UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

NMFS Tracking
No. 2003/00928

February 20, 2004

Claire Lavendel
Forest Supervisor
Gifford Pinchot National Forest
10600 NE 151 Circle
Vancouver, Washington 98682

Re: Endangered Species Act section 7 Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Upper Trout Creek Stream Restoration and Riparian Thinning Project, Skamania County, WA

Dear Mrs. Lavendel:

In accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended, 16 U.S.C. 1536, and the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996, 16 U.S.C. 1855, the attached document transmits NOAA's National Marine Fisheries Service (NOAA Fisheries) Biological Opinion (Opinion) and Essential Fish Habitat (EFH) consultation on the proposed Upper Trout Creek Stream Restoration and Riparian Thinning Project, Skamania County, Washington.

The Forest Service (FS) has determined that the proposed action was likely to adversely affect Lower Columbia River steelhead (*Oncorhynchus mykiss*) Evolutionarily Significant Unit (ESU). Formal consultation was initiated on August 11, 2003.

This Opinion reflects formal consultation and an analysis of effects covering listed steelhead in Upper Trout Creek, Washington. The Opinion is based on information provided in the biological evaluation received by NOAA on July 21, 2003, subsequent information transmitted by telephone conversations, and email. A complete administrative record of this consultation is on file at the Washington State Habitat Office.

NOAA Fisheries concludes that the implementation of the proposed project is not likely to jeopardize the continued existence of Lower Columbia River steelhead. Please note the incidental take statement, which includes reasonable and prudent measures and terms and conditions, was designed to minimize take.

The MSA consultation concluded that the proposed project may adversely impact designated Essential Fish Habitat (EFH) for chinook (*O. tshawytscha*) salmon. Specific Reasonable and Prudent Measures of the ESA consultation, Terms and Conditions identified therein, would address the negative effects resulting from the proposed FS actions. Therefore, NOAA Fisheries recommends that they be implemented as EFH conservation measures.

If you have any questions, please contact Karla Reece of the Washington State Habitat Branch Office at (360) 753-4374 or email at karla.reece@noaa.gov.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

Enclosure

Endangered Species Act - Section 7
Biological Opinion

and

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Upper Trout Creek Stream Restoration and Riparian Thinning Project
Skamania County, Washington

Agency:	U.S. Department of Agriculture Forest Service, Gifford Pinchot National Forest
Consultation Conducted By:	National Marine Fisheries Service Northwest Region
Date:	February 20, 2004
Issued by:	for Michael R Course D. Robert Lohn Regional Administrator
NMFS Tracking No.	2003/00928

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Background and Consultation History

On July 21, 2003, the NOAA's National Marine Fisheries Service (NOAA Fisheries) received a Biological Evaluation (BE) and Essential Fish Habitat (EFH) Assessment from the United States Department of Agriculture, Forest Service (FS) regarding the Upper Trout Creek Stream Restoration and Riparian Thinning (UTC) project in the Gifford Pinchot National Forest, and a request for consultation under both section 7 of the Endangered Species Act (ESA) and the EFH provisions of the Magnuson-Stevens Act (MSA). The proposed project area occurs within the geographic range of the Lower Columbia River (LCR) steelhead (*Oncorhynchus mykiss*) Evolutionarily Significant Unit (ESU). The FS has determined that the project "may affect, and is likely to adversely affect" LCR steelhead.

This document contains the Biological Opinion (Opinion) which is based on the information presented in the BE, phone conversations, electronic mail correspondence, and a site visit on August 11, 2003. The purpose of the Opinion is to indicate if the proposed project is likely to jeopardize listed LCR steelhead. The objective of the EFH consultation is to determine whether the proposed project will adversely affect designated EFH, and to recommend conservation measures to avoid, minimize or otherwise offset any such adverse effects.

1.2 Description of the Proposed Action

Proposed actions are defined in the Services' ESA consultation regulations (50 CFR 402.02) as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." Because the FS proposed project may affect listed resources and their habitat, it must consult under ESA section 7(a)(2) and MSA section 305(b)(2).

Activities carried out under the Upper Trout Restoration Project will:

1) Restore riparian conifers along Upper Trout, Crater, Compass, Planting, and Layout Creek to 22-55 trees per acre, which will be greater than 31 inch diameter at breast height (dbh) in 200 years.
2) Increase shade to greater than 80% in 60 years.
3) Increase bank stability to greater than 80% in 2 years.
4) Reduce low flow width-to-depth ratios to a ratio of less than 10.
5) Increase in-stream large woody debris (LWD) to greater than 200 pieces per river mile, greater than 12 inch diameter, and greater than 50 feet in length in 1 year.
6) Increase survival and carrying capacity for rearing stages of juvenile steelhead in 2 to 60 years.

Whole trees and logs used for floodplain, stream channel, terrestrial, and fisheries habitat restoration within the Trout Creek subwatershed will be acquired from selective thinning of

four overstocked young stands (Units 1, 3, 4, and 7) and thinning dense second growth timber stands along the affected riparian areas. The trees and logs removed from these areas will be used to add LWD to streams in vegetated areas. Young stand thinning in riparian areas will accelerate growth and function of residual trees within the stands.

The FS proposes to conduct a restoration and riparian thinning project in the Upper Trout Creek watershed during 2004 and 2005. Restoration activities will take place in Trout Creek, Crater Creek, Compass Creek, Layout Creek and one and Planting Creek (Figure 1). These stream restoration projects were recommended in the Wind River Watershed Analysis (USDA Forest Service 2001). Two culverts, at the 42 road crossing of Trout Creek and the 43 road crossing of an unnamed tributary, would be replaced with bridges (Figure 1). Replacement of the two culverts will be covered under U.S.D.A. Forest Service Programmatic Culvert Replacement Activities in Washington and Eastern Oregon Biological Opinion, (NMFS Tracking No. 2003/00676) and will not be analyzed in this Opinion.

This project will take place in the summer months of 2004 and 2005. In addition, as many as 427 acres of riparian forests would be thinned to accelerate the development of old-growth characteristics. Riparian thinning will occur on both sides of the streams where proposed in-stream restoration activities would occur, with the exception of Trout Creek where only the east side will be thinned. Over-crowded and immature trees will be thinned from around the largest and most mature trees in the riparian stand. Harvested trees not used for instream restoration purposes will be left on the ground. Fifty percent canopy cover would remain in the riparian stands after thinning. This project will result in no commercial timber harvest.

Harvest prescriptions for selective thinning in units 1, 3, 4, and 7 (Figure 1) will combine light, medium, and/or heavy thinning in 183 acres. Resultant upland stands would have 30-50% canopy closure and 70-140 trees per acre. The riparian thinning calls for fewer trees harvested and greater canopy closure returned than in the upland units, and few, if any trees contributing shade to the stream will be removed. All units will be treated with ground-based equipment. In all, approximately 6,000 trees (from the riparian and upland units) would be used either singly as LWD or in the creation of in-stream large wood structures. The FS will remove approximately 50% of the trees removed during thinning operations by pushing them over with tracked excavators to capture the root network of the trees. All riparian forests would be under-planted with a mix of Western red cedar, Western hemlock, grand fir, and Western white pine.

Stream channel morphology and hydrology will be manipulated in an effort to foster and enhance recovery of fish habitat and hydrologic function. Specifically, tracked excavators and other walking ‘spyders’ would move up and down the stream channel to specific project sites where meander logjams and gravel bar structures are to be constructed. Construction of log structures would require excavation of stream banks and the streambed in order to partially bury treetops and roots. While the exact location of each structure will be determined by site-specific conditions, on average, a new structure will be built every 300 feet.

Figure 1: Upper Trout Stream Restoration and Riparian Thinning Project Area

The FS has proposed the following Best Management Practices (BMPs) to minimize the impacts of the proposed bank stabilization project on listed salmonids.

- Skid trails would be between 12 and 15 feet wide and covered with slash to minimize soil compaction and disturbance to ground cover vegetation.
- To the maximum extent practicable, all in channel work in streams will be done in dry portions of the channel during low water periods.
- No Western red cedar of any size would be cut in the construction of skid trails.
- All trees to be cut within Riparian Reserves will be identified and marked before cutting.
- No trees will be cut within 25 feet of the edge of any stream.
- All perennial water courses adjacent to in-channel work will be snorkeled to locate adult and juvenile salmonids. Heavy equipment access and construction will be restricted from areas that contain adult steelhead or high densities of juvenile steelhead.
- The use of mechanized equipment within the ordinary high-water mark would be held to a minimum. Approved equipment would be limited to a tracked excavator and dozer (gross vehicle weight of no greater than 70,000 lbs), portable winch, power saws, and hand tools.
- All ground based mechanized equipment used in this project will be power washed to remove excess grease, oil, and noxious weed seeds.
- A spill containment plan will be prepared and approved prior to operation. It will require absorbent diapers to be available on-site in case of petroleum leaks or spills.
- Control methods will be used within the channel to reduce sedimentation/turbidity. These will include the diversion of water away from excavation sites, use of filter fences, temporary settling ponds, and check dams. Objectives of these measures are to minimize downstream sedimentation and turbidity.
- Alteration or disturbance of bank, shoreline, logjams, or vegetation will be held to a minimum. On sites that are disturbed, mulch, willow cuttings and native grass will be applied. The objective is to re-vegetate disturbed areas to reduce surface soil erosion and sedimentation.
- Access roads, whether they be old skid roads or fire-lines, will be rehabilitated following use, to reduce soil erosion and possible stream sedimentation. Access roads will be water barred and seeded with native grasses. Areas of adverse compaction may also be ripped. Berms would be constructed at the entrances to discourage vehicle access. Another objective of this mitigation is to prevent these temporary access roads from becoming permanent roads and cause an increase in road density within allocated Winter Range,

Riparian Reserves, or Experimental Forest. Rehabilitation also decreases the potential for noxious weed invasion.

- Trees that have been girdled by bears or have other physical defects predisposing the tree to early mortality would be left standing and allowed to die, providing snag and downed log habitat.
- A minimum of one cut tree per thinned gap would be left on the ground. The current stands have little to no down woody debris. This measure would add 6-8 downed trees per acre or approximately 350 linear feet per acre of small diameter, down woody debris.
- Cut trees will be skidded with tops attached to designated sites along Trout and Dry Creeks. Objective is to provide the most woody material for revetment construction and bio-engineering.
- Rubbing or basal scarring of the trees designated for release will not be permitted during operations.
- The small 1/30th acre gaps created around the selected leave tree would receive an enrichment planting of western red cedar, western hemlock or other native species designated by Silviculturist. This will help to minimize occupation of these sites by noxious weeds provide some forest structure/diversity in the long-term. The planting will occur in the fall of 2005 or spring of 2006.
- Individual large trees (dbh greater than 40 inches) will be left within all treatment units. Where feasible, large leave aggregates will be designated around these trees. These "no-cut" areas along with individual old-growth trees would provide stand diversity, in terms of size, structure, and function.
- Pacific yew, Black Cottonwood, and Bigleaf maple trees will be protected during felling and log removal. Yew, Cottonwood, and Bigleaf maple trees will not be cut. The following requirements would apply: (1) directional felling away from the Pacific yew, Cottonwood, and Bigleaf maple; and (2) should yew, cottonwood, or maple be severely damaged from log removal, it would be high stumped (minimum 1 foot) to promote basal sprouting.
- Ground Based Skidding Restriction. In areas proposed for thinning, ground based skidding operations will be suspended during the period of sap flow to prevent damage to the boles of leave trees (bark slough). The sap flow period lasts from the time of bud break in the spring (May 1) to the time of bud set in Midsummer (July 15).
- Leave Tree Preference. Leave tree species preference for retention in commercial thinning units: Western red cedar, western white pine, noble fir, grand fir, western hemlock, Douglas fir, and Pacific silver fir.
- Stump Height Restriction. Stump heights are to be no more than 12 inches in height.

- Planting Mix (Unit 7). No site preparation will be needed in the four, one-quarter acre created gaps. Plant a mix of species (Western red cedar (20%), western white pine (20%), and Douglas fir (60%)) on a 12 foot by 12 foot spacing.
- Riparian Enrichment Planting. The thinned areas (second growth) of the riparian, will be underplanted with a mixture of western hemlock, grand fir, western white pine, and western red cedar trees to enhance structural diversity. Included in this process will be cutting/bucking/placing material from the previous thinning/falling operation over selected seedlings to mitigate expected animal browsing and planting a mix of species (Western red cedar (50%), western white pine (10%), grand fir (20%), and western hemlock (20%)) on a 12 foot by 12 foot spacing. Thick slash will be used to "hide" seedlings from browse animals.
- Young Stand Thinning. Trees will be cut (maximum dbh cut equals 7 inches) and spaced 14 foot by 14 foot (approximately 220 to 250 trees/acre) utilizing a "site adapted/structure based approach to young stand thinning. Minor tree species (western red cedar, western white pine, and noble fir) are retained and just the tree species that are causing the density problem (i.e. Douglas fir) will be thinned.
- Twelve inch diameter and larger Douglas fir logs. To help prevent the Douglas fir beetle from producing brood in these host logs, trees measuring 12 inches in diameter and larger will be cut no earlier than July 1 and no later than the September 30. These logs will be placed in sunny locations as much as possible.

1.3 Description of the Action Area

An action area is defined by NOAA Fisheries' regulations (50 CFR Part 402) as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The fifth field hydrologic unit code (HUC) encompassing the Action Area is the Wind River (1707010512) including Trout Creek, Layout Creek, Compass Creek, Crater Creek, and Planting Creek from 50 feet upstream from restoration activities extending a quarter of a mile downstream from work areas. These areas serve as migratory corridors for juveniles and adults, and provide habitats for spawning, rearing, and growth and development to adulthood for Lower Columbia river steelhead salmon. The Action Area also includes the adjacent riparian zone within the restoration area, upland thinning sites, and all areas affected by the project including any staging areas and roadways.

2.0 ENDANGERED SPECIES ACT - BIOLOGICAL OPINION

The objective of consultation is to produce a biological opinion that determines whether a proposed Federal activity is likely to jeopardize the continued existence of endangered or threatened species, or destroy or adversely modify its designated critical habitat. Critical habitat is not currently designated for the LCR steelhead ESU, and that analysis accordingly does not appear below. An ESU is considered a distinct population segment suitable for protection under the ESA. 16 U.S.C. 1532 (16).

2.1 Evaluating the Proposed Actions

The standards for determining jeopardy as set forth in section 7(a)(2) of the ESA are further defined by 50 CFR 402, et. seq. NOAA Fisheries must determine whether the effect of the action, taken together with effects from the baseline and cumulative effects, is likely to jeopardize the listed species. This analysis involves the initial steps of (1) defining the biological requirements of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries considers estimated level of injury and mortality attributed to: (1) collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed steelhead's life stages that occur beyond the Action Area. NOAA Fisheries must identify any reasonable and prudent alternatives available for the action if it is determined that the action will jeopardize the listed species.

2.1.1 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying ESA section 7(a)(2) to listed salmon is to define the species' biological requirements. Generally, biological requirements are those conditions necessary for the listed species to survive and recover to naturally reproducing population levels, at which time protection under the ESA would be unnecessary. Species or ESUs not requiring ESA protection have the following attributes: population sizes large enough to maintain genetic diversity and heterogeneity; the ability to adapt to and survive environmental variation; and they are self-sustaining in the natural environment.

The biological requirements for LCR steelhead include food (energy) source, flow regime, water quality, habitat structure, passage conditions (migratory access to and from potential spawning and rearing areas), and biotic interactions (Spence *et al.* 1996). The specific biological requirements affected by the proposed action include water quality, sediment, riparian vegetation, and streambank condition.

2.1.2 Environmental Baseline

The environmental baseline represents the current set of conditions to which the effects of the proposed action would be added. The term "environmental baseline" means "the past and present impacts of all Federal, state, or private actions and other human activities in the Action Area, the anticipated impacts of all proposed Federal projects in the Action Area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process" (50 CFR 402.02).

Watershed conditions including forest cover and road density in the Action Area are important to salmonids because of the influence of those conditions on peak and low stream flows. Because of the shape, elevation, and geology of the watershed, Trout Creek has a hydrologic regime with frequent and extreme fluctuations. Fish native to this system have adapted to the hydrology of

the Trout Creek system. Alterations of the hydrologic characteristics of the stream, including changes in timing, magnitude, or frequency of peak flows, or changes in water quality could affect the survival of fish eggs and fry due to the changes in frequency and depth of spawning gravel scour, or changes in water quality due to the altered flow regime.

Forest cover has been significantly modified over the past century in the Trout Creek subwatershed from a combination of massive wildfires (Yacolt burns of the early 1900's), and extensive timber harvest occurring in the 1950-1980 era. In addition, flow pathways for water in the Trout Creek drainage have been affected by the development of a road network that follows much of Trout Creek and circles the area known as Trout Creek Flats. Other practices that may have modified the hydrologic performance of this watershed include the past practice of using heavy equipment to yard and pile logging debris, draining wetlands, and removing woody debris from stream channels. The combination of management activities and wildfire have affected the hydrologic processes that contribute to both peak and low streamflows in the Trout Creek subwatershed.

Currently, approximately 88% of the Trout Creek subwatershed is forested in a hydrologically mature condition. In this context, hydrologically mature forest is defined as 70% or greater canopy closure with trees an average 8 inch dbh of 8 inches or greater. With 88% of the subwatershed in hydrologically mature forest cover, the snow accumulation, snowmelt, and runoff-generating dynamics in this subwatershed are well along the path toward recovery following extensive timber harvest that occurred in the mid and late 1900's.

The existing road network in the Trout Creek subwatershed alters the pathways and movement of water through the drainage, and influencing runoff and streamflow characteristics. Currently, there are on average 2.7 miles of road for every square mile of the Trout Creek subwatershed. Although decommissioning efforts have reduced road densities in this subwatershed by nearly one half mile of road per square mile, the remaining roads continue to influence the hydrology of the system, particularly in the area surrounding Trout Creek Flats. Roads that essentially circumscribe the Flats have modified the runoff patterns by intercepting subsurface water flows, and concentrating flows through culvert crossings.

2.1.3 Status of Species

NOAA Fisheries also considers the current status of the listed species; taking into account population size, trends, distribution, and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its original decision to list the species for protection under the ESA. Additionally, the assessment will consider any new information or data that are relevant to the determination.

2.1.3.1 Lower Columbia River Steelhead

The LCR steelhead were listed as an endangered species under the ESA on August 18, 1997 (62 FR 43937). Range-wide factors for the decline of west coast steelhead stocks are primarily attributed to the destruction and modification of habitat, over-utilization for recreational purposes, and natural and human-made factors (Busby *et al.* 1996). Forestry, agriculture, mining, and urbanization have degraded, simplified, and fragmented habitat. Water diversions

for agriculture, flood control, domestic, and hydropower purposes (including the Columbia River Basin) have greatly reduced or eliminated historically accessible habitat. Studies estimate that during the last 200 years, the lower 48 states have lost approximately 53% of all wetlands and the majority of the rest are severely degraded (Gregory & Bisson 1997).

Loss of habitat complexity has also contributed to range-wide decline of steelhead. In portions of some national forests in Washington, there has been a 58% reduction in large deep pools resulting from sedimentation and loss of pool-forming structures such as boulders and large wood (McIntosh *et al.* 1994). Sedimentation from land use activities is recognized as a primary cause of habitat degradation in the range of west coast steelhead (August 18, 1997, 62 FR 43942).

The life history of steelhead is more variable than other Pacific salmon (*Oncorhynchus* genus) concerning time spent in the ocean, freshwater residence, and the times of emigration from and immigration into freshwater habitat. Unlike other Pacific salmon, steelhead do not usually die just after spawning. Incidence of repeat spawning appears to vary widely within the steelhead range with a very small percentage of fish spawning up to four times.

According to the Wind River Watershed Analysis (USDA Forest Service, 1996), steelhead enter the Wind River watershed from March through December with a peak between July and October. Spawning usually occurs from February to May with peaks in March and April. The summer run is larger than the winter run, and the majority of summer steelhead return to the Wind River as four and five year old fish. Juveniles probably emerge sometime between March and September and rear for at least two years before emigrating in April and May. Both wild and hatchery steelhead are present in the Wind River watershed.

Forty-five percent of all redds observed in the Wind River watershed were found in Trout Creek between 1985 and 1989 (USDA Forest Service, 2001). The historic run size of steelhead in the Wind River is estimated to be 2,500 fish (Bryant 1951). The current escapement goal for wild summer steelhead is 1,000 adults. In 1999, Washington Department of Fish and Wildlife (WDFW) initiated a mark-recapture study for wild summer and winter steelhead. Preliminary estimates indicate that less than 200 wild summer steelhead returned in 1999. Historically, Trout Creek accounted for a large amount of total spawning in the Wind River. The annual return to Trout Creek has declined from over 450 (range 162-464) in the 1980's, to less than 30 in the 1990's (USDA Forest Service 2001).

Most populations of salmonids that historically occupied the Wind River watershed are considered depressed (WDF *et al.* 1993). Shipherd Falls, which is 4.3 miles upstream from the historic mouth of the Wind River, is a set of four plunges that drop a total of 43 feet in less than one-quarter mile. Prior to construction of a fish ladder in 1956, only steelhead were capable of ascending these falls (Bryant 1949). The ladder made it possible for spring chinook to pass upstream.

Hemlock Dam is located on Trout Creek approximately one mile upstream from its confluence with the Wind River. The 22-foot high dam is a total fish barrier to fish and was constructed in 1936 to generate electrical power and later (1958) retooled to serve as source of irrigation. A

prototype fish ladder was constructed to allow upstream fish migration. The Mt. Adams Ranger District of the FS is considering whether or not to propose removing Hemlock Dam and rehabilitating the reservoir, to restore fish passage and improve aquatic and riparian habitat for steelhead in Trout Creek.

2.2 Effect of the Proposed Action

The proposed stream restoration, bank stabilization and all related construction activities are likely to adversely affect LCR steelhead. NOAA Fisheries' ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline" (50 CFR 402.02).

2.2.1 Direct Effects

Direct effects are the immediate effects of the project on the species or its habitat. Direct effects result from the agency action and include the effects of interrelated and interdependent actions. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated (USFWS and NMFS 1998).

2.2.1.1 Turbidity

Reconstruction of the stream channel and extra up bank stabilization projects associated with this project would mobilize sediments and temporarily increase downstream turbidity levels. In the immediate vicinity of the construction activities (several hundred feet), the level of turbidity would likely exceed ambient levels by a substantial margin and potentially affect LCR steelhead. However, it is anticipated that approximately 135 cubic yards of sediment would enter the channel and be carried downstream with the first substantial rainfall after project implementation and would likely be a brief, one-time event. Following the initial peak, sediment loads would be incrementally reduced to a level near, or at background rates. Such sediment loading is not expected to occur at a time when redds are present, nor expected to cement the substrate making it unsuitable for future spawning. Long term, implementation of the UTC is expected to lead to a net decrease in sediment loading.

For salmonids, turbidity has been linked to a number of behavioral and physiological responses (e.g., gill flaring, coughing, avoidance, increase in blood sugar levels) which indicate some level of stress (Bisson and Bilby 1982, Sigler 1984, Berg and Northcote 1985, Servizi and Martens 1987). The magnitude of the stress responses is generally higher when turbidity is increased and particle size is decreased (Bisson and Bilby 1982, Servizi and Martens 1987, Gregory and Northcote 1993). Although turbidity may cause stress, Gregory and Northcote (1993) have shown that moderate levels of turbidity accelerate foraging rates among juvenile chinook salmon, likely because of reduced vulnerability to predators due to camouflaging.

2.2.1.2 Large Woody Debris

Volumes of large woody debris would immediately increase as a direct effect of implementing the UTC. Approximately 6,000 trees would be used to construct in-stream structures in an effort to provide greater bank stability and improved fish habitat. On average, there would be an increase from approximately 50 pieces of LWD per river mile, to 200 pieces of LWD per river mile. This increase of in-stream LWD debris would foster improvement of hydrologic function and channel morphology. Ultimately, the addition of in-stream wood helps increase pool depths to provide cover and habitat during migration periods and will improve retention of carcasses and other organics increasing prey resources. Over the long-term (50-100 years) the effect of the UTC would become less and less significant as natural recruitment of large wood from the riparian area began to play a more important role in providing in-stream woody debris.

2.2.1.3 Riparian Forests

The 12,235 feet of new skid road construction in riparian areas will remove as much as 75% of the ground cover. Stockpiles of LWD may damage over 100,000 square feet of the riparian canopy throughout the project area during implementation. These actions will likely compact the ground in these areas affecting regeneration, and may remove some riparian vegetation currently important for streambank stability and shade. However, the structure and diversity of riparian forests are likely to improve from the effects of the UTC. Thinning the overstocked and immature riparian forests may accelerate tree growth by as much as 2 inches dbh per decade (Doede, unpublished data, 2002) and allow room for shade-tolerant conifers to be planted in the understory. In the short-term (0-25 years) these actions would likely have a beneficial effect on riparian stand health; trees would mature faster, be less susceptible to disease, and provide more canopy cover and greater root networks to stabilize soils. However, in the long-term (greater than 50-100 years) the beneficial effects of the UTC would be harder to discern due to slowing rate of tree growth over time, and natural processes that would have otherwise taken place.

In addition, as many as 427 acres of riparian forests may be thinned to accelerate the development of old-growth characteristics. Over-crowded and immature trees will be thinned from around the largest and most mature trees in the riparian stand, and shade tolerant conifers will be planted in the understory. Implementation would be timed to ensure that activities associated with these actions would not impede adult steelhead immigration, smolt emigration, spawning, incubation or emergence periods. Whole trees and logs will be acquired for in-stream restoration through selective thinning of four upland overstocked young stands in 183 acres (units 1, 3, 4, and 7) (Figure 1). Harvest prescriptions for these stands will be a combination of light, medium, and/or heavy thinning. Resultant stands would have 30-50% canopy closure and 70-140 trees per acre. The riparian thinning will result in fewer trees harvested and retain a greater canopy closure than in the upland units, and no trees contributing shade to the stream will be removed. The UTC riparian thinning will create better functioning riparian areas increasing shade to the stream, increased inputs of terrestrial insects increasing the prey base for steelhead and increased potential for naturally occurring LWD.

2.2.1.4 Width to Depth Ratios

In the short-term (0-10 years), implementation of the UTC would directly affect width-to-depth ratios. Manipulation of gravel bars, creation of in-stream large wood structures, and increased bank stability, would provide a more defined stream channel with greater lateral resistance. Decreasing lateral migration of the stream channel would improve width-to-depth ratios. Analysis of previous restoration efforts suggests that width to depth ratios may be reduced by one third or more in the year following in-stream activity (USDA 1997). This immediate enhancement of channel morphology would foster recovery of riparian vegetation and improvement of stable riffle and pool development important habitats for migration and rearing of steelhead. As natural stream evolution continued, and hydrologic function improved, width to depth ratios would begin to decrease until they were representative of a more properly functioning system.

2.2.1.5 Pool Frequency and Quality

The direct and indirect effects of implementing the UTC will result in a measurable improvement in pool frequency and quality over the short-term (0-10 years). Creation of in-stream meander logjams will allow increased scouring under structures to create pools and subsequent deposition will develop into pool tails. In addition, improved width-to-depth ratios would lead to greater pool depths and more regular pool spacing, as stream energy was directed away from the stream banks and into the streambed. Monitoring of restoration efforts on the Wind River show that bank-full pool volume increased by approximately 500% within five years of active restoration efforts (similar to those proposed for upper Trout Creek) (Bair 2002). Ultimately, the improvement in pool frequency and quality helps provide cover and habitat during migration periods and will improve retention of carcasses and other organics increasing prey resources.

2.2.1.6 Fish and macro-invertebrates

Project activities will probably kill aquatic macro-invertebrates within the project area. This impact would be brief (12 hours) after disturbance. Based on research by Novotny and Faler (1982), re-colonization of aquatic invertebrates from upriver reaches could occur rapidly through species dispersal from in river drift. Gersich and Brusven (1981) estimated that full aquatic insect colonization of rock substrates within disturbed areas would take 47 days. Over the long term, project activities will increase aquatic macro-invertebrates within the project area due to improved habitat conditions thus increasing prey resources to steelhead.

2.2.2 Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the action. Indirect effects may include other Federal actions that have not undergone section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or be a logical extension of the proposed action.

2.2.2.1 Water Temperature

While measurable damage to canopy cover from helicopter stockpiles could expose streams to more solar radiation, most stockpiling sites will not be adjacent to streamcourses, and to the degree that they are, the accelerated recovery of width to depth ratios would likely lead to commensurate improvement in water temperatures from implementation of the UTC. Over the long term (50-100 years), stream temperatures would likely decrease due to the enhanced canopy cover from riparian thinning, lower width/depth ratios, and an increase in the number of deep pools.

When water temperature becomes too high, salmon suffer a variety of ill effects ranging from decreased spawning success to death. There is a reduction in their capacity for activity and growth, as well as their ability to tolerate other stresses, such as disease. Over time, the reduction in water temperature will lead to better overall health for steelhead.

2.2.2.2 Floodplain Connectivity

The degree of floodplain connectivity would likely improve as a result of the indirect effects of implementing The UTC. While there would be *no direct effects* on floodplain connectivity, the short-term (0-10 years) *indirect effect* of having improved width to depth ratios, increased bank stability, and greater volumes of in-stream LWD, would allow peak flows to have better access to the floodplain. As peak flows dissipated energy on the floodplain instead of stream banks, further recovery of bank stability and riparian zone vegetation would be encouraged. Over the long-term this would greatly improve habitat for steelhead and lead to improved survival and productivity.

2.2.2.3 Bank Stability and Sediment Input

The indirect effects of implementing the UTC would likely lead to an improvement in bank stability and a reduction in sediment inputs after the first year. Monitoring of 1996 restoration efforts in Layout Creek (a project similar to the Upper Trout Restoration project) demonstrated that in-stream log structures helped reduce the annual sediment load from 330 cubic yards to less than 30 cubic yards, within four years. Furthermore, over the same period, stream banks within the treated reach improved from 60% stable to 80% stable. As with previous restoration efforts, in-stream gravel bar structures and meander logjams in upper Trout Creek, combined with improved riparian conditions, would slow water velocities, reduce the erosive force of the stream, and provide greater soil stability thus improving habitat conditions for steelhead.

2.3 Cumulative Effects

Cumulative effects are defined as "those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the Action Area of the Federal action subject to consultation" (50 CFR 402.2). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Because the geographic area of this proposal is wholly within Federal ownership, any future activities would require consultation, and are not considered cumulatively affecting.

2.4 Synthesis

While there would be some short-term *adverse* effects from the implementation of the UTC, it is anticipated that this would be outweighed by the overall progress of improving fish habitat. Improvements in stream hydrology and channel morphology will occur as riparian forest health improves, in-stream LWD is increased to historic volumes, the stream is reconnected to its floodplain, and stream banks become more stable. The threatened run of Wind River wild summer steelhead will reap the benefits of these improvements. Monitoring of 1997 restoration efforts demonstrate this potential. Just one year after using 1,200 trees to treat nearly two miles of Layout Creek with in-stream log structures, 23% of all steelhead spawning redds were observed in Layout Creek. These results are especially impressive when considering the fact that during the two previous spawning years, there were no steelhead redds observed in Layout Creek. Substantial improvement in the quality of pool habitat as a result of restoration activities is expected to improve resting and rearing habitat, and to allow for the development of spawning beds. Superior fish habitat would facilitate development of a larger and healthier population of wild steelhead that would be better equipped to deal with stresses in the watershed, as well as the hazards outside the watershed. Because the Trout Creek cohort of wild summer steelhead must survive a gauntlet of dams, predators, and fishing on their way to and from the ocean, optimizing rearing and feeding conditions in the watershed will improve overall survivability. Implementing the UTC will have beneficial cumulative effects for fish and fish habitat, as well as overall watershed processes.

2.5 Conclusion

NOAA Fisheries has reviewed the direct and indirect effects of the proposed action on LCR steelhead and its habitat. NOAA Fisheries evaluated these effects in light of effects from existing conditions in the Action Area (the baseline) and the measures included in the action to minimize the risk of effects. The proposed action is likely to cause short-term adverse effects on LCR steelhead by modifying habitat, and through removing riparian vegetation. These effects to LCR steelhead are reasonably certain to occur, but will be minimized by specific measures included in the action. Moreover positive improvements for salmonid are expected over the long term as a result of the project. Consequently, the proposed action is not likely to jeopardize the continued existence of LCR steelhead.

2.6 Reinitiation of Consultation

This concludes formal consultation for the UTC. Consultation must be reinitiated if: (1) the amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) or, a new species is listed or critical habitat is designated that may be affected by the action (50 C.F.R. 402.16). To reinitiate consultation, the FS should contact the Washington State Habitat Office of NOAA Fisheries. Upon reinitiation, the protection provided by this incidental take statement, section 7(o)(2), becomes invalid.

2.7 Incidental Take Statement

The ESA at section 9 (16 U.S.C. 1538) prohibits take of endangered species. The prohibition of take has been extended to threatened anadromous salmonids by rule (50 CFR 223.203), pursuant to section 4(d) of the ESA. Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." (16 U.S.C. 1532(19)). Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering" (50 CFR 222.102). Harass is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering" (50 CFR 17.3).

Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant" (50 CFR 402.02). The ESA at section 7(o)(2) exempts from the prohibition incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement (16 U.S.C. 1536). An incidental take statement specifies the effects of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize take and sets forth terms and conditions with which the FS must comply to implement the reasonable and prudent measures.

2.7.1 Amount or Extent of the Take

As stated in section 1.3, LCR steelhead use the Action Area for migration, spawning, rearing, and growth. As such, they are likely to be present in the Action Area at all times of the year, meaning they would likely be present in the Action Area during those periods when the FS undertakes habitat modification activities, or the effects of such modification occur. Therefore, NOAA Fisheries the proposed action is reasonably certain to cause incidental take of LCR steelhead.

Despite the use of the best scientific and commercial data available, NOAA Fisheries cannot estimate a specific amount of incidental take of individual fish from these activities, due to the highly variable numbers of fish that may be present at any given time. In the event that take is unquantifiable, a surrogate measure for extent of take may be used. In this case, because NOAA Fisheries believes take will be in the form of harm from temporary habitat modification (through sedimentation that will occur at the restoration sites, and which will extend several hundred feet downstream) the extent of habitat that will be affected is used as the surrogate measure to the amount take.

Habitat modification will occur within the entire 10.4 mile stretch of the stream restoration (although the degree of these effects will be moderated over time as the reconfiguration is intended to contribute to restoring habitat forming processes that are presently absent). The FS is expected to construct no more than 96 meander log jams, 145 gravel bar structures, and fell approximately 125 trees toward the channel, all for the purpose of long-term habitat

improvement within this 10.5 mile corridor, but which will create sedimentation and thus short term adverse effects to salmon. Finally, habitat modification would occur in the form of vegetation removal from UTC project activities and related loss of riparian function for a number of years after the projects is completed (although lost vegetation will be replanted and effects will diminish over time as new vegetation matures, ultimately to create conditions which are an improvement over the current, baseline conditions). Harm to fish resulting from these activities is expected only within this corridor.

2.7.2 Reasonable and Prudent Measures

The following reasonable and prudent measures (RPM's) are necessary and appropriate to minimize take of LCR steelhead. These RPM's are partially integrated into the BE and proposed project. NOAA Fisheries has included them here to provide further detail as to their implementation.

1. The FS will minimize the incidental take from in-water construction activities in the UTC project.

2. The FS will minimize incidental take from degraded water quality from construction activities in or near the project.

3. The FS will minimize incidental take from lost riparian and instream function.

4. The FS will minimize incidental take by requiring monitoring of all erosion control measures and plantings for site restoration during and following construction to meet criteria as described below in the terms and conditions.

2.7.3 Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the FS must comply with the following terms and conditions, which implement the RPM's described above. Implementation of the terms and conditions within this Opinion will further reduce the risk of impacts to fish and their habitat. These terms and conditions are non-discretionary.

1. To implement RPM No. 1 (in-water work) above, the FS shall ensure that:

    1.1 All work within the active channel of the UTC project will be completed between July 15 and August 31 (USDA 2003). Any extension of the in-water work period will first be approved by, and coordinated with, NOAA Fisheries.

    1.2 Alteration or disturbance of stream banks and existing riparian vegetation will be minimized. Where bank work is necessary, bank protection material shall be placed to maintain normal waterway configuration.

    1.3 During excavation, native streambed materials will be stockpiled out of the two-year floodplain for later use.

2. To implement RPM No. 2 (construction activities), the FS shall ensure that all erosion and pollution control measures included in the BE are included as special provisions in

the UTC project. The FS will implement an erosion control plan (ECP). The ECP will outline how and to what specifications various erosion control devices will be installed to meet water quality standards, and will provide a specific inspection protocol and time response. Erosion control measures shall be sufficient to ensure compliance with applicable water quality standards and this Opinion. The ECP shall be maintained on site and shall be available for review upon request.

2.1 Effective erosion control measures shall be in place at all times during the contract. Construction within the project vicinity will not begin until all temporary erosion controls (e.g., sediment barriers and containment curtains) are in place.

2.2 All exposed areas will be replanted with a native seed mix. Erosion control planting will be completed on all areas of bare soil within 14 days of completion of construction.

2.3 All equipment that is used for instream work will be cleaned prior to entering the two year floodplain. External oil and grease will be removed, along with dirt and mud. Untreated wash and rinse water will not be discharged into streams and rivers without adequate treatment.

2.4 Measures will be taken to prevent construction debris from falling into any aquatic habitat. Any material that falls into a stream during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.

2.5 Project actions will follow all provisions of the Clean Water Act (40 CFR Subchapter D).

2.6 The FS will implement a Pollution Control Plan (SCP), and is responsible for containment and removal of any toxicants released. Project work will be monitored by the FS to ensure compliance with this SCP.

2.7 Areas for fuel storage, refueling, and servicing of construction equipment and vehicles will be at least 150 feet from the stream channel and all machinery fueling and maintenance will occur within a contained area. Overnight storage of vehicles and equipment must also occur in designated staging areas.

2.8 Equipment refueling and storage areas will have hydrologic function restored (e.g., ripping or subsoiling) in areas where it has been degraded.

2.9 No surface application of nitrogen fertilizer will be used within 50 feet of any water body.

3. To implement RPM No. 3 (riparian habitat protection), the FS shall ensure that:

3.1 Alteration of native vegetation will be minimized. Where native vegetation will be altered, measures will be taken to ensure that roots are left intact. This will

reduce erosion while still allowing room to work. No protection will be made of invasive exotic species (e.g. Himalayan blackberry), although no chemical treatment of invasive species will be used.

3.2 Riparian vegetation removed will be replaced with a native seed mix, shrubs, and trees according to the BMP regarding re-vegetation plan in section 1.2.

4. To implement RPM No. 4 (monitoring), the FS shall ensure that:

4.1 Erosion control measures as described above in RPM No. 2 shall be monitored.

4.2 All riparian planting areas will be monitored to ensure that finished grade slopes are at stable angles of repose and plantings are surviving satisfactorily (80% survival over three years).

4.3 Failed plantings will be replaced for a period of three years. If successive plantings have failed, the FS will replant an equally sized area in the project vicinity.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species managed under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2));
- NOAA Fisheries must provide conservation recommendations for any Federal or State action that would adversely affect EFH (section 305(b)(4)(A));
- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (section 305(b)(4)(B)).

Essential Fish Habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA section 3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a

sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

Essential Fish Habitat consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of Essential Fish Habitat

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally-managed Pacific salmon: chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

3.3 Proposed Actions

The proposed action is detailed above in section 1.2 of this document. The proposed action includes habitats that have been designated as EFH for various life-history stages of chinook salmon.

3.4 Effects of Proposed Action

As described in detail in section 2.2 of this document, the proposed action may result in short- and long-term adverse effects to a variety of habitat parameters. These adverse effects are:

1. Short-term degradation of water quality in the Action Area because of an increase in turbidity and sedimentation during in-water construction and vegetation manipulation and the potential for contaminants to reach the stream.

2. Riparian disturbance from temporary road construction and construction activities performed from the bank.

3.5 Conclusion

NOAA Fisheries concludes that the proposed action may adversely affect designated EFH for chinook and coho salmon.

3.6 Essential Fish Habitat Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. While the proposed action may adversely affect EFH as described above, NOAA Fisheries believes that the conservation measures incorporated into the project by the FS to address ESA concerns already minimize these effects to the maximum extent practicable and are sufficient to conserve EFH. Therefore, conservation recommendations are not required.

3.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 CFR 600.920(k), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The FS must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(l)).

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