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Reply to: 2672.4 Date: April 10, 2007

Subject: Biological Assessment & Evaluation for Tumbledown Fuels Project

To: Richard Kramer, Sandpoint District Ranger
Cc: Joe Heisel, Project Leader
Kevin Davis, Project Watershed Specialist
Jason Gritzner, North Zone Aquatics Program Manager

The U. S. Fish and Wildlife Service (USFWS) lists two fish species that occur, potentially occur, and/or habitat exists within the Kaniksu portion of the Idaho Panhandle National Forests as endangered or threatened under the Endangered Species Act (ESA) of 1973 (Biannual Forest Wide Species List: FWS 1-9-07-SP-0054; January 22, 2007). The Kootenai River population of the white sturgeon (*Acipenser transmontanus*) is listed as "endangered" (Federal Register, Volume 59, No. 171, September 6, 1994) and the Columbia River Distinct Population Segment of bull trout (*Salvelinus confluentus*) is listed as "threatened" (Federal Register, Volume 63, No. 111, June 10, 1998). For bull trout, Critical Habitat was designated on September 26, 2005 (Federal Register, Volume 70, No. 185). Three additional fish species; burbot (*Lota lota*), Interior redband trout (*Oncorhynchus mykiss gairdneri*), and westslope cutthroat trout (*Oncorhynchus clarki lewisi*) are listed as "species of special concern" by USFWS and as "sensitive" by the Regional Forester.

The purpose of this document is to analyze the effects of the proposed project, described below, on these five fish species. It was prepared in accordance with Section 7(c) of ESA, and manual direction to review all Forest Service activities to ensure that such activities do not contribute to a downward trend in population numbers or density of sensitive species and/or a downward trend in habitat capability, either of which might ultimately result in the need for federal listing (FSM 2672.1 and 2672.4). This Biological Assessment has been prepared for consultation under the Joint Counterpart Endangered Species Act Section 7 Consultation Regulations (50 CFR, Part 402; Federal Register Vol. 68, No. 235) because this project qualifies as a Hazardous Fuels Reduction Project under the 2000 National Fire Plan. Furthermore, this document describes the measurable effects of this activity on aquatic habitat and the fish species that rely upon those habitats as required under the National Environmental Policy Act.

Summary of Activity

Activity:
Small diameter trees and brush would be removed over approximately 700 acres in order to decrease fuel loadings and disrupt fuel continuity, thereby reducing the risk of wildlife spreading to adjacent land, and increasing the chance of successful suppression efforts.

Fuel reduction treatments would employ a combination of mechanical methods to remove saplings, brush, and primarily small diameter (i.e. 4" to 14" diameter) mixed conifer species in areas of mortality attributed to insect attack, competition, and/or root disease. Please see Table 1 for the details of each treatment unit. These treatments would result in long-term reduction of ladder fuels as well as reduction in live and dead fuel loadings. Priority would be given to retaining cedar-dominated riparian areas and large, healthy larch, ponderosa pine, and white pine. Openings created by fuels reduction treatments would be planted with white pine, western larch and ponderosa pine.

Prescribed fire would be used to reduce hazardous fuels and recycle forest nutrients. In areas where slopes permit, an excavator would be used to pile woody debris. These piles would then be burned in late fall during periods of low fire danger.

Based upon field review of fuel conditions in the project area, approximately 671 acres is proposed for treatment. Individual treatment areas would range in size from 5-93 acres. Fuels treatments are described with the silvicultural diagnosis and prescriptions listed below.

Treatment Areas 1-6, 10-14, 16, 20, 25-32 (505acres) – Are a combination of **Irregular Shelterwood** and **Commercial Thinning**. Irregular shelterwood is a silvicultural term that describes a variable spatial arrangement of dominant and codominant trees of desired species (such as western white pine, ponderosa pine, and western larch) to provide seed and shade. This method would be applied where there is a lack of desirable trees to allow for a commercial thinning. Areas with a greater density of desired trees would receive a commercial thinning. Harvest will focus on leaving good form, full crowned, healthy trees (in the upper crown classes) in the following order of preference: western white pine, western larch, ponderosa pine and western redcedar as well as some healthy Douglas-fir. Additional fuel treatments would be machine grapple piling of created activity fuels and the burning of these piles. Underburning would generally take place on slopes steeper than 35%. Some tree planting would follow timber harvest in order to establish more early seral fire resistant species such as ponderosa pine and western larch.

Treatment Areas 8, and 21 (35 acres) - Are **Commercial thinning** with a focus on "low thinning" to remove trees in the lower crown classes which provide ladder fuels to the larger surrounding trees. The larger trees with higher crowns would be favored to leave. Some spot grapple piling would be needed in small areas with concentrations of activity fuels. No planting would be needed.

Treatment Areas 7, 9, 15, 17,18,22,23 (95 acres) - Are **Irregular Shelterwood (See previous description above).** Some grapple piling on slopes up to 35% and underburning on steeper slopes. Tree planting of western white pine, larch and ponderosa pine would follow to establish these early seral fire resistant species.

Treatment Area 19 (25 acres) – Liberation cut is a release harvest in a stand not past the sapling stage to free the favored trees from competition with older overtopping trees. This unit has thousands of sapling-sized western hemlock, larch, western redcedar, lodgepole pine and Douglas-fir per acre in need of precommercial thinning and release

from poor formed overstory trees. No planting would be needed.

Treatment Area 99 (11acres) – Is a **Fuel break.** The fuel break would consist of felling hardwoods and brush species, precommercial thinning of conifers, and hand piling and burning of piles in an approximately two chain (132 foot) strip along strategic areas (primarily adjacent to private land).

Table 1. Summary of treatment types, yarding system, and fuels treatment for all units.

Unit	Proposed Treatment Acres	Harvest System*			Underburn Acres	Grapple/Hand Pile Acres	Reforestation Acres
		CTL	T	S			
1	22	22				22	16
2	39		39			39	33
3	93			93	93		40
5	5		5			5	
6	40			40	40		27
7	22		22		22		22
8	18		18		18		
9	14			14	14		14
10	11		11			11	9
12	49		49			49	40
14	18		18		18		8
15	21		21			21	21
16	33	33				33	23
17	14	14				14	14
18	11			11	11		11
19	25		25			25	
20	56		56		56		28
21	17		17			17	
22	7			7		7	7
23	6		6			6	6
25	33	33				33	22
26	28	28				28	17
30	44	44			10		34
31	9	9				9	6
32	25	25			12		13
Fuel Break	11					11	
Total	**671**	**208**	**287**	**165**	**294**	**377**	**411**

* Cut to Length (CTL), Tractor (T), Skyline (S). Note that CTL is ground-based yarding with a track-mounted machine.

Mechanical Cutting

Mechanical fuel reduction treatments completed prior to prescribed burning or grapple piling allows us to redeem the beneficial effects of fire in the ecosystem in a setting of reduced risk to firefighter and public safety. Removal of excessive hazardous fuels prior to the ignition of a prescribed burn increases our opportunities to preserve unique ecosystem components (snags, old growth trees, riparian habitat, etc.) that may otherwise be consumed in a wildfire.

Table 2. Summary of Mechancial Timber Cutting Acres.

Sum of Acres	
Mechanical Cutting	**Total**
Harvester/Forwarder	208
Fuel Break	11
Skyline	165
Conventional Tractor	287
Grand Total	**671**

Prescribed Burning:

Prescribed fire would be used to reduce hazardous fuels and recycle forest nutrients. In areas where slopes permit, an excavator would be used to pile woody debris, otherwise underburning would be used to reduce hazardous fuels and recycle forest nutrients.

Some areas in the project are not conducive to broadcast burning or mechanized activity. In an effort to reduce hazardous fuel loadings and construct fuel breaks, hand crews would be used to:

- Thin small diameter trees
- Reduce shrub cover
- Remove ladder fuels
- Construct and burn slash piles

Table 3. Summary of fuels treatment acres. Note that 129 acres of the tractor/harvester logged treatments will be broadcast burned, instead of being grapple-piled and burned.

Sum of Acres	
Fuels Treatment	**Total**
Grapple Pile	366
Hand Pile	11
Underburn	294
Grand Total	**671**

Road Construction and Maintenance:

A complete roads analysis plan for this project area was prepared through an interdisciplinary team process. No new permanent roads will be constructed. Treatment areas will be accessed using existing classified roads, existing unclassified roads, and new temporary roads (see Table 2 & 3). Approximately 1.87 miles of road that is currently impassible and needed for this project will be opened during project activities, and closed after treatment activities are completed.

The proposal would require approximately construction of 0.71 miles of new temporary roads. Temporary road construction is necessary to access National Forest System (NFS) land adjacent to private property and NFS Road #278 in the project area. Each new temporary road constructed would not exceed one half mile in length, and the combined distance of all new temporary road constructed in the project would not exceed one mile.

Traffic on newly constructed temporary roads and on roads opened for the project would be limited to project related activities. Newly constructed temporary roads and roads opened for the project would be gated during the project and decommissioned after project activities are completed. Some reconditioned roads will be placed back into storage at the end of the project.

ROAD DEFINITIONS
(From FSM 7705)

Temporary Road – Road constructed but not necessary for long-term resource management.

Decommissioning – Activities that result in the stabilization and restoration of unneeded roads to a more natural state. Includes removal of all stream crossings and full recontour of the entire road prism, introduction of woody debris, and revegetation as needed.

Storage – A method of retaining a permanent road for future use but removing features to eliminate hydrologic risks. Includes, recontour of unstable fill slopes, cutslope stabilization, ripping the road tread, installation of no-maintenance cross ditches, and revegetation. Also includes some kind of road closure method such as with a guard rail barrier, gate, an earthen berm, or a short section of full recontour.

Road Maintenance – The upkeep of a road necessary to retain or restore the road to the approved road management objective.

Reconditioning -- Maintenance activities performed prior to use, such as; removal of barricades, clearing trees and brush, general road blading, and construction of drain dips.

Classified Road – Road determined to be needed for long-term motor vehicle access.

Unclassified Road – Roads on National Forest lands that are not managed in the forest transportation system. Examples include abandoned roads, unplanned roads, and roads constructed previously but not included in the system for maintenance or regular upkeep.

Table 4. Record of planned maintenance, reconditioning, and temporary road construction for all roads being used in the project area.

ROAD NUMBER	TREATMENT	Miles	Current Status	Status After Project
FSR 1050	Road Maintenance	3.70	Classified / Open	Classified / Open
FSR 278	Road Maintenance	12.80	Classified / Open	Classified / Open
FSR 278H	Road Maintenance	2.60	Classified / Open	Classified / Open
FSR 278HUC	Recondition	0.50	Classified / Open	Classified / Open
FSR 278HUD	Recondition	0.15	Classified / Open	Classified / Open
FSR 278K	Road Maintenance	1.50	Classified / Open	Classified / Open
FSR 278KA	Recondition	0.20	Classified / Open	Classified / Open
FSR 278L	Recondition	0.38	Classified / Storage	Classified / Storage
FSR 278LUA	Recondition	0.10	Classified / Impassible	Classified / Decommission
FSR 278LUB	Recondition	0.20	Classified / Open	Classified / Open
FSR 278P	Recondition	0.11	Classified / Impassible	Classified / Decommission
FSR 278UG	Recondition	0.51	Unclassified / Impassible	Unclassified / Decommission
FSR 278UGAG	Recondition	0.11	Unclassified / Impassible	Unclassified / Decommission
FSR 278UKAP	Recondition	0.20	Private Road	Private Road
FSR 278UKAQ	Recondition	0.10	Unclassified / Open	Unclassified / Open
FSR 278UKAR	Recondition	0.32	Unclassified / Impassible	Unclassified / Decommission
FSR 278Z	Recondition	0.34	Classified / Storage	Classified / Storage
Temporary Road 1	New Construction	0.14	N/A	Decommission
Temporary Road 2	New Construction	0.21	N/A	Decommission
Temporary Road 3	New Construction	0.12	N/A	Decommission
Temporary Road 4	New Construction	0.09	N/A	Decommission
Temporary Road 5a	New Construction	0.05	N/A	Decommission
Temporary Road 5b	New Construction	0.04	N/A	Decommission
Temporary Road 6	New Construction	0.06	N/A	Decommission

Table 5. Summary of road treatments for the project area

Transportation Activity Summary	
Action	**Miles**
Road Maintenance	20.60
Reconditioning of Open Roads	1.35
Reconditioning of Closed Roads	1.87
Temp Road Construction	0.71
Grand Total	**24.53**

In addition to the aforementioned activities, the interdisciplinary team has identified the following road improvements for stream quality and/or fish habitat:

- Remove an undersized culvert where FSR 278 crosses Tumbledown Creek and install

a larger culvert to reduce stream sedimentation and restore fish passage.

- Apply crushed rock and improve surface and ditch drainage where FSR 278 crosses Tumbledown Creek, Gold Creek, Branch North Gold Creek, Kickbush Gulch, Granite Creek, and Tom's Gulch to reduce sedimentation.

With respect to road use on all Forest Service roads, timber hauling would occur in accordance with Forest Service Timber Sale contract provisions for environmental protections (B5.12 "Use of Roads by Purchaser"). Provisions explicitly state that the [purchaser] is authorized to use existing National Forest roads when such use would not cause damage to the roads or National Forest resources and when hauling can be done safely. For protection of soil and water quality, timber hauling on Forest Service controlled roads would be restricted when there are excessively wet weather conditions. Compliance with such restriction shall remain the responsibility of the timber sale administrator (Forest Service representative) for the life on the project. In addition, hauling would adhere to regulations within the Inland Native Fish Strategy (INFS), Clean Water Act, Idaho Forest Practices Act, Bonner County Road and Bridge Department, and Idaho Department of Transportation.

Location: (see Project File map)
This project would occur on the East Face of Lake Pend Oreille, along the southern arm of the lake. Critical Habitat for bull trout was occurs within and adjacent to the project area: Lake Pend Oreille proper and the lower reach of North Gold Creek where it flows through private property.

Duration:
Project activities would likely start in the summer of 2007 and be completed by fall of 2012.

Timeline:
Roadwork would be detailed in engineer's road package and completed as prehaul maintenance. Road maintenance activities as such, including culvert replacement and rocked stream crossings, would begin in the 2007 summer. Harvesting, yarding, and decking logs would begin during this same timeframe within the limits of Best Management Practices (USDA Forest Service 1988); however, hauling timber would not occur until the project-related road maintenance activities have been completed.

Prefield/Field Review

On August 30, September 16, and October 19, 2005, stream reviews and surveys were conducted on project area reaches of Brush, Cedar, Canyon, North Gold, South Twin, North Twin, and Tumbledown Creeks. Sensitive areas of most proposed harvest units, temporary road locations, existing stream conditions, and existing road conditions were examined during this review (see Fisheries Field/Survey Notes in project file). More than

half of these reviews were performed with Hydrology staff. During these field reviews, fish presence/absence surveys were conducted via electrofishing to establish an environmental baseline (results located in project file). In addition, the North Zone fisheries databases and archives (USDA Forest Service 2005a) were searched to find relevant fisheries abundance data for Management Indicator Species (MIS), westslope cutthroat trout and bull trout as well as other desired non-native fish species and fisheries habitat information. An interdisciplinary field review was completed on April 25, 2006 to discuss specific road maintenance activities associated with the project (see hydrology project file). Additionally, a literature review on traffic effects was prepared and reviewed by the interdisciplinary team (see fisheries project file).

Status of Fish Species and Habitat

The Inland Native Fish Strategy (INFS) (USDA Forest Service 1995) established six principle Riparian Management Objectives (RMO) for continued persistence and recovery of inland native fish: pool frequency, water temperature, large woody debris, bank stability, lower bank angle, and width/depth ratios. Supportively, Rieman and McIntyre (1993) also suggest five habitat characteristics that are particularly important for bull trout. Those are channel stability, substrate composition, cover, stream temperature, and migratory corridors. These habitat requirements, as described below for bull trout, have been used to analyze the effects of this project to listed fish species and fisheries resources. Habitat needs of bull trout are similar to the needs of other native fish species, particularly other salmonids (i.e., westslope cutthroat trout). The following subsections describe bull trout life history, describe bull trout and other salmonid habitat requirements, assess existing fish populations, and assess current habitat conditions.

Bull Trout Life History

Bull trout exhibit resident, fluvial and adfluvial life histories (Averett and MacPhee 1971, Bjornn and Liknes 1986, and Goetz 1989); however, the adfluvial life-history is the only documented form in the Pend Oreille system. Resident populations remain in their natal streams throughout their life. Migratory populations (fluvial and adfluvial) use tributary streams for spawning and may remain in these areas throughout the summer. In the fall, migratory fish that have not previously returned to rivers (fluvial) and lakes (adfluvial) migrate to deeper water where they congregate and over-winter (Bjornn 1957). These life history strategies allow bull trout populations to maintain a degree of resiliency to disturbance regimes that are inherent to geographic areas defined by their native distribution.

The annual life history cycle of bull trout involves the following pattern. Fluvial and adfluvial spawners begin migrating to spawning tributaries in the spring and summer. These fish remain in staging areas in rivers and lakes during the summer and wait for the fall spawning period. Spawning occurs in clear streams that possess appropriate habitat characteristics with respect to substrate composition, water quality, and cover elements.

Spawning adults that survive migrate back to rivers or lakes soon after spawning. Fertilized eggs incubate approximately 200 days in spawning gravels during the fall and winter and fry emerge in the spring. Juvenile fish remain in natal streams for three to five years before migrating downstream to more productive river or lake habitat. Resident bull trout exhibit the same annual life history cycle as the fluvial and adfluvial fish but adults remain in the tributaries throughout the year.

Rieman and McIntyre (1993) state that fragmentation and disruption of bull trout habitat will increasingly isolate populations and isolate or eliminate life-history forms. This fragmentation and disruption of habitat will lead to problems for populations and ultimately increase the risk of extinction.

Bull Trout Habitat Requirements

Rieman and McIntyre (1993) suggest that five habitat characteristics are particularly important for bull trout. These are channel stability, substrate composition, cover, stream temperature, and migratory corridors. Requirements for good rearing habitat for bull trout include water temperatures below 15 degrees Celsius (Goetz 1989) and abundant cover (Fraley *et al.* 1989). Idaho water quality standards for cold water biota is below 22 degrees Centigrade, whereas for salmonid spawning the standard is a maximum of 13˚C and a Mean Daily Average of 9˚C (IDEQ 2000, IDAPA 58.01.02). The Idaho water temperature standards for bull trout are a Mean Weekly Maximum Temperature (MWMT) of <13˚C for June-August and a Mean Daily Average of 9˚C for September-October (IDEQ 2000, IDAPA 58.01.02). Juvenile rearing habitat is generally in smaller tributaries where the fish will remain for 3-5 years before migrating downstream to seek more suitable habitat. Gravel areas near headwater streams are utilized by spawning bull trout in the fall. More recent data indicate that bull trout seek areas of groundwater upwelling for spawning, presumably for the benefit of buffered temperature ranges (Baxter and Hauer 2000).

Though there are general characteristics of habitat for bull trout, specific habitat requirements vary by age (McPhail and Baxter 1996) and season of the year (Campbell and Neuner 1985, Moore and Gregory 1988, Rieman and Apperson 1989, Baltz *et al.* 1991). Young-of-the-year fish initially seek stream margins with heterogeneous habitat structure (McPhail and Baxter 1996). Where this habitat is not present or has been lost, juvenile trout populations are virtually eliminated (Moore and Gregory 1988). Dolloff and Reeves (1990) reported that young Dolly Varden (*Salvelinus malma*), a species closely related to bull trout, most frequently used woody debris as cover. Juvenile fish overwintering in stream habitats often use interstitial spaces of large substrate (Bonneau and Scarnecchia 1998). As fish grow larger and mature they seek out deep water habitat types, such as pools and deep runs (Hickman and Raleigh 1982, Baltz *et al.* 1991).

The function of headwater streams and their importance to downstream supported fisheries has been reviewed by Bilby and Likens (1980) and Schlosser (1982). Their

work suggests that organic debris dams are an important component of small stream ecosystems and that their loss results in considerable seasonal and annual variation in the trophic structure and total biomass of aquatic ecosystems. Debris jams retain nutrients vital to fisheries productivity and moderate sediment pulses from exceeding channel capacities downstream (Meehan 1991).

Stream channel equilibrium (stability) is the balance between sediment yield, water yield, and channel morphology, which exists within a stream system. Studies indicate that shifts away from channel equilibrium can result in negative changes in the structure and function of stream ecosystems (Bilby and Likens 1980, Schlosser 1982) and their dependent fish populations. Bisson and Sedell (1982) reported that where stream channels have become destabilized, riffles elongate and in many cases extend through former pool locations resulting in loss of pool volume. They suggested that declines in older fish might be the result of their dependency upon deeper water habitats. The persistence of bull trout over time can best be provided by maintaining lateral and in stream habitat complexity in association with channel stability (Gorman and Karr 1978, Karr and Dudley 1981, Karr and Freemark 1983).

Project Area Fish Populations and Habitat Conditions

Four primary fish species currently inhabit the streams along the south face of Lake Pend Oreille; however, species composition varies by individual drainage. Those species are bull trout, westslope cutthroat trout, eastern brook trout *Salvelinus fontinalis* (invasive non-native), and rainbow trout *Oncorhynchus mykiss* (Figure 1). Shorthead sculpin *Cottus confusus* also inhabitat portions of these streams, but have patchy distributions and were not observed in 2005 surveys (IDEQ 2000, IDAPA 58.01.02).

Fish community structure and habitat use in these streams is controlled by physical barriers and size of habitat patches. Cedar and North Gold Creeks have gradual, relatively low-slope approaches to Lake Pend Oreille, which provides access for migratory fish from the lake up to the middle reaches of those streams. The Twin Creeks have extremely steep approaches from the lake to the streams that does not provide access for migratory fish. Nonetheless, North Twin has habitat patches large enough to support a resident fish population, whereas South Twin does not have patches large enough to support fish (Figure 1). Brush, Canyon, and Tumbledown Creeks are tributaries to Cedar Creek, but natural barriers to migratory fish exist for each stream[1]. Despite those barriers, resident fish do occur in Canyon and Tumbledown Creeks.

[1] The middle section of Brush Creek is not perennial and goes subsurface. A steep stream reach in the lower section of Canyon Creek serves as a natural barrier. The lower section of Tumbledown Creek flows subsurface or intermittently as it enters Cedar Creek.

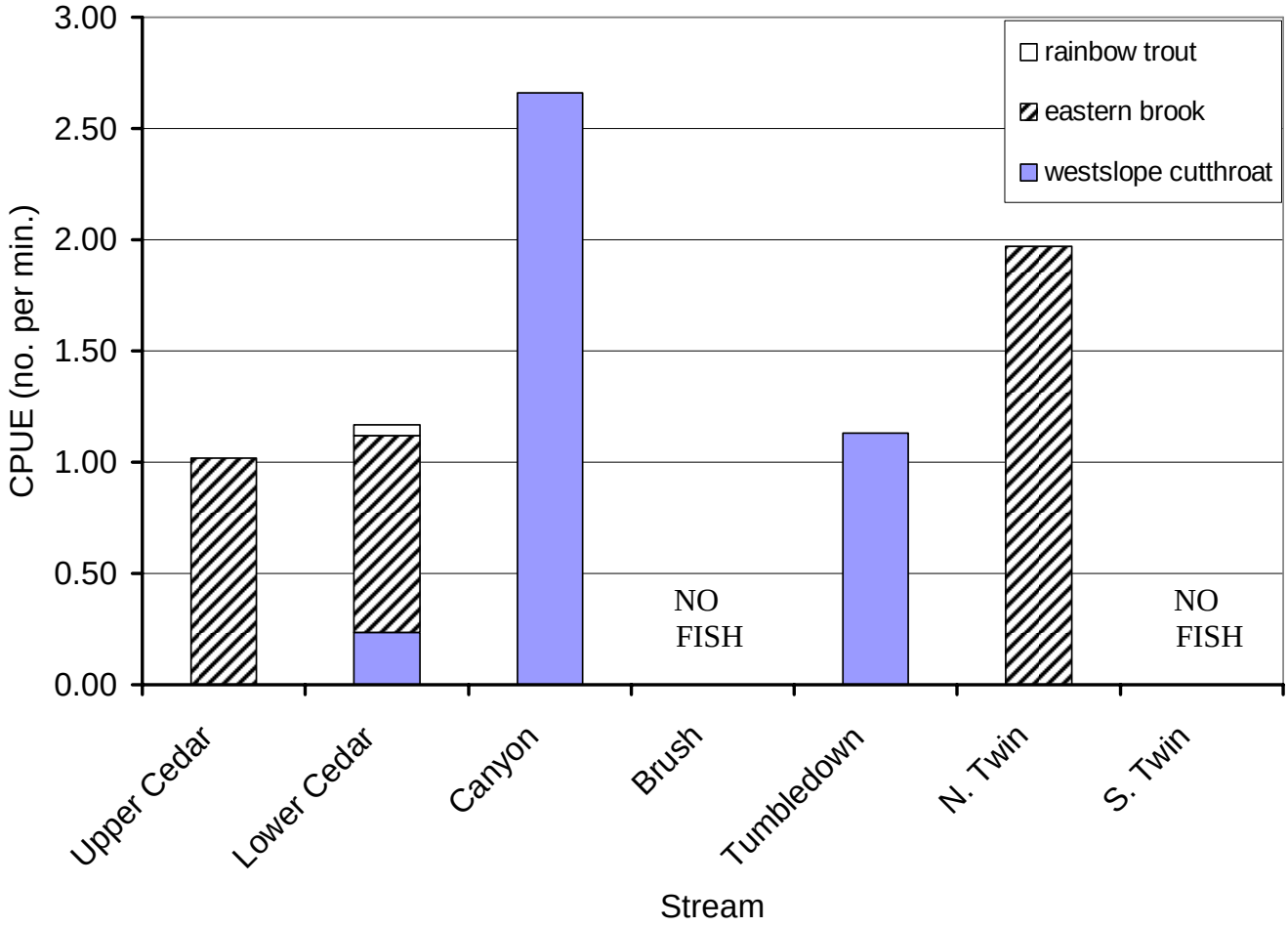

Figure 1. Relative abundance as estimated by Catch per Unit Effort (CPUE) of fish species in streams within the project area. Brush Creek, where surveyed (FS land), is not perennial and therefore is not fish-bearing. Bull trout do not occur within these streams and North Gold Creek was not surveyed due to known bull trout occurrence and spawning.

Bull trout occur in North Gold, Gold, and Granite Creeks along the southern face of the lake (IDFG 2000). Anecdotal accounts indicate bull trout may have historically used Cedar Creek, however, survey data from the distant past (40+ years) do not corroborate the claim. Bull trout populations in North Gold Creek and other Pend Oreille streams are strong, steady, and viable as evidenced by reproduction trends (Figure 2). Westslope cutthroat trout, a management indicator species, occur in Canyon, Cedar, Tumbledown, and North Gold Creeks. Cutthroat populations in Tumbledown and Canyon Creek appear healthy and show limited signs of introgression with non-native rainbow trout (*O. mykiss*). The remaining fish-bearing streams in the project area are inhabitated by eastern brook trout (e.g., Upper Cedar, N. Twin) and likely were historically inhabited by native resident cutthroat trout (*sensu* Shepard 2004). Native cutthroat trout have been

completely replaced by eastern brook trout in North Twin Creek. Although not observed during field surveys, shorthead sculpin likely have patchy distributions within some of these streams. Shorthead sculpin are widespread throughout North America (Wydoski and Whitney 2003).

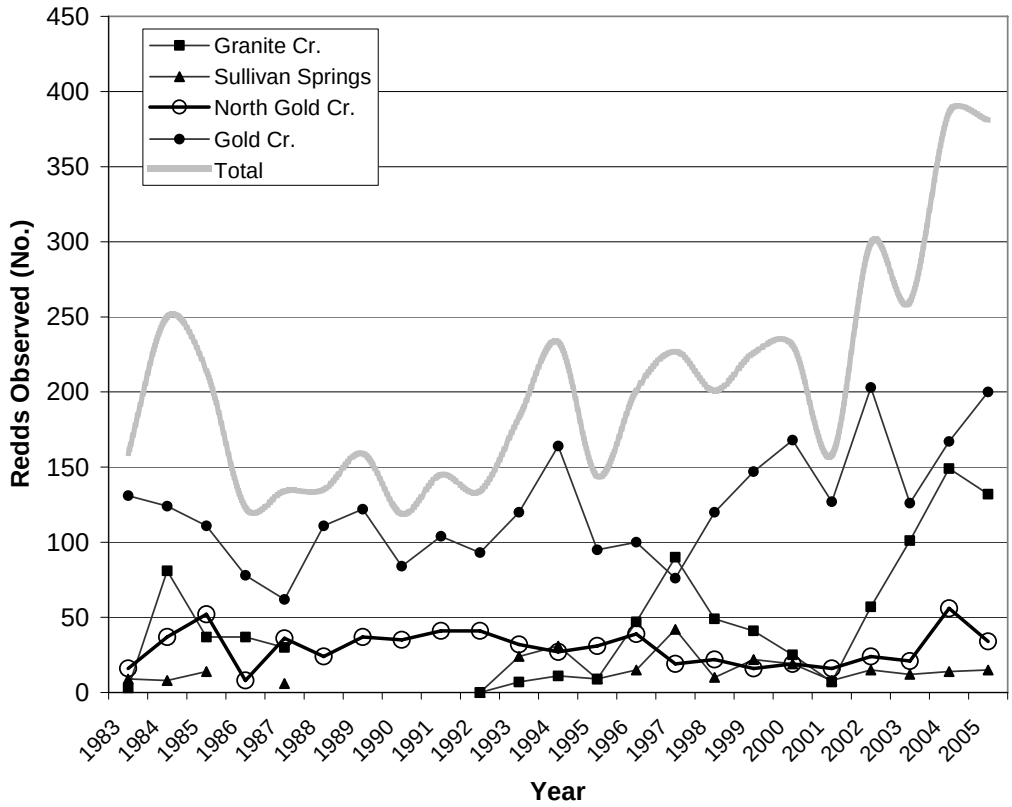

Figure 2. Trends in bull trout reproduction over the past 20 year period as measured by the number of redds observed in the respective stream. The broad gray line indicates the cumulative total reproduction for bull trout streams along the eastern face of Lake Pend Oreille (data from Idaho Department of Fish & Game). Granite Creek and Sullivan Springs were not surveyed from 1987 to 1992.

The streams within the project area are relatively small (2nd to 3rd order) and similar in geomorphic structure (refer to Tumbledown Hydrology Report). Fish habitat conditions in the 2nd order streams (Brush, Canyon, Tumbledown, N. Twin, S. Twin) are typical of small order streams (i.e., moderate gradients, few deep pools), but vary by individual drainage depending the degree of past land use. Habitat conditions in the relatively larger (3rd order) Cedar and North Gold Creeks, include more heterogeneity of habitat types, greater pool depths, and larger functional habitat patches for fish. Cedar Creek has a highly altered riparian area because of the powerline, has warm thermal conditions, and is listed for temperature impaired (Idaho Department of Environmental Quality 2002). Conversely, North Gold Creek has an intact Riparian Habitat Conservation Area and subsequently a cool thermal regime that can support bull trout. However, the lower mile

of North Gold Creek is not in a state of dynamic equilibrium and experiences atypical channel headcutting, streambank erosion, and extended periods of flow intermittency. These conditions are most likely associated with past mining and homesteading efforts (riparian clearing and removal of in-channel LWD). Upper reaches of North Gold Creek and its tributaries appear to be functioning well (USFS 2002).

For more specific information about water quality, habitat elements, channel conditions, and streamflow for the project area streams please refer to the Matrix of Conditions in the Fisheries Project File.

Table 6. Summation of the Analysis of Effects for Endangered, Threatened, and Sensitive Species for the Tumbledown Fuels Reduction Project

Species	Habitat Present	Habitat Absent	Species Present	Species Absent	Cumulative Effects
Endangered:					
White sturgeon *Acipenser transmontanus*		X		X	Not Applicable
Threatened:					
Bull trout *Salvelinus confluentus*	X		X		NO
Sensitive/Species of Concern:					
Burbot *Lota lota*		X		X	Not Applicable
Interior redband trout *Oncorhynchus mykiss gairdneri*		X		X	Not Applicable
Westslope cutthroat trout *Oncorhynchus clarki lewisi*	X		X		NO

Further explanations for above table:

- White sturgeon and burbot are not found outside the Kootenai River drainage on the North Zone of the Idaho Panhandle National Forests.
- Interior redband trout are not known to inhabit any portion of the Lake Pend Oreille Basin.

Determination of Effects and Rationale

The purpose of this section is to provide a quantified baseline of aquatic habitat conditions in the 6th field Lake Pend Oreille Riparian and North Gold Hydrologic Units (HUC) as well as to describe the anticipated changes in habitat conditions and fish populations as a result of implementing this project. This section documents the direct and indirect effects to specific aquatic habitat elements (i.e., INFS Riparian Management Objectives [RMO]) relevant to this project, overall effects to bull trout, and overall effects to sensitive species (Table 6). This effects determination examines road maintenance for sensitive species; however, road maintenance as it affects Endangered Species (i.e., bull trout) has been analyzed previously in the Programmatic Road Maintenance Biological Assessment for the Idaho Panhandle National Forests. Through informal consultation pursuant to section 7(a)(2) of the Endangered Species Act of 1973, the U.S. Fish and Wildlife Service issued a Letter of Concurrence to the Forest Service on September 3, 2005 concurring that road maintenance activity *May Affect, but is Not Likely to Adversely Affect* bull trout. Therefore, road maintenance effects associated with the Tumbledown Fuels Reduction Project will not be included in the determination of effects on bull trout on the project level. In accordance with the conditions of the Programmatic Road Maintenance Biological Assessment, all road maintenance performed within the terms of this assessment will be annually reported to the U.S. Fish and Wildlife Service. However, road maintenance effects associated with this project are evaluated for westslope cutthroat trout.

Direct/Indirect Effects

The Tumbledown Hazardous Fuels Reduction Project would not directly affect temperature, sediment regime, habitat cover/complexity, pool frequency, or width/depth ratios because there are no fuel treatment units or road construction scheduled to occur within any RHCA. The culvert replacement on Tumbledown Creek will directly affect habitat connectivity by providing year-round upstream-downstream fish passage for native cutthroat trout within this stream. The road improvements being made to the existing road network for this project will reduce the amount of road-derived fine sediment being delivered to Granite, Toms Gulch, Tumbledown, North Gold, Kickbush Gulch, Gold Creek and other project-area streams over the long-term (1-10 years). This would transpire into small-scale improvements in spawning areas (cleaner gravel), better insect production and prey availability for native trout, and less native fish avoidance of road-impacted reaches. However, these and other road improvements (miles of grading, brushing, ditch cleaning) to the road network may indirectly affect native cutthroat trout by temporarily increasing sediment delivery into Tumbledown, Cedar, Canyon, N. & S. Twin, and North Gold Creeks, through the improvements. This effect would be a short-duration pulse of elevated turbidity (>25 NTUs; Waters 1995), which could temporarily displace or cause physiological stress to individual fish within the immediate vicinity (100 m downstream). The replacement of the culvert on Tumbledown Creek and realignment of the stream will reduce road-based sedimentation into Tumbledown Creek over the long-term (USDA Forest Service 2007, Hydrology Report), but will indeed

deliver some sediment to the stream during construction. The road treatments (e.g., reconditioning, "re-opening" roads) near RHCAs will not increase sediment loads in stream channels (see Hydrology Report). Furthermore, mitigation measures (Appendix 1) and best management practices (USDA Forest Service 1988; FSH 2509.22) would limit the increased risk in sediment production/delivery to negligible levels.

Sediment (Data: visual observations, 1992 Pebble Counts, Sediment Production Loads [WEPP Models; Elliott 2004])
Although sediment composition is not an INFS RMO, it is well known that unnatural loads of fine sediment can have numerous deleterious effects on salmonids (Waters 1995). Tumbledown, Cedar, and North Twin Creeks have relatively high amounts of fine sediment within the bedload (>20%) and moderate levels of embeddedness (USFS surveys, 2005). Canyon Creek has a properly functioning bedload with lower amounts of fine sediment (<20%) and embeddedness values are within the natural range of variability (see Hydrology Report). The primary human-caused contributors of fine sediment to these streams are the 278 and 1050 Forest Service Roads and associated spur roads (private and federal). The road network within this subwatershed is not extensive (e.g., only 2.6 mi/mi^2); however, the location of roads is concentrated in riparian areas (within RHCA ~ 4.5 mi/mi^2).

Road improvement work would occur within some of the RHCAs in the project area and within close proximity to fish-bearing streams. Those sites are the 278H road adjacent to the North Gold Creek RHCA, the 278 road crossings over Tumbledown Creek, Gold Creek, Branch North Gold Creek, Kickbush Gulch, Granite Creek, and Tom's Gulch, and the access roads into Units adjacent to Tumbledown and South Twin Creeks. Associated with such improvements, short-term pulses of sediment delivery could occur and effect individual fish through gill irritation, physical displacement, or short-term physiological stress (Waters 1995). However, the long-term risk of fine sediment delivery to affected streams would be substantially reduced, thereby causing less frequent negative effects to fish. Road Maintenance activities for this project would include blading the road surface, ditch cleaning, and culvert cleaning and would reduce erosion, particularly for roads that receive moderate use, by improving how well water is drained off of the road surface; however, because those actions disturb compacted material there would be a small pulse of fine sediment into adjacent streams following such maintenance with consequences to individual fish as previously described. Despite the very short-term sediment pulse, road erosion and subsequent sediment delivery to the stream should be markedly lower for a period of 1-5 years, depending on traffic levels. Furthermore, the overall effect of road maintenance and road decommissioning would be a reduction in sediment load in stream over the longer-term (5-10 years) and thus beneficial to fish and fish habitat.

Sedimentation effects to fish or fish habitat are well insulated from the harvest, yarding, and burning of units by the establishment of well-defined RHCAs throughout the project area. Fuels treatments would not occur within any RHCA. Because RHCAs are not being treated by this project, there is substantial buffering capacity between treatment units and

running water**.** For all units, sediment generated from harvesting trees, yarding logs, and burning slash would not be delivered to stream channels (see Hydrology Report).

Site-specific analyses are summarized below.

- Approximately 2.6 miles of road maintenance would occur on the 278H road adjacent to the North Gold Creek RHCA. This may possibly contribute sediment to North Gold Creek as described above and may affect fish through gill irritation and displacement of individuals from suspended sediment, or by temporarily reducing insect prey availability from deposited sediment. In addition, use of this road for the treatment and hauling operations would be restricted after September 30 to eliminate the risk of sediment deposition on bull trout redds in North Gold Creek.
- Six stream-road crossings would be improved on the main 278 road crossings by adding a 6-inch lift of gravel for 100 feet on either side of the stream. Over the long-term, habitat conditions downstream of the road would be improved over current conditions. In the short-term, some fish may be temporarily displaced.
- The replacement of the culvert on the 278 road crossing over Tumbledown Creek would generate and deliver a small amount of to the stream during the removal and installation of a larger, fish passable culvert. Native cutthroat trout could be displaced and some individuals may even suffer physiological stress due to high suspended sediment levels. In addition, habitat conditions would be negatively affected by the loss of interstitial spaces between gravels for good quality spawning habitat and good insect production as well as loss of pool habitat where sediment may fill in pools. Such effects would be limited to the site area (100 feet up and downstream of the road) due to the use of best management practices and would not persist for more than 2 years due to annual resorting of channel materials during the spring freshet. Furthermore, employing site specific mitigation (i.e., BMPs, dewatering the site, and diverting the streamflow around the construction area) would minimize the actual amount of sediment deliver to Tumbledown Creek.

Cover and habitat complexity (Data: 1992 large woody debris frequency)
Surveys completed by BioWest in 1992 indicated that overall habitat cover in the project area streams was variable. Cover habitat within North Gold Creek, the only bull trout stream in the project area, is present (Figure 3) and functioning properly. Large woody debris (LWD) accumulations within Cedar and Tumbledown Creeks are considered inadequate as compared to INFS RMOs based on field observations. Whereas other streams in the project area had moderate levels of LWD that were commensurate with INFS RMOs given the stream type of size. Past events that help to explain some of this variation in LWD levels and potential recruitment within the 6th field HUC include recent (1990) riparian timber harvest, road construction and continued operation of large electrical transmission lines, and the extensive areas burned by the wildfires of the early 1900s. Although habitat complexity within the 6th field watershed is in fair condition

currently, this project would not adversely affect this habitat element because there are no activities within the RHCA that would affect this element.

Pool Quantity and Quality (1992 Data: pools per mile, large pools [>1m] per mile)
For the small-order streams (i.e., headwater sections), pool frequencies were 20.1/mi, which is far below the RMO 96 pools/mi. Stream reaches farther downstream had pool frequencies that were commensurate with the established RMO. Nonetheless, three streams were particularly devoid of adequate pool quality, Brush, N. Twin, and Tumbledown Creeks (see Fisheries Project File – Survey Notes). In addition, observations of habitat conditions in Cedar Creek indicate poor pool quality. The current riparian road network and the improperly functioning riparian conditions likely hinder the attainment of this RMO in Cedar Creek. The replacement of the culvert on Tumbledown Creek has the potential to affect pool quantity and quality where sediment loads would be increased to a measurable level. This effect would be short-lived and would only affect a small area.

Figure 3. Habitat (A) and riparian (B) conditions along North Gold Creek.

Habitat connectivity & fish distribution. (Data: 2005 culvert inventory; 2005 electrofishing; fish database)
Fish presence and species occurrence on the high-gradient streams of Pend Oreille face drainages is patchy and some fragmentation is the result of natural features (e.g., waterfalls, steep stream reaches, stream intermittency). The natural fragmentation most likely has helped to maintain the genetic integrity of isolated populations of westslope cutthroat trout[2]. Yet, some of the habitat fragmentation is due to road crossings. Table 7 describes the type, location, and severity of fish passage barriers in the subwatersheds. In addition, Figure 4 illustrates the severity of the fish passage barrier on Canyon Creek. In Canyon Creek, there is approximately 1 mile of usable habitat for westslope cutthroat

[2] IDFG stocked Canyon, Creek once in 1957 and there are no records of Tumbledown Creek ever being stocked (see Stocking Records in Fisheries Project File).

trout upstream from this culvert on FS road 1050. The road package of this project would not include the culvert replacement on Canyon Creek, but would include replacing the existing culvert on Tumbledown Creek. Replacement of the existing culvert with a larger capacity culvert that provides for year-round fish passage would restore upstream connectivity to about 1.5 miles of habitat for resident westslope cutthroat trout. Removal of this fish passage barrier would reconnect cutthroat populations upstream and downstream of Road 278 and improve the likelihood of this population persisting over time. Based upon fish surveys for this project, the only species present downstream of the 278 culvert is westslope cutthroat trout and thus improving fish passage at this site would not facilitate the invasion of eastern brook trout into cutthroat trout habitat.

Table 7. Description of barriers to fish passage within the project area.

Barrier Type	Stream Name	Habitat Upstream (mi)	Severity
FS Rd.278 (box culvert)	Cedar Creek	5.0	Juvenile
FS Rd.278 (culvert)	Tumbledown Creek	1.5	Adult & Juvenile
FS Rd. 1050 (culvert)	Canyon Creek	1.1	Adult & Juvenile

Figure 4. The culvert under FS Rd. 1050 on Canyon Creek is a fish passage barrier for an isolated population of westslope cutthroat trout.

Determination of Effects on Bull Trout

A portion of the adfluvial population of bull trout from Lake Pend Oreille occupies one stream within the project area (North Gold Creek) and several others within the subwatershed (6th level HUC). Some of the road improvement work, namely ditch improvements and addition of crushed rock over crossings and crossing approaches, associated with this project would potentially deliver some fine-sediment into bull trout

streams. No other road reconditioning actions (i.e., "re-opening" roads) would be performed within RHCAs of occupied bull trout streams. Because the road maintenance activities would be performed in compliance with the provisions of the Idaho Panhandle National Forests Programmatic Road Maintenance Biological Assessment, the road maintenance activities of this project have already been consulted upon with the U.S. Fish & Wildlife Service. The harvest and actions associated with fuels treatment adjacent to North Gold Creek would not deliver sediment to the stream and thus would not affect bull trout or designated Critical Habitat. Therefore, this project would result in ***No Effect*** to bull trout. This determination is based on the fact that the majority of streams are not inhabited by the species or do not provide potential habitat and within streams that do currently support bull trout hydrologic analysis of treatments (see Hydrology Report) and predictions of site specific effects support this determination. This effects determination is supported by the previous sections that describe the current use of habitat in North Gold Creek by bull trout, the effects to specific habitat factors, and completed matrix of pathways and indicators (located in the Fisheries Project File).

Determination of Effects to Sensitive Species

Westslope cutthroat trout currently occupy Tumbledown, Canyon, and Cedar Creek. The current habitat conditions, although altered from ideal conditions (i.e., few large pools, habitat fragmentation, moderate loads of sediment), appear to support these small populations at present. Most project activities, such as the majority of fuel treatments would not adversely affect individual fish or the populations to which they belong; however, road reconditioning, road maintenance, and the replacement of the Tumbledown Creek culvert do pose risks of affecting fish and degrading fish habitat, by temporarily increasing sediment loads in project area streams. Sediment-related effects could affect westslope cutthroat trout through gill irritation, displacement, temporarily altered feeding habits, and even death (Meehan et al. 1991). Sediment contributed from road maintenance activities would be negligible based on-site specific mitigation (i.e., not between spawning and emergence) and would not occur when embryos or fry were most susceptible to entrapment or oxygen deprivation. The combination of sediment-related effects (sedimentation, turbidity, and reductions in pool habitat) within Tumbledown Creek poses the greatest risk to this species. Based upon the low likelihood and anticipated short duration of negative effects, the effects of this project are not great enough to threaten the persistence of the westslope cutthroat trout population in Tumbledown Creek. Therefore, I find that this project ***May Impact Individuals, But would Not Likely Result in a Trend Toward Federal Listing or Reduced Viability for the Population or Species.***

Cumulative Effects

Management Indicator Species (NEPA-based Cumulative Effects)

This section addresses how this project contributes cumulatively to the past, ongoing, and reasonably foreseeable activities' effects to MIS and fisheries resources as defined by the

National Environmental Policy Act of 1970. The cumulative effects area for fisheries is the same as the project area boundary and encompasses approximately 5,611 acres. The Tumbledown Timber sale area is spread over five watersheds with a minimal percentage of area treated within each watershed. This project has a low likelihood of negative site-specific, measurable effects to fisheries resources. No other timber sales on Forest Service System Lands are proposed in the immediate vicinity of the project area at this time. Other actions that have affected fisheries resources in the past include the powerline construction and ongoing maintenance, timber harvest, and road building; however, the legacy effects of those projects have already been incorporated into the analysis of this project by the establishment of a current environmental baseline. The actions tied to this project have low-risk effects, thus, there are no effects that would contribute to a cumulative effect over the long-term. Road maintenance has been occurring and will most likely continue to occur in the area. Although road maintenance does put sediment in streams, it is only performed periodically and is designed to reduce long-term erosion of forest roads. Therefore the small short-term effect of sediment delivery would not add to a cumulative effect of total sediment delivered.

Ongoing and reasonably foreseeable activities in the vicinity of the sale area are: routine road maintenance, noxious weed treatment, treatment of the powerline corridor, public firewood collection, fire suppression, and development on private land. Routine road maintenance will improve road drainage over time, reducing sediment delivery to streams and addressing point sources of chronic sediment delivery to streams. Noxious weed activities would follow guidelines established by the Sandpoint Noxious Weeds Control Project EIS (USDA Forest Service 1998).

Federally Listed Species (ESA-based Cumulative Effects)
This section addresses the effects of future state, local, and private actions on listed fish species that are reasonably certain to occur as defined by the Endangered Species Act of 1973, as amended. Development and road building on private lands within the area (lower reach of North Gold Creek) are expected to continue and will likely produce measurable effects (e.g., fish avoidance and less use of habitat, except for the purposes of migration) to bull trout and designated Critical Habitat; however, those actions occur on private land and are not tied the actions of this project.

Extraordinary Circumstances

Based on the rationale discussed above for each sensitive species, the proposed action may impact individual westslope cutthroat trout or their habitat, but would not impact these species to a meaningful or significant degree that would likely contribute to a trend towards Federal listing or cause a loss of viability of the population or species. Furthermore, the proposed action would not affect bull trout or their habitat period. Therefore, there would be no extraordinary circumstances regarding this project for sensitive wildlife species.

Mandatory Conservation Requirements

In order for the Effects Determinations for this project to remain valid, the following provisions must be met throughout the planning and implementation phases:

1. Ground disturbing activities would not occur within the RHCA, with the exception of road maintenance activities.
2. All project related activities would occur in accordance with the Soil and Water Conservation Handbook (USDA Forest Service 1988; FSH 2509.22).
3. The project must meet the relevant Inland Native Fish Strategy (INFS) Standards and Guidelines that relate to the proposed action (see section below).
4. Operations for opening roads (i.e., brushing and blading), restoring adequate drainage features, and restoring fish passage would follow the mitigation measures (Appendix 1) from the IPNF Road Maintenance Programmatic Biological Assessment (USDA Forest Service 2004).
5. In order to protect populations of bull trout and westslope cutthroat trout occupying Cedar, Canyon, Tumbledown, and North Gold Creeks, hauling of timber would not occur when surfaces and ditches of Forest Service roads pose a risk to delivering sediment to streams. In particular, road 278H would not be used for this project after September 30 to avoid impacts to North Gold Creek. Such hauling limitations are provided under Forest Service Timber Sale contract provisions and compliance with such restriction shall remain the responsibility of the timber sale administrator for the life of the project.

Consistency with Forest Plan Standards

The Tumbledown Hazardous Fuels Project is consistent with the Forest Plan for the Idaho Panhandle National Forests (IPNF) (USDA Forest Service 1987) as amended by the Inland Native Fish Strategy (INFS) (USDA Forest Service 1995) and the removal of the Fry Emergence Standard (USDA Forest Service 2005b). The project's consistency with INFS standards and RMOs are addressed in the above *Determination of Effects and Rationale* section of this joint Biological Assessment and Biological Evaluation. The specific INFS standards and guidelines relevant to this project are listed below along with how the proposed action intends to meet those standards.

RF – 2 For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects to inland native fish by:

b. minimizing road and landing locations in RHCAs

Access to units attempted to minimize new road construction and utilize existing road prisms that already occur on the landscape. Some roads in the project area that occur in the RHCA will be obliterated after use so they are no longer preventing attainment of RMOs.

c. initiating development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items.

2. Road management objectives for each road.

A Road Analysis Procedure (RAP) was performed for all of the roads within the project area to determine if they are still needed or could possibly be decommissioned. If the road will be used by the project, we determined required maintenance needs and identified roads that will be decommissioned after the project.

6. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives.

Operational controls have been established and will be accounted for in the Timber Sale Contract to meet this standard.

d. avoiding sediment delivery to streams from the road surface.

Operational controls, special management of riparian zones, road drainage improvements, and road surface treatments have been incorporated to meet this standard.

RF – 3 Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on inland native fish by:

a. reconstructing road and drainage features that …do not retard attainment of Riparian Management Objectives.

Road reconditioning and improvements will be made to roads used for the project, particularly where roads cross streamcourses.

c. closing and obliterating roads not needed in the future based on the ecological value of the riparian resources.

Approximately 1.9 miles of road that will no longer be needed will be decommissioned after the project.

RF – 5 Provide and maintain fish passage at all road crossings or existing and potential fish-bearing streams.

One fish passage barrier culvert within the project area will be replaced to provide upstream connectivity for native fish in Tumbledown Creek as a result of this project.

FM – 1 Design fuel treatment…actions so as not to prevent attainment of Riparian Mangement Objectives, and to minimized disturbance of riparian ground cover and vegetation.

The fuels treatment units for this project do not treat any RHCA and should not indirectly affect the capacity of RMO attainment within the RHCAs.

Biological Assessment/Evaluation Preparers

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Appendix 1. Mitigation Measures for Road Maintenance Operations under the Tumbledown Fuels Reduction Project

General mitigation

- Locate fuel storage areas outside of RHCAs 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.
- When conducting surface blading and surface replacement utilize natural moisture or delivered water in blading operations to ensure rapid consolidation and compaction of the disturbed surface material.
- When conducting surface blading and surface replacement remove and re-incorporate material from the outside edges of the roadway that may result in the formation of a berm or other barrier to proper dispersal of water.
- DO NOT side cast waste material within RHCAs, waste material must be end hauled to an appropriate disposal location. Outside of RHCAs, side casting of minor amounts of material, such as oversize rock, may occur if no other practical solution exists. In no instance should side cast material be placed in a manner that results in oversteepened fill slopes, additional road width or impede proper drainage.
- On site disposal of material may be appropriate if the material can be incorporated into the road surface or drainage structure. Do not dispose of material within RHCA, floodplain or other wetlands.
- Cleaning of ditch relief culverts on cross drain structures such as open top culvert will not be done with flushing water within the RHCAs. Flushing of these structures outside of the RHCA can only be done if there is no potential for sediment delivery to any defined stream channel.
- If culvert cleaning is conducted with heavy machinery, this machinery shall be used only from the established road prisms.
- Dispose of materials suspected to contain harmful contaminates such as timber preservatives, red lead, fuel oil, solvents etc. appropriately as required by applicable regulations.
- Maintain a packed snow floor and/or utilize shoes on blades, dozers and other snow removal equipment to minimize amount of road surface material placed in snow berms.
- Do not side cast into or adjacent to streams snow containing significant amounts of dirt, debris or other materials removed from the roadway. This snow may need to be hauled to an appropriate disposal location.
- Sidecasting of snow should be avoided in areas adjacent to streams where there is potential to cause snow or ice damming.
- All debris, except snow and ice, that is removed from the road surface and ditches shall be deposited away from stream channels at agreed upon locations.
- Berms left on the shoulder of the road will be removed and/or drainage holes will be opened and maintained. Drainage holes will be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills.
- Snow Removal will adhere to the Standard Forest Service Timber Sale Contract Provisions (C5.316).

- Damage from, or as a result of, snow removal will be restored by the following summer.

Species Specific Mitigation

bull trout (*Salvelinus confluentus*)
westslope cutthroat trout (*Oncorhynchus clarki lewisi*)

- All road maintenance actions will meet BMPs and INFS Standards and Guidelines

- Road maintenance activities in live water and which generate the potential for instream sedimentation or channel alteration are prohibited after September 1 through July 15th on sites adjacent to or upstream of known or potential bull trout populations and/or spawning areas, namely Gold Creek, North Gold Creek, Kickbush Gulch, and Granite Creek.

- If brush cutting is needed within riparian areas (particularly stream crossings) heavy machinery shall be used only from the established road prism or it will be done with hand tools to the same specifications.

- When a stream parallels within five feet of a road the brush cutter will be turned vertically to cut only the vegetation growing towards the road and not the vegetation providing canopy to the stream.

- This biological assessment also covers activity that will require heavy equipment and the introduction of fill material into active channels and flood plains. The Tumbledown Creek and Rd 278 intersection/crossing is the only known site where fill will be removed and replaced in the floodplain. The final culvert replacement pland will require a review by zone biologist and hydrologist to ensure channel function is not impeded and INFS standards (RF-3) are met. This sites will also require a site evaluation and documentation for the feasibility of road alignment shifting to reduce encroachment upon RHCAs and channels. If it is determined that realignment is feasible a plan will be submitted requesting funding for realignment. The site can be repaired but a long term option must be evaluated and presented. These plans will be part of the annual monitoring program.

- Any soil disturbance adjacent to stream channels shall receive evenly distributed weed free mulch coverage with brush and trees to reduce sheet erosion. Mulch generated during the clearing phase of the rehabilitation work shall be used to the maximum extent practicable.

- Utilize good surface preparation and multiple pass application of chloride products to minimize runoff and promote infiltration of the product. Dust abatement chemicals should be applied shortly after blading (within 1 week). The road should have good moisture content, in order to get the calcium chloride to adhere well to the fines. The purpose of mutliple pass application is to avoid spraying off the road, particularly when crossing streams. Chemicals should be applied in a manner that minimizes calcium chloride from running off the road.

- To prevent injury to small fish during drafting, utilize either 3/32-inch or smaller mesh intake screens or double rolled 1/8-inch hardware cloth crimped at both ends when drafting water for dust abatement operations.

- Drafting rates will be such that no noticeable decrease in wetted width of the stream will occur. Should it be necessary to create a temporary barrier or blockage to the stream (to create a pool deep enough to draft from), during drafting an agency fish biologist will evaluate the site and may identify further mitigation.