Biological Assessment for the Potential Effects of Managing the Payette National Forest in the Brownlee Reservoir Section 7 Watershed on Columbia River Bull Trout and Biological Evaluation for Westslope Cutthroat Trout

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I. INTRODUCTION

This Biological Assessment (BA) determines the effects of various Federal actions in the Brownlee Reservoir watershed (fourth level Hydrologic Unit) on Columbia River bull trout *(Salvelinus confluentus)*. This BA is tiered to previous BAs and supplements for the Section 7 watershed defined as Brownlee Reservoir. 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). Actions supersede all those in previous consultations within the boundaries of the Payette National Forest. All acronyms, phrases, references, and associated documents from these BAs are included.

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). All actions considered in this Biological Assessment will have no impacts on westslope cutthroat trout because the species does not exist within the Brownlee Reservoir Section 7 watershed.

Descriptive information in this BA covers Brownlee Reservoir Section 7 watershed (Figure 1). The Federal actions are in the Indian Creek, upper Bear Creek, and Crooked River subwatersheds. Hereafter for simplicity these areas are referred to as analysis areas or subwatersheds, because the hydrologic unit level varies. Some of the descriptive information in Sections I and II of this BA has been condensed from previous volumes or referenced to avoid repetition. All acronyms, phrases, references and associated documents from these BAs are included.

II. General Description of Section 7 Watershed

The Idaho portion of the Brownlee Reservoir Section 7 watershed is an area of extremely high relief, ranging in elevation from 8,151 feet (2,484 m) at Echols No 2 in the Seven Devils Mountains to about 1,500 feet (457 m) on the Snake River at Hells Canyon Dam. Because of this, potential natural vegetation varies greatly with elevation, aspect, and slope. Low lying areas, such as the the canyon of the Snake River, typically comprise grassland and shrub steppe communities of native and introduced grasses including bluebunch wheatgrass (*Agropyron spicatum*), Idaho fescue (*Festuca idahoensis*), and cheatgrass (*Bromus tectorum*), among others, with big sagebrush (*Atremesia tridentata*) co-dominant in the shrub steppes. Middle to high elevations such as in the Seven Devils mountains and on the insular formations of Cuddy Mountain (7,867 ft [2,398 m]) and Sturgill Peak (7,589 ft [2,311 m]) support stands of conifer forest composed of varying proportions of Ponderosa pine (*Pinus ponderosa*), Douglas Fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*) and lodgepole pine (*P. contorta*). Northerly aspects are often well forested, while southerly aspects may be predominantly grassland with forests occupying shaded valley positions. There are also large plateau areas, dissected by deep canyons, such as those of the Wildhorse River watershed with grassy tablelands on top and forest vegetation in the canyons; these tablelands are important grazing lands for cattle. Riparian vegetation can be diverse and includes alders (*Alnus spp.*), red-osier dogwood (*Cornus stolonifera*), syringa (*Philadelphus lewisi*) and, occasionally, water birch (*Betula occidentalis*) and cottonwoods (*Populus spp.*). For a comprehensive description of Section 7 watershed, pages 7 – 13 in Volume 3 of the Biological Assessments for the Brownlee Reservoir Section 7 watershed (Nelson and Burns 2001) should be referenced. A map of large fires within the Watershed from 1981-2005 is located on current CD1: \Support Documents\Maps\large_fire_map.pdf).

A. Listed Species and Critical Habitat, and Sensitive Species

1. Overview

The only listed fish species in the Brownlee Reservoir watershed is bull trout. Anadromous fish are denied access to the subbasin by the Hells Canyon Dam complex, which was completed in 1967 with the closure of Hells Canyon Dam. See Fish Distribution Maps on CD1: \Support Documents\Support Documents\Maps\bull_trout_map.pdf.

2. Bull Trout

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 Brownlee Reservoir Section 7 watershed in the Crooked River, Upper Bear Creek and Indian Creek analysis areas. Hereinafter, all references to bull trout are for the listed species.

a. 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).

B. Scope of the Actions

Payette National Forest (hereafter referred to as the Forest) lands in the subbasin are managed for a variety of uses, including, but not limited to, livestock grazing, mining, recreation, wildlife and fisheries habitat enhancement, road maintenance, reconstruction, and use, fuels reduction, and timber harvest.

C. Location

The Brownlee River Subbasin includes tributaries to the Snake River, on both the Idaho and Oregon sides of the river, from Hell's Canyon Dam in the north to the mouth of Rock Creek in the south (see map on current CD1: \Support Documents\maps\section7watersheds.pdf).

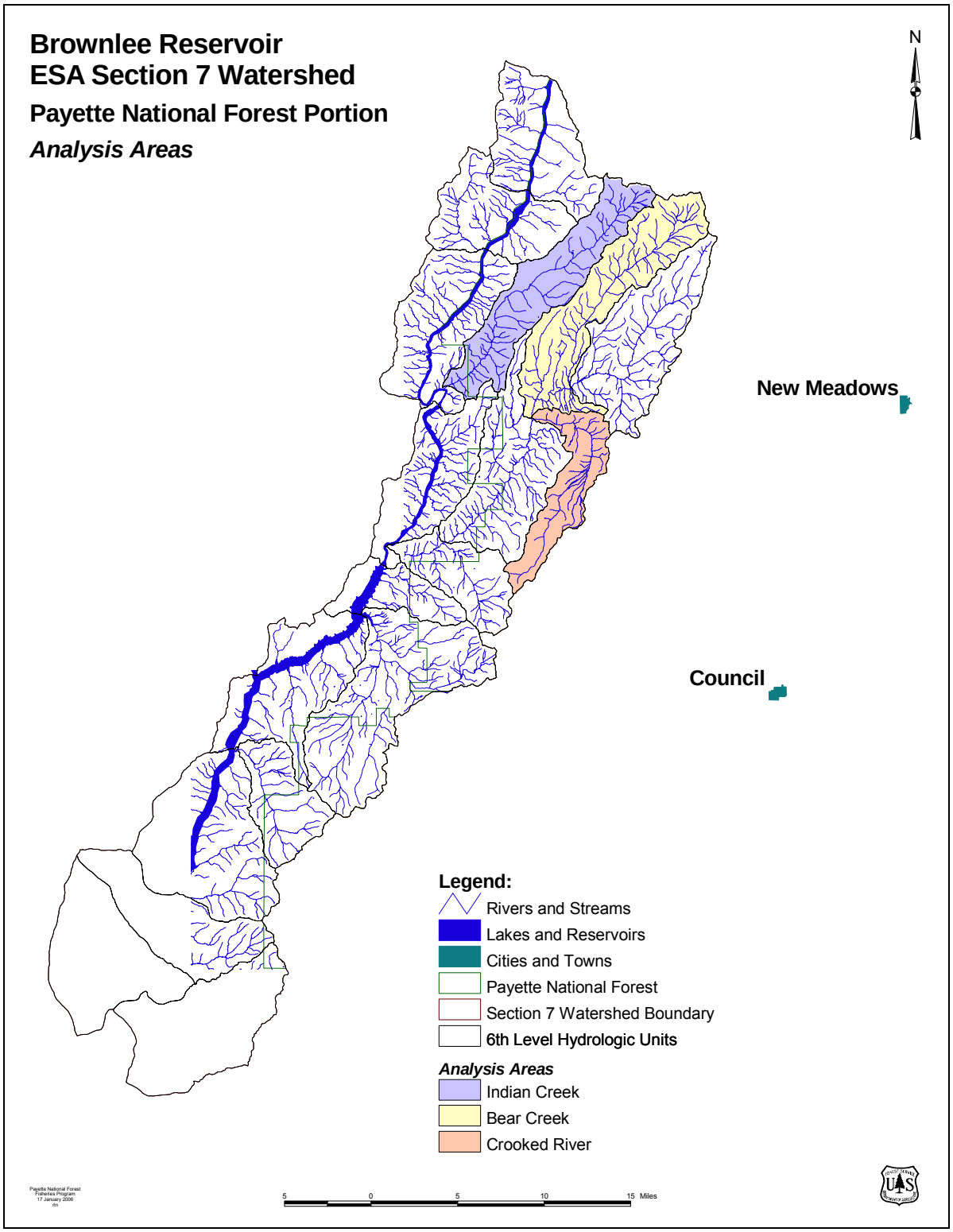

Figure 1.—Analysis areas, Brownlee Reservoir Section 7 Watershed. (location on current CD1: \Support Documents\Maps\br_aa_map.pdf)

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

Analysis areas are synonymous in this BA with action areas. Based on the best available information the bull trout populations inhabiting the three subwatersheds within the Brownlee Section 7 watershed are isolated from one another (Figure 1). Because the bull trout in the three subwatersheds act as discrete populations the environmental baseline descriptions are restricted to the individual subwatersheds and are not compiled up to the entire Brownlee Section 7 watershed. Many subwatershed descriptions that were presented in Nelson and Burns (2001) were not included this update because bull trout are not present and there is no Designated Critical Habitat.

A. Indian Creek

1. Natural Physical Characteristics

For a comprehensive description of Indian Creek, page 16 in Volume 3 of the Biological Assessments for the Brownlee Reservoir Section 7 watershed. (Nelson and Burns 2001) should be referenced. The only substantial change in baseline conditions since those described in Nelson and Burns is from a high intensity rainstorm occurred during July of 2003, which resulted in the stream channel being completely modified from the headwaters downstream near Huntley Gulch. The WCIs in Appendix 2 should be referenced for further description of current natural physical characteristics.

2. Human-Caused Physical Characteristics

The WCIs in Appendix 2 should be referenced for further description of current human-caused physical characteristics. Refer to Appendix 1 for a summary of past actions and their effects for which consultation has been completed. Page 16 in Volume 3 of the Biological Assessments for the Brownlee Section 7 watershed (Nelson and Burns 2001) should also be referenced for a comprehensive description of human-caused characteristics of this analysis area.

a. Unauthorized Activities on the National Forest

Unauthorized activities in the Indian Creek analysis area with potential to negatively impact fish habitat and listed species include grazing practices that are not in compliance with the Annual Operating Provisions, motor vehicle use that violates Forest Plan Guidelines, drug cultivation or production, arson or accidental fire starts, and illegal harvest of fuel wood. An unscreened irrigation diversion is located approximately 0.5 miles upstream of Cuprum on Indian Creek. A thorough discussion of unauthorized activities can be referenced on page 17 of Nelson and Burns (2001).

b. Livestock Grazing

Sheep and cattle are both grazed in the Indian Creek analysis area, with sheep in the headwaters (Snake River / Indian Creek S&G) and cattle further downstream (Lick Creek C&H and Bear Creek C&H allotments). Monitoring results of grazing activities in the Indian Creek Analysis Area are displayed in Table 1. In general, utilization has been within allowable levels. In 2003, additional monitoring sites were investigated to determine areas utilized by sheep in the headwaters of Indian Creek.

Table 1.—Monitoring results of grazing in the Indian Creek watershed (CD1: \Support Documents\ Miscellaneous\01-05_WZ_range_monitoring_results2.xls).

Stream	Location	Date	Utilization/Stubble Height
Camp Creek	T21N R3W S30 NW NE	8/26/03	0-5% Utilization
	T21N R2W S18 NW NW	10/17/05	NA, Bedding area
Tributary of Camp Creek	T21N R2W S19 NENE	8/26/03	21% Utilization, 12% streambank disturbed
		10/13/04	Utilization 28%
		10/17/05	Utilization 30%, 5% streambank disturbance
Indian Creek	T21N R3W S36 NE SE	9/04/01	No Utilization
		10/29/01	No Utilization
	T21N R2W S21 SW SW	08/27/02	0-5% Utilization
	T21N R2W S21 NW SW	8/26/03	0-5% Utilization, 3% streambank disturbance
		10/13/04	Utilization 6-20%
		10/17/05	Utilization 0-5%, 2% streambank disturbance
	T21N R2W S29 NE SW	8/26/03	0-5% Utilization, 16% streambank disturbance
	T21N R2W S21 SW SW	8/27/02	0-5% Utilization
	T21N R2W S21 SW SW	8/26/03	0-5% Utilization
	T21N R2W S20 SE NE	8/26/03	0-5% Utilization, 3% streambank disturbance
		10/13/04	Utilization 0-5%
		10/17/05	Utilization 25%, 2.5% streambank disturbance
	T21N R2W S20 NW NE	8/26/03	41–60% Utilization, 1% streambank disturbed
	T21N R2W S20 NE NE	8/26/03	Moderate utilization
		10/17/05	0-5% Utilization, 15% streambank disturbance
		10/17/05	35% Utilization, 3.5% streambank disturbance

c. Past Mitigation as Part of the Environmental Baseline

Previous BA's from 1998-2004 identified specific mitigations necessary for each federal action (Appendix 1). Their implementation or non-implementation is part of the environmental baseline.

3. Cumulative Watershed Effects

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

4. Watershed Restoration Opportunities

Potential watershed restoration opportunities include restoring fish passage at the culvert on road 50105 near Landore, decommissioning non-system roads, and screening an irrigation diversion at the Cuprum townsite.

5. Description and Distribution of Bull Trout

Bull trout are known to exist in Upper Indian Creek and Camp Creek, a small tributary to Indian Creek. The population may have an adfluvial component since migratory individuals have been collected in an Idaho Power weir near the mouth of Indian Creek (Chandler et al. 2001). Two bull trout were trapped on October 29, 1999, which measured 234 and 271 mm total length. Brook trout are present and hybridization (F1 and > F1) with bull trout has taken place (Veach 1996, Burns et al. 2005). A flood event occurred in the summer of 2003, which has altered the quality of the habitat where bull trout were known to occur. During the summer of 2004, bull trout were collected below the impassable culvert on Road 50105 near Landore and moved above the culvert. As of 2005, densities of fish appear to be lower than pre-flood conditions, but distribution appears to be similar to pre-flood conditions. See Fish Distribution Maps CD1: \Support Documents\Maps\bull_trout_map.pdf.

6. Habitat Condition, Trend, Limiting Factors

See the Watershed Condition Indicators in Appendix 2 for habitat condition trend and limiting factors. WCIs which have changed in status since 2001 (Nelson and Burns 2001), or that are functioning at unacceptable risk for the Indian Creek analysis area are described below.

a. Bull Trout Local Population Size - FUR. FR in 2001

The change in from FR to FUR is based on new data, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004), but not due to data trends. Double pass electrofishing surveys completed by Idaho Power in 2002 estimated the number of bull trout (>200 mm) in Indian Creek to be 174 (range from 174 to 202, 95% C.I.). They also calculated a population estimate for bull trout > 150 mm and it was 1082 (range from 1055 to 1192, 95% C.I.) Since the flood of July 2003, very few bull trout (less than 30) have been observed while electrofishing and ocular investigation of previously occupied bull trout habitat (Burns et al. 2005; Greenway 2005a, b).

b. Bull Trout Growth and Survival - FUR. FR in 2001

Same as local population size WCI above.

c. Bull Trout Life History Diversity And Isolation - FUR. FR in 2001

The change from FR to FUR is based on new data, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004), but not due to data trends. The population may have an adfluvial component since migratory individuals have been collected in an Idaho Power weir near the mouth of Indian Creek (Chandler et al. 2001). Two bull trout were trapped on October 29, 1999, which measured 234 and 271 mm total length (Chandler et al. 2001). A culvert on road 50105 near Landore blocks all upstream migration of fish (Burns et al. 2005).

d. Persistence and Genetic Integrity – FUR. FR in 2001

The change in from FR to FUR is based on new data, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004), but not due to data trends. The Indian Creek local population is connected (downstream only) to the local populations in Oregon. Upstream migration into the headwaters of Indian Creek is blocked due to an impassable culvert on road 50105 near Landore. Brook trout and hybrids (F1 and > F1) have been collected in Indian Creek below the culvert barrier on road 50105 and a few hybrids (less than 10% of fish collected) have been collected above the culvert (Burns et al. 2005).

e. Temperature - FR. FA in 2001

The change from FA to FR is due to new data, the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004), but not due to data trends. Temperature data were collected in Huntley Gulch (W215) in 2003, Indian Creek (W018) near Mann Creek in 2001-2005, Indian Creek (W220) near Camp Creek in 2005, and Ladder Creek (W216) in 2003. The 7-day average maximum temperatures were 13.2°C in Ladder Creek, 16.4°C in Huntley Gulch, 12.5°C in Indian Creek near Camp Creek, and ranged from 15.0°C to 17.1°C in Indian Creek near Mann Creek. In 2005, in bull trout spawning and rearing habitat on Indian Creek near Camp Creek the The 7-day average maximum temperature was 9.5°C during the bull trout spawning period. Temperature summary data on file at S.O., McCall, ID.

f. Sediment/Turbidity - FUR. FR in 2001

The change from FR to FUR is due to new data collected after the 2003 flood, and the new LRMP functionality definitions. Surface fines ranged from 12 to 21% in the lower reaches of Indian Creek and in reach 3 of Huntley Gulch. Surface fines in the flood effected upper two reaches of Indian Creek were > 20%. Surface fines data were collected in 2003 (post-flood) and 2004 using the R1/R4 stream habitat inventory (Data 2004 on file at S.O., McCall, ID).

g. Physical Barriers - FUR. FR in 2001

The change from FR to FUR is due to new data collected after the 2003 flood, and the new LRMP functionality definitions. There is one known year-round bull trout passage barrier due to a culvert (Road 50105) on Indian Creek. The 2003 flood scoured the channel downstream of the culvert creating a leap barrier for fish (Burns et al. 2005).

h. Substrate Embeddedness - FUR. FR in 2001.

The change from FR to FUR is due to new data collected after the 2003 flood, and the new LRMP functionality definitions. Embeddedness has not been measured. Wolman pebble counts were used to determine dominant substrate. From Wolman pebble counts fines (< 2mm) and small gravel (2-8mm) combined were the dominant substrate in two reaches of Indian Creek and one reach of Huntley Gulch. Gravel (8-64mm), small cobble (64-128mm) and cobble (128-256mm) combined were dominant in four reaches of Indian Creek and one reach of Huntley Gulch, and subdominant in all reaches where fines and small gravel were dominant [data (2003, 2004) on file at S.O., McCall, Idaho].

i. Large Woody Debris - FR. FA in 2001.

The change from FA to FR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004). All reaches exceed 20 pieces per mile. In 2003, the flood caused most of the LWD to be grouped in large aggregates (> 10 pieces) and few single pieces (2004 data on file at S.O., McCall, ID.). It is functioning at risk due to the current distribution of the LWD. Roads within RCAs have somewhat limited short and long term recruitment of LWD (authors personal observation).

j. Pool Frequency - FUR. FA in 2001

The change from FA to FUR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004). One of the nine reaches surveyed is functioning appropriately (Huntley Gulch Reach 2) and that could be due to the short distance surveyed (0.1 miles). The other reaches are drastically (less than 10 pools per mile) below the desired range due to the flood event in 2003 (2004 data on file at PNF S.O., McCall, ID).

k. Pool Quality - FUR. FA in 2001

The change from FA to FUR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004). In Indian Creek, approximately five pools exceed 1 meter in max depth. All other streams throughout the analysis area have no deep pools (2003 and 2004 R1/R4 stream habitat inventory). Fines and small gravel are the dominant substrate in the stream channels (2004 data on file at S.O., McCall, ID).

l. Refugia - FUR. FR in 2001

The change from FR to FUR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004). Due to a fish passage barrier, low pool frequency, moderately high sedimentation, and hybridization occurring in the area, refugia for bull trout is functioning at an unacceptable risk.

m. Streambank Condition - FR. FA in 2001

The change from FA to FR is due to new data collected after the 2003 flood, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004). Bank stability ranged from 80.0% to 96% in Indian Creek, with the exception of one short reach upstream of Cuprum where bank stability was 62.6%. Indian Creek upstream of Cuprum has numerous areas of unstable banks due to the flood. Bank stability ranged from 92% to 93% in Huntley Gulch (2004 data on file at S.O., McCall, ID.).

For the Travel Plan EIS (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]) analysis the number of stream crossings by authorized motorized trails and roads was used as an index of

streambank condition. With 39 road crossing and 14 trail crossings, streambank condition is considered FUR.

n Floodplain Connectivity - FR. FA in 2001

The change from FA to FR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004). No side channels were observed in 5.5 miles of survey after the flood (2004 data on file PNF S.O. McCall, ID). Due to the gradient of the watershed and restricted valley floor, side channels are not expected to be very frequent in a functioning appropriately condition (Hogen and Burns 2004). High road density in RCAs (CD1: \Support Documents\maps\total_roads.pdf) has narrowed the flood plain of some of the streams.

o. Drainage Network Increase - FR. FA in 2001.

The change from FA to FR is due to the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004), but not due to data trends. Road densities are high in RCAs (3.8 mi/mi^2) and many of the roads were built below current standards, which inhibit channelization of runoff. PNF GIS 9/05, in CD1: \Support Documents\maps\total_roads.pdf.

p. Road Density and Location – FUR. FUR in 2001

The total road density is 3.7 mi/mi^2 and 3.8 mi/mi^2 within RCAs. PNF GIS 9/05, in CD1: \Support Documents\Maps\total_roads.pdf.

q. Disturbance History - FUR. FUR in 2001

ECA is 19% in the Indian Creek analysis area. The road density within RCAs is 3.8 mi/mi^2 for the analysis area. PNF GIS 9/05, in CD1: \Support Documents\Maps\total_roads.pdf and eca_lsp.pdf

r. Riparian Conservation Areas - FR. FA in 2001.

The change from FA to FR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004). The analysis area has high road densities, low pool frequency, moderate fine sediment levels, areas of low bank stability, and experienced a flood in 2003 (see WCIs in Appendix 2).

s. Integration of Species and Habitat Conditions - FUR. FR 2001

The change from FR to FUR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004). The population may have an adfluvial component since migratory individuals have been collected in an Idaho Power weir near the mouth of Indian Creek (Chandler et al. 2001). Two bull trout were trapped on October 29, 1999, which measured 234 and 271 mm total length. A culvert on road 50105 near Landore blocks all upstream migration of fish. Habitat quality is functioning at risk or unacceptable risk in most areas affected by the flood (see WCIs in Appendix 2).

B. Upper Bear Creek

1. Natural Physical Characteristics

For a comprehensive description of Indian Creek, page 19 in Volume 3 of the Biological Assessments for the Brownlee Reservoir Section 7 watershed. (Nelson and Burns 2001) should be referenced. The WCIs in Appendix 2 should be referenced for further description of current natural physical characteristics.

2. *Human-Caused Physical Characteristics*

A ford on Bear Creek at the end of FDR 110 R2W T20N Sec 4 NE ¼ NE ¼ was converted to a pack bridge in 2003. In 2005, as part of the Upper Bear Timber Sale Project, two culverts on intermittent tributaries to Bear Creek were replaced to restore aquatic organism passage and meet 100-year flow requirements. The WCIs in Appendix 2 should be referenced for further description of current human - caused physical characteristics. Refer to Appendix 1 for a summary of past actions and their effects for which consultation has been completed. Page 19 in Volume 3 of the Biological Assessments for the Brownlee Section 7 watershed (Nelson and Burns 2001) should also be referenced for a comprehensive description of human-caused characteristics of this analysis area.

a. *Unauthorized Activities on the National Forest*

Most unauthorized activities occur downstream of the habitat known to be occupied by bull trout because public access to Upper Bear Creek is difficult. A thorough discussion of unauthorized activities can be referenced on page 19 of Nelson and Burns (2001).

b. *Livestock Grazing*

Upper Bear Creek contains portions of the Smith Mountain S&G group of allotments as well as portions of the Bear Creek and Lick Creek C&H allotments. Results of monitoring efforts are displayed in Table 2. Grazing in the Bear Creek watershed is meeting the Terms and Condition of the permittees' Term Grazing Permit that specifies maintaining a stubble height of 4 – 6 inches or 50 percent allowable use.

Table 2.—Monitoring results of riparian grazing in the Upper Bear Creek watershed (CD1: \Support Documents\ Miscellaneous\01-05_WZ_range_monitoring_results2.xls).

Stream	Location	Date	Utilization/Stubble Height
Little Bear Creek	T21N R2W S28 NW SW	11/05/01	15% Utilization / 8.5" Stubble height
		10/08/02	28% Utilization / 6" Stubble height
		10/28/03	Stubble height 6.5"
		9/27/05	0-10% Utilization/ 10" Stubble height
Bear Creek	T21N R2W S4 NW SE	10/29/01	15% Utilization / 8.5" Stubble height
		09/24/02	30% Utilization
		10/22/02	15% Utilization / 19" Stubble height /
		10/27/03	15" Stubble height
		11/8/04	25% Utilization/ 11.5" Stubble height on carex
		9/20/05	0-10% Utilization/ 11" Stubble height

c. *Past Mitigation as Part of the Federal Action*

Previous BA's from 1998-2004 identified specific mitigations necessary for each federal action (Appendix 1). Their implementation or non-implementation is part of the environmental baseline.

3. *Cumulative Watershed Effects*

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

4. *Watershed Restoration Opportunities*

Watershed restoration opportunities include road obliteration, upgrading culverts to accommodate a 100-year flood flow event, closing fords, and restoring fish passage where necessary. Opportunities to fence livestock away from sensitive areas also exist.

5. *Description and Distribution of Bull Trout*

In 2005, 19 bull trout were captured using electrofishing at the bull trout monitoring site in upper Bear Creek (Greenway 2005b). Extensive electrofishing and spawning surveys (1999-2005) have been completed in the Upper Bear watershed and bull trout presence and spawning have been documented above the crossing of FT 228 (Williams and Veach 1999, Williams and McGee 2001; Greenway 2005a, b). See Fish Distribution Maps (CD1: \Support Documents\Maps\bull_trout_map.pdf and bull trout population WCIs (Appendix 2) for further detail.

6. *Habitat Condition, Trend, Limiting factors*

See the Watershed Condition Indicators in Appendix 2 for habitat condition trend and limiting factors. WCIs which have changed in status since 2001 (Nelson and Burns 2001), or that are functioning at unacceptable risk for the Indian Creek analysis area are described below.

a. Bull Trout Life History Diversity And Isolation - FUR. FR in 2001

The change in from FR to FUR is based on new data, and on rationale and FUR rating given for this analysis area in McGee and Burns (2003), but not due to data trends. The migratory form is absent. Bull trout in upper Bear Creek are highly isolated and interaction with the Crooked River population only allows for one-way movement because of Bear Creek Falls (Burns et al. 2005)

b. Persistence and Genetic Integrity – FUR. FR in 2001

The change in from FR to FUR is based on new data, and on rationale and FUR rating given for this analysis area in McGee and Burns (2003), but not due to data trends. Hybridization with brook trout has been documented (Spruell 2000) and the resident population is isolated by Bear Creek Falls (Burns et al. 2005).

d. Chemical Contaminants and/or Nutrients - FA. FR in 2001

The change from FR to FA is due to new data, the new LRMP functionality definitions, and on rationale and FA rating given for this analysis area in McGee and Burns (2003), but not due to data trends. There are no 303(d) listed segments within the analysis area (IDEQ 1998).

e. Substrate Embeddedness - FA. FR in 2001.

The change from FR to FA is due to the new LRMP functionality definitions, and on rationale and FA rating given for this analysis area in McGee and Burns (2003), but not due to data trends. McGee and Burns (2003) noted that "Substrate in upper Bear Creek appear to be suitable for salmonids and not limiting to successful reproduction of fish. The proposed actions are mitigated to reduce sediment inputs and any increase to embeddedness will be minimal and short-term. There is no expected increase to embeddedness in habitat occupied by bull trout".).

f. Refugia - FUR. FA in 2001

The change from FA to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. Due to population isolation created by Bear Creek Falls and the current WCI conditions in Lick Creek (McGee and Burns 2003), the potential for bull trout refugia is very limited (Burns et al. 2005).

g. Streambank Condition - FA. FA in 2001.

Bank stability was >90% in 8 out of 11 reaches surveyed in the analysis area. The remaining three reaches had > 80% bank stability. Data (2000) on file PNF S.O. McCall, ID.

For the Travel Plan EIS (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]) analysis the number of stream crossings by authorized motorized trails and roads was used as an index of streambank condition. With 566 road crossing and 35 trail crossings, streambank condition is considered FUR.

h. Road Density and Location – FUR. FUR in 2001

The total road density within the analysis area is 4.2 mi/mi^2 and the road density within RCAs is 6.1 mi/mi^2. PNF GIS 9/05, in CD1: \Support Documents\Maps\total_roads.pdf.

i. Disturbance History - FR. FUR in 2001

The change from FUR to FR is due to the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in McGee and Burns (2003), but not due to data trends. ECA is 13%, but the road density WCI is functioning at unacceptable risk. Road density within RCAs is 6.1 mi/mi^2. PNF GIS 9/05, in CD1: \Support Documents\Maps\total_roads.pdf.

j. Integration of Species and Habitat Conditions - FUR. FR 2001

The change from FR to FUR is due to new data and on the new LRMP functionality definitions, but not due to data trends. Sediment, large woody debris, temperature, and pool frequency and quality WCI are functioning appropriately, but the bull trout population is isolated by Bear Creek Falls and hybridization with brook trout has been confirmed. The refugia WCI is functioning at unacceptable risk and the local population is isolated (see WCIs in Appendix 2).

C. CROOKED RIVER

1. NATURAL PHYSICAL CHARACTERISTICS

For a comprehensive description of Crooked River, page 24 in Volume 3 of the Biological Assessments for the Brownlee Reservoir Section 7 watershed (Nelson and Burns 2001) should be referenced. The WCIs in Appendix 2 should be referenced for further description of current natural physical characteristics.

2. HUMAN-CAUSED PHYSICAL CHARACTERISTICS

The WCIs in Appendix 2 should be referenced for further description of current human-caused physical characteristics. Refer to Appendix 1 for a summary of past actions and their effects for which consultation has been completed. Page 24 in Volume 3 of the Biological Assessments for the Brownlee Section 7 watershed (Nelson and Burns 2001) should be referenced for a comprehensive description of human-caused characteristics of this analysis area.

a. Unauthorized Activities on the National Forest

A thorough discussion of unauthorized activities can be referenced on page 25 of Nelson and Burns (2001).

b. Livestock Grazing

The Crooked River watershed contains the Wildhorse/Crooked River allotment. Results of monitoring efforts from 2001 to 2005 are displayed in Table 3. In some areas, grazing in the Crooked River watershed is not meeting the Terms and Conditions of the permittees' Term Grazing Permit that specifies maintaining a stubble height of 4 – 6 inches or 50 percent allowable use. Riparian forage utilization measurements were generally below the allowable use standard, but equaled and exceeded the standard in 2004 and 2005 on Moonshine Creek (Table 3). Stubble height standards were also exceeded on Moonshine Creek in 2001, 2003, and 2005. Bank stability is low, and sediment and embededness levels are high in Dick Ross and Moonshine Creeks all of which may be related to livestock use in the area (see WCIs in Appendix 2). Bull trout have not been documented in Moonshine Creek or Dick Ross Creek, but they have been documented in Crooked River downstream of these tributaries.

Table 3.—Monitoring results of riparian grazing in the Crooked River watershed (CD1: \Support Documents\ Misc\ 01-05_WZ_range_monitoring_results2.xls).

Stream	Location	Date	Utilization/Stubble Height
Moonshine Creek	T18N R3W S14 NW SW	11/01/01	38% Utilization / 3.5" Stubble height
		10/01/02	29% Utilization Poa spp. 60% Utilization Scirpus spp
		9/4/03 Util. 10/27/03 Stub. hgt.	40% Utilization on Poa spp. 35% on Scirpus spp. / 3" Stubble height
		8/11/04 Util. 10/25/04 Stub. hgt.	50% Utilization on carex 30% on Poa spp. / 5" Stubble height on carex
		10/6/05	55% Utilization / 3" Stubble height
Crooked River 2	T19N R3W S36 NW NW	11/01/01	45% Utilization / 5" Stubble height
		10/29/02	25% Utilization / 7" Stubble height
		9/4/03 Util. 10/27/03 Stub. hgt.	45% Utilization / 4.5" Stubble height
		7/21/04 Util. 10/25/04 Stub. hgt.	10% Utilization on scirpus / 11" Stubble height on carex
		10/31/05	42% Utilization / 7" Stubble height
Crooked River 1	T19N R3W S26 SW SE	11/01/01	30% Utilization / 5" Stubble height
		10/29/2002	34% Utilization / 4" Stubble height
		10/27/03	6.5" Stubble height
		10/25/04	8.5" Stubble height on carex
		10/31/05	37.5% Utilization / 7" Stubble height
Crooked River 3	T18N R3W S1 SW NW	11/01/2001	37% Utilization / 4" Stubble height
		10/29/2002	40% Utilization / 6.5" Stubble height
		9/4/03 Util. 10/27/03 Stub. hgt.	0-5% Utilization / 22" Stubble height
		10/25/04	13" Stubble height on carex
		10/31/05	0-5% Utilization / 19" Stubble height
Lower Crooked River BO Bull Trout Greenline Read every 3-5 years	T18N R3W S26 SE SE	09/18/2001	Moderate Stability / 80% Late Seral
Upper Crooked River BO Bull Trout Greenline Read every 3-5 years	T18N R3W S1 SW NW	09/18/2001	Mod-High Stability / 69% Late Seral

c. Past Mitigation as Part of the Federal Action

Riparian fencing of 2 miles of Crooked River upstream of Lafferty Campground was completed in 2002. The fencing was required mitigation in conjunction with Council-Cuprum Road project. Previous BA's from 1998-2004 identified specific mitigations necessary for each federal action (Appendix 1). Their implementation or non-implementation is part of the environmental baseline.

3. Cumulative Watershed Effects

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

4. Watershed Restoration Opportunities

Watershed restoration opportunities include road obliteration and restoring fish passage at the culvert under the Forest Road 50061, which is funded for 2006. Attempts to use fencing to discourage use of a dispersed campsite adjacent to Crooked River and an ATV ford near the junction of Forest Road 061 and Forest Trail 235, have met limited success. Further actions could be taken to at this site.

5. Description and Distribution of Bull Trout

The local population appears to be isolated to the upper 5 miles of Crooked River (Moore et al. 2002; Greenway 2005a, b; Burns et al. 2005). The bull trout population is considerably hybridized with brook trout (Spruell 2000).

6. *Habitat Condition, Trend, Limiting Factors*

See the Watershed Condition Indicators in Appendix 2 for habitat condition trend and limiting factors. WCIs which have changed in status since 2001 (Nelson and Burns 2001), or that are functioning at unacceptable risk for the Indian Creek analysis area are described below.

a. Bull Trout Local Population Size - FUR. FR in 2001

The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. There are not sufficient data to accurately estimate the local population size, but surveys indicate that spawning and rearing habitat primarily occurs in the upper 5 miles of Crooked River (Moore et al. 2002). In addition, the number of genetically pure adult bull trout in the analysis area has been impacted by hybridization with brook trout (Spruell 2000; Moore et al. 2002; Greenway 2005a, b).

b. Bull Trout Life History Diversity And Isolation - FUR. FR in 2001

The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. The migratory form has not been documented in Crooked River. The local population appears to be isolated to the upper 5 miles of Crooked River (Moore et al. 2002; Greenway 2005a, b; Burns et al. 2005).

c. Persistence and Genetic Integrity – FUR. FR in 2001

The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. There is only one other local population (upper Bear Creek) within the Wildhorse drainage and connectivity is restricted by Bear Creek Falls. Extensive brook trout hybridization with bull trout has been documented (Spruell 2000; Moore et al. 2002; Greenway 2005a, b; Burns et al. 2005).

d. Chemical Contaminants and/or Nutrients - FR. FA in 2001

The change from FR to FA is due to the new LRMP functionality definitions, but not due to data trends. There are no 303(d) listed segments within the analysis area (IDEQ 1998).

e. Physical Barriers - FUR. FR in 2001

The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. The culvert where Forest Road 50061 crosses the Crooked River hinders or blocks upstream passage of fish at various flows. Replacement of this culvert is funded for 2006. The culverts where Forest Road 50511 crosses Crooked River and Moonshine Creek on private land are likely barriers to fish passage at certain flows. Culvert inventory data are on file PNF S.O. McCall, ID.

f. Off-Channel Habitat - FA. FR in 2001.

The change from FR to FA is due to new data, and the new LRMP functionality definitions, but not due to data trends. Habitat inventories document some side channels, off-channel areas, backwaters, and beaver ponds. Data (2001, 2004) on file PNF S.O. McCall, ID.

g. Refugia - FUR. FR in 2001.

The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. The temperature, sediment, pool quantity and quality, large woody debris and physical barriers WCIs are not functioning appropriately within the analysis area. The habitat that is adjacent and connected to the analysis does not provide high quality habitat for bull trout (probably temperature limited) or is blocked by barrier falls (McGee and Burns 2003).

h. Width/Depth Ratio - FA. FR in 2001

The change from FR to FA is due to new data, and the new LRMP functionality definitions, but not due to data trends. Width to maximum depth ratios range from 4.0 to 7.1 in Crooked River and 4.8 to 7.4 in Dick Ross and Moonshine Creek (fish habitat inventory data (2001, 2004) on file PNF S.O. McCall, ID; width/depth ratio summaries on CD1: \Support Documents\Reports\habitat_summary\crooked_river_width_depth_ratio.xls [in Reports.zip]).

i. Streambank Condition - FR. FR in 2001

Bank stability in occupied bull trout habitat was 98%, but < 90% in other reaches of Crooked River, and ranged from 53% to 78% in Dick Ross Creek and Moonshine Creek (2001 and 2004 data on file PNF S.O. McCall, ID.). Bull trout have not been documented in these tributaries, but have been observed downstream in Crooked River (Burns et al. 2005; Greenway 2005a, b).

For the Travel Plan EIS (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]) analysis the number of stream crossings by authorized motorized trails and roads was used as an index of streambank condition. With 566 road crossing and 35 trail crossings, streambank condition is considered FUR.

j. Change in Peak/Base Flows - FR. FA in 2001

The change from FA to FR is due to new data, and the new LRMP functionality definitions, but not due to data trends. There are no hydrograph data for this analysis area; however, high road densities in the uplands and RCAs (see road density and location WCI), past logging and irrigation diversions onto private land have likely altered the magnitude and timing of peak and base flows. PNF GIS 9/05, in CD1: \Support Documents\maps\eca_lsp.pdf.

k. Drainage Network Increase - FR. FA in 2001.

The change from FA to FR is due to new data, and the new LRMP functionality definitions, but not due to data trends. Road densities in RCAs of 10.5 mi/mi^2 have increased the drainage network by a moderate amount. PNF GIS 9/05, in CD1: \Support Documents\maps\total_roads.pdf.

l. Road Density and Location – FUR. FR in 2001

The change from FR to FUR is due to the new LRMP functionality definitions, but not due to data trends. Road densities are 5.1 mi/mi^2 overall and 10.5 mi/mi^2 in RCAs. PNF GIS 9/05, in CD1: \Support Documents\maps\total_roads.pdf.

m. Integration of Species and Habitat Conditions - FUR. FR 2001

The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. The majority of WCIs are functioning at risk, and many are functioning at unacceptable risk including refugia. The sediment and temperature WCIs are functioning at risk, the local bull trout population is likely on a downward trend due to hybridization with brook trout, and the bull trout local population is not well connected with other local populations (see WCIs in Appendix 2).

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 4).

Table 4.—Ongoing and proposed actions in the Brownlee Section 7 watershed

Analysis Area	Federal Action
All three subwatersheds	Miscellaneous Forest Products
	Mistletoe Control and Precommercial Thinning
	Fire Management
	Fish Habitat and Riparian Sampling
	Watershed Improvements and Maintenance
	Noxious Weed Management
	Road Management
	Trails, Recreation and Administrative Site Operation and Maintenance
	Travel Plan
	Power and Telecommunication Lines
	Grazing Allotments
	Outfitters and Guides
Indian Creek and Bear Creek	Special Use Permits (water diversions)

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: Brownlee Reservoir Section 7 Watershed

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 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 RCAs 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: Brownlee Reservoir Section 7 Watershed

Dates of Previous Concurrence:

- USFWS: October 15, 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 project involves all activities that could occur during management of wildland fires on the Payette National Forest until LRMP revision. This includes wildfire, 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 Brownlee Reservoir Section 7 watershed this action will amount to an annual average of 10 initial attacks (most of which will receive initial attack), an average of one large fire per year (i.e., larger than 100 acres), some of which may be designated Wildland Use Fires (WFUs), amounting to approximately 100 and 1000 acres, respectively. These estimates are based on historic fire occurrence (see CD1: \Support Documents\Maps\large_fire_map.pdf & fire_history.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:

- USFWS: October 15, 2001

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 CD: \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 consulation 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 Brownlee Reservoir watershed.

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001

DESCRIPTION: The Payette National Forest's Land and Resource Management Plan (LRMP, 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:

DATES OF PREVIOUS CONCURRENCE:

USFWS: October 15, 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 CD2: \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 Brownlee Reservoir 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 Brownlee Reservoir 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

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 5 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 5.—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 6.—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.—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 7.—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 (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.

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 1999).

- 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 Brownlee Reservoir 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:

DATES OF PREVIOUS CONCURRENCE:

USFWS: October 15, 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). . 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 archive 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 Brownlee 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: Brownlee Reservoir Section 7 Watershed

Dates of Previous Concurrence:

- USFWS: October 15, 2001.

Description: Operation and maintenance of recreation and administrative facilities on the Payette National Forest would include the following activities:

- ***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 8).

Table 8.—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
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 Brownlee Reservoir Section 7 watershed

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 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 9. Travel on foot and riding livestock is permitted Forest-wide. Motorized use on trails is limited to those so designated by the Forest (Figure 2) 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 3) 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 9).

Table 9.—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)
Indian Creek	
Substrate Embeddedness	Open acres decrease by 7882
Stream bank Condition	Increase by 0.7 mi.
Bear Creek and Crooked River	
Substrate Embeddedness	Open acres decreases by 19169
Stream bank Condition	Increases 6.9 mi. in an area now open to motorized use. Opportunities increase and PDFs are applied.

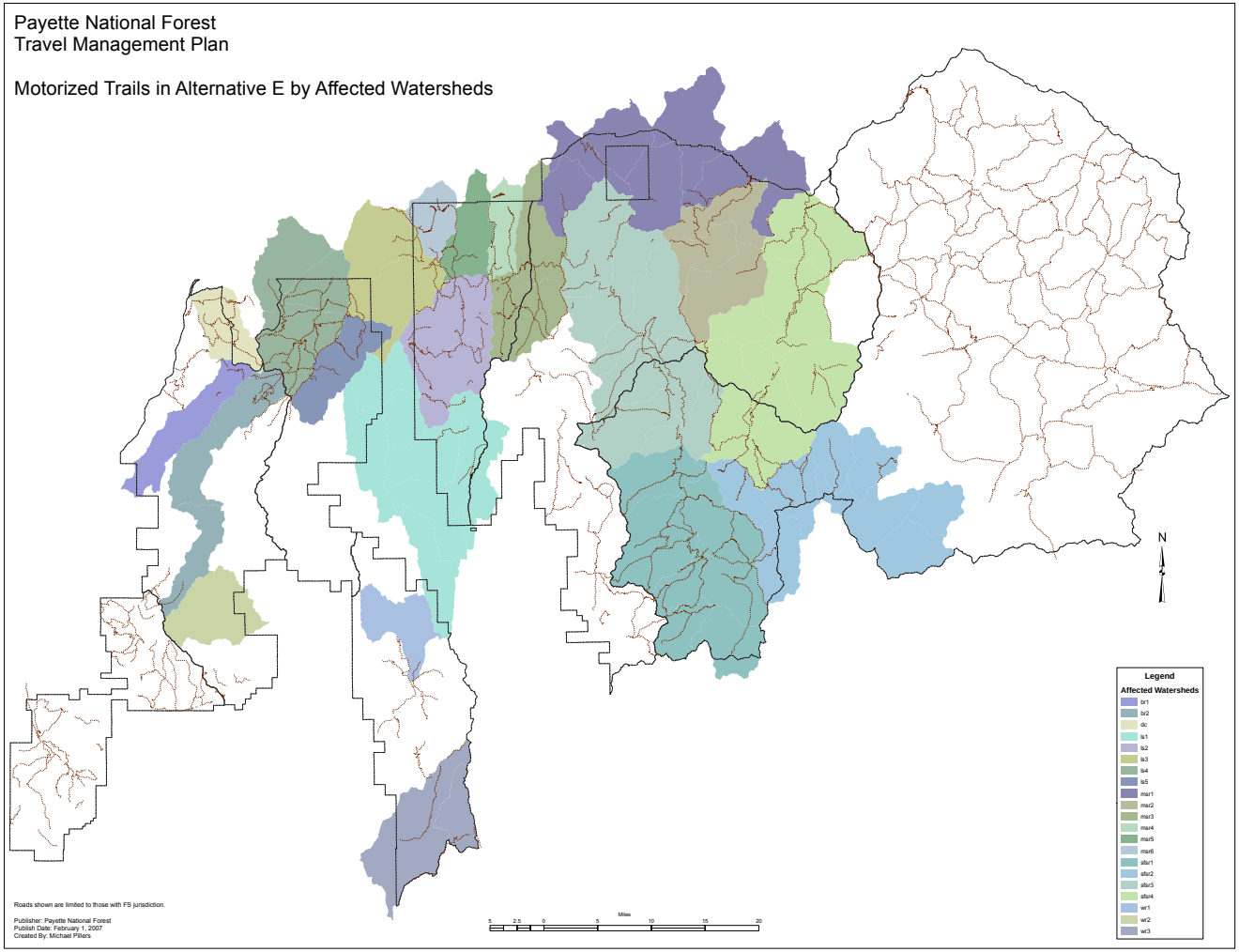

Figure 2.—Trails under Payette National Forest jurisdiction with motorized use.

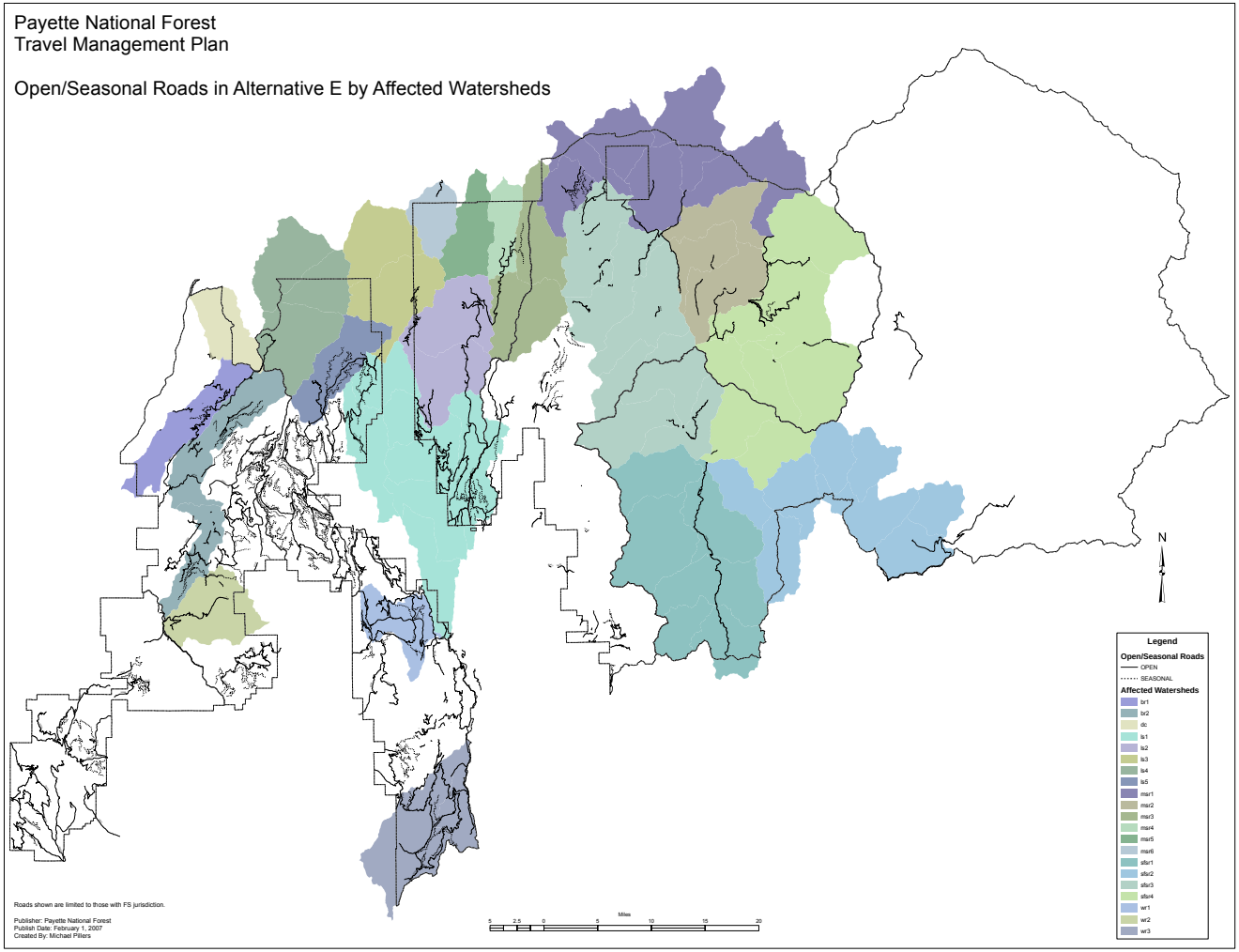

Figure 3.—Roads under Payette National Forest jurisdiction with motorized use.

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 Brownlee Reservoir 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 10) are included in order to minimize adverse effects to listed fish species where they occur.

Table 10.—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, l
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
SWCP 15.14 - Diversion of flows around	Minimize downstream sedimentation by ensuring that all	HIGH. IFPA Rule 040:

BMP Description	Purpose or Objective	Effectiveness and IFPA Compliance
construction sites.	stream diversions are carefully planned.	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.

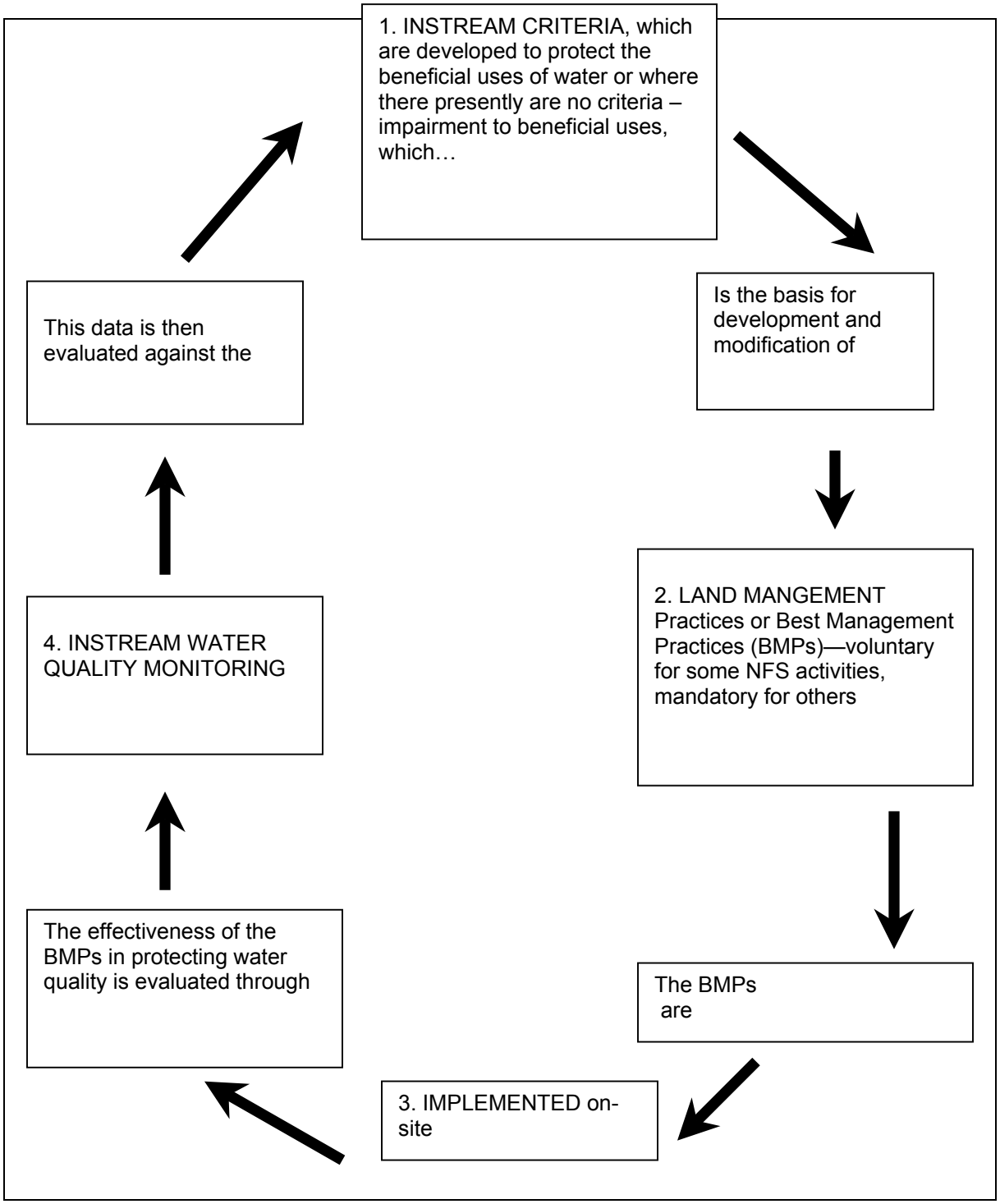

Figure 4.—Feedback loop for BMPs associated with the Travel Plan.

J. FEDERAL ACTION: GRAZING ALLOTMENTS

PURPOSE AND NEED: Permitting grazing of domestic livestock (cattle and sheep) on various allotments in the bull trout analysis areas of the Brownlee Reservoir Section 7 watershed until December 31, 2017.

***LOCATION*:** This action is dispersed throughout the bull trout analysis areas of the Brownlee Reservoir Section 7 watershed.

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001

***DESCRIPTION*:** The action consists of permitting grazing by authorized permittees in several allotments in the Brownlee Reservoir Section 7 watershed (Figure 5). Although all allotments in the Brownlee Reservoir Section 7 watershed are displayed, only those occurring within the defined analysis areas have been considered. All of these permits have received previous concurrence (Nelson and Burns 2001). The Annual Operating Instructions (AOIs) describe season of use, permitted numbers and head months, and cattle trailing patterns. The allotments are grazed in accordance with LRMP.

Bear Creek C&H Allotment

This is a cattle and horse allotment in the Upper Bear Creek analysis area. Use consists of grazing domestic cattle following the approved AOI and long-term allotment management plan (AMP). Permitted use includes 100 cow/calf pairs from 12 July to 1 October, and 879 cow/calf pairs from 1 June to 30 November. Bull trout occur within the upper portion of the allotment.

- AOI CD1: \Support Documents\AOIs\bear_creek_AOI_05.doc

Lick Creek C&H Allotment

This is a cattle and horse allotment in the Indian Creek analysis area that is mostly in the lower Indian 6th level HU and a small portion of the Middle Indian 6th level HU at its downstream end. Use consists of grazing domestic cattle in the analysis area following the approved AOI and long-term AMP. Permitted use is 879 cow/calf pairs from 5 June to 30 November. The Indian Creek pasture described above is one of 9 pastures in the allotment.

- AOI CD1: \Support Documents\AOIs\lick_AOI_05.doc

Wildhorse/Crooked River C&H Allotment

This is a large cattle and horse allotment in the Crooked River analysis area and the lower portion of the Wildhorse River watershed. Use consists of grazing domestic cattle in the analysis area following the approved AOI and long-term AMP. Permitted use is 100 cow/calf pairs from 16 May to 7 June, 214 cow/calf pairs from 20 May to 10 October, and 308 cow/calf pairs from 15 June to 10 September.

- AOI CD1 :\Support Documents\AOIs\wildhorse_AOI_05.doc

Crooked River On/Off C&H Allotment

This is a small cattle and horse allotment on Crooked River near the confluence of Disk Ross Creek in the Crooked River analysis area. Use consists of grazing domestic cattle in the allotment following the approved AOI and long-term AMP. Permitted grazing is for 100 cattle from 16 June to 30 June.

- AOI CD1: \Support Documents\AOIs\crooked_on_off_AOI_05_doc

Mill Creek C&H Allotment (note- this allotment also discussed in Weiser BA)

This cattle and horse allotment is located at the lower end of the Crooked River analysis area. Use consists of grazing domestic cattle in the Crooked River subwatershed following the approved AOI and long-term AMP. Permitted use is 66 cow/calf pairs from 16 May to 30 September. Grazing of the

West pasture, the only one of the allotment's pastures in the Crooked River analysis area, varies depending on the rotation, being either from 1 August to 15 September or 1 September to 15 October. Bull trout have not been documented in the Crooked River tributaries within the Mill Creek allotment, but have been documented downstream in Crooked River. Bull trout have not been documented in Mill Creek and it flows into Hornet Creek in the Weiser watershed.

- AOI CD1: \Support Documents\AOIs\mill_AOI_05.doc

Smith Mountain S&G Allotment

This is a complicated arrangement of four sheep and goat allotments that are managed as pastures in a rotational grazing system. The pastures of interest are Snake River/Indian Creek in the Indian Creek analysis area and Smith Mountain in the Upper Bear Creek analysis area. Permitted use consists of grazing 1200 ewe/lamb pairs of domestic sheep from 16 May to 15 October, following the long-term AMP, under the conditions of the current AOI. This group of allotments is managed together, allowing for rotation of three bands of sheep belonging to the Shirts brothers among them, and for rotating periods of use among the three bands; forage use is held to 30% with sheep passing over each area one time only. The Deep Creek Allotment is one of the four allotments managed as pastures and is discussed in detail in the Deep Creek BA.

- AOI CD1: \Support Documents\AOIs\smithmtn_AOI_05.doc

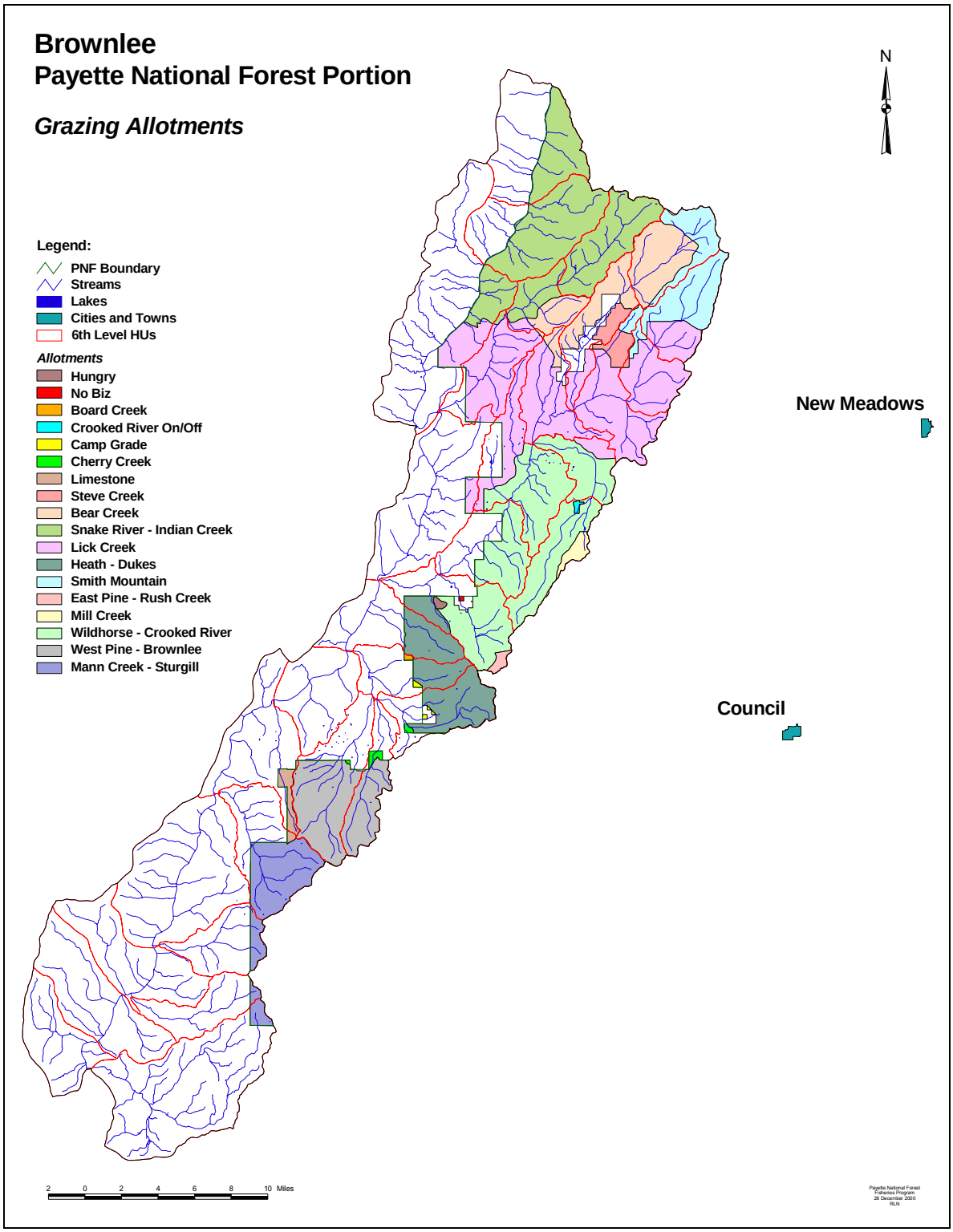

Figure 5.—Grazing allotments, Brownlee Reservoir Section 7 watershed.

REQUIRED MITIGATION

General Measures (Cattle and Horse Allotments)

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

- TEST25 - Mitigate, through avoidance, the adverse effects of livestock access or activites that may result in trampling of redds or disturbance of spawning or reproductive staging of ESA listed fish species (see required mitigation below).
- RAST01 – Riparian Ares: Maximum 45% use or retain a minimum 4 inch stubble height of hydric greenline species, whichever occurs first. Upland Vegetation Cover Types: Early season or season long pastures 40% use. Vegetative slow growth, after seed ripe conditions, or late season pastures 50% use.
- 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 an desired non-native fish habitat.
- RAST04 - Livestock salting will be prohibited in RCAs

Additional Mitigation for the Bear Creek C&H Allotment

- To avoid impacts to spawning bull trout cattle will be removed prior to 15 August. If needed, the Forest will construct fence to limit use by cattle that may stray into areas found to have bull trout spawning areas.

Additional Mitigation for the Wildhorse/Crooked River C&H

Documentation of bull trout in the Crooked River analysis area and questions about the localized effects of grazing on Crooked River lead to the required additional mitigation for this allotment:

- Fish habitat condition monitoring that includes greenline analysis and photopoints. These are to occur at at least three fixed locations on Crooked River upstream of Laferty Campground. A report that summarizes the monitoring results will be annually provided to the Level 1 team. If necessary, based on the results of monitoring changes will be made to grazing practices.
- If conditions appear to be deteriorating, grazing practices will be modified as needed to permit rehabilitation.
- If spawning bull trout are located where cattle may have access to the spawning grounds, the cattle will be removed immediately and prior to 15 August each year thereafter. If needed, the Forest will construct fence to limit use by cattle that may stray into areas found to have bull trout spawning areas.

Additional Mitigation for the Mill Creek C&H Allotment

- A fisheries biologist and range conservationist will visit areas of concern on Moonshine Creek in 2007 to assess the need to reduce grazing impacts and will report back to Level 1 Team.

General Measures (Sheep and Goat Allotments)

Several mitigation measures are specified as LRMP Standards in 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 (see required mitigation below).

- 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 an desired non-native fish habitat.
- RAST04 - Livestock salting will be prohibited in RCAs. Sheep will be salted only at bed grounds. Salt will be placed in containers and moved with the sheep.
- RAST07 Only annual once-over sheep grazing will be allowed, with the exception of designated sheep driveways, travel routes, or where specifically authorized.

Additional Mitigation for the Smith Mountain S&G Allotment

Documented headwaters bull trout population in Indian Creek, lead to the required additional mitigation for this allotment:

- Keep sheep away from Indian Creek and its tributaries downstream of the Forest Trail 227 crossing of Indian Creek, by trailing the sheep uphill of the trail. This must be monitored to insure compliance.

K. FEDERAL ACTION: POWER AND TELECOMMUNICATIONS LINES

PURPOSE AND NEED: Permit maintenance of public utility lines (power and telecommunications) in the bull trout HU's until December 31, 2017.

***LOCATION*:** Actions are dispersed throughout the bull trout HUs, but are mostly in Indian Creek and Crooked River. All of these actions, except Oxbow-McCall overhead power lines, have received previous concurrence (Nelson and Burns 2001).

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001

***DESCRIPTION*:** Provide electric power and telecommunications to private inholdings. Special use permits are available on this CD2: \Support Documents\SUPs\ (in file SUPs.zip) and inspections are on this CD2: \Support Documents\SUPs\brownlee_inspections\ (in file SUPs.zip).

Cuprum–Bear exchange buried cable (Cambridge telephone)

CD2: \Support Documents\SUPs\Cuprum-Bear-Oxbow Line.PDF (in file SUPs.zip).
Cable is buried along the Council-Cuprum road from Cuprum up Huntley Gulch and branches off into Bear. From Bear the cable continues up the Council-Cuprum road to private property along Crooked River and down the Wildhorse River. Cable is buried beneath stream channels using a boring machine and in some cases is attached to bridges or converted to overhead lines.

Cuprum - Bear underground power line (Idaho Power)

CD2: \Support Documents\SUPs\Cuprum-Bear Power Line.PDF (in file SUPs.zip). Cable is buried along the road on the northwest side of Bear Creek and runs cross country to Cuprum where it crosses Indian Creek as an overhead line.

Big Bar - Silver King buried power line (Idaho Power)

CD2: \Support Documents\SUPs\Big Bar Line.PDF (in file SUPs.zip). Cable runs from the Snake River up to Lynes Point and along ridge over to private in holdings on Mann Creek (old Silver King Mine).

McCall-Oxbow overhead power lines (Idaho Power)

CD2: \Support Documents\SUPs\oxbow_mccall.pdf, and oxbow_mcall_power_crooked.pdf (in file SUPs.zip). Overhead power lines run from Oxbow power facility to McCall crossing Crooked River in one location.

REQUIRED MITIGATION:

All activities related to power or telephone line maintenance would follow standards presented in the LRMP:

- TEST06: Management actions shall be designed to avoid or minimize adverse effects to listed species and their habitats. For listed fish species use Appendix B for determining compliance with this standard
- SWST04: Management actions will neither degrade nor retard attainment of properly functioning soil, water, riparian, and aquatic desired conditions, except: a) When outweighed by demonstrable short- or long-term benefits to watershed resource conditions, or b) Where the Forest Service has limited authority (e.g., access roads, hydropower, etc.) In these cases, the Forest Service shall work with permittee(s) to minimize the degradations of watershed resource conditions.

Any excavation of buried cable will be done under consultation with the Forest Service to insure that this activity does not result in ground-disturbing activities that could affect substrate, sedimentation, or other bull trout habitat parameters. The Idaho Power SUP does not authorize cutting of trees, or other vegetation along the overhead power line corridor. The Forest Service will not authorize cutting of trees or vegetation in the Crooked River riparian area until a journey level fisheries biologist has determined that the action will not significantly reduce potential LWD recruitment or have a significant effect on stream temperature or other WCIs.

Maintenance will be completed with as little disturbance to surrounding soil and vegetation as possible. Care will be taken to minimize sediment delivery to any associated stream channel. Erosion will be minimized where necessary using straw bales, sediment fences, excelsior blankets, jute matting or similar protective measures if ground-disturbing activities occur as a result of maintenance.

L. FEDERAL ACTION: SPECIAL USE PERMITS (WATER DIVERSIONS)

PURPOSE AND NEED: Authorize water diversions SUPs in the Upper Indian Creek and Crooked River HUs through Forest Plan revision.

***LOCATION*:** Actions are concentrated near Cuprum, Idaho in the Indian Creek analysis area and near the confluence Dick Ross Creek in the Crooked River analysis area.

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001

***DESCRIPTION*:** Permit use and maintenance of water development systems that provide domestic water to private property. Special Use Permits for these actions are included on the attached CD2: Support Documents\SUP and inspections are on CD2: \Support \Documents\SUP\brownlee_inspections\ (in file SUPs.zip).

Hedges domestic water SUP

Takes water from a developed spring and transports it 2500 feet (T18N, R03W, Section 14, T18N, R03W, Section 23) to private users through a 2-in pipe. Water right allows for up to 0.05 cubic feet per second to be diverted. The spring is a tributary to Dick Ross Creek, which is a tributary to Crooked River where bull trout have been found. A few bull trout were found below the confluence of Dick Ross Creek, but none within Dick Ross Creek itself. Basic maintenance of the development would occur.

- CD2: \Support Documents\SUPs\Hedges_Water.pdf (in file SUPs.zip).

Green domestic water SUP

Takes water from a developed spring in T20N, R03W, Section 10 and transports it 500 feet to private land through 4-in and 1½ -in pipes. Water right allows for up to 0.03 CFS to be diverted. The spring is a tributary to Hitchcock Gulch, which is a tributary to Indian Creek where bull trout have been found. Bull trout have been found upstream, about four miles above Hitchcock Gulch, but could be using this area as a migration route. Basic maintenance of the development would occur.

- CD2: \Support Documents\SUP \Green_Water.pdf (in file SUPs.zip).

***REQUIRED MITIGATION*:**

All activities related to water diversions must comply with Forest standards and guides and those specified in LRMP.

- LSST07: New authorized facilities shall be located outside of RCAs wherever possible. When new facilities must be located in RCAs, they shall be developed such that degrading effects to RCAs are mitigated, through avoidance or minimization.
- LSST12: Where the authority to do so was retained, and in cooperation with affected state, tribal, and local governments, holders of water rights, and other interested parties, require that water diversion structures: a) Be monitored to limit water withdrawals to the amount of the water rights and the time period of the water right; and b) Have either fish screens, or other means, to prevent fish entrapment or entrainment, issue leases, permits, rights of way and easements to avoid effects that would retard or prevent the attainment of WCIs and avoid adverse effects on inland native fish. Where the authority to do so was retained, adjust existing leases, permits, rights of way, and easements to eliminate effects that would retard or prevent attainment of the WCIs or adversely affect inland native fish. If adjustments are not effective, eliminate the activity.

M. FEDERAL ACTION: OUTFITTERS AND GUIDES

PURPOSE AND NEED: Permit outfitter and guide operations in the bull trout HUs through 31 December 2017. 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.

***LOCATION*:** Actions are dispersed throughout the bull trout HUs, but are most likely to occur in Upper Indian Creek and Upper Bear Creek. All of these permits have received previous concurrence (Nelson and Burns 2001).

DATES OF PREVIOUS CONCURRENCE:

- USFWS: October 15, 2001

***DESCRIPTION*:** Provide outdoor recreation for people. Special Use Permits for these actions are included on the CD:

Heavens Gates Outfitters

Permit is for guided hunting trips using stock or by foot. There are no designated campsites in the Brownlee Section 7 Watershed.

- CD2: \Support Documents\SUPs\Heavens Gate Outfitter.PDF (in file SUPs.zip).

Seven Devils Lodge

Permit activities include horseback riding, fishing, photographic trips, viewing wildlife, moving cattle, ranch work, snowmobiling, and cross country skiing. There are no designed campsites. Overnight camping would require Forest Service authorization.

- CD2: \Support Documents\SUPs\Seven Devils Lodge.PDF (in file SUPs.zip).

***REQUIRED MITIGATION*:**

- Keep stock and people away from upper Indian Creek and its tributaries in sections 29, the south halves of sections 19 and 20, the north half of section 30 in Township 21N Range 2W after 15 August.
- Keep stock and people away from upper Bear Creek and its tributaries in sections 25, 26, 27, 34, 35 & 36, T21N, R2W
- Keep stock and people away upper Crooked River, in sections 1, 11, 15, 20, 21, and 28, T18N, R3W.
- The Forest will report noncompliance with outfitter and guide operating plans to the level one team.
- Annual training will be provided by the Forest to outfitters and guides about how to avoid adverse effects to listed fish.

V. Analysis of Potential Effects

Based on the best available information the bull trout populations inhabiting the three subwatersheds within the Weiser RIver Section 7 watershed are isolated from one another (see bull trout distribution in section III). Because the bull trout in the three subwatersheds act as discrete populations the effects analysis is restricted to the individual subwatersheds and is not compiled up to the entire Weiser River Section 7 watershed.

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 McKleod, 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 declines at distances greater than approximately one-half tree height away from the channel (Forest Ecosystem Assessment Team, 1993).

Within riparian areas, landslide prone areas and other RCAs, buffers are identified to protect streams from non-channelized sediment inputs (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 areas are required to be mapped on the ground and specific standards and guidelines applied. Landslide prone areas are excluded from harvest during the final unit layout.

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 (Chicken BAER 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 [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 (J. Lund, Krassel District Fish Biologist, 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 1995) 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 11, 12). 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 11.—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 12.—Risk quotient values and aquatic level of concern assessment for chemical products used by the PNF (information from NMFS [2007, CD1: \Support Documents\BAs\LOCs\noaa_weeds_bo_07.pdf] except as indicated).

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 13. 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 13.—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.—Sublethal 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 14, below), would reduce risks associated with herbicides moving into surface waters or leaching into ground water.

Table 14.—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 if the petroleum product(s) make contact with them. Fuels and other petroleum products can directly poison salmonids and their aquatic invertebrate food source. Fuels and petroleum products are moderate 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. Plant utilization rates of no more than 30%, in riparian areas, provides stream bank protection and decreased 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

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 in a variety of salmonid species and at all life stages, from possible suffocation and entrapment of incubating embryos (see 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, and Reiser and White 1988). Also through the loss of summer rearing and overwintering cover for juveniles (see Bjornn et al.1977, Kelley and Dettman 1980, Hillman et al. 1987, and Griffith and Smith 1993). Also through the reduced availability of invertebrate food for resident adults (see e.g., Tebo 1955, Nuttall 1972, Cederholm and Lestelle 1974, Bjornn et al. 1977, and Alexander and Hansen 1986).

B. INDIAN CREEK

1. DIRECT AND INDIRECT EFFECTS FROM FEDERAL ACTIONS

Section V-A provides a description of general effects. Refer to Appendix 3 effects table for an analysis of effects to WCIs for each action. For the analysis of effects the actions were grouped based on similarities in effects to WCIs.

a. Miscellaneous forest products harvest

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 harvest 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 WCIs will be negligible. Public contact and education through signing will help minimize illegal removal of firewood from RCAs. Activities within LRMP RCA buffers will only occur after a journey level fisheries biologist and hydrologist has insured that all of the mitigations desribed in the Federal action are followed. If followed the mitigations will insure that effects from activites in RCAs 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).

b. Mistletoe control and pre-commercial thinning, noxious weed management

Reduced availability of recruitable LWD, reduced stream shading, ground disturbance yielding sediment delivery, or a fuel spill contaminating waters are seen as 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 activities 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).

c. Fire management

See the V.A.2. in the general effects section for a detail discussion of fire management effects. Refer to Appendix 3 for effects to all WCIs.

d. Fish habitat/riparian sampling

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.

e. Watershed & habitat improvements and maintenance

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 activites 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).

f. Noxious weeds

See the general effects section on V.A.3. for a detailed discussion of noxious weed conrtrol effects. Refer to Appendix 3 for effects to all WCIs.

g. Road management

The primary mechanism of effect from the road management action is sediment delivery to the channel (Appendix 3). 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 over not taking the road management action. This is especially true with expected future increases in public travel on Forest roads. Specific mitigation that will insure sediment delivery is negligible include 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).

h. Trails, recreation and administrative site operation & maintenance

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).

i. Travel Plan

Potential effects of this action are increased sedimentation in streams due to motorized and non-motorized use at road and trail stream crossings, adverse effects of petroleum spills, and physical harm to eggs that may be present in redds at trail fords and elsewhere. Soils on roads and trails at stream crossings will often be delivered to streams via wind, water, tires at fords etc. As described above (section V. A. 6.), 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 (take) can occur should a redd 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 no stream trail crossings within occupied bull trout habitat, and an unknown number of crossings upstream of occupied habitat. Fording, even off roads and trail, frequently occurs in spawning habitat because these are often the easiest places to cross a creek. Roberts and White (1992), found twice-daily wading throughout 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 conditions) 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. Project Design Features and Best

Management Practices will reduce sediment delivery during reroute or reconstruction of previously unauthorized routes to negligible levels. Specific examples of methods to reduce sediment delivery to negligible levels 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. The specific effects of these methods are covered under road management and trails. Over time, increasing public use of roads and trails and related increases in sediment yield will degrade the sediment substrate embeddedness WCIs in the short and long term. Because of the proximity of bull trout habitat to roads and/or trails in this analysis area, increases in sediment due to travel plan actions are expected to have adverse effects.

For the Travel Plan EIS (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]) analysis, miles of road and trail authorized for motorized use was used as an index of streambank condition with the assumption that the number of stream crossings would increase with mileage. The 0.7 mile increase in roads and trails open to motorized use will have a negligible effect on streambank condition related to the number of road and trail crossings. Using the LRMP WCI definition of streambank condition, short and long term streambank condition at existing crossings will degrade with increased public use. Road and trail maintenance (Section IV.G.) 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 tributaries directly adjacent to occupied habitat in the analysis area, and roads also occur adjacent to and cross streams with bull trout, a fuel spill in these areas is likely to result in adverse effects to listed fishes. Adverse effects to bull trout such as harassment or redd trampling are also likely to occur from fording streams on foot, horseback, or other non-motorized travel.

j. Grazing Allotments—Two Actions (Smith Mountain S&G Allotment and Lick Creek C&H)

The potential effects of this action are discussed above under *General Effects* (V.A.5.). Utilization and stubble height standards for riparian areas (mitigation described in the Federal action) will limit the amount of livestock use and impacts to levels that will not degrade WCIs such as shade providing riparian vegetation and streambank stability. 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; therefore, effects to bull trout will be negligible. The portions of the Lick Creek C&H Allotment that include Indian Creek are downstream of bull trout spawning and rearing habitat. If present, migratory bull trout would not likely be affected by livestock due to the steep inaccessible terrain in that section of Indian Creek. On the Smith Mountain S&G allotment sheep trailing will have negligible effects on bull trout in upper Indian Creek because herders will keep sheep uphill of Trail 227, which is upstream of occupied bull trout habitat.

k. Power and Telecommunications Lines—Three Actions (Big Bar-Silver King Mine, Bear-Cuprum Exchange [telephone] Cuprum Bear Underground Cable (power])

Potential impacts from these actions are reductions in the age and structure of riparian vegetation where existing lines cross riparian areas. Typically, these lines affect only small areas. Because some natural openings are common in functioning riparian areas, these openings are not expected to decrease riparian area function or quality. The buried Cuprum-Bear power line converts to an overhead line to pass over Indian Creek, therefore stream channel excavation would not be necessary for maintenance. Due to the minimal area of riparian canopy influenced effects to stream temperature are not expected to be measurable. In addition, it is in an area that does not support resident bull trout; migrant bull trout, if they should pass through, are unlikely to be affected should routine line maintenance be needed. The Big Bar-Silver King Mine buried power line is well away from the Indian Creek Riparian area, and occurs downstream of bull trout spawning and rearing; therefore effects to bull trout are unlikely and negligible. The Bear-Cuprum buried telephone line is buried along the Huntley Gulch Road, which is downstream of bull trout spawning and rearing habitat. When the buried lines (both power and phone) intersect streams, they are either tunneled 10-15 ft under the channel in

PVC conduit, or in rare occasions, converted to an overhead line. In no circumstance would maintenance require excavation of a stream channel. Mitigations, such as the use of silt fences and other erosion control, will insure that the amount of sediment delivery related to maintenance of the buried lines within riparian areas will be negligible.

I. Special Use Permits (Water Diversions)—One Action (Green Water Diversion)

This action is well away from resident bull trout populations and, being a small spring diversion of only 0.03 cubic feet per second (0.0008 cms), is unlikely to materially affect flows or water temperatures in Indian Creek, which had a measured flow of approximately 35 cubic feet per second (0.84 cms) in June (Figure 6). The change in weighted usable habitat for bull trout spawning, and juvenile and adult habitat, due to a 0.03 cfs change in flows would be minimal and the effects would be biologically negligible for bull trout (Figure 7).

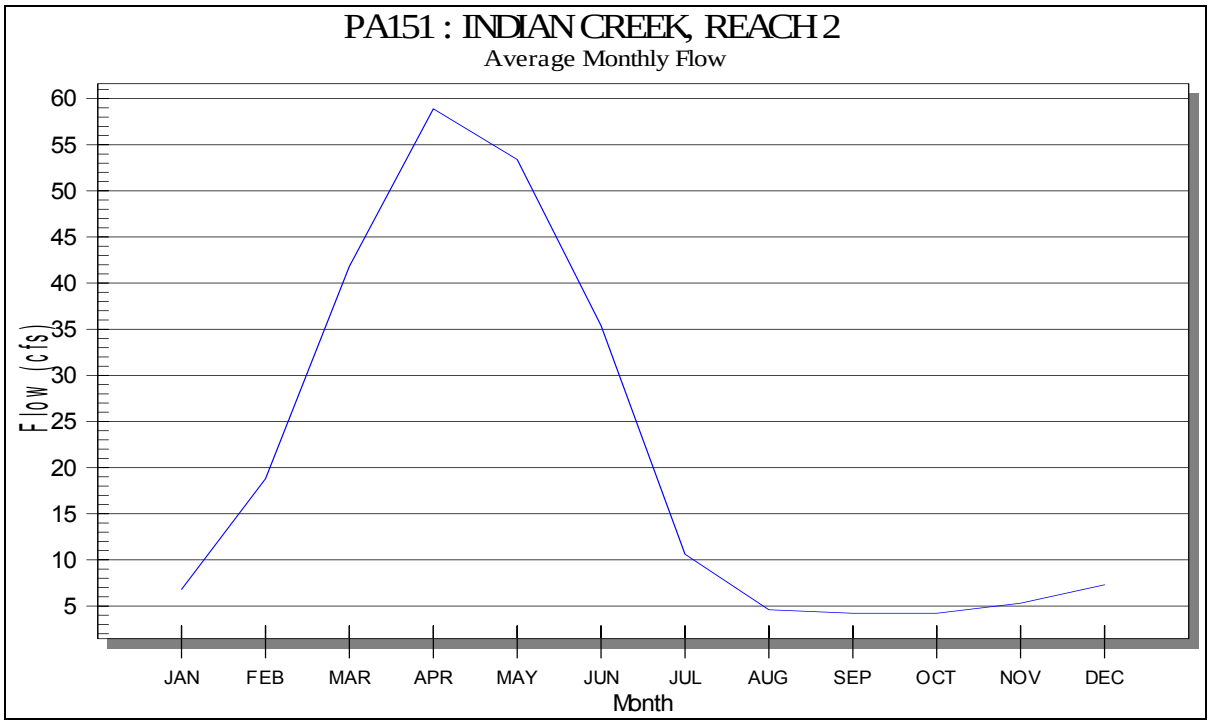

Figure 6.—Indian Creek average monthly flow data (Snake River Adjudication Team data on file PNF S.O).

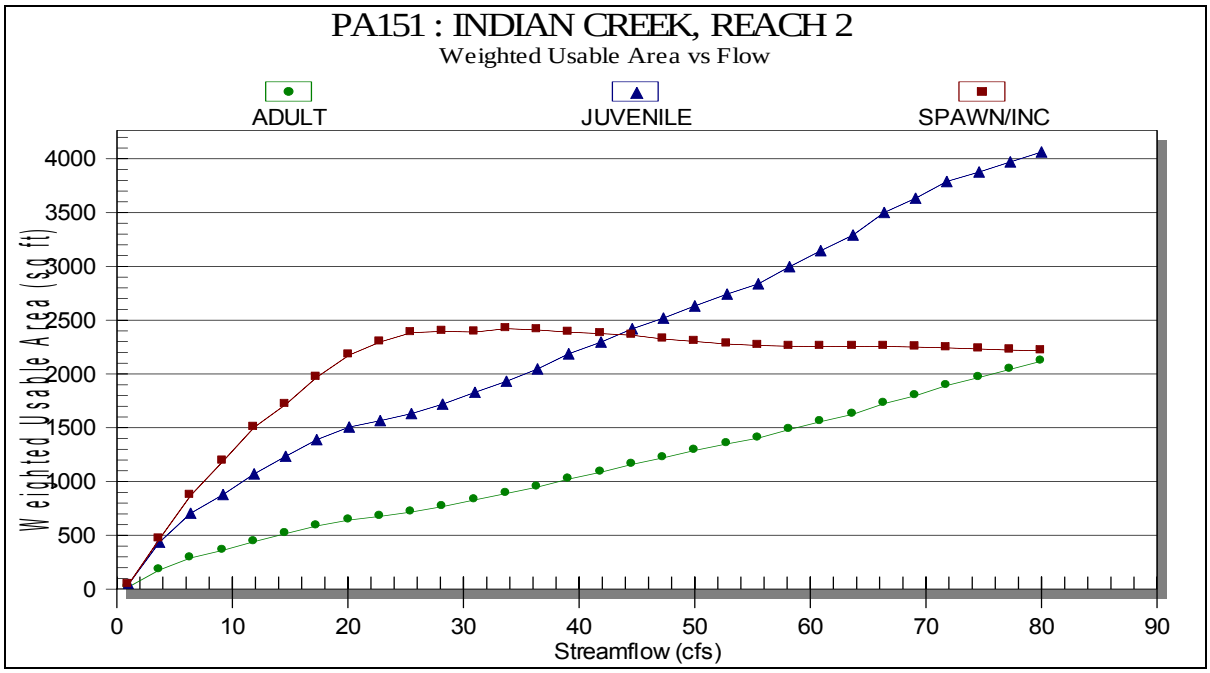

Figure 7.—Weighted usable habitat for bull trout vs. flow (Snake River Adjudication flow data on file PNF S.O.).

m. Outfitters and Guides—Two Actions (Heavens Gate Outfitters, Seven Devils Lodge)

These activities are widely dispersed throughout the analysis area, unlikely to occur near known bull trout populations to any substantial extent, and highly unlikely to lead to any measurable effects on bull trout. In the case of Heavens Gate Outfitters, they mainly just pass through the analysis area to designated outfitting areas in the Rapid River watershed on the other side of the Seven Devils Mountains. Seven Devils Lodge, on the other hand, is an outfitting operation aimed largely at dispersed winter recreation and trail riding.

2. Cumulative Effects, State and Private

Except for patented mine claims most state and private land in the analysis area occurs downstream of occupied bull trout habitat, although the use of Indian Creek as a migratory corridor has not been confirmed or refuted.

3. Combined Effects, including those from Interrelated and Interdependent Federal Actions

All of the ongoing actions except for travel plan and fire management maintain or improve each of the WCIs considered in the environmental baseline. The combined effect of actions other than travel plan and fire management will be to slowly move the environmental baseline towards the condition described as "functioning appropriately". Implementing watershed rehabilitation projects linked to the LRMP Aquatic Conservation Strategy and other LRMP watershed maintenance and improvement related goals and objectives will help offset degrading effects from the travel plan and fire management.

C. Upper Bear Creek

1. Direct and Indirect Effects from all Federal Actions

Section V-A. provides a description of general effects. Refer to Appendix 3 effects table for an analysis of effects on WCIs for each action. Most of the actions and effects of the actions on WCIs will be the same as described in the Indian Creek subwatershed. The travel plan, grazing, power and telecommunications, and outfitters and guide actions are unique or different from the Indian Creek subwatershed and are described below.

a. Travel Plan

Potential effects of this action are increased sedimentation in streams due to motorized and non-motorized use at road and trail stream crossings, adverse effects of petroleum spills, and physical harm to eggs that may be present in redds at trail fords and elsewhere. Soils on roads and trails at stream crossings will often be delivered to streams via wind, water, tires at fords etc. As described above (section V. A. 6.), 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 (take) can occur should a redd 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 at least two trail crossings within occupied bull trout habitat, and an unknown number of crossings upstream of occupied habitat. Fording, even off roads and trail, frequently occurs in spawning habitat because these are often the easiest places to cross a creek. Roberts and White (1992), found twice-daily wading throughout 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 conditions) 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. Project Design Features and Best Management Practices will reduce sediment delivery during reroute or reconstruction of previously unauthorized routes to negligible levels. Specific examples of methods to reduce sediment delivery to negligible levels 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. The specific effects of these methods are covered under road management and trails. Over time, increasing public use of roads and trails and related increases in sediment yield will degrade the sediment substrate embeddedness WCIs in the short and long term. Because of the proximity of bull trout habitat to roads and/or trails in this analysis area, increases in sediment due to travel plan actions are expected to have adverse effects.

For the Travel Plan EIS (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]) analysis, miles of road and trail authorized for motorized use was used as an index of streambank condition with the assumption that the number of stream crossings would increase with mileage. The 6.9 mile increase in roads and trails open to motorized use will have a negligible effect on streambank condition related to the number of road and trail crossings. Using the LRMP WCI definition of streambank condition, short and long term streambank condition at existing crossings will degrade with increased public use. Road and trail maintenance (Section IV.G.) 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 tributaries directly adjacent to occupied habitat in the analysis area, and roads also occur adjacent to and cross streams with bull trout, a fuel spill in these areas is likely to result in adverse effects to listed fishes. Adverse effects to bull trout such as harassment or redd trampling are also likely to occur from fording streams on foot, horseback, or other non-motorized travel.

b. Grazing Allotments—Three Actions (Smith Mountain S&G Allotment, Lick Creek C&H Allotment, Bear Creek C&H Allotment)

The potential effects of this action are discussed above under *General Effects* (V-A). Utilization and stubble height standards for riparian areas (mitigation described in the Federal action) will limit the amount of livestock use and impacts to levels that will not degrade WCIs such as shade providing riparian vegetation and streambank stability. 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; therefore, effects to bull trout will be negligible. Sheep on the Smith Mountain allotment are trailed along FS Trail 226 in the headwaters of Little Bear Creek and well away from upper Bear Creek; therefore, any effects to bull trout would be negligible. The section of Bear Creek within the Lick Creek Allotment is downstream from documented bull trout distribution; therefore, any effects from livestock would be the result of straying cattle and are not likely. Within the Bear Creek Allotment in addition to allowable utilization and stubble height standards designed to prevent degradation of riparian areas cattle are removed from the vicinity of Bear Creek prior to 15 August. The combination of these mitigations limit effects to bull trout to negligible levels (Appendix 3).

c. Power and Telecommunications Lines—Two Actions (Bear-Cuprum Exchange [telephone] Cuprum–Bear Underground Cable [power])

Potential impacts from these actions are reductions in the age and structure of riparian vegetation where existing lines cross riparian areas (Appendix 3). Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are not expected to decrease riparian area function or quality. These buried cables will rarely need attention, pass through very small sections of Forest system lands along Bear Creek, and are in areas that are unlikely to support resident bull trout (i.e., in Bear Creek downstream of Huckleberry Campground) or to contain migrants. When the buried lines (both power and phone) intersect streams they are either tunneled 10-15 ft under the channel in PVC conduit or converted to an overhead line. In no circumstance would maintenance require excavation of a stream channel. Mitigations, such as the use of silt fences and other erosion control, will insure that the amount of sediment delivery related to maintenance of the buried lines within riparian areas will be negligible.

d. Outfitters and Guides—Two Actions (Heavens Gate Outfitters, Seven Devils Lodge)

These activities are widely dispersed throughout the analysis area, unlikely to occur near known bull trout populations to any substantial extent, and highly unlikely to lead to any measurable effects on bull trout (Appendix 3). In the case of Heavens Gate Outfitters, they mainly just pass through the analysis area to designated outfitting areas in the Rapid River watershed on the other side of the Seven Devils Mountains. Seven Devils Lodge, on the other hand, is an outfitting operation aimed largely at dispersed winter recreation and trail riding.

2. Cumulative Effects, State and Private

Although there is a small amount of private land in the Upper Bear Creek analysis area, no actions are known to be occurring on private land.

3. Combined Effects, including those from Interrelated and Interdependent Federal Actions

All of the ongoing actions except for travel plan and fire management maintain or improve each of the WCIs considered in the environmental baseline. The combined effect of actions other than travel plan and fire management will be to slowly move the environmental baseline towards the condition described as “functioning appropriately”. Implementing watershed rehabilitation projects linked to the LRMP Aquatic Conservation Strategy and other LRMP watershed maintenance and improvement related goals and objectives will help offset degrading effects from the travel plan and fire management.

D. Crooked River

1. Direct and Indirect Effects from all Federal Actions

Section V-A. provides a description of general effects. Refer to Appendix 3 effects table for an analysis of effects on WCIs for each action. Most of the actions and the effects of the actions on WCIs will be the same as described in the Indian Creek subwatershed. The travel plan, grazing actions, power and telecommunication lines, and special use permits are unique or different from the Indian Creek subwatershed and are described below.

a. Travel Plan

Potential effects of this action are increased sedimentation in streams due to motorized and non-motorized use at road and trail stream crossings, adverse effects of petroleum spills, and physical harm to eggs that may be present in redds at trail fords and elsewhere. Soils on roads and trails at stream crossings will often be delivered to streams via wind, water, tires at fords etc. As described above (section V. A. 6.), 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 (take) can occur should a redd 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 no stream trail crossings within occupied bull trout habitat, and an unknown number of crossings upstream of occupied habitat. Fording, even off roads and trail, frequently occurs in spawning habitat because these are often the easiest places to cross a creek. Roberts and White (1992), found twice-daily wading throughout 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 conditions) 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. Project Design Features and Best Management Practices will reduce sediment delivery during reroute or reconstruction of previously unauthorized routes to negligible levels. Specific examples of methods to reduce sediment delivery to negligible levels 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. The specific effects of these methods are covered under road management and trails. Over time, increasing public use of roads and trails and related increases in sediment yield will degrade the sediment substrate embeddedness WCIs in the short and long term. Because of the proximity of bull trout habitat to roads and/or trails in this analysis area, increases in sediment due to travel plan actions are expected to have adverse effects.

For the Travel Plan EIS (CD2: \Support Documents\Travel Plan [in Travel Plan.zip]) analysis, miles of road and trail authorized for motorized use was used as an index of streambank condition with the assumption that the number of stream crossings would increase with mileage. The 6.9 mile increase in roads and trails open to motorized use will have a negligible effect on streambank condition related to the number of road and trail crossings. Using the LRMP WCI definition of streambank condition, short and long term streambank condition at existing crossings will degrade with increased public use. Road and trail maintenance (Section IV.G.) 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 tributaries directly adjacent to occupied habitat in the analysis area, and roads also occur adjacent to and cross streams with bull trout, a fuel spill in these areas is likely to result in adverse effects to listed fishes. Adverse effects to bull trout such as harassment or redd trampling are also likely to occur from fording streams on foot, horseback, or other non-motorized travel.

b. Grazing Allotments—Three Actions (Wildhorse/Crooked River C&H Allotment, Crooked River C&H On/Off Allotment, Mill Creek C&H Allotment)

The potential effects of this action are discussed above under *General Effects (*V-A). Utilization and stubble height standards for riparian areas (mitigation described in the Federal action) will limit the amount of livestock use and impacts to levels that will not degrade WCIs such as shade providing riparian vegetation and streambank stability (Appendix 3). 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; therefore, effects to bull trout will be negligible. The Crooked River On/Off Allotment is located downstream of bull trout spawning habitat and adult bull trout have rarely been documented in the vicinity or downstream. The combination of allowable utilization and stubble height limits designed not to degrade WCIs and limited occurrence of bull trout make more than negligible effects to bull trout unlikely. Bull trout have not been documented in the tributaries to Crooked River within the Mill Creek Allotment. Bull trout occurrence is rare downstream of the Mill Creek Allotment and with mitigations for allowable use and stubble height effects to bull trout are expected to be negligible. Due to the densely forested nature of upper Crooked River the likelihood of cattle effecting spawning bull trout or eggs is negligible. In general, riparian utilization and stubble height data on Crooked River indicate livestock use has been limited to allowable levels and therefore effects to bull trout are likely limited to negligible levels. If future monitoring (e.g., range monitoring, MIS monitoring) indicates a degrading trend or the presence of cattle in the vicinity of bull trout spawning areas, grazing practices will be modified to avoid more than negligible effects.

c. Power and Telecommunications Lines—Two Actions (Bear – Cuprum Exchange [telephone], Oxbow-McCall overhead power line [Idaho Power])

Potential impacts from these actions are reductions in the age and structure of riparian vegetation where existing lines cross riparian areas. Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are not expected to decrease riparian area function or quality. The buried telephone cable will rarely need attention; crosses Crooked River in one location that is downstream of documented bull trout occurrence, and in locations where the line parallels Crooked River it is downstream of reaches where bull trout typically are found. The Oxbow-McCall overhead power line passes over Crooked River in one location, which is downstream of reaches where bull trout are typically found. Due to the small area of influence (< 50 m of channel) and the requirement that a journey level fisheries biologist must approve alteration of vegetation in the riparian area, the effect on stream temperature from reduction in shade at the point of power line crossing is not expected to be measurable downstream. When the buried lines (power and phone) intersect streams they are either tunneled 10-15 ft under the channel in PVC conduit or converted to an overhead line. In no circumstance would maintenance require excavation of a stream channel. Mitigations, such as the use of silt fences and other erosion control, will insure that the amount of sediment delivery related to maintenance of the buried lines within riparian areas will be negligible (Appendix 3).

d. Special Use Permits (Water Diversions)—One Action (Hedges Water Diversion)

This action is well away from known resident bull trout populations and, being a small spring diversion of only 0.03 cubic feet per second (0.0008 cms), is unlikely to materially affect flows or water temperatures in Dick Ross Creek or Crooked River. Crooked River had a measured flow of approximately 38 cubic feet per second (1.08 cms) in June (Figure 8). Snake River Adjudication Team weighted usable bull trout habitat data vs. flows are not available for Crooked River, however the flow and stream morphology are similar to Indian Creek, therefore the data from Indian Creek are a reasonable approximation for Crooked River. As with the Green water diversion on Indian Creek (V.B.j.) the change in weighted usable habitat for bull trout spawning, and juvenile and adult habitat, due to a 0.03 cfs change in flows would be minimal and the effects would be biologically negligible for bull trout in Crooked River.

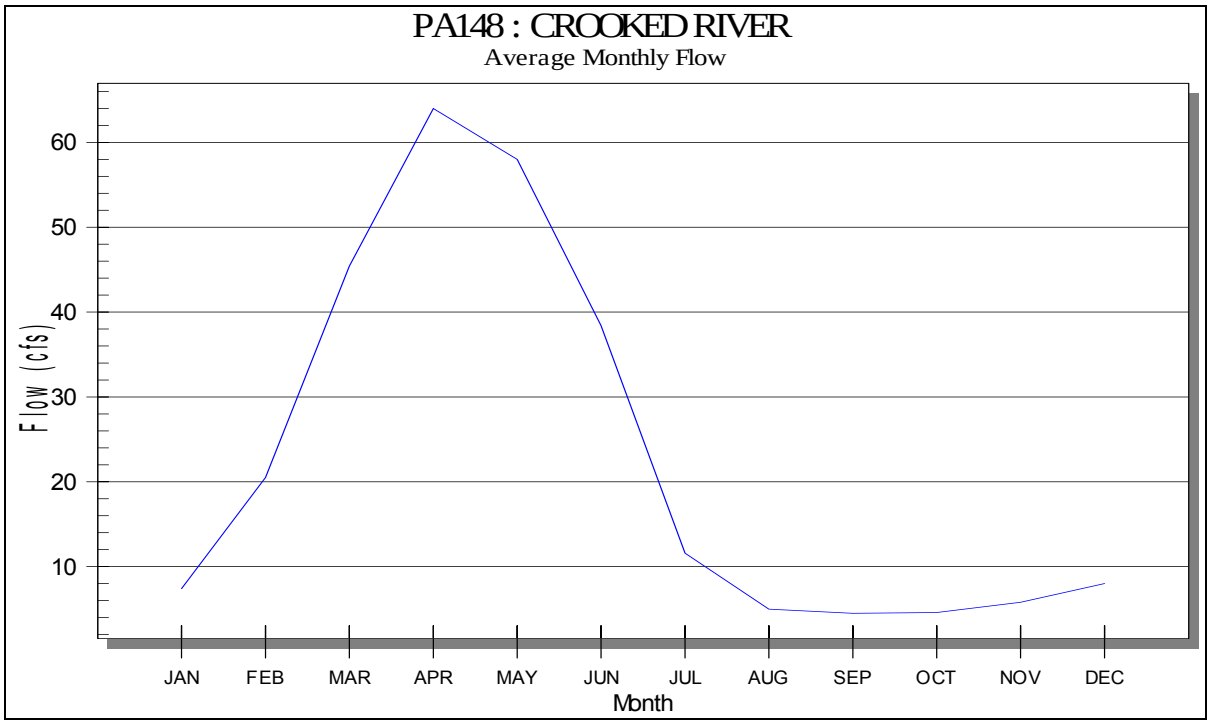

Figure 8.—Crooked River average monthly flow data (Snake River Adjudication Team data on file PNF S.O).

e. Outfitters and Guides—One Action (Seven Devils Lodge)

These activities are widely dispersed throughout the analysis area, unlikely to occur near known bull trout populations to any substantial extent, and highly unlikely to lead to any measurable effects on bull trout. Seven Devils Lodge is an outfitting operation aimed largely at dispersed winter recreation and trail riding.

2. Cumulative Effects, State and Private

Livestock grazing, logging, residential homes, irrigation water withdrawals, and all actions that occur on the Forest occur on state and private lands within the analysis area. One private action occurring within the analysis area is the unauthorized ditch described in the unauthorized actions section for the analysis area. This ditch may be limiting bull trout movement within the analysis area during some seasons and may be reducing the quality of pools or increasing stream temperatures on the Forest downstream of the diversion site.

3. Combined Effects, including those from Interrelated and Interdependent Federal Actions

All of the ongoing actions except for travel plan and fire management maintain or improve each of the WCIs considered in the environmental baseline. The combined effect of actions other than travel plan and fire management will be to slowly move the environmental baseline towards the condition described as “functioning appropriately”. Implementing watershed rehabilitation projects linked to the LRMP Aquatic Conservation Strategy and other LRMP watershed maintenance and improvement related goals and objectives will help offset degrading effects from the travel plan and fire management.

VI. MITIGATION MEASURES

No additional mitigation measures are needed other than those specified in the descriptions of the federal actions.

VII. MONITORING AND EVALUATION

No new monitoring is proposed beyond what is described in the required mitigation for individual actions.

VIII. DETERMINATIONS

Determinations of potential effects of federal actions assessed here are summarized in Table 15.

A. RATIONALE

1. *MISCELLANEOUS FOREST PRODUCTS HARVEST, MISTLETOE CONTROL AND PRE-COMMERCIAL THINNING*

Since 2001, there have not been any documented adverse effects from these actions in these analysis areas. The considered action is not likely to adversely affect listed species, because the WCIs will be improved, or maintained (see matrix, Appendix 3). None of the effects to WCIs will result in adverse affects to bull trout.

2. *FIRE MANAGEMENT ACTIVITIES*

If mitigations are followed the considered action is not likely to adversely affect listed species, because fire management caused disturbance to feeding and breeding, and direct mortality of listed fishes, is not expected (see effects matrix, Appendix 3). Suppression activity procedures found in Section V-A are designed to minimize impacts to bull trout and associated habitat if a fire should start in one of the Weiser subwatersheds occupied by bull trout. The frequency and size of prescribed fire will be limited in the analysis areas and effects to WCIs will be negligible. Wildland Fire Use is expected to have negligible or no effect because it will only be used when there is a low risk of fire spread.

3. *FISH HABITAT AND RIPARIAN SAMPLING*

Since 2001, there have not been any documented adverse effects from these actions in these analysis areas. The considered action is not likely to adversely affect listed species, because the WCIs will be improved, maintained, or there will be negligible effects (see matrix, Appendix 3). None of the effects to WCIs will result in adverse affects to bull trout.

Table 15.—Determinations for ongoing actions.

Federal Action	Listed Species	Expiration Date
	Bull Trout	
Programmatic Actions		December 31, 2017
Miscellaneous Forest Products	NLAA	
Mistletoe Control and Pre-commercial Thinning	NLAA	
Fire management	NLAA	
Fish Habitat and Riparian Sampling	NLAA	
Watershed and Fish Habitat Improvement and Maintenance	NLAA	
Noxious Weed Control	LAA	
Road Management	LAA	
Trails, Recreation and Administrative Site Operation and Maintenance	LAA	
Travel Plan	LAA	
Other Actions		
Smith Mountain S&G Allotments	NLAA	
Lick Creek C&H Allotment	NLAA	
Bear Creek Allotment	NLAA	
Mill Creek C&H Allotment	NLAA	
Wildhorse/Crooked River C&H Allotment	NLAA	
Power & Telecommunications Lines	NLAA	
Special Use Permits (Water Diversions)	NLAA	
Outfitters and Guides	NLAA	

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

4. *WATERSHED AND FISH HABITAT IMPROVEMENTS AND MAINTENANCE*

Since 2001, there have not been any documented adverse effects from these actions in these analysis areas. The considered action is not likely to adversely affect listed species, because the WCIs will be improved, or maintained (see matrix, Appendix 3). None of the effects to WCIs will result in adverse affects to bull trout.

5. Noxious Weeds

Bull trout are likely to be exposed to sublethal levels of noxious weed control chemicals (see matrix, Appendix 3).

6. Road Management

Since 2001, there have not been any documented adverse effects from these actions in these analysis areas. The WCIs will be improved, or maintained (see matrix, Appendix 3): however, an adverse determintation for road management was made due to the interdependent relationship to the travel plan action, which will have adverse effects on bull trout (Appendix X).

7. Trails, Recreation, and Administrative Site Operation and Maintenance

Since 2001, there have not been any documented adverse effects from these actions in these analysis areas. The WCIs will be improved, or maintained (see matrix, Appendix 3): however, an adverse determintation for road management was made due to the interdependent relationship to the travel plan action, which will have adverse effects on bull trout (Appendix 3).

8. Travel Plan

The considered action is likely to adversely affect listed species despite some improvement to WCIs, such as disturbance regime, history, and RCAs. Increasing trends in public use of roads and trails degrade the substrate embeddedness WCI in the long term. Increasing substrate embeddedness will have adverse effects on bull trout survival (see effects matrix, Appendix 3). Bull trout "take" in the form of harassment or redd trampling is likely to occur in the long term from fording streams on foot, horseback, or other non-motorized travel.

9. Grazing Allotments

The considered action is not likely to adversely affect bull trout because specific design features have been included that minimize the likelihood of livestock disturbing bull trout redds Species and habitat criteria will be maintained, or negligibly affected (see App. 3 Indian, Bear, and Crooked). These conclusions are based on the implementation of mitigation outlined in Section IV-I that will reduce grazing impacts.

10. Power and Telephone Line Easements on Federal Lands

Since 2001, there have not been any documented adverse effects from these actions in these analysis areas. The considered action is not likely to adversely affect listed species, because the habitat indicators addressed in the matrix will be maintained (see App. 3 Indian, Bear, and Crooked).

11. Special Use Permits (Water Diversions)

Since 2001, there have not been any documented adverse effects from these actions. The considered action is not likely to adversely affect bull trout because species and habitat indicators addressed in the matrix will be maintained (see App. 3 Indian, and Crooked). Bull trout have not been found near these diversions, and even if migrants should occur in the general area, diversions are too small to materially affect streamflows and water temperatures.

12. Outfitters and Guides

Since 2001, there have not been any documented adverse effects from these actions in these analysis areas. The considered action is not likely to adversely affect listed species, because the WCIs will be maintained (see App. 3 Indian, Bear, and Crooked). None of the effects to WCIs will result in adverse affects to bull trout.

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X. APPENDICES

A. APPENDIX 1. FEDERAL ACTIONS IN THE BROWNLEE SECTION 7 WATERSHED.

BA Volume	Author, Year	Federal Action & Mitigation	Status	Effects
WFHLD	Veach, 1997	**Council-Cuprum Road Project** Large woody debris structures in Crooked River-	Completed 8/99, monitoring complete in 2004.	Effects were mitigated to negligible levels
1	Nelson and Burns, 1998	**Travel Plan** Look for conflicts- Trail 227 crossing Indian Cr- Trail 228 crossing Bear Cr- Road 130 crossing Bear Cr-	Ongoing Completed Completed Completed	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.
		Miscellaneous Forest Products Fish surveys-	Ongoing	Effects were mitigated to negligible levels
		Road Maintenance ID and upgrade substandard culverts- ID and gravel roads contributing sediment to spawning areas-	Ongoing Ongoing	
		Smith Mt S&G allotment Keep sheep away from fish habitat in Indian Creek- ID spawning area in Indian Cr- Survey Bear Cr headwaters-	Ongoing Completed Completed	
		Lick Cr C&H allotment **Bear Cr C&H allotment** Remove cattle from Upper Bear subwatershed after 8/15 - **Wildhorse/Crooked C&H allotment** Mitigation for all: Survey Indian Cr for migration	Ongoing Ongoing	
		Crooked River On/Off Allotment **Mill Creek Allotment** Fish surveys in Crooked River-	Completed	
		Thorn Creek Timber sale Fish surveys in Crooked River-	Completed	
		Lookout Salvage Timber sale Fish surveys in Indian Cr-	Timber Sale Completed Completed	
2	Banach et al., 1999	**Tad's Cleanup Timber Sale**	No Decision	
3	Nelson and Burns, 2001	**Fish Habitat and Riparian Surveys**[1]	Ongoing	
		Miscellaneous Forest Products		

BA Volume	Author, Year	Federal Action & Mitigation	Status	Effects
		A positive emphasis will be used on signing with emphasis along Crooked River, Bear Creek, and Indian Creek. Signs will emphasize areas open to use of miscellaneous forest products and the reasons certain areas, like RHCAs, are generally closed.	Partial completion	Effects were mitigated to negligible levels
		Increased monitoring of firewood harvest will occur in the Upper Bear Creek, Crooked River, and Upper Indian Creek subwatersheds and will include monitoring freshly cut stumps within some prohibited riparian conservation areas at least once every 2 weeks.	Partial completion	
		Trained permanent Forest employees will talk to firewood cutters in the field with training & emphasis in riparian areas. Contacts will occur if the employee believes that he/she is safe in 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.	Not completed	
		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.	No apparent decrease in woodcutting violations	
		Firewood may also be harvested where the following condition is met: where trees are located away from streams uphill or upslope from an existing open road, but where they would not be felled or brought across any road cutslope greater than three feet in height.	Not being followed	
		Mistletoe and Pre-commercial Thinning[1]	Ongoing	
		Noxious Weed Control[1]	Ongoing	
		Road Management[1]		
		Road maintenance crews, contractors and cooperators will be provided training, prior to operation, regarding the potential for effects to listed fishes and designated critical habitat, and what maintenance practices are appropriate.	Unknown	
		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.	County completed road maintenance on FR 105 that did not meet these specifications.	

BA Volume	Author, Year	Federal Action & Mitigation	Status	Effects
		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.	County completed road maintenance on FR 105 did not meet these specifications.	
		Inspect ditches and culverts frequently, minimum of once a year, 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.	Partial completion	
		Water Diversions		
		Extensive surveys designed to determine the extent of bull trout populations in Indian Creek outside the headwater areas are needed.	Completed	
		Travel Plan		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.
		Access to certain areas, near bull trout, can cause adverse effects. These areas should be mapped and the "conflicts" specified. Trail crews and other field going personnel will be provided with the "Access Impacts to Riparian Areas" form to document existing problems.	Not completed	
		Install a bridge at the motorized crossing of Bear Creek by Forest trail 228 and close the ford. This bridge will be permanent, will meet INFISH standards, and will be constructed in 2001.	Completed in 2003	
		Where area closures are implemented, effectiveness of the closure will be monitored by periodic site visits by Forest personnel. Trail maintenance crews will, at a minimum annually, determine whether the area closure is effective; any use noticed by Forest personnel that is potentially adverse to listed species will be brought to the attention of the Level 1 Team.	Not completed	
		Trails, Recreation, and Administrative Site Operation and Maintenance		
		Planned trail, recreation and administrative site work will be presented to the level one team annually.	Not completed	

BA Volume	Author, Year	Federal Action & Mitigation	Status	Effects
		Conduct fish habitat (riparian and stream channel condition) survey of streamside trails. Develop and implement recommendations for Annual Trail Maintenance Management Plans. Side casting of soil/sediment from trails directly into stream channels 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 stream that may direct sediment toward stream. Place rolling dips/waterbars such that water and material potentially moving down trails is directed off the trail and filtered by intervening vegetation.	Not completed	Effects were mitigated to negligible levels
3	Nelson and Burns, 2001 Continued	**Outfitters and Guides**		
		Keep stock and people away from upper Indian Creek and its tributaries in sections 29, the south halves of sections 19 and 20, the north half of section 30 in Township 21N Range 2W after 15 August. Keep stock and people away from upper Bear Creek and its tributaries in sections 25, 26, 27, 34, 35 & 36, T21N, R2W Keep stock and people away upper Crooked River, in sections 1, 11, 15, 20, 21, and 28, T18N, R3W.	Unknown	
		Watershed and Fish Habitat Improvements and Maintenance[1]	Ongoing	
		Wildland Fire Suppression Activities[1]	Ongoing	
		Grazing Allotments C&H and S&G[1] General Measures	Ongoing	
		Bear Creek C&H Allotment Survey to identify bull trout spawning areas- Cattle will be removed from bull trout spawning before August 15 every year- The Forest will create debris barriers around FDR 130 stream crossing of Bear Creek to limit cattle access to potential bull trout spawning areas-	Completed Ongoing Not completed, however, bull trout have only been documented approximately 3 miles upstream of the bridge	

BA Volume	Author, Year	Federal Action & Mitigation	Status	Effects
		Wildhorse/Crooked River C&H Allotment Establish Greenline analysis and photopoints on Crooked River-	Completed	Effects were mitigated with varying success.
		Inventory fish habitat in the Wildhorse/Crooked River watersheds-	Completed	
		Fish surveys throughout the Wildhorse/Crooked River watersheds-	Completed	
		Survey to identify bull trout spawning areas-	Completed	
		Remove cattle from identified bull trout spawning areas prior to August 15-	Ongoing	
		Riparian vegetation must retain a stubble height of 4-6in (10-15cm) on sedges and no more than 50% on grasses; upland vegetation use held to 50%.	Isolated areas of non compliance on tributaries to Crooked River.	
		Mill Creek C&H Allotment Complete fish surveys in Crooked River-	Completed	Effects were mitigated to negligible levels
		Smith Mountain S&G Allotment[1] Keep sheep away from Indian Creek and tributaries above Forest Trail 227 crossing of Indian Creek-	Ongoing	
		Conduct more extensive surveys to better describe the distribution of bull trout-	Completed	
		Survey to identify bull trout spawning areas in Indian Creek-	Completed	
		Remove cattle from identified bull trout spawning areas prior to August 15-	Ongoing	
		Power and Telecommunications[1]	Ongoing	
		Road Use Permits[1]	Ongoing	
		Special Use Permits[1]	Ongoing	
4	McGee and Burns, 2003	**Upper Bear Timber Sale**	Two culverts on intermittent tributaries upgraded other project activities have not yet been implemented. ROD revised in 2006.	Effects to this point have been mitigated to negligible levels
5	Hogen and Burns, 2004	**Landore Salvage Timber Sale**	Completed	Effects were mitigated to negligible levels
6	Zurstadt and Burns, 2006 (Counterpart Regs.)	**Bear Tornado Blow down Recovery**	Ongoing	Effects to this point have been mitigated to negligible levels

1 – Complete mitigation measures can be referenced in Nelson and Burns (2001).

B. APPENDIX 2. ENVIRONMENTAL BASELINE

1. INDIAN CREEK

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Local Population Character			
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.	2001 - FR 2006 - FUR – SR, PJ	The change in from FR to FUR is based on new data, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004), but not due to data trends. Double pass electrofishing surveys completed by Idaho Power in 2002 estimated the number of bull trout (>200 mm) in Indian Creek to be 174 (range from 174 to 202, 95% C.I.). They also calculated a population estimate for bull trout > 150 mm and it was 1082 (range from 1055 to 1192, 95% C.I.) (2002 Idaho Power data on file PNF S.O. McCall, ID). Since the flood of July 2003, very few bull trout (less than 30) have been observed while electrofishing and ocular investigation of previously occupied bull trout habitat (Burns et al. 2005; Greenway 2005a, b).
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.	2001 - FR 2006 - FUR – SR, PJ	Same as 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.	2001 - FR 2006 - FUR - SR	The change from FR to FUR is based on new data, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004), but not due to data trends. The population may have an adfluvial component since migratory individuals have been collected in an Idaho Power weir near the mouth of Indian Creek (Chandler et al. 2001). Two bull trout were trapped on October 29, 1999, which measured 234 and 271 mm total length. A culvert on road 50105 near Landore blocks all upstream migration of fish (Burns et al. 2005).

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
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.	2001 - FR 2006 - FUR -SR, M	The change in from FR to FUR is based on new data, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004), but not due to data trends. The Indian Creek local population is connected (downstream only) to the local populations in Oregon. Upstream migration into the headwaters of Indian Creek is blocked due to an impassable culvert on road 50105 near Landore. Brook trout and hybrids (F1 and > F1) have been collected in Indian Creek below the culvert barrier on road 50105 and a few hybrids (less than 10% of fish collected) have been collected above the culvert (Burns et al. 2005; Greenway 2005a, b).
Water Quality			
Temperature	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)	2001 - FA 2006 - FR - M	The change from FA to FR is due to new data, the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004), but not due to data trends. Temperature data were collected in Huntley Gulch (W215) in 2003, Indian Creek (W018) near Mann Creek in 2001-2005, Indian Creek (W220) near Camp Creek in 2005, and Ladder Creek (W216) in 2003. The 7-day average maximum temperatures were 13.2°C in Ladder Creek, 16.4°C in Huntley Gulch, 12.5°C in Indian Creek near Camp Creek, and ranged from 15.0°C to 17.1°C in Indian Creek near Mann Creek. In 2005, in bull trout spawning and rearing habitat on Indian Creek near Camp Creek the The 7-day average maximum temperature was 9.5°C during the bull trout spawning period. Temperature summaries on file at S.O., McCall, ID.
Sediment	< 12% fines (< 0.85 mm) in gravel. Surface fines (≤6mm) ≤ 20%	2001 - FR 2006 - FUR – SR, PJ	The change from FR to FUR is due to new data collected after the 2003 flood, and the new LRMP functionality definitions. Surface fines ranged from 12 to 21 % in the lower reaches of Indian Creek and in reach 3 of Huntley Gulch. Surface fines in the flood effected upper two reaches of Indian Creek were > 20%. Surface fines data were collected in 2003 (post-flood) and 2004 using the R1/R4 stream habitat inventory(data on file at S.O., McCall, ID).

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
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.	2001 - FR 2006 - FR - M	There are no 303(d) listed segments within the analysis area (IDEQ 1998).
Habitat Access			
Physical Barriers	Any man-made barriers present in watershed allow upstream and downstream fish passage at all flows.	2001 - FR 2006 - FUR – SR	The change from FR to FUR is due to new data collected after the 2003 flood, and the new LRMP functionality definitions. There is one known year-round bull trout passage barrier due to a culvert (Road 50105) on Indian Creek. The 2003 flood scoured the channel downstream of the culvert creating a leap barrier for fish (Burns et al. 2005).
Habitat Elements			
Substrate Embeddedness	Dominant substrate is gravel or cobble (interstitial spaces clear), or embeddedness is < 20%.	2001 - FR 2006 - FUR - SR	The change from FR to FUR is due to new data collected after the 2003 flood, and the new LRMP functionality definitions. Embeddedness has not been measured. Wolman pebble counts were used to determine dominant substrate. From Wolman pebble counts fines (< 2mm) and small gravel (2-8mm) combined were the dominant substrate in two reaches of Indian Creek and one reach of Huntley Gulch. Gravel (8-64mm), small cobble (64-128mm) and cobble (128-256mm) combined were dominant in four reaches of Indian Creek and one reach of Huntley Gulch, and subdominant in all reaches where fines and small gravel were dominant. Wolman pebble count data (2003, 2004) on file at S.O., McCall, Idaho.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
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.	2001 - FA 2006 - FR – SR, PJ	The change from FA to FR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004). All reaches exceed 20 pieces per mile. In 2003, the flood caused most of the LWD to be grouped in large aggregates (> 10 pieces) and few single pieces. It is functioning at risk due to the current distribution of the LWD. Roads within RCAs have somewhat limited short and long term recruitment of LWD. LWD data (2004) on file at S.O., McCall, ID.
Pool Frequency	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 (ft.) / Number of Pools/Mile 0-5: 39 5-10: 60 10-15: 48 15-20: 39 20-30: 23 30-35: 18 35-40: 10 40-65: 9 65-100: 4	2001 - FA 2006 - FUR - SR	The change from FA to FUR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004). One of the nine reaches surveyed is functioning appropriately (Huntley Gulch Reach 2) and that could be due to the short distance surveyed (0.1 miles). The other reaches are drastically (less than 10 pools per mile) below the desired range due to the flood event in 2003. R1/R4 fish habitat inventory data (2004) on file at S.O., McCall, ID.
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.	2001 - FA 2006 - FUR - SR	The change from FA to FUR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004). In Indian Creek, approximately five pools exceed 1 meter in max depth. All other streams throughout the analysis area have no deep pools. Fines and small gravel are the dominant substrate in the stream channels (2003 and 2004 R1/R4 stream habitat inventory data on file at PNF S.O., McCall, ID).

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Off-Channel Habitat	Watershed has many ponds, oxbows, backwaters, and other off-channel areas with cover; side channels are low energy areas.	2001 - FR 2006 - FR - SR	No side channels were observed in 5.5 miles of survey after the flood. Due to the gradient of the watershed and restricted valley floor, side channels are not expected to be very frequent in a functioning appropriately condition. 2004 R1/R4 stream habitat inventory data on file at PNF S.O., McCall, ID.
Refugia	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.	2001 - FR 2006 - FUR - PJ	The change from FR to FUR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FUR rating given for this analysis area in Hogen and Burns (2004). Due to a fish passage barrier, low pool frequency, moderately high sedimentation, and hybridization occurring in the area, refugia for bull trout is functioning at an unacceptable risk.
Channel Condition and Dynamics			
Width/Depth Ratio	≤10	2001 - FA 2006 - FA - SR	Width to maximum depth ratio ranges from 6.4 to 8.6 in Indian Creek and 7.1 to 8.1 in Huntley Gulch. Data (2003, 2004) on file at S.O., McCall, ID.
Streambank Condition (LRMP)	>90% of any stream reach has stable banks relative to the percent of inherent stable streambanks associated with a similar unmanaged stream system.	2001 - FA 2006 - FR – SR, PJ	The change from FA to FR is due to new data collected after the 2003 flood, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004). Bank stability ranged from 80.0% to 96% in Indian Creek, with the exception of one short reach upstream of Cuprum where bank stability was 62.6%. Indian Creek upstream of Cuprum has numerous areas of unstable banks due to the flood. Bank stability ranged from 92% to 93% in Huntley Gulch. Data (2004) on file at S.O., McCall, ID.
Streambank Condition (Travel Plan)	No road or trail stream crossings.	FUR	39 road crossings, 14 trail crossings
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.	2001 - FA 2006 - FR – SR, PJ	The change from FA to FR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004). No side channels were observed in 5.5 miles of survey after the flood. Due to the gradient of the watershed and restricted valley floor, side channels are not expected to be very frequent in a functioning appropriately condition. High road density in RCAs has narrowed the flood plain of some of the streams. Data (2004) on file at S.O., McCall, ID.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
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.	2001 - FR 2006 - FR – PJ, O (GIS)	There is one unauthorized water diversion on Indian Creek. ECA is 19% in the analysis area. PNF GIS 9/05, in CD1: \Support Documents\maps\eca_lsp.pdf.
Drainage Network Increase	Zero or minimum change in active channel length correlated with human caused disturbance.	2001 - FA 2006 - FR - O (GIS), PJ	The change from FA to FR is due to the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004), but not due to data trends. Road densities are high in RCAs (3.8 mi/mi^2) and many of the roads were built below current standards, which inhibit channelization of runoff. PNF GIS 9/05, in CD1: \Support Documents\maps\total_roads.pdf.
Watershed Conditions			
Road Density and Location	Total road density < 0.7 miles/square mile of subwatershed, no roads within RCAs.	2001 - FUR 2006 - FUR – O (GIS)	The total road density is 3.7 mi/mi^2 and 3.8 mi/mi^2 within RCAs. PNF GIS 9/05, in 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.	2001 - FUR 2006 - FUR – O (GIS)	ECA is 19 % in the Indian Creek analysis area. The road density within RCAs is 3.8 mi/mi^2 for the analysis area. PNF GIS 9/05, in CD1: \Support Documents\maps\eca_lsp.pdf and \total_roads.pdf.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
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.	2001 - FA 2006 - FR – SR, PJ	The change from FA to FR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004). The analysis area has high road densities, low pool frequency, moderate fine sediment levels, areas of low bank stability, and experienced a flood in 2003 (see WCIs above).
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.	2001 - FR 2006 - FR – SR, M, PJ	A flood event occurred in 2003 and resulted in low pool frequency, uneven distribution of LWD, an impassable culvert, and unstable streambanks (see WCIs above). Bull trout distribution appears to be similar to pre-flood conditions with lower densities (Greenway 2005a, b).

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Integration of Species and Habitat Conditions	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.	2001 - FR 2006 - FUR – PJ, SR	The change from FR to FUR is due to new data collected after the 2003 flood, the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in Hogen and Burns (2004). The population may have an adfluvial component since migratory individuals have been collected in an Idaho Power weir near the mouth of Indian Creek (Chandler et al. 2001). Two bull trout were trapped on October 29, 1999, which measured 234 and 271 mm total length. A culvert on road 50105 near Landore blocks all upstream migration of fish. Habitat quality is functioning at risk or unacceptable risk in most areas affected by the flood (see WCIs above).

2. *BEAR CREEK*

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Local Population Character			
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.	2001 - FR 2006 - FR - SR, M	Mean total local population size is unknown. Our data suggest that this bull trout population is small and isolated in the headwater reaches. In 2005, 19 bull trout were captured using electrofishing at the bull trout monitoring site in upper Bear Creek (Greenway 2005b). Extensive electrofishing and spawning surveys (2000-2005) have been completed in the Upper Bear watershed and bull trout presence and spawning have been documented above the crossing of FT 228 (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.	2001 - FR 2006 - FR - PJ	There are not sufficient data (>10 years) to support an estimate of growth and survival. Therefore, the baseline is described as FR as directed in Appendix 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.	2001 - FR 2006 - FUR - SR, M	The change in from FR to FUR is based on new data, and on rationale and FUR rating given for this analysis area in McGee and Burns (2003), but not due to data trends. The migratory form is absent. Bull trout in upper Bear Creek are highly isolated and interaction with the Crooked River population only allows for one-way movement because of Bear Creek Falls (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.	2001 - FR 2006 - FUR - SR, M	The change in from FR to FUR is based on new data, and on rationale and FUR rating given for this analysis area in McGee and Burns (2003), but not due to data trends. Hybridization with brook trout has been documented (Spruell 2000) and the resident population is isolated by Bear Creek Falls(Burns et al. 2005).
Water Quality			
Temperature	7-day average maximum temperature	2001 - FA	7-day average maximum temperatures range between 12.4°C

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
	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)	2006 - FA - M	(1999) and 15.2°C (2001) at the downstream end of occupied bull trout habitat (site W154 1999-2001, elevation 1500 m) and range between 9.6°C (2000) and 11.2°C (2001) within occupied bull trout habitat (site W155 2000-2005, elevation 1900 m). 7-day average maximum temperatures within occupied bull trout habitat (site W155, elevation 1900 m) during the spawning period range from 7.4°C (2002) to 8.5°C (2001) Temperature summaries on file PNF S.O. McCall, ID.
Sediment	< 12% fines (< 0.85 mm) in gravel. Surface fines (≤6mm) ≤ 20%	2001 - FR 2006 - FR - SR	Surface fines (<6mm) estimates within the analysis area range from 4% to 13% with one site in a tributary at 18%. Data (2000) on file PNF S.O. McCall, ID.
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.	2001 - FR 2006 - FA - M	The change from FR to FA is due to new data, the new LRMP functionality definitions, and on rationale and FA rating given for this analysis area in McGee and Burns (2003), but not due to data trends. There are no 303(d) listed segments within the analysis area (IDEQ 1998).
Habitat Access			
Physical Barriers	Any man-made barriers present in watershed allow upstream and downstream fish passage at all flows.	2001 - FR 2006 - FR - SR	Five culverts have been identified as passage barriers for fish within the analysis area. All five culverts are on small streams that are downstream of known bull trout distribution. Culvert inventory data on file PNF S.O. McCall, ID.
Habitat Elements			
Substrate Embeddedness	Dominant substrate is gravel or cobble (interstitial spaces clear), or embeddedness is < 20%.	2001 - FR 2006 - FA - PJ	The change from FR to FA is due to the new LRMP functionality definitions, and on rationale and FA rating given for this analysis area in McGee and Burns (2003), but not due to data trends. "Substrate in upper Bear Creek appears to be suitable for salmonids and not limiting to successful reproduction of fish. The proposed actions are mitigated to reduce sediment inputs and any increase to embeddedness will be minimal and short-term. There is no expected increase to embeddedness in habitat occupied by bull trout" (page 48 McGee and Burns 2003).
Large Woody Debris	> 20 pieces per mile, > 12 inches in	2001 - FA	Large woody debris peices per mile range from 13 to 130 in

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
	diameter, > 35 feet length; and adequate sources of large woody debris for both long and short-term recruitment in RCAs.	2006 - FA - SR	tributaries to Bear Creek and 18 to 51 in Bear Creek (2000 data 2000 on file PNF S.O. McCall, ID.). RCAs contain an adequate short and long term source of large wood that has potential for recruitment into the stream channel (McGee and Burns 2003).
Pool Frequency	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 (ft.) / Number of Pools/Mile 0-5: 39 5-10: 60 10-15: 48 15-20: 39 20-30: 23 30-35: 18 35-40: 10 40-65: 9 65-100: 4	2001 - FA 2006 - FA - SR	The number of pools in mainstem Bear Creek range from 18 to 48 pools per mile and tend to be less than the default values for functioning appropriately, but approximate or exceed values found in the Natural Conditions Database (NCD) (Overton et al 1995). The number of pools in tributaries to Bear Creek range from 42 to 166 per mile (data (2000) on file PNF S.O. McCall, ID.). The large woody debris, sediment, and temperature WCIs are functioning appropriately (see WCIs above) in Bear Creek and associated tributaries.
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.	2001 - FA 2006 - FA - SR	There were nine pools in upper Bear Creek that exceeded 1.0 meter in depth out of a total of 217 pools (2000 data on file PNF S.O. McCall, ID.). This seems to be a natural condition since large woody debris and sediment WCIs are functioning appropriately.
Off-Channel Habitat	Watershed has many ponds, oxbows, backwaters, and other off-channel areas with cover; side channels are low energy areas.	2001 - FA 2006 - FA - SR	Data collected from R1/R4 surveys indicate that off-channel habitat is available in upper Bear Creek. Thirty pools were identified in side channels of upper Bear Creek (2000 data on file PNF S.O. McCall, ID.). These side channels are likely providing valuable rearing habitat.
Refugia	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.	2001 - FA 2006 - FUR - SR, PJ	The change from FA to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. Due to population isolation created by Bear Creek Falls (Burns et al. 2005) and the current WCI conditions in Lick Creek (McGee and Burns 2003), the potential for bull trout refugia is

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
			very limited. Data on file PNF S.O. McCall, ID.
Channel Condition and Dynamics			
Width/Depth Ratio	≤10	2001 - FA 2006 - FA - SR	This habitat indicator is functioning appropriately in Bear Creek. Average width/max depth ratio for Bear Creek varied from a low of 5.59 to 8.47 (data (2000) on file PNF S.O. McCall, ID.).
Streambank Condition (LRMP)	>90% of any stream reach has stable banks relative to the percent of inherent stable streambanks associated with a similar unmanaged stream system.	2001 - FA 2006 - FA - SR	Bank stability was >90% in 8 out of 11 reaches surveyed in the analysis area. The remaining three reaches had > 80% bank stability. Data (2000) on file PNF S.O. McCall, ID.
Streambank Condition (Travel Plan)	No road or trail stream crossings	FUR	566 road crossings, 35 trail crossings
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.	2001 - FA 2006 - FA - O (GIS), PJ	Upper Bear Creek has a near natural floodplain throughout, and high road densities within RCAs (6.1 mi/mi^2) predominantly occur downstream of documented occupied bull trout habitat. PNF GIS 9/05, in CD1: \Support Documents\maps\total_roads.pdf.
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.	2001 - FA 2006 - FA - SR, O (GIS), PJ	There have been no direct measurements of peak or base flows in the analysis area. ECA in this analysis area is 13% (PNF GIS 9/05, in CD1: \Support Documents\maps\eca_lsp.pdf), bank stability, sediment and pool quantity and quality WCIs are functioning appropriately (see WCIs above); therefore, peak flows are likely functioning appropriately.
Drainage Network Increase	Zero or minimum change in active channel length correlated with human caused disturbance.	2001 - FA 2006 - FA - PJ	Many of the roads within the analysis area are in good condition with outsloped surfaces (McGee and Burns 2003); therefore, there is a minimal change in active channel length correlated with human caused disturbance.
Road Density and Location	Total road density < 0.7 miles/square mile of subwatershed, no roads within RCAs.	2001 - FUR 2006 - FUR - O (GIS)	The total road density within the analysis area is 4.2 mi/mi^2 and the road density within RCAs is 6.1 mi/mi^2. PNF GIS 9/05, in PNF GIS 9/05, in 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.	2001 - FUR 2006 - FR - O (GIS), PJ	The change from FUR to FR is due to the new LRMP functionality definitions, and on rationale and FR rating given for this analysis area in McGee and Burns (2003), but not due to data trends.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
			ECA is 13%, but the road density WCI is functioning at unacceptable risk. Road density within RCAs is 6.1 mi/mi^2. PNF GIS 9/05, in PNF GIS 9/05, in CD1: \Support Documents\maps\eca_lsp.pdf and \total_roads.pdf.
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.	2001 - FA 2006 - FA - O (GIS), SR	Roads within RCA are predominantly downstream of documented occupied bull trout habitat and sediment, large woody debris, temperature, and pool quantity and quality WCIs are functioning appropriately (see WCIs above).
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.	2001 - FR 2006 - FR - O (GIS), SR, PJ	Management activities such as logging and livestock grazing occur within the analysis area. The density of roads within RCAs in the analysis area is 6.1 mi/mi^2 (see road density and location WCI). Because logging, livestock grazing, and roads have not always been a part of the landscape ecological processes are considered moderately outside of historical ranges. Sediment, large woody debris, temperature, and pool quantity and quality WCIs are functioning appropriately (see WCIs above).

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Integration of Species and Habitat Conditions	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.	2001 - FR 2006 - FUR - O (GIS), M, SR, PJ	The change from FR to FUR is due to new data and on the new LRMP functionality definitions, but not due to data trends. Sediment, large woody debris, temperature, and pool frequency and quality WCI are functioning appropriately (see WCIs above), but the bull trout population is isolated by Bear Creek Falls and hybridization with brook trout has been confirmed (Burns et al. 2005). The refugia WCI is functioning at unacceptable risk (see WCI above) and the local population is isolated (Spruell 2000; McGee and Burns 2003;; Burns et al. 2005).

3. CROOKED RIVER

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Local Population Character			
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.	2001 - FR 2006 - FUR - SR, PJ	The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. There are not sufficient data to accurately estimate the local population size, but surveys indicate that spawning and rearing habitat primarily occurs in the upper 5 miles of Crooked River (Moore et al. 2002). In addition, the number of genetically pure adult bull trout in the analysis area has been impacted by hybridization with brook trout (Spruell 2000; Moore et al. 2002; Burns et al. 2005; Greenway 2005a, b).
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.	2001 - FR 2006 - FR - PJ	There are not sufficient data (>10 years) to support an estimate of growth and survival. Therefore, the baseline is described as FR as directed in Appendix B, Table B-1.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
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.	2001 - FR 2006 - FUR - SR	The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. The migratory form has not been documented in Crooked River. The local population appears to be isolated to the upper 5 miles of Crooked River (Moore et al. 2002; Burns et al. 2005; Greenway 2005a, b).
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.	2001 - FR 2006 - FUR - SR	The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. There is only one other local population (upper Bear Creek) within the Wildhorse drainage and connectivity is restricted by Bear Creek Falls. Extensive brook trout hybridization with bull trout has been documented (Spruell 2000; Moore et al. 2002; Burns et al. 2005; Greenway 2005a, b).
Water Quality			
Temperature	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)	2001 - FR 2006 - FR - M	7-day average maximum summer stream temperatures within the upper extent of occupied bull trout habitat (site W195 2002 and 2005, elevation 1962 m) ranged from 12.5°C (2005) - 12.8°C (2002) and from 9.5°C (2005) to 9.8°C (2002) during the spawning period. Near Coyote Gulch (site W158, 2001-2003, and 2005, elevation 1296 m) 7-day average maximum summer stream temperatures ranged from 12.3°C (2005) to 15.5°C (2002) and from 17.4°C (2002) to 19.6°C (2003) during the spawning period (data on file PNF S.O. McCall, ID.). Diversions on private land may be elevating stream temperatures.
Sediment	< 12% fines (< 0.85 mm) in gravel. Surface fines (≤6mm) ≤ 20%	2001 - FR 2006 - FR - SR	Estimated surface fines in Crooked River ranged from 19% to 20%. Surface fines in tributaries to Crooked River (Dick Ross Creek and Moonshine Creek), where bull trout have not been detected, ranged from 30% to 81% (data (2001, 2004) on file PNF S.O. McCall, ID.).

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
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.	2001 - FR 2006 - FA - M	The change from FR to FA is due to the new LRMP functionality definitions, but not due to data trends. There are no 303(d) listed segments within the analysis area (IDEQ 1998).
Habitat Access			
Physical Barriers	Any man-made barriers present in watershed allow upstream and downstream fish passage at all flows.	2001 - FR 2006 - FUR - SR	The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. The culvert where Forest Road 50061 crosses the Crooked River hinders or blocks upstream passage of fish at various flows. Replacement of this culvert is funded for 2006. The culverts where Forest Road 50511 crosses Crooked River and Moonshine Creek on private land are likely barriers to fish passage at certain flows. Culvert inventory data on file PNF S.O. McCall, ID.
Habitat Elements			
Substrate Embeddedness	Dominant substrate is gravel or cobble (interstitial spaces clear), or embeddedness is < 20%.	2001 - FR 2006 - FR - SR	Embeddedness has not been measured. Wolman pebble counts were used to determine dominant substrate. From Wolman pebble counts fines (< 2mm) and small gravel (2-8mm) combined were the dominant substrate in Moonshine Creek, Dick Ross Creek, and an unnamed creek (tributaries to Crooked River). Bull trout have not been documented in these tributaries (Burns et al. 2005). Gravel (8-64mm), small cobble (64-128mm) and cobble (128-256mm) combined were dominant in all Crooked River reaches, including those where bull trout have been documented (data (2001, 2004) on file at PNF S.O., McCall, ID.).
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.	2001 - FR 2006 - FR - SR	Large woody debris counts in occupied bull trout habitat were 76 peices per mile but are < 20 pieces per mile in all other inventoried reaches in the analysis area (data (2001, 2004) on file PNF S.O. McCall, ID.).

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Pool Frequency	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 (ft.) / Number of Pools/Mile 0-5: 39 5-10: 60 10-15: 48 15-20: 39 20-30: 23 30-35: 18 35-40: 10 40-65: 9 65-100: 4	2001 - FR 2006 - FR - SR	There were 37 pools per mile in occupied bull trout habitat, which is below the functioning appropriately value of 60 pools per mile (data (2001, 2004) on file PNF S.O. McCall, ID.). Pools per mile in other reaches within the analysis area were generally below values for functioning appropriately. The WCIs for temperature, sediment, and large woody debris are functioning at risk (see WCIs above).
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.	2001 - FR 2006 - FR - SR	There were no pools that exceeded 1 m in maximum depth in occupied bull trout habitat, but pools of such depth are not expected to be common in channels of similar size (2.6 avg. width) (data (2001, 2004) on file PNF S.O. McCall, ID.). Pools with maximum depths > 1 m are also scarce in other inventoried reaches. The WCIs for temperature, sediment, and large woody debris are functioning at risk (see WCIs above).
Off-Channel Habitat	Watershed has many ponds, oxbows, backwaters, and other off-channel areas with cover; side channels are low energy areas.	2001 - FR 2006 - FA - SR	The change from FR to FA is due to new data, and the new LRMP functionality definitions, but not due to data trends. Habitat inventories document the occurance ofside channels, off-channel areas, backwaters, and beaver ponds (data (2001, 2004) on file PNF S.O. McCall, ID).
Refugia	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.	2001 - FR 2006 - FUR - SR, PJ	The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. The temperature, sediment, pool quantity and quality, large woody debris and physical barriers WCIs are not functioning appropriately within the analysis area (see WCIs above). The habitat that is adjacent and connected to the analysis does not provide high quality habitat for bull trout (probably temperature limited) or is blocked by barrier falls (McGee and Burns 2003).
Channel Condition and Dynamics			
Width/Depth Ratio	≤10	2001 - FR	The change from FR to FA is due to new data, and the new LRMP functionality definitions,

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
		2006 - FA - SR	but not due to data trends. Width to maximum depth ratios range from 4.0 to 7.1 in Crooked River and 4.8 to 7.4 in Dick Ross and Moonshine Creek (rawdata (2001, 2004) on file PNF S.O. McCall, ID. width/depth ratio summaries on CD1: \Support Documents\reports\habitat_summary\crooked_river_width_depth_ratio.xls).
Streambank Condition (LRMP)	>90% of any stream reach has stable banks relative to the percent of inherent stable streambanks associated with a similar unmanaged stream system.	2001 - FR 2006 - FR - SR	Bank stability in occupied bull trout habitat was 98%, but < 90% in other reaches of Crooked River, and ranged from 53% to 78% in Dick Ross Creek and Moonshine Creek (2001 and 2004 data on file PNF S.O. McCall, ID.). Bull trout have not been documented in these tributaries, but have been observed downstream in Crooked River (Burns et al. 2005; Greenway 2005a, b).
Streambank Condition (Travel Plan)	No road or trail stream crossings	FUR	566 road crossings, 35 trail crossings
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.	2001 - FR 2006 - FR - SR, PJ	There is no evidence of channel entrenching, width to depth ratios are functioning appropriately (see above); however, roads within RCAs confine the floodplain in some locations, such as road-stream crossings (authors 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.	2001 - FA 2006 - FR - PJ	The change from FA to FR is due to new data, and the new LRMP functionality definitions, but not due to data trends. There are no hydrograph data for this analysis area; however, high road densities in the uplands and RCAs (see road density and location WCI), past logging and irrigation diversions onto private land have likely altered the magnitude and timing of peak and base flows. Documents.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
Drainage Network Increase	Zero or minimum change in active channel length correlated with human caused disturbance.	2001 - FA 2006 - FR - O (GIS)	The change from FA to FR is due to new data, and the new LRMP functionality definitions, but not due to data trends. Road densities in RCAs of 10.5 mi/mi^2 have increased the drainage network by a moderate amount. PNF GIS 9/05, in Supporting Documents.
Watershed Conditions			
Road Density and Location	Total road density < 0.7 miles/square mile of subwatershed, no roads within RCAs.	2001 - FR 2006 - FUR - O (GIS)	The change from FR to FUR is due to the new LRMP functionality definitions, but not due to data trends. Road densities are 5.1 mi/mi^2 overall and 10.5 mi/mi^2 in RCAs. PNF GIS 9/05, in 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.	2001 - FR 2006 - FR - O (GIS), SR	ECA is 12%, but high road densities (PNF GIS 9/05, in CD1: \Support Documents\maps\total_roads.pdf) and livestock grazing have created disturbance in RCAs (riparian inventory data (2004) on CD1: \Support Documents\Misc\WildhorStrInv2004Cor.xls.). .
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	2001 - FR 2006 - FR - SR, O (GIS)	There are high road densities within RCAs, which has led to a moderate loss to shade, large woody debris recruitment, and sediment buffering (see road density and location WCI above). Riparian inventories indicate that vegetation in some areas is in a very early or early success ional state, which can be a sign of disturbance (riparian inventory data (2004) on file Council Ranger District, Council, ID and CD1: \Support Documents\Miscellaneous\WildhorStrInv2004Cor.xls).

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Programmatic ongoing		

Pathways & Indicators	Population and Environmental Baseline		
	Desired Condition	**Baseline Condition**	**Discussion of Baseline and Current Condition**
	habitat for aquatic species.		
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.	2001 - FR 2006 - FR - SR, O (GIS)	Fish habitat and riparian inventories indicate that ecological processes such as riparian succession and bank stability are moderately altered by management practices such as road construction and livestock grazing (see WCIs for bank stability, sediment, road density and location, RCAs, etc. above).
Integration of Species and Habitat Conditions	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.	2001 - FR 2006 - FUR - SR, M, O (GIS)	The change from FR to FUR is due to new data, and the new LRMP functionality definitions, but not due to data trends. The majority of WCIs are functioning at risk (see WCIs above), and many are functioning at unacceptable risk including refugia. The sediment and temperature WCIs are functioning at risk (see WCIs above), the local bull trout population is likely on a downward trend due to hybridization with brook trout, and the bull trout local population is not well connected with other local populations (Burns et al. 2005).

C. APPENDIX 3. MATRICES OF EFFECTS

1. INDIAN CREEK

a. Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning		

	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 **FUR**	N	none	none	none	No influence
Growth and Survival **FUR**	N	none	none	none	No influence
Life History Diversity and Isolation **FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FR**	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.
Sediment **FUR**	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.
Chemical Contaminants and/or Nutrients **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	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
FUR					
Habitat Elements					
Substrate Embeddedness FUR	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.
Large Woody Debris FR	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 FUR	N	none	none	none	No influence
Pool Quality FUR	N	none	none	none	No influence
Off-Channel Habitat FR	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio FA	N	none	none	none	No influence
Streambank Condition FR	N	none	none	none	No influence
Floodplain Connectivity FR	N	none	none	none	No influence
Flow/Hydrology					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Change in Peak/Base Flows FR	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	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location FUR	N	none	none	none	No influence
Disturbance History FUR	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	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	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).
Integration of Species and Habitat Conditions FUR	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).

b. Fire management

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Indian Creek
Management Actions	Fire management				
	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 FUR	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 FUR	M	*-	*-	*-	
Life History Diversity and Isolation FUR	M	*-	*-	*-	
Persistence and Genetic Integrity FUR	N	none	none	none	No influence.
Water Quality					
Temperature FR	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).
Sediment FUR	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	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Chemical Contaminants and/or Nutrients FR	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 resource advisors will serve to minimize deviations during suppression activities.
Habitat Access					
Physical Barriers FUR	N	none	none	none	No influence.
Habitat Elements					
Substrate Embeddedness FUR	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).
Large Woody Debris FR	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 FUR	M	*-	*-	*-	Negligible effects on these WCIs are expected due to expected negligible effects on sediment and LWD WCIs.
Pool Quality FUR	M	*-	*-	*-	Negligible effects on these WCIs are expected due to expected negligible effects on sediment and LWD WCIs.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
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Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Off-Channel Habitat FR	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 Minshall 1999).
Refugia FUR	N	none	none	none	No influence.
Channel Condition and Dynamics					
Width/Depth Ratio FA	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 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	N	none	none	none	No influence.
Flow/Hydrology					
Change in Peak/Base Flows FR	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 Minshall 1999).
Drainage Network Increase FR	N	none	none	none	No influence.
Watershed Conditions					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Road Density and Location FUR	N	none	none	none	No influence.
Disturbance History FUR	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 adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Riparian Conservation Areas FR	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	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 by moving vegetation towards the desired condition. Monitoring has shown that large stand replacing wildfires have not

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			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).
Integration of Species and Habitat Conditions FUR	M	*-	*-	*-	As fire management actions are expected to have no or negligible effect on all WCIs, negligible effects on bull trout are also expected.

c. Fish habitat/riparian sampling, watershed and habitat improvements and maintenance

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance		

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 **FUR**	I	+	+	+	Watershed improvement projects that open up new habitat or reduce sediment delivery could increase local population size.
Growth and Survival **FUR**	I	+	+	+	The actions that reduce sediment delivery could improve growth and survival.
Life History Diversity and Isolation **FUR**	N	none	none	none	Habitat conditions downstream of Forest lands constrain life history diversity and isolation. The Federal actions will have no influence on life history diversity and isolation.
Persistence and Genetic Integrity **FUR**	N	none	none	none	Habitat conditions downstream of Forest lands and the presence of brook trout constrain persistence and genetic integrity. The Federal actions will have no influence on persistence and genetic integrity.
Water Quality					
Temperature **FR**	I	+	+	+	Watershed and habitat improvement will decrease summer stream temperatures in some areas. Mitigations will maintain temperature in all other actions.
Sediment **FUR**	M	-*	-*	-*	• There may be negligible amounts of temporary sediment delivery from habitat improvement, but actions, such as bank stabilization and road obliteration 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.
Chemical Contaminants and/or Nutrients **FR**	M	-*	-*	-*	Restrictions concerning refueling in RCAs and spill prevention and cleanup requirements will reduce the likely hood of chemical contamination to negligible levels.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance		

	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 FUR	I	+	+	+	Removal or replacement of fish barriers, such as old culverts, will improve connectivity.
Habitat Elements					
Substrate Embeddedness FUR	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.
Large Woody Debris FR	I	+	+	+	Watershed and habitat improvement may increase the current quantity of LWD and future recruitment in some areas. Mitigations will maintain LWD in all other actions.
Pool Frequency FUR	I	+	+	+	Watershed and habitat improvement may increase pool frequency in some areas. Mitigations will maintain pool frequency in all other actions.
Pool Quality FUR	I	+	+	+	Watershed and habitat improvement may increase the pool quality in some areas. Mitigations will maintain pool quality in all other actions.
Off-Channel Habitat FR	M	+*	+*	+*	Watershed and habitat improvement may increase off-channel habitat in some areas by negligible levels. Mitigations will maintain off channel habitat in all other actions.
Refugia FUR	N	none	none	none	The actions will have no influence on refugia.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance		

	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/Depth Ratio FA	M	+	+	+	Watershed and habitat improvement may decrease width to depth ratio in some areas. Mitigations will maintain width to depth ratio in all other actions.
Streambank Condition 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	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	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	I	+	+	+	Watershed and habitat improvement such as road obliteration, and appropriate road and trail maintenance will improve hyrologic processes and diffuse the drainage network in some areas. Mitigations will maintain drainage networkin all other actions.
Watershed Conditions					
Road Density and Location 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 FUR	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	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	I	+	+	+	Watershed and habitat improvement, such as road obliteration in

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
FR					RCAs, and appropriate road and trail maintenance, will improve watershed resilience to disturbance. Mitigations will maintain the disturbance regime all other actions.
Integration of Species and Habitat Conditions FUR	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.

d. Noxious weed treatment

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Indian Creek
Management Actions	Noxious weed treatment				
	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 **FUR**	N	none	none	none	No influence
Growth and Survival **FUR**	D	-	-	-	Sub-lethal effects to listed fish and their food sources are probable
Life History Diversity and Isolation **FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FR**	M	-*	-*	-*	Shade and subsequent loss of riparian vegetation due to chemical application is negligible due to buffers.
Sediment **FUR**	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable increases in erosion and sedimentation.
Chemical Contaminants and/or Nutrients **FR**	D	-	-	-	Sub-lethal effects to listed fish and their food sources are probable
Habitat Access					
Physical Barriers **FUR**	N	none	none	none	No influence
Habitat Elements					
Substrate Embeddedness **FUR**	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	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Noxious weed treatment		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Large Woody Debris FR	M	-*	-*	-*	LWD loss due to loss of riparian vegetation due to chemical application is negligible due to buffers.
Pool Frequency FUR	N	none	none	none	No influence
Pool Quality FUR	N	none	none	none	No influence
Off-Channel Habitat FR	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio FA	N	none	none	none	No influence
Streambank Condition 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	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 FUR	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Noxious weed treatment		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Disturbance History FUR	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	M	-*	-*	-*	Shade and subsequent loss of riparian vegetation due to chemical application is negligible due to buffers.
Disturbance Regime FR	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 FUR	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

e. Travel plan, road management, trails, recreation and administrative site operation and maintenance

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Indian Creek
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance				
	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 FUR	D	-	-	-	• Fording streams on foot, horseback, or other non-motorized travel is likely to result in bull trout 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 FUR	D	-	-	-	• Fording streams on foot, horseback, or other non-motorized travel is likely to result in bull trout 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 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.
Persistence and Genetic Integrity 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 FR	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
Sediment FUR	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

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Indian Creek
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance				
	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
					travel. • Road management and trail maintenance will help reduce travel plan related sediment effects at all time scales..
Chemical Contaminants and/or Nutrients FR	D	+	-	-	• As motorized travel increases there is likely to be petroleum 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 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					
Substrate Embeddedness FUR	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	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			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 FUR	N	none	none	none	No influence
Pool Quality FUR	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 FUR	N	none	none	none	No influence.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance		

Pathways & Indicators	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Effects of the Management Action(s)					
Channel Condition and Dynamics					
Width/Depth Ratio **FA**	D	+	-	-	• Travel plan related degradation of streambank condition will degrade width to depth ratio at road and trail crossings. • Road and trail maintenance will reduce travel plan related degradation of streambank condition reducing effects to width/depth ratio.
Streambank Condition (Travel Plan) **FUR**	M	-*	-*	-*	Increase by 0.7 mi.
Streambank Condition (LRMP) **FR**	D	+	-	-	• After a temporary decrease 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**	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 **FUR**	N	none	none	none	No influence.
Disturbance History	I	+	+	+	Restricting cross-country motorized travel will result in fewer

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Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Indian Creek
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance				
	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					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.
Integration of Species and Habitat Conditions **FUR**	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.

f. Smith Mountain Goat and Sheep Allotment and Lick Creek Cattle and Horse Allotment

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Smith Mountain goat and sheep allotment and Lick Creek cattle and horse allotment		

	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 FUR	N	none	none	none	No influence because sheep trailing occurs upstream occupied bull trout habitat and cattle grazing occurs downstream of bull trout spawning and rearing or in areas where Indian Creek is inaccessible.
Growth and Survival FUR	N	none	none	none	No influence because sheep trailing occurs upstream occupied bull trout habitat and cattle grazing occurs downstream of bull trout spawning and rearing or in areas where Indian Creek is inaccessible.
Life History Diversity and Isolation FUR	N	none	none	none	No influence
Persistence and Genetic Integrity FUR	N	none	none	none	No influence
Water Quality					
Temperature FR	N	none	none	none	No influence
Sediment FUR	M	-*	-*	-*	Occasional sheep trailing across headwater RCAs will result in negligible amounts of sediment delivery from soil disturbance. Mitigations and restriction on use will minimize the effects (see description of action and effects narrative). The Lick Creek allotment is downstream of bull trout spawning and rearing habitat and due to the inaccessibility of Indian Creek, cattle would have negligible influence sediment delivery to potential bull trout migration habitat.
Chemical Contaminants and/or Nutrients FR	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. The Lick Creek allotment is downstream of bull trout spawning and rearing habitat and would have negligible influence on potential migratory habitat.
Habitat Access					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Smith Mountain goat and sheep allotment and Lick Creek cattle and horse allotment		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Physical Barriers FUR	N	none	none	none	No influence
Habitat Elements					
Substrate Embeddedness FUR	M	-*	-*	-*	Occasional sheep trailing across headwater RCAs will result in negligible amounts of sediment delivery from soil disturbance. Mitigations and restriction on use will minimize the effects (see description of action and effects narrative). The Lick Creek allotment is downstream of bull trout spawning and rearing habitat and due to the inaccessibility of Indian Creek, cattle would have negligible influence sediment delivery to potential bull trout migration habitat.
Large Woody Debris FR	N	none	none	none	No influence
Pool Frequency FUR	N	none	none	none	No influence
Pool Quality FUR	N	none	none	none	No influence
Off-Channel Habitat FR	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio FA	N	none	none	none	No influence
Streambank Condition FR	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. The Lick Creek allotment is downstream of bull trout spawning and rearing habitat and would have negligible influence on potential migratory habitat.
Floodplain Connectivity FR	N	none	none	none	No influence
Flow/Hydrology					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Smith Mountain goat and sheep allotment and Lick Creek cattle and horse allotment		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
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 FUR	N	none	none	none	No influence
Disturbance History FUR	M	-*	-*	-*	Disturbance history will continue to be altered by livestock use. Mitigations and restrictions on use (once over grazing, 30% maximum utilization) will limit effects to negligible levels.
Riparian Conservation Areas FR	M	-*	-*	-*	RCA vegetation will remain altered from livestock use in RCAs. Mitigations and restrictions on use will limit effects to negligible levels.
Disturbance Regime FR	M	-*	-*	-*	Disturbance regime will continue to be altered by livestock use. Mitigations and restrictions on use (once over grazing, 30% maximum utilization) will limit effects to negligible levels.
Integration of Species and Habitat Conditions FUR	M	-*	-*	-*	The mitigations and restrictions on use will limit the effects to negligible levels for all WCIs above.

g. Buried power and telecommunication lines (Big Bar – Silver King, Cuprum-Bear exchange telephone, Cuprum-Bear power)

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Buried power and telecommunication lines (Big Bar – Silver King, Cuprum-Bear exchange telephone, Cuprum-Bear power)		

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 FUR	N	none	none	none	No influence
Growth and Survival FUR	N	none	none	none	No influence
Life History Diversity and Isolation FUR	N	none	none	none	No influence
Persistence and Genetic Integrity FUR	N	none	none	none	No influence
Water Quality					
Temperature FR	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of riparian vegetation and stream shade where existing lines cross streams. Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are expected to have a negligible influence on stream temperature.
Sediment FUR	M	-*	-*	-*	Excavation of stream channels for line maintenance will not be necessary. Any excavation of buried cable outside of the stream channel will be done under consultation with the Forest Service to insure that this activity does not result in ground-disturbing activities that could affect substrate, or sedimentation. Maintenance will be completed with as little disturbance to surrounding soil and vegetation as possible. Care will be taken to minimize sediment delivery to any associated stream channel. Erosion will be minimized where necessary using straw bales, sediment fences, excelsior blankets, jute matting or similar protective measures if ground-disturbing activities occur as a result of maintenance.
Chemical Contaminants and/or Nutrients	M	*-	*-	*-	Restrictions concerning refueling in RCAs and spill prevention and cleanup requirements will reduce the likely hood of chemical

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Buried power and telecommunication lines (Big Bar – Silver King, Cuprum-Bear exchange telephone, Cuprum-Bear power)		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
FR					contamination to negligible levels.
Habitat Access					
Physical Barriers FUR	N	none	none	none	No influence
Habitat Elements					
Substrate Embeddedness FUR	M	-*	-*	-*	Excavation of stream channels for line maintenance will not be necessary. Any excavation of buried cable outside of the stream chanel will be done under consultation with the Forest Service to insure that this activity does not result in ground-disturbing activities that could affect substrate, or sedimentation. Maintenance will be completed with as little disturbance to surrounding soil and vegetation as possible. Care will be taken to minimize sediment delivery to any associated stream channel. Erosion will be minimized where necessary using straw bales, sediment fences, excelsior blankets, jute matting or similar protective measures if ground-disturbing activities occur as a result of maintenance.
Large Woody Debris FR	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of riparian vegetation where existing lines cross streams. Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are expected to have negligible influence LWD recruitment.
Pool Frequency FUR	N	none	none	none	No influence
Pool Quality FUR	N	none	none	none	No influence
Off-Channel Habitat FR	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Buried power and telecommunication lines (Big Bar – Silver King, Cuprum-Bear exchange telephone, Cuprum-Bear power)		

	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/Depth Ratio **FA**	N	none	none	none	No influence
Streambank Condition **FR**	N	none	none	none	No influence
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 **FUR**	N	none	none	none	No influence
Disturbance History **FUR**	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of upland and riparian vegetation where existing lines cross the landscape. Typically, these lines affect only small areas. Since some natural openings are common in properly functioning areas, these openings are expected to have a negligible influence on disturbance history.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Buried power and telecommunication lines (Big Bar – Silver King, Cuprum-Bear exchange telephone, Cuprum-Bear power)		

	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	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of riparian vegetation and where existing lines cross streams. Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are expected to have a negligible influence.
Disturbance Regime FR	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of upland and riparian vegetation where existing lines cross the landscape. Typically, these lines affect only small areas. Since some natural openings are common in properly functioning areas, these openings are expected to have a negligible influence on disturbance regime.
Integration of Species and Habitat Conditions FUR	M	-*	-*	-*	The effects of the actions on WCIs range fromnone to negligible.

h. Green spring development

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Indian Creek
Management Actions	Special use permit – Green spring development				
	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 FUR	N	none	none	none	No influence
Growth and Survival FUR	N	none	none	none	No influence
Life History Diversity and Isolation FUR	N	none	none	none	No influence
Persistence and Genetic Integrity FUR	N	none	none	none	No influence
Water Quality					
Temperature FR	M	-*	-*	-*	The water right for the spring development is for 0.03 cfs, and the influence on stream temperature would be negligible to none.
Sediment FUR	N	none	none	none	No influence
Chemical Contaminants and/or Nutrients FR	N	none	none	none	No influence
Habitat Access					
Physical Barriers FUR	N	none	none	none	No influence
Habitat Elements					
Substrate Embeddedness FUR	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Special use permit – Green spring development		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Large Woody Debris FR	N	none	none	none	No influence
Pool Frequency FUR	N	none	none	none	No influence
Pool Quality FUR	N	none	none	none	No influence
Off-Channel Habitat FR	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio FA	N	none	none	none	No influence
Streambank Condition FR	N	none	none	none	No influence
Floodplain Connectivity FR	N	none	none	none	No influence
Flow/Hydrology					
Change in Peak/Base Flows FR	M	-*	-*	-*	The water right for the spring development is for 0.03 cfs. There would be no influence to peak flow and base flow would be influenced by some amount less than 0.03 cfs, which would have a negligible influence on peak and base flows relative to the subwatershed.
Drainage Network Increase FR	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location FUR	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Special use permit – Green spring development		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Disturbance History FUR	M	-*	-*	-*	The permit allows very limited disturbance associated with spring development and maintenance. The spring is well away from any perennial streams.
Riparian Conservation Areas FR	M	-*	-*	-*	The permit allows very limited disturbance associated with spring development and maintenance. The spring is well away from any perennial streams.
Disturbance Regime FR	N	none	none	none	No influence
Integration of Species and Habitat Conditions FUR	M	-*	-*	-*	Effects to WCIs would be negligible to none.

i. Guides and outfitters (Heavens Gate Outfitters)

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Special use permit – Guides and Outfitters (Heavens Gate Outfitters)		

	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 FUR	N	none	none	none	No influence
Growth and Survival FUR	N	none	none	none	Outfitters are instructed to avoid specific areas were bull trout are known to occur.
Life History Diversity and Isolation FUR	N	none	none	none	No influence
Persistence and Genetic Integrity FUR	N	none	none	none	No influence
Water Quality					
Temperature FR	N	none	none	none	No influence
Sediment FUR	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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Chemical Contaminants and/or Nutrients FR	N	none	none	none	No influence
Habitat Access					
Physical Barriers FUR	N	none	none	none	No influence
Habitat Elements					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Special use permit – Guides and Outfitters (Heavens Gate Outfitters)		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Substrate Embeddedness FUR	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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Large Woody Debris FR	N	none	none	none	No influence
Pool Frequency FUR	N	none	none	none	No influence
Pool Quality FUR	N	none	none	none	No influence
Off-Channel Habitat FR	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio 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. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Streambank Condition FR	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. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Floodplain Connectivity FR	N	none	none	none	No influence
Flow/Hydrology					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010503 Indian
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (24,289 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Indian Creek
Management Actions	Special use permit – Guides and Outfitters (Heavens Gate Outfitters)		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
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 FUR	N	none	none	none	No influence
Disturbance History FUR	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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Disturbance Regime FR	N	none	none	none	No influence
Integration of Species and Habitat Conditions FUR	M	-*	-*	-*	Effects to WCIs would be negligible to none.

2. BEAR CREEK

a. Miscellaneous forest products harvest and mistletoe control and pre-commercial thinning

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning		

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**	N	none	none	none	No influence
Growth and Survival **FR**	N	none	none	none	No influence
Life History Diversity and Isolation **FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FA**	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.
Sediment **FR**	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.
Chemical Contaminants and/or Nutrients **FA**	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 **FR**	N	none	none	none	No influence
Habitat Elements					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Substrate Embeddedness 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.
Large Woody Debris FA	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	N	none	none	none	No influence
Off-Channel Habitat FA	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio FA	N	none	none	none	No influence
Streambank Condition FA	N	none	none	none	No influence
Floodplain Connectivity FA	N	none	none	none	No influence
Flow/Hydrology					
Change in Peak/Base Flows	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

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Bear Creek
Management Actions	Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning				
	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
FA					the WCI.
Drainage Network Increase **FA**	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location **FUR**	N	none	none	none	No influence
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 **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**	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).
Integration of Species and Habitat Conditions **FUR**	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).

b. Fire management

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Bear Creek
Management Actions	Fire management				
	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	*-	*-	*-	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 FUR	M	*-	*-	*-	
Persistence and Genetic Integrity FUR	N	none	none	none	No influence. Connectivity is limited by a natural impassable water fall.
Water Quality					
Temperature FA	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).
Sediment FR	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	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Chemical Contaminants and/or Nutrients FA	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 resource advisors will serve to minimize deviations during suppression activities.
Habitat Access					
Physical Barriers FR	N	none	none	none	No influence.
Habitat Elements					
Substrate Embeddedness 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).
Large Woody Debris FA	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	M	*-	*-	*-	Negligible effects on these WCIs are expected due to expected negligible effects on sediment and LWD WCIs.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Off-Channel Habitat 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 Minshall 1999).
Refugia FUR	N	none	none	none	No influence.
Channel Condition and Dynamics					
Width/Depth Ratio FA	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	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 FA	N	none	none	none	No influence.
Flow/Hydrology					
Change in Peak/Base Flows 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 Minshall 1999).
Drainage Network Increase FA	N	none	none	none	No influence.
Watershed Conditions					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Road Density and Location 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 adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Riparian Conservation Areas 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	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 by moving vegetation towards the desired condition. Monitoring has shown that large stand replacing wildfires have not

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			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).
Integration of Species and Habitat Conditions FUR	M	*-	*-	*-	As fire management actions are expected to have no or negligible effect on all WCIs, negligible effects on bull trout are also expected.

c. Fish habitat/riparian sampling, watershed and habitat improvements and maintenance

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Bear Creek
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance				
	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	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 FUR	N	none	none	none	Habitat conditions downstream of Forest lands constrain life history diversity and isolation. The Federal actions will have no influence on life history diversity and isolation.
Persistence and Genetic Integrity FUR	N	none	none	none	Habitat conditions downstream of Forest lands and the presence of brook trout constrain persistence and genetic integrity. The Federal actions will have no influence on persistence and genetic integrity.
Water Quality					
Temperature FA	M	+	+	+	Watershed and habitat improvement will decrease summer stream temperatures in some areas. Mitigations will maintain temperature in all other actions.
Sediment FR	M	-*	-*	-*	• There may be negligible amounts of temporary sediment delivery from habitat improvement, but actions, such as bank stabilization and road obliteration 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.
Chemical Contaminants and/or Nutrients FA	M	*-	*-	*-	Restrictions concerning refueling in RCAs and spill prevention and cleanup requirements will reduce the likely hood of chemical contamination to negligible levels.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Habitat Access					
Physical Barriers FR	I	+	+	+	Removal or replacement of fish barriers, such as old culverts, will improve connectivity.
Habitat Elements					
Substrate Embeddedness 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.
Large Woody Debris FA	M	+	+	+	Watershed and habitat improvement may increase the current quantity of LWD and future recruitment in some areas. Mitigations will maintain LWD in all other actions.
Pool Frequency FA	M	+	+	+	Watershed and habitat improvement may increase pool frequency in some areas. Mitigations will maintain pool frequency in all other actions.
Pool Quality FA	M	+	+	+	Watershed and habitat improvement may increase the pool quality in some areas. Mitigations will maintain pool quality in all other actions.
Off-Channel Habitat FA	M	+*	+*	+*	Watershed and habitat improvement may increase off-channel habitat in some areas by negligible levels. Mitigations will maintain off channel habitat in all other actions.
Refugia FUR	N	none	none	none	The actions will have no influence on refugia.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Channel Condition and Dynamics					
Width/Depth Ratio FA	M	+	+	+	Watershed and habitat improvement may decrease width to depth ratio in some areas. Mitigations will maintain width to depth ratio in all other actions.
Streambank Condition FA	M	+	+	+	Watershed and habitat improvement may increase bank stability in some areas. Mitigations will maintain bank stability in all other actions.
Floodplain Connectivity FA	M	+	+	+	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 FA	M	+	+	+	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 FA	M	+	+	+	Watershed and habitat improvement such as road obliteration, and appropriate road and trail maintenance will improve hyrologic processes and diffuse the drainage network in some areas. Mitigations will maintain drainage networkin all other actions.
Watershed Conditions					
Road Density and Location 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 FA	M	+	+	+	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	I	+	+	+	Watershed and habitat improvement, such as road obliteration in

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Bear Creek
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance				
	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
FR					RCAs, and appropriate road and trail maintenance, will improve watershed resilience to disturbance. Mitigations will maintain the disturbance regime all other actions.
Integration of Species and Habitat Conditions FUR	I	+	+	+	The actions with mitigations will improve, maintain or have negligible effect on all WCIs listed above; therefore, the integration of species and habitat conditions WCI will improve.

d. Noxious weed treatment

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Bear Creek
Management Actions	Noxious weed treatment				
	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	D	-	-	-	Sub-lethal effects to listed fish and their food sources are probable
Life History Diversity and Isolation FUR	N	none	none	none	No influence
Persistence and Genetic Integrity FUR	N	none	none	none	No influence
Water Quality					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Noxious weed treatment		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Temperature FA	M	-*	-*	-*	Shade and subsequent loss of riparian vegetation due to chemical application is negligible due to buffers.
Sediment FR	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable increases in erosion and sedimentation.
Chemical Contaminants and/or Nutrients FA	D	-	-	-	Sub-lethal effects to listed fish and their food sources are probable
Habitat Access					
Physical Barriers FR	N	none	none	none	No influence
Habitat Elements					
Substrate Embeddedness FA	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable increases in erosion and sedimentation.
Large Woody Debris FA	M	-*	-*	-*	LWD loss due to loss of riparian vegetation due to chemical application is negligible due to buffers.
Pool Frequency FA	N	none	none	none	No influence
Pool Quality FA	N	none	none	none	No influence
Off-Channel Habitat FA	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Noxious weed treatment		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Channel Condition and Dynamics					
Width/Depth Ratio **FA**	N	none	none	none	No influence
Streambank Condition **FA**	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 **FA**	N	none	none	none	No influence
Flow/Hydrology					
Change in Peak/Base Flows **FA**	N	none	none	none	No influence
Drainage Network Increase **FA**	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location **FUR**	N	none	none	none	No influence
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 **FA**	M	-*	-*	-*	Shade and subsequent loss of riparian vegetation due to chemical application is negligible due to buffers.
Disturbance Regime **FR**	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable decreases in landscape stability

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Noxious weed treatment		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Integration of Species and Habitat Conditions FUR	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

e. Travel plan, road management, trails, recreation and administrative site operation & maintenance

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance		

	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	D	-	-	-	• Fording streams on foot, horseback, or other non-motorized travel is likely to result in bull trout 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 bull trout 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 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.
Persistence and Genetic Integrity 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 FA	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
Sediment 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

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Bear Creek
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance				
	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
					travel. • Road management and trail maintenance will help reduce travel plan related sediment effects at all time scales..
Chemical Contaminants and/or Nutrients FA	D	+	-	-	• As motorized travel increases there is likely to be petroleum 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 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					
Substrate Embeddedness FA	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	USDA Forest Service / Payette National Forest			HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Bear Creek
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance				
	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
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	M	+	-	-	• Restricting cross-country motorized travel expected to reduce sedimentation in pools temporarily 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 FA	N	none	none	none	No influence.
Refugia FUR	N	none	none	none	No influence.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance		

	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/Depth Ratio **FA**	D	+	-	-	• Travel plan related degradation of streambank condition will degrade width to depth ratio at road and trail crossings. • Road and trail maintenance will reduce travel plan related degradation of streambank condition reducing effects to width/depth ratio.
Streambank Condition (Travel Plan) **FUR**	M	-*	-*	-*	Increases 6.9 mi.
Streambank Condition (LRMP) **FA**	D	+	-	-	• After a temporary decrease 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**	N	none	none	none	No influence.
Flow/Hydrology					
Change in Peak/Base Flows **FA**	N	none	none	none	No influence.
Drainage Network Increase **FA**	N	none	none	none	No influence.
Watershed Conditions					
Road Density and Location **FUR**	N	none	none	none	No influence.
Disturbance History	I	+	+	+	Restricting cross-country motorized travel will result in fewer

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Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
FR					incidences of resource damage to landslide or landslide prone areas, and to RCAs.
Riparian Conservation Areas **FA**	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 **FUR**	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.

f. Smith Mountain goat and sheep and Bear Creek cattle and horse allotments

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Smith Mountain goat and sheep and Bear Creek cattle and horse allotments		

	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, because sheep are trailed upstream of occupied bull trout habitat and location and accessibility of Bear Creek limit cattle access to occupied bull trout habitat (see description of action and effects narrative).
Growth and Survival FR	N	none	none	none	No influence, because sheep are trailed upstream of occupied bull trout habitat and location and accessibility of Bear Creek limit cattle access to occupied bull trout habitat (see description of action and effects narrative).
Life History Diversity and Isolation FUR	N	none	none	none	No influence
Persistence and Genetic Integrity FUR	N	none	none	none	No influence
Water Quality					
Temperature FA	N	none	none	none	No influence
Sediment FR	M	*-	*-	*-	Live stock use in RCAs will result in negligible amounts of sediment delivery from soil disturbance. Mitigations and restriction on use will minimize the effects (see description of action and effects narrative).
Chemical Contaminants and/or Nutrients FA	M	*-	*-	*-	Live stock waste in stream channels will have a negligible influence on this WCI. Mitigations and restriction on use will minimize the effects.
Habitat Access					
Physical Barriers FR	N	none	none	none	No influence
Habitat Elements					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Smith Mountain goat and sheep and Bear Creek cattle and horse allotments		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Substrate Embeddedness FA	M	*-	*-	*-	Live stock use in RCAs will result in negligible amounts of sediment delivery from soil disturbance. Mitigations and restriction on use will minimize the effects (see description of action and effects narrative).
Large Woody Debris FA	N	none	none	none	No influence
Pool Frequency FA	N	none	none	none	No influence
Pool Quality FA	N	none	none	none	No influence
Off-Channel Habitat FA	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio FA	M	*-	*-	*-	Streambank condition will continue to be altered by livestock use. Mitigations and restrictions on use will limit effects to negligible levels.
Streambank Condition FA	M	*-	*-	*-	Streambank condition will continue to be altered by livestock use. Mitigations and restrictions on use will limit effects to negligible levels.
Floodplain Connectivity FA	N	none	none	none	No influence
Flow/Hydrology					
Change in Peak/Base Flows FA	N	none	none	none	No influence
Drainage Network Increase FA	N	none	none	none	No influence
Watershed Conditions					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Smith Mountain goat and sheep and Bear Creek cattle and horse allotments		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Road Density and Location FUR	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 will limit effects to negligible levels.
Riparian Conservation Areas FA	M	*-	*-	*-	RCA vegetation will remain altered from livestock use in RCAs. Mitigations and restrictions on use will limit effects to negligible levels.
Disturbance Regime FR	M	*-	*-	*-	Disturbance regime will continue to be altered by livestock use. Mitigations and restrictions on use will limit effects to negligible levels.
Integration of Species and Habitat Conditions FUR	M	*-	*-	*-	The mitigations and restrictions on use will limit the effects to negligible levels for all WCIs above.

g. Cuprum-Bear exchange buried cable (Cambridge Telephone), Cuprum Bear buried cable (Idaho Power)

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Cuprum-Bear Exchange buried cable. (Cambridge Telephone), Cuprum-Bear Buried Cable (Idaho Power)		

	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 FUR	N	none	none	none	These buried cables will rarely need attention and are in areas that are unlikely to support resident bull trout (i.e., Bear Creek downstream of Huckleberry Campground) or to contain migrants (Burns et al. 2005).
Growth and Survival FUR	N	none	none	none	No influence
Life History Diversity and Isolation FUR	N	none	none	none	No influence
Persistence and Genetic Integrity FUR	N	none	none	none	No influence
Water Quality					
Temperature FR	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of riparian vegetation and stream shade where buried lines cross RCAs. Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are expected to have a negligible influence on stream temperature.
Sediment FR	M	-*	-*	-*	Excavation of stream channels for line maintenance will not be necessary. Any excavation of buried cable outside of the stream channel will be done under consultation with the Forest Service to insure that this activity does not result in ground-disturbing activities that could affect substrate, or sedimentation. Maintenance will be completed with as little disturbance to surrounding soil and vegetation as possible. Care will be taken to minimize sediment delivery to any associated stream channel. Erosion will be minimized where necessary using straw bales, sediment fences, excelsior blankets, jute matting or similar protective measures if ground-disturbing activities

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Cuprum-Bear Exchange buried cable. (Cambridge Telephone), Cuprum-Bear Buried Cable (Idaho Power)		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
					occur as a result of maintenance.
Chemical Contaminants and/or Nutrients 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 FUR	N	none	none	none	No influence
Habitat Elements					
Substrate Embeddedness FA	M	-*	-*	-*	Excavation of stream channels for line maintenance will not be necessary. Any excavation of buried cable outside of the stream channel will be done under review with the Forest Service to insure that this activity does not result in ground-disturbing activities that could affect substrate, or sedimentation. Maintenance will be completed with as little disturbance to surrounding soil and vegetation as possible. Care will be taken to minimize sediment delivery to any associated stream channel. Erosion will be minimized where necessary using straw bales, sediment fences, excelsior blankets, jute matting or similar protective measures if ground-disturbing activities occur as a result of maintenance.
Large Woody Debris FR	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of riparian vegetation where buried lines cross RCAs. Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are expected to have negligible influence LWD recruitment.
Pool Frequency FUR	N	none	none	none	No influence
Pool Quality FUR	N	none	none	none	No influence
Off-Channel Habitat FR	N	none	none	none	No influence
Refugia	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Cuprum-Bear Exchange buried cable. (Cambridge Telephone), Cuprum-Bear Buried Cable (Idaho Power)		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
FUR					
Channel Condition and Dynamics					
Width/Depth Ratio **FA**	N	none	none	none	No influence
Streambank Condition **FR**	N	none	none	none	No influence
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 **FUR**	N	none	none	none	No influence
Disturbance History **FUR**	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of upland and riparian vegetation where buried lines cross the landscape. Typically, these lines affect only small areas. Since some natural openings are common in properly functioning areas, these openings are expected to have a negligible influence on disturbance history.

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Bear Creek
Management Actions	Cuprum-Bear Exchange buried cable. (Cambridge Telephone), Cuprum-Bear Buried Cable (Idaho Power)				
	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	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of riparian vegetation and where buried lines cross RCAs. Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are expected to have a negligible influence.
Disturbance Regime FR	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of upland and riparian vegetation where buried lines cross the landscape. Typically, these lines affect only small areas. Since some natural openings are common in properly functioning areas, these openings are expected to have a negligible influence on disturbance regime.
Integration of Species and Habitat Conditions FUR	M	-*	-*	-*	The effects of the action on all other WCIs will be negligible; therefore, the effects to this WCI will be negligible.

h. Guides and uutfitters (Heavens Gate Outfitters, Seven Devils Lodge)

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Guides and Outfitters - Heavens Gate Outfitters and Seven Devils Lodge		

	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 FUR	N	none	none	none	No influence
Growth and Survival FUR	N	none	none	none	Outfitters are instructed to avoid specific areas were bull trout are known to occur.
Life History Diversity and Isolation FUR	N	none	none	none	No influence
Persistence and Genetic Integrity FUR	N	none	none	none	No influence
Water Quality					
Temperature FR	N	none	none	none	No influence
Sediment FUR	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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Chemical Contaminants and/or Nutrients FR	N	none	none	none	No influence
Habitat Access					
Physical Barriers FUR	N	none	none	none	No influence
Habitat Elements					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Guides and Outfitters - Heavens Gate Outfitters and Seven Devils Lodge		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Substrate Embeddedness FUR	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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Large Woody Debris FR	N	none	none	none	No influence
Pool Frequency FUR	N	none	none	none	No influence
Pool Quality FUR	N	none	none	none	No influence
Off-Channel Habitat FR	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio 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. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Streambank Condition FR	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. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Floodplain Connectivity FR	N	none	none	none	No influence
Flow/Hydrology					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010501 Bear
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed (29,316 acres)
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Bear Creek
Management Actions	Guides and Outfitters - Heavens Gate Outfitters and Seven Devils Lodge		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
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 FUR	N	none	none	none	No influence
Disturbance History FUR	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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Disturbance Regime FR	N	none	none	none	No influence
Integration of Species and Habitat Conditions FUR	M	-*	-*	-*	Effects to WCIs would be negligible to none.

3. CROOKED RIVER

a. Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning		

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 **FUR**	N	none	none	none	No influence
Growth and Survival **FR**	N	none	none	none	No influence
Life History Diversity and Isolation **FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FR**	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.
Sediment **FR**	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.
Chemical Contaminants and/or Nutrients **FA**	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 **FUR**	N	none	none	none	No influence
Habitat Elements					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Substrate Embeddedness FR	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.
Large Woody Debris FR	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 FR	N	none	none	none	No influence
Pool Quality FR	N	none	none	none	No influence
Off-Channel Habitat FA	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio FA	N	none	none	none	No influence
Streambank Condition FR	N	none	none	none	No influence
Floodplain Connectivity FR	N	none	none	none	No influence
Flow/Hydrology					
Change in Peak/Base Flows	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

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Miscellaneous forest products harvest, mistletoe control and pre-commercial thinning		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
FR					the WCI.
Drainage Network Increase **FR**	N	none	none	none	No influence
Watershed Conditions					
Road Density and Location **FUR**	N	none	none	none	No influence
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**	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**	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).
Integration of Species and Habitat Conditions **FUR**	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).

b. Fire management

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Crooked River
Management Actions	Fire management				
	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 FUR	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 FUR	M	*-	*-	*-	
Persistence and Genetic Integrity FUR	N	none	none	none	No influence. Connectivity is limited by impassable culverts and irrigation diversions.
Water Quality					
Temperature FR	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).
Sediment FR	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	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Chemical Contaminants and/or Nutrients FA	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 resource advisors will serve to minimize deviations during suppression activities.
Habitat Access					
Physical Barriers FUR	N	none	none	none	No influence.
Habitat Elements					
Substrate Embeddedness FR	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).
Large Woody Debris FR	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 FR	M	*-	*-	*-	Negligible effects on these WCIs are expected due to expected negligible effects on sediment and LWD WCIs.
Pool Quality FR	M	*-	*-	*-	Negligible effects on these WCIs are expected due to expected negligible effects on sediment and LWD WCIs.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Off-Channel Habitat 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 Minshall 1999).
Refugia FUR	N	none	none	none	No influence.
Channel Condition and Dynamics					
Width/Depth Ratio FA	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 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	N	none	none	none	No influence.
Flow/Hydrology					
Change in Peak/Base Flows FR	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 Minshall 1999).
Drainage Network Increase FR	N	none	none	none	No influence.
Watershed Conditions					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Road Density and Location 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 adversely affected fish habitat quality (Minshall et al 1994, Royer and Minshall 1996, Bowman and Minshall 1999).
Riparian Conservation Areas FR	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	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 by moving vegetation towards the desired condition. Monitoring has shown that large stand replacing wildfires have not

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Fire management		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			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).
Integration of Species and Habitat Conditions FUR	M	*-	*-	*-	As fire management actions are expected to have no or negligible effect on all WCIs, negligible effects on bull trout are also expected.

c. Fish habitat/riparian sampling, watershed and habitat improvements and maintenance

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Crooked River
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance				
	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 FUR	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 FUR	N	none	none	none	Habitat conditions downstream of Forest lands constrain life history diversity and isolation. The Federal actions will have no influence on life history diversity and isolation.
Persistence and Genetic Integrity FUR	N	none	none	none	Habitat conditions downstream of Forest lands and the presence of brook trout constrain persistence and genetic integrity. The Federal actions will have no influence on persistence and genetic integrity.
Water Quality					
Temperature FR	I	+	+	+	Watershed and habitat improvement will decrease summer stream temperatures in some areas. Mitigations will maintain temperature in all other actions.
Sediment FR	M	-*	-*	-*	• There may be negligible amounts of temporary sediment delivery from habitat improvement, but actions, such as bank stabilization and road obliteration 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.
Chemical Contaminants and/or Nutrients FA	M	*-	*-	*-	Restrictions concerning refueling in RCAs and spill prevention and cleanup requirements will reduce the likelihoodof chemical contamination to negligible levels.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Habitat Access					
Physical Barriers FUR	I	+	+	+	Removal or replacement of fish barriers, such as old culverts, will improve connectivity.
Habitat Elements					
Substrate Embeddedness FR	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.
Large Woody Debris FR	I	+	+	+	Watershed and habitat improvement may increase the current quantity of LWD and future recruitment in some areas. Mitigations will maintain LWD in all other actions.
Pool Frequency FR	I	+	+	+	Watershed and habitat improvement may increase pool frequency in some areas. Mitigations will maintain pool frequency in all other actions.
Pool Quality FR	I	+	+	+	Watershed and habitat improvement may increase the pool quality in some areas. Mitigations will maintain pool quality in all other actions.
Off-Channel Habitat FA	M	+*	+*	+*	Watershed and habitat improvement may increase off-channel habitat in some areas by negligible levels. Mitigations will maintain off channel habitat in all other actions.
Refugia FUR	N	none	none	none	The actions will have no influence on refugia.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance		

	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/Depth Ratio FA	M	+	+	+	Watershed and habitat improvement may decrease width to depth ratio in some areas. Mitigations will maintain width to depth ratio in all other actions.
Streambank Condition 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	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	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	I	+	+	+	Watershed and habitat improvement such as road obliteration, and appropriate road and trail maintenance will improve hyrologic processes and diffuse the drainage network in some areas. Mitigations will maintain drainage networkin all other actions.
Watershed Conditions					
Road Density and Location 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	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	I	+	+	+	Watershed and habitat improvement, such as road obliteration in

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Crooked River
Management Actions	Fish habitat/riparian sampling, watershed and habitat improvements and maintenance				
	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
FR					RCAs, and appropriate road and trail maintenance, will improve watershed resilience to disturbance. Mitigations will maintain the disturbance regime all other actions.
Integration of Species and Habitat Conditions FUR	I	+	+	+	The actions with mitigations will improve, or maintain or have negligible effect on all WCIs listed above; therefore the integration of species and habitat conditions WCI will improve.

d. Noxious weed treatment

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Noxious weed treatment		

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 **FUR**	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 **FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FR**	M	-*	-*	-*	Shade and subsequent loss of riparian vegetation due to chemical application is negligible due to buffers.
Sediment **FR**	M	-*	-*	-*	Loss of negligible amounts of vegetation from the landscape due to herbicide application may cause un-measurable increases in erosion and sedimentation.
Chemical Contaminants and/or Nutrients **FA**	D	-	-	-	Sub-lethal effects to listed fish and their food sources are probable
Habitat Access					
Physical Barriers **FUR**	N	none	none	none	No influence
Habitat Elements					
Substrate Embeddedness **FR**	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	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Noxious weed treatment		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Large Woody Debris FR	M	-*	-*	-*	LWD loss due to loss of riparian vegetation due to chemical application is negligible due to buffers.
Pool Frequency FR	N	none	none	none	No influence
Pool Quality FR	N	none	none	none	No influence
Off-Channel Habitat FA	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio FA	N	none	none	none	No influence
Streambank Condition 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	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 FUR	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Noxious weed treatment		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
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	M	-*	-*	-*	Shade and subsequent loss of riparian vegetation due to chemical application is negligible due to buffers.
Disturbance Regime FR	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 FUR	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

e. Travel plan, road management, trails, recreation and administrative site operation & maintenance

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance		

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 **FUR**	D	-	-	-	• Fording streams on foot, horseback, or other non-motorized travel is likely to result in bull trout 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 bull trout 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 **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.
Persistence and Genetic Integrity **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 **FR**	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
Sediment **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

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Crooked River
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance				
	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
					travel. • Road management and trail maintenance will help reduce travel plan related sediment effects at all time scales..
Chemical Contaminants and/or Nutrients FA	D	+	-	-	• As motorized travel increases there is likely to be petroleum 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 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					
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	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			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 FR	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 FA	N	none	none	none	No influence.
Refugia FUR	N	none	none	none	No influence.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance		

	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/Depth Ratio **FA**	D	+	-	-	• Travel plan related degradation of streambank condition will degrade width to depth ratio at road and trail crossings. • Road and trail maintenance will reduce travel plan related degradation of streambank condition reducing effects to width/depth ratio.
Streambank Condition (Travel Plan) **FUR**	M	-*	-*	-*	Increases 6.9 mi.
Streambank Condition (LRMP) **FR**	D	+	-	-	• After a temporary decrease 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**	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 **FUR**	N	none	none	none	No influence.
Disturbance History	I	+	+	+	Restricting cross-country motorized travel will result in fewer

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Travel plan, road management, trails, recreation and administrative site operation & maintenance		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
FR					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.
Integration of Species and Habitat Conditions **FUR**	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.

f. Wildhorse-Crooked River C&H, Crooked River C&H, and Mill Creek C&H

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Wildhorse-Crooked River C&H, Crooked River C&H, and Mill Creek C&H		

	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 FUR	N	none	none	none	No influence. Dense forest prevents cattle access to spawning habitat.
Growth and Survival FR	N	none	none	none	No influence. Dense forest prevents cattle access to spawning habitat.
Life History Diversity and Isolation FUR	N	none	none	none	No influence
Persistence and Genetic Integrity FUR	N	none	none	none	No influence
Water Quality					
Temperature FR	N	none	none	none	No influence
Sediment FR	M	*-	*-	*-	Live stock use in RCAs will result in negligible amounts of sediment delivery from soil disturbance. Mitigations and restriction on use will minimize the effects (see description of action and effects narrative).
Chemical Contaminants and/or Nutrients FA	M	*-	*-	*-	Live stock waste in stream channels will have a negligible influence on this WCI. Mitigations and restriction on use will minimize the effects.
Habitat Access					
Physical Barriers FUR	N	none	none	none	No influence
Habitat Elements					
Substrate Embeddedness FR	M	*-	*-	*-	Live stock use in RCAs will result in negligible amounts of sediment delivery from soil disturbance. Mitigations and restriction on use will minimize the effects (see description of action and effects narrative).

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Wildhorse-Crooked River C&H, Crooked River C&H, and Mill Creek C&H		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Large Woody Debris **FR**	N	none	none	none	No influence
Pool Frequency **FR**	N	none	none	none	No influence
Pool Quality **FR**	N	none	none	none	No influence
Off-Channel Habitat **FA**	N	none	none	none	No influence
Refugia **FUR**	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio **FA**	M	*-	*-	*-	Streambank condition will continue to be altered by livestock use. Mitigations and restrictions on use will limit effects to negligible levels.
Streambank Condition **FR**	M	*-	*-	*-	Streambank condition will continue to be altered by livestock use. Mitigations and restrictions on use will limit effects to negligible levels.
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 **FUR**	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Wildhorse-Crooked River C&H, Crooked River C&H, and Mill Creek C&H		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Disturbance History FR	M	*-	*-	*-	Disturbance history will continue to be altered by livestock use. Mitigations and restrictions on use will limit effects to negligible levels.
Riparian Conservation Areas FR	M	*-	*-	*-	RCA vegetation will remain altered from livestock use in RCAs. Mitigations and restrictions on use will limit effects to negligible levels.
Disturbance Regime FR	M	*-	*-	*-	Disturbance regime will continue to be altered by livestock use. Mitigations and restrictions on use will limit effects to negligible levels.
Integration of Species and Habitat Conditions FUR	M	*-	*-	*-	The mitigations and restrictions on use will limit the effects to negligible levels for all WCIs above.

g. Cuprum-Bear exchange buried cable (Cambridge Telephone), Oxbow-McCall overhead power lines (Idaho Power)

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Cuprum-Bear exchange buried cable (Cambridge Telephone), Oxbow-McCall overhead power lines (Idaho Power)		

	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 **FUR**	N	none	none	none	These cables or lines will rarely need attention and are in areas that are unlikely to support resident bull trout or to contain migrants (Burns et al. 2005).
Growth and Survival **FR**	N	none	none	none	No influence
Life History Diversity and Isolation **FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FR**	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of riparian vegetation and stream shade where existing lines cross RCAs. Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are expected to have a negligible influence on stream temperature.
Sediment **FR**	M	-*	-*	-*	Excavation of stream channels for line maintenance will not be necessary. Any excavation of buried cable outside of the stream channel will be done under consultation with the Forest Service to insure that this activity does not result in ground-disturbing activities that could affect substrate, or sedimentation. Maintenance will be completed with as little disturbance to surrounding soil and vegetation as possible. Care will be taken to minimize sediment delivery to any associated stream channel. Erosion will be minimized where necessary using straw bales, sediment fences, excelsior blankets, jute matting or similar protective measures if ground-disturbing activities occur as a result of maintenance.

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Cuprum-Bear exchange buried cable (Cambridge Telephone), Oxbow-McCall overhead power lines (Idaho Power)		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Chemical Contaminants and/or Nutrients FA	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 FUR	N	none	none	none	No influence
Habitat Elements					
Substrate Embeddedness FR	M	-*	-*	-*	Excavation of stream channels for line maintenance will not be necessary. Any excavation of buried cable outside of the stream channel will be done under consultation with the Forest Service to insure that this activity does not result in ground-disturbing activities that could affect substrate, or sedimentation. Maintenance will be completed with as little disturbance to surrounding soil and vegetation as possible. Care will be taken to minimize sediment delivery to any associated stream channel. Erosion will be minimized where necessary using straw bales, sediment fences, excelsior blankets, jute matting or similar protective measures if ground-disturbing activities occur as a result of maintenance.
Large Woody Debris FR	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of riparian vegetation where existing lines cross RCAs. Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are expected to have negligible influence LWD recruitment.
Pool Frequency FR	N	none	none	none	No influence
Pool Quality FR	N	none	none	none	No influence
Off-Channel Habitat FA	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Cuprum-Bear exchange buried cable (Cambridge Telephone), Oxbow-McCall overhead power lines (Idaho Power)		

	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/Depth Ratio **FA**	N	none	none	none	No influence
Streambank Condition **FR**	N	none	none	none	No influence
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 **FUR**	N	none	none	none	No influence
Disturbance History **FR**	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of upland and riparian vegetation where existing lines cross the landscape. Typically, these lines affect only small areas. Since some natural openings are common in properly functioning areas, these openings are expected to have a negligible influence on disturbance history.

Agency/Unit	USDA Forest Service / Payette National Forest			HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout			Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse			Local Population	Crooked River
Management Actions	Cuprum-Bear exchange buried cable (Cambridge Telephone), Oxbow-McCall overhead power lines (Idaho Power)				
	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	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of riparian vegetation and where existing lines cross RCAs. Typically, these lines affect only small areas. Since some natural openings are common in functioning riparian areas, these openings are expected to have a negligible influence.
Disturbance Regime FR	M	-*	-*	-*	Potential impacts from these actions are reductions in the age and structure of upland and riparian vegetation where existing lines cross the landscape. Typically, these lines affect only small areas. Since some natural openings are common in properly functioning areas, these openings are expected to have a negligible influence on disturbance regime.
Integration of Species and Habitat Conditions FUR	M	-*	-*	-*	The effects of the actions on WCIs are negligible.

h. Special Use Permit – Hedges Spring Development

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Special use permit – Hedges spring development		

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 **FUR**	N	none	none	none	No influence
Growth and Survival **FR**	N	none	none	none	No influence
Life History Diversity and Isolation **FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FR**	M	-*	-*	-*	The water right for the spring development is for 0.03 cfs, and the influence on stream temperature would be negligible.
Sediment **FR**	N	none	none	none	No influence
Chemical Contaminants and/or Nutrients **FA**	N	none	none	none	No influence
Habitat Access					
Physical Barriers **FUR**	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Special use permit – Hedges spring development		

	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 Elements					
Substrate Embeddedness FR	N	none	none	none	No influence
Large Woody Debris FR	N	none	none	none	No influence
Pool Frequency FR	N	none	none	none	No influence
Pool Quality FR	N	none	none	none	No influence
Off-Channel Habitat FA	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio FA	N	none	none	none	No influence
Streambank Condition FR	N	none	none	none	No influence
Floodplain Connectivity FR	N	none	none	none	No influence
Flow/Hydrology					
Change in Peak/Base Flows FR	M	-*	-*	-*	The water right for the spring development is for 0.03 cfs. There would be no influence to peak flow and base flow would be influenced by some amount less than 0.03 cfs, which would have a negligible influence on peak and base flows relative to the subwatershed.
Drainage Network Increase FR	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Special use permit – Hedges spring development		

	Effects of the Management Action(s)				
		Expected Trend (improve/degrade/maintain/no effect)			
Pathways & Indicators	**Effects**	**Temporary**	**Short-term**	**Long-term**	**Discussion of Effects**
Watershed Conditions					
Road Density and Location FUR	N	none	none	none	No influence
Disturbance History FR	M	-*	-*	-*	The permit allows very limited disturbance associated with spring development and maintenance. The spring is well away from any perennial streams.
Riparian Conservation Areas FR	M	-*	-*	-*	The permit allows very limited disturbance associated with spring development and maintenance. The spring is well away from any perennial streams.
Disturbance Regime FR	N	none	none	none	No influence
Integration of Species and Habitat Conditions FUR	M	-*	-*	-*	Effects to WCIs would be negligible.

i. Guides and Outfitters (Seven Devils Lodge)

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Guides and Outfitters (Seven Devils Lodge)		

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 **FUR**	N	none	none	none	No influence
Growth and Survival **FR**	N	none	none	none	Outfitters are instructed to avoid specific areas were bull trout are known to occur.
Life History Diversity and Isolation **FUR**	N	none	none	none	No influence
Persistence and Genetic Integrity **FUR**	N	none	none	none	No influence
Water Quality					
Temperature **FR**	N	none	none	none	No influence
Sediment **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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Chemical Contaminants and/or Nutrients **FA**	N	none	none	none	No influence
Habitat Access					
Physical Barriers **FUR**	N	none	none	none	No influence

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Guides and Outfitters (Seven Devils Lodge)		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
Habitat Elements					
Substrate Embeddedness 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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Large Woody Debris FR	N	none	none	none	No influence
Pool Frequency FR	N	none	none	none	No influence
Pool Quality FR	N	none	none	none	No influence
Off-Channel Habitat FA	N	none	none	none	No influence
Refugia FUR	N	none	none	none	No influence
Channel Condition and Dynamics					
Width/Depth Ratio 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. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Streambank Condition FR	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. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Floodplain Connectivity FR	N	none	none	none	No influence
Flow/Hydrology					

Agency/Unit	USDA Forest Service / Payette National Forest	HU Code and Name	170502010603 Crooked
Fish Species Present	Bull trout	Spatial Scale of this Matrix	One 6th level subwatershed
Core Area (Bull Trout)	Pine-Indian-Wildhorse	Local Population	Crooked River
Management Actions	Guides and Outfitters (Seven Devils Lodge)		

Pathways & Indicators	Effects of the Management Action(s)				
	Effects	Expected Trend (improve/degrade/maintain/no effect)			Discussion of Effects
		Temporary	Short-term	Long-term	
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 FUR	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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
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 to bull trout would be negligible. Requirements to avoid areas where bull trout are known to occur further reduce the likelihood of effects to bull trout.
Disturbance Regime FR	N	none	none	none	No influence
Integration of Species and Habitat Conditions FUR	M	-*	-*	-*	Effects to WCIs would be negligible to none.

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