g	microgram.
:g/L	micrograms per liter.
mi	mile.
mi ²	square mile.
ppm	parts per million.

b. Toxicology

ai	Active ingredient.
a.e.	Acid equivalents.
EC_{50}	Toxicant concentration causing an observable effect in 50% of test organisms.
EEC	Estimated environmental concentration.
LC_{50}	Lethal concentration that kills half of a test population.
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3. CONVERSIONS

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