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

Refer to:
2004/00151

April 2, 2004

Mr. Fred Patron
U.S. Department of Transportation
Federal Highway Administration
The Equitable Center, Suite 100
530 Center Street NE
Salem, OR 97301

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation on the Effects of a Roughened Chute Fish Passage Project on Oak Creek, a tributary to Mary's River, Willamette River Basin, Benton County, Oregon (6th Field HUC Code: 170900030511)

Dear Mr. Patron:

Enclosed is a biological opinion (Opinion) pursuant to section 7 of the Endangered Species Act (ESA) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries), on the effects of the proposed Roughened Chute Fish Passage Project in Benton County, Oregon. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Upper Willamette River (UWR) chinook salmon (*Oncorhynchus tshawytscha*). As required by section 7 of the ESA, NOAA Fisheries included reasonable and prudent measures with non-discretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the impact of incidental take associated with this action.

This document also serves as consultation on essential fish habitats (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects to EFH. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NOAA Fisheries within 30-days after receiving these recommendations. If the response is inconsistent with the recommendations, the action agency must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations.

If you have any questions regarding this consultation, please contact Tom Loynes of my staff in the Oregon State Habitat Office at 503.231.6892.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Molly Cary, ODOT
Randy Reeve, ODFW
Sam Dunnavant, ODOT
Nick Testa, ODOT

Endangered Species Act - Section 7 Consultation
Biological Opinion

&

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

Effects of a Roughened Chute Fish Passage Project on Oak Creek, a tributary to Mary's River, Willamette River Basin, Benton County, Oregon
6th Field HUC Code: 170900030511

Agency:	Federal Highway Administration
Consultation Conducted By:	National Marine Fisheries Service, Northwest Region
Date Issued:	April 2, 2004
Issued by:	for Michael R Crouse D. Robert Lohn Regional Administrator
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1. INTRODUCTION

1.1 Background

On February 12, 2004, NOAA's National Marine Fisheries Service (NOAA Fisheries) received a request from the Federal Highway Administration (FHWA) for Endangered Species Act (ESA) section 7 formal consultation on the proposed funding of the Oak Creek Roughened Chute Fish Passage Project. The proposed action is the funding of the construction of a roughened chute, which will remove a barrier below two existing box culverts. The project applicant is the Oregon Department of Transportation (ODOT) and FHWA funds would partially finance this project and constitute the Federal nexus. ODOT is responsible for the project design and management.

The effects determination was made using the methods described in *Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NOAA Fisheries 1996). FHWA determined that the proposed action was likely to adversely affect Upper Willamette River (UWR) chinook. The UWR spring chinook salmon were listed as threatened under the ESA on March 24, 1999 (64 FR 14308).

This biological opinion (Opinion) is based on the information presented in the biological assessment (BA), site visits, meetings with ODOT biologists, Oregon Department of Fish and Wildlife (ODFW) biologists, NOAA Fisheries Hydro staff and the result of the consultation process. The consultation process involved correspondence and communications to obtain additional information and clarify information in the BA. As a result, a BA was produced that tiered off of the SLOPES Opinion (NOAA Fisheries 2002 http://www.nwr.noaa.gov/1publcat/bo/2002/ohb2001-0016-pec_06-14-2002.pdf). The roughened chute portion of this project and some adaptive management elements are the only actions that would not fit under SLOPES. The BA includes conservation measures and Best Management Practices (BMPs) that would cover effects matching the SLOPES terms and conditions.

The objective of this Opinion is to determine whether the action to construct a roughened chute for fish passage is likely to jeopardize the continued existence of the UWR chinook salmon.

1.2 Proposed Action

The project site is at mile point 55.16 on the Corvallis-Newport Highway 20/34 in Benton County, Oregon. The stream crossing is in the town of Corvallis, Oregon, and is approximately 1.6 kilometers (km) upstream of the confluence with Mary's River. Mary's River enters the Willamette River less than 3.7 km from the confluence with Oak Creek.

The purpose of this project is restoration of fish passage through construction of a roughened chute and weir placement in two culverts to establish a naturally-functioning channel that allows fish passage into the upper reaches of Oak Creek. The Oak Creek culvert under Highway 20/34 is impassable to fish due to perched culverts. The ODFW classified the Oak Creek crossing culvert as a high priority to enhance for fish passage.

Roughened Chute Installation

The proposed roughened chute was designed to restore fish passage and to simulate the natural streambed. As designed, the proposed channel will meet state fish passage statutes and function during a range of flow conditions similarly to the existing channel. Habitat structures, including large rocks and root wads, have been incorporated into the channel design to establish the low-flow channel and backwater areas. A NOAA Fisheries hydraulic engineer reviewed the proposed roughened chute design.

The 34-meter (m) long roughened chute will average a 5.6% slope, which is steeper than the stream channel immediately above and below the project area. This created cascade is necessary to eliminate the height differential between the upstream and downstream channel elevations hindering fish passage. The total new channel area below the ordinary high water (OHW) is approximately 435 m^2. The channel area inside the culvert that will have weirs is approximately 115 m^2.

To stabilize the constructed stream channel below the box culverts, a 1- to 1.7-m blanket of class 350 riprap consisting of a well-graded mixture of fines and large woody debris (LWD) will line the channel bottom for 33 m downstream of the culvert. Most of the LWD material will be placed below the OHW in the approximately 4.9-m wide streambed in the sections below the culvert crossing. The class 350 riprap mixture will also be placed above the OHW elevation tying into the existing creek banks. Approximately 0.15 m of natural streambed materials will be placed within streambed at, and below, the OHW elevation throughout the roughened chute channel section to help establish the low-flow channel. The constructed stream channel will stay within the existing alignment of the creek.

The side slopes of the streambed will have a ratio of 1V:8H, and the slopes of the constructed stream channel will have a ratio of 1V:1.5H.

Disturbance of the riparian areas will be avoided by accessing the project through the existing culverts. However, to improve watershed function, ODOT will seed and plant the side slopes of the roughened chute down to the OHW with native trees, shrubs, and herbaceous plants. Tree species will include red alder (*Alnus rubra*) and Douglas-fir (*Pseudotsuga menziezii*). Shrub species will include red-osier dogwood (*Cornus stolonifera*), and willow such as Sitka willow (*Salix sitchensis*) and Scouler's willow (*Salix scouleriana*). Herbaceous species will include sedges (*Carex spp*.), rushes (*Juncus spp.*), and native grasses. The existing creek banks will not

be cleared of vegetation. However, ODOT may augment plant density here to increase riparian functions within the project area.

Large wood pieces and large, class 350 rocks have been incorporated into the design to deflect flows from the streambank at several locations and provide hydraulic roughness and resting areas for fish. The large wood pieces will be conifers approximately 41 to 76 centimeters (cm) in diameter and 5 to 6 m long, with much of the log keyed into the bank with the boulders. Four pieces of LWD with rootwads will be incorporated into the roughened chute to help sinuosity in the low-flow channel.

Streambed material has been specified to ensure stream flow is maintained above the substrate through the roughened chute section. Mechanical blending of the fines with the larger riprap and water compaction is planned to fill in voids within the streambed material. Natural streambed material will be placed on top of the riprap as the natural bed material exposed to fish.

Water compaction of the streambed material is accomplished with a water hose, mixing materials and forcing fines into the remaining voids of the riprap. The goal of water compaction is to add enough water to wash the fines into the voids, but not enough to lose the fines downstream. The final mix of materials should keep water suspended and on top of the roughened chute and prevent subsurface flow.

The specified rock, large wood pieces, and natural streambed materials will be installed during the construction of the roughened chute. A well-graded substrate material will be mixed with the riprap during placement to ensure that the streambed is sealed. Large, class 350 rocks will be selected and embedded as the rock material is built up, so that there is partial exposure of the large rock providing hydraulic shadow.

The Project Inspector and/or a Hydraulic Engineer, and/or an ODOT or ODFW biologist will be onsite during channel enhancement activities to monitor the contractor's activities. The hydraulic key point (large rocks) at the downstream end of the roughened chute will most likely be constructed first, and then the channel substrate will be built up to match the grade at the culvert outlets.

The west culvert will be modified with 6, 20-cm plastic, full-spanning weirs spaced 5.2 m apart with a staggered low-flow notch in each weir of 15 cm in height. The weirs will raise the surface water elevation creating a swim-through condition in the culvert. One 30-cm weir without a low-flow notch will be installed on the inlet face of the eastern culvert to direct water to flow into the western culvert during low-flow periods.

Adaptive Management for the Roughened Chute

This treatment is experimental and ODOT may need to make repairs or modifications to maintain adequate fish passage and beneficial habitat features. Possible corrective actions within the next five years include: (1) Replacement plantings along the banks and within the riparian area; (2) stabilizing scour critical banks or failing deflection points; (3) monitoring the effectiveness for fish passage; and (4) replacing poorly functioning habitat structures.

Most of these activities will include disturbance within the OHW of Oak Creek. These activities will be conducted within limitations, including: (1) ODOT Environmental Services will provide instruction, including BMPs, for the performance of this work; (2) an ODOT Geo-Hydro Engineer, Environmental Staff, or ODFW-ODOT Liaison will be present onsite during adaptive management activities; (3) mechanized equipment will not be allowed to enter below the OHW elevation of Oak Creek during these activities; (4) all work below the OHW elevation of Oak Creek will be conducted during the ODFW-defined in-water work period; (5) all remediation work will occur within the original project footprint; and (6) all subsequent impacts to riparian vegetation during adaptive management activities will be mitigated at a 2:1 replacement ratio.

Work Area Isolation

The proposed work area will be isolated and dewatered before construction. Construction in dry conditions will reduce potential impacts to downstream water quality and minimize direct harm to fish. Water will be diverted from the work area for approximately 5 to 10 days. A water management plan has been designed by ODOT, however; if the contractor chooses to submit an alternative design it will require approval by the ODOT hydraulics engineer and written approval from NOAA Fisheries before implementation.

A diversion pipe will route water collected from an upstream sandbag and/or barrier dam back to the channel downstream of the work area. ODOT will divert or pump all water around the work area. The flow downstream of the work area will not drop below 50% of upstream flow. The diversion pipe will be routed under the highway through the east culvert.

A gravity-fed system will be used to transport water around the work area at night, which should have no effect on the flow. During the day, however, water may be pumped through the diversion. A sump pump will be installed between the upstream sandbag dam and the inlet's concrete apron to ensure a dry work area. The sump pump will transport water downstream via a pipe that parallels the larger diversion pipe. The gravity-fed system is generally preferred because it will allow downstream fish passage through the work area and requires less maintenance and monitoring. If pumps are required, they will be monitored during the entire period of use and the intake will be screened according to NOAA Fisheries guidelines. An additional operational backup pump will be available onsite for rapid deployment if needed.

Work area isolation, dewatering, re-watering, and fish salvage and handling activities will be monitored by trained and experienced biologist(s).

1.3 Description of the Action Area

The action area for the proposed roughened chute project, in terms of potential impacts to fish, is centered on the Oak Creek Culvert and extends upstream 15 m to the upper diversion and 150 m downstream to the lower diversion. The action area also extends 91.44 m to the east and west of the crossing along Highway 34/20.

2. ENDANGERED SPECIES ACT

2.1 Biological Opinion

2.1.1 Biological Information

The listing status and biological information for UWR chinook salmon are described in Myers *et al*. (1998) and the Federal Register (64FR 14308).

Freshwater habitat includes all waterways, substrates, and areas beside a stream that provide shade, sediment, nutrient or chemical regulation, streambank stability, and input of large wood or organic matter below longstanding, natural impassable barriers (*i.e.*, natural waterfalls in existence for at least several hundred years) and several dams that block access to former UWR chinook salmon habitat.

UWR chinook salmon enter the Columbia River in March or April, but do not ascend Willamette Falls until May or June. Spawning in the upper reaches of the Willamette River basin generally occurs in late August to early October, with spawning peaks in September. Most of the UWR chinook in the Upper Willamette River watershed migrate up the Middle Fork Willamette and McKenzie Rivers. The two rivers provide colder water temperatures which cause UWR chinook to favor them over the Coast Fork Willamette River. Juveniles spend from a few months to one year in fresh water before out-migrating.

Adult spring chinook salmon require deep pools within reasonable proximity to spawning areas where they hold and mature for several months between migration and spawning. Preferred spawning and rearing areas have a low gradient, generally less than 3%, but adults often ascend much higher gradient reaches to find desirable spawning areas. UWR chinook use the main Willamette River primarily for rearing and migration just downstream of the project (StreamNet 2003)

2.1.2 Evaluating Proposed Action

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations).

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 must consider the estimated level of mortality attributable 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 salmon's life stages that occur beyond the action area. If NOAA Fisheries finds that the action is likely to jeopardize the listed or proposed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

For the proposed action, NOAA Fisheries' jeopardy analysis considers direct or indirect mortality of fish attributable to the action.

2.1.2.1 Biological Requirements

The first step NOAA Fisheries uses when applying the ESA section 7(a)(2) to listed salmonids is to define the species' biological requirements that are most relevant to each consultation. 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 decision to list UWR chinook salmon for ESA protection and also considers new data available that is relevant to the determination.

The relevant biological requirements are those necessary for UWR chinook salmon to survive and recover to naturally-reproducing population levels, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful adult and juvenile migration, spawning and rearing. UWR chinook salmon survival in the wild depends on the proper functioning of certain ecosystem processes, including habitat formation and maintenance. Restoring functional habitats depends largely on allowing natural processes to increase their ecological function, while at the same time removing adverse impacts of current practices. In conducting analyses of habitat-altering actions, NOAA Fisheries defines the biological requirements in terms of a concept called

Properly Functioning Condition (PFC) and applies a "habitat approach" to its analysis (NOAA Fisheries 1999). The current status of the UWR chinook salmon, based on their risk of extinction, has not significantly improved since the species were listed.

2.1.2.2 Environmental Baseline

The defined action area is the area that is directly and indirectly affected by the action. The direct effects occur at the project site and may extend upstream or downstream based on the potential for impairing fish passage, hydraulics, sediment and pollutant discharge, and the extent of riparian habitat modifications. Indirect affects may occur throughout the watershed where actions described in this Opinion lead to additional activities or affect ecological functions contributing to stream degradation. As such, the action area for the proposed activities include the immediate watershed containing the channel modification. For the purposes of this Opinion, the action area is defined as the streambed and streambank of Oak Creek extending upstream 15 m above the culverts and downstream approximately 150 m from the culverts. All effects associated with this project should be contained within the dry work area between the diversions. Other reaches of Oak Creek or the Mary's River watershed are not expected to be directly or indirectly impacted.

Based on the best available information on the current range-wide status of UWR chinook salmon; the population status, trends, and genetics; and the poor environmental baseline conditions within the action area, NOAA Fisheries concludes that the biological requirements of the identified ESU within the action area are not currently being met. River basins have degraded habitat resulting from agricultural and forestry practices, water diversions, and urbanization. Actions that do not maintain or restore properly functioning aquatic habitat conditions would be likely to jeopardize the continued existence of UWR chinook salmon.

2.1.3 Analysis of Effects

2.1.3.1 Effects of Proposed Action

This effects analysis addresses effects to listed UWR chinook salmon that may result from this project given the conservation measures to be employed. Potential effects include reductions in water quality, changes in stream channel conditions and hydrology, and direct harm to fish.

<u>Water Quality</u>
The quality of the water that fish encounter on their migration is extremely important, and can determine such things as feeding and breeding success rates, disease levels, growth rates, and predation rates. Major elements of water quality critical to salmon are turbidity, suspended sediment, chemical contamination, and temperature. Turbidity and fine sediments can reduce prey detection, alter trophic levels, reduce substrate oxygen, smother redds, and damage gills, as

well as cause other deleterious effects. Chemical contamination can reduce fecundity and fertility, increase disease, shift biotic communities, and reduce the overall health of migrating salmon. Temperature affects metabolic rates, resistance to disease, oxygen concentrations in the water, and other vital factors.

Since equipment will be operating in the channel (isolated area), there is potential for chemical contamination due to leaks and spills. As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. Operation of the back-hoes, excavators, and other equipment requires the use of fuel, lubricants, *etc.*, which, if spilled into the channel of a waterbody or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain poly-cyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high levels of exposure and can also cause chronic lethal and acute and chronic sublethal effects to aquatic organisms (Neff 1985).

To minimize the potential for chemical contamination and disturbance of fish, construction activities will use BMPs outlined in the BA (pages 23-25).

A major portion of this project entails using rock to rebuild a stream channel. The proposed additional amount of rock in the channel increases the possibility of elevated water temperatures due to solar radiation. This potential will be minimized by maintaining a low-flow channel during the summer months decreasing the width to depth ratio. The riparian plantings over time will encroach on the riparian zone providing shade, and vegetation will grow beside the channel.

The water above the upper diversion could also experience elevated temperatures. Maintaining downstream flow and fish passage will allow fish to move without being trapped in this pool, and exposed to elevated stream temperatures and predation.

The effects of suspended sediment and turbidity on fish, as reported in the literature, range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorus fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure, not just the TSS concentration.

During water compaction, there is potential for turbid waters to escape the work area subjecting ESA-listed fish downstream sediment and detrimental conditions. In addition, sediment-laden water created within isolated work areas could escape, resulting in effects to the aquatic environment downstream of the project site. This will be avoided by pumping the turbid waters up to a settling pond allowing sediments to settle out before infiltration.

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (DeVore *et al*. 1980, Birtwell *et al*. 1984, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (Sigler *et al*. 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, unless the fish need to traverse these streams along migration routes (Lloyd *et al*. 1987). Turbidity resulting from the proposed project will be confined to the construction and removal of the temporary structures, the removal of the box culvert, post-project remediation, and the construction within the stream channel. The turbidity resulting from this in-water work will be isolated and limited in space and time.

Increases in suspended sediment and turbidity would be short-term and limited to activities associated with construction of the roughened chute. An erosion and sediment control plan and pollution control plan specifying containment measures would be developed to minimize water quality effects. The work area would be isolated using sandbag diversions at the upper and lower sections of the work area and sediment mats (Sedimats) would be deployed to minimize turbidity effects.

Stream Channel Conditions

The in-water work proposed will also alter the substrate in the stream around the existing culvert. The substrate will be disturbed when the new channel is constructed. When the channel is watered up after project completion later in the summer, there will be a short-term suspension of fine sediments within the work area. In the long term, the substrate will become more stable and even, due to the elimination of the step in the channel. The streambank and channel will be temporarily disturbed by placement of LWD and ballast rocks, actions that will be completed in the dry. If remedial action is required due to rock or log movement there may be a need to adjust boulders and disturb the substrate, potentially causing short-term suspension of fine sediments. This could cause hydraulic jumps, turbulence, or velocity barriers to fish passage if not corrected. All remedial actions will be completed during the ODFW in-water work period and from above the OHW mark.

Direct Harm

Individual fish may be injured or killed during fish removal and construction activities. The probability of injury or death will be reduced by completion of these activities during the preferred in-water work period, when fewer fish are likely to be present. Most work will occur during the preferred in-water work timing guideline of July 1 through September 30. During this window, streamflow is typically low, less than 1 cubic feet per second (cfs), fish presence is reduced, and rainfall is minimal. In-water work area isolation will allow the work to occur in the dry, thereby reducing the chemical contaminants entering the actively flowing water and direct impacts to fish. During channel modification activities, passage would be blocked by the diversion and fish would be removed from the work area and moved an area downstream with

adequate cover and water quality. The area will need to be isolated and fish removed so that equipment can work within a dry channel, eliminating turbidity and the potential for direct take of ESA-listed chinook salmon. The resulting lack of upstream fish passage during construction would be the same condition that exists now during low-flow conditions.

Fish removal activities would be in accordance with NOAA Fisheries fish handling guidelines (NOAA Fisheries 2000). Work area isolation can result in a loss of aquatic invertebrates due to dewatering areas within the wetted channel. Individual fish may also be injured or killed as a result of fish removal from the work area. The probability of this is low because these activities would be conducted using containment measures isolating the work area with coffer dams. Any listed fish removed from the isolated work areas would experience high stress with the possibility of up to a 5% delayed mortality rate depending on rescue method. Fish salvage would occur within the isolated work area. Mortality and/or injury to fish species may occur during handling. Delayed mortality may occur due to stress from the handling.

Although fish passage may be temporarily impaired by isolating the channel in Oak Creek during construction of the roughened chute, the proposed action potentially will result in improved year-round fish passage conditions for both adult and juvenile salmonids, including UWR chinook salmon within the Oak Creek portion of the action area. If the roughened chute works as postulated, long-term, beneficial effects to fish passage are expected in Oak Creek. If fish passage is not established as a result of this project, ODOT will pursue remedial action to repair and make adjustments. Placing large rock in a stream channel has the potential to create sub-surface flow due to porosity. This could create a passage barrier at moderate and lower flows. This project will utilize methods that will reduce the risk of sub-surface flow by mixing of different sizes of material including fines and water compaction. If porosity is not eliminated after completion of the project, remedial actions will entail remixing of fines with the substrate and water compaction. This could resuspend particles in the short term, exposing ESA-listed salmonids to gill abrasion and other effects listed above. ODOT will maintain a dry isolated work area, utilizing pumps if needed to ensure that this does not occur.

The effects of these activities on UWR chinook salmon and aquatic habitat would be limited by construction methods and approaches, included in the project design, that are intended to avoid or minimize impacts. The BA lists conservation measures and BMPs on pages 23-34 that will enable minimization and avoidance of impacts to ESA-listed salmonids.

The proposed action would cause temporary impacts to UWR chinook salmon and their habitat, but would provide a long-term benefit by reducing local erosion, enhancing riparian vegetation, and re-establishing fish passage. The track hoe would be working directly in the isolated portion of the stream channel. A key trench would be excavated in the stream and large boulders placed at the bottom of the new channel to key in the roughened chute, per NOAA Fisheries hydraulic engineers' request.

Because time is needed to construct the dams and install a diversion pipe, much of the preparation work will likely be done the day before dewatering and fish removal. As the diversions are removed, because of the damming effect on the water above the upper diversion, there is potential for fish stranding as that water level is dropped during demolition of the diversion. Fish could possibly utilize newly-wetted areas artificially created by the diversion. The water level would need to be ramped down and the area above the diversion monitored for fish stranding. Because the roughened chute will be dry, it will take awhile for the channel to saturate. If the water is released into the roughened chute, the lower portion of Oak Creek could be de-watered for a period of time until the water level rises. To avoid this the channel must be re-watered slowly maintaining flow in the portion of the stream below the lower diversion.

NOAA Fisheries expects the proposed action will create beneficial habitat conditions over the long term based on the current condition of the site. In the long term, hydraulic conditions will change within the channel, establishing fish passage and allowing access to additional spawning and rearing habitat. In the short term, a temporary increase in sediment entrainment within the isolated work area, turbidity, and temperature.

2.1.3.2 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 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." The action area has been defined as the streambed and streambank of Oak Creek extending upstream 15 m to the upper diversion and downstream approximately 150 m to the lower diversion. A wide variety of actions occur within the Upper Willamette River watershed, which includes the action area. NOAA Fisheries is not aware of any significant change in non-federal activities that are reasonably certain to occur. NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years. Future ODOT transportation projects are planned in the Upper Willamette River watershed. Each of these projects will be reviewed through separate section 7 consultation processes and therefore are not considered cumulative effects.

2.1.4 Conclusion

NOAA Fisheries has determined that, based on the available information, the proposed action is not likely to jeopardize the continued existence of UWR chinook salmon. NOAA Fisheries used the best available scientific and commercial data to analyze the effects of the proposed action on the biological requirements of the species relative to the environmental baseline, together with cumulative effects.

NOAA Fisheries' conclusions are based on the following considerations: (1) The proposed work will occur outside of the flowing waters of Oak Creek (*i.e.*, in the dry); (2) in-water work will be

completed between July 1and September 30, when NOAA Fisheries expects presence of ESA-listed fish are low, thereby minimizing the likelihood of UWR chinook salmon presence in the action area due to low-flow (less than 1 cfs), and/or warm water conditions; (3) any increases in sedimentation and turbidity in the project reach of the Oak Creek will be short-term and minor in scale, and would not change or worsen existing conditions for stream substrate in the action area; (4) downstream fish passage will be provided; and (7) the proposed action is not likely to impair properly functioning habitat, appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat toward proper functioning condition essential to long-term survival and recovery at the population ESU scale.

2.1.5 Reinitiation of Consultation

This concludes formal consultation on the Oak Creek Roughened Chute Project. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

2.2 Incidental Take Statement

The ESA at section 9 [16 USC 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule [50 CFR 223.203]. 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 USC 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) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 USC 1536].

2.2.1 Amount or Extent of Take

NOAA Fisheries anticipates that the action covered by this Opinion is reasonably certain to result in incidental take of UWR chinook salmon because of harm from project failure, the potential for injuring and/or killing individual fish during the work area isolation, and delayed mortality due to handling during the fish salvage process. Effects of actions such as these are largely unquantifiable in the short term, and are not expected to be measurable as long-term harm to habitat features or by long-term changes to UWR chinook salmon populations. Therefore, even though NOAA Fisheries expects some low-level incidental take to occur due to the actions covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NOAA Fisheries to estimate a specific amount of incidental take to the species itself. In instances such as these, the NOAA Fisheries designates the expected level of take as "unquantifiable". Based on the information in the BA, NOAA Fisheries anticipates that an unquantifiable amount of incidental take is reasonably certain to occur as a result of the actions covered by this Opinion.

In addition, NOAA Fisheries expects that the possibility exists for handling UWR chinook salmon during the work isolation process, which will result in incidental take to individuals during the construction period. NOAA Fisheries anticipates that incidental take of up to eight juvenile UWR chinook salmon, including injury of seven and death of one individual(s), could occur as a result of the fish salvage process. This take estimate is based on approximately 75 m^2 of stream habitat that will be dewatered during work area isolation. The extent of the take is limited to UWR chinook salmon within the action area. The extent of the take includes the streambed and streambank of Oak Creek extending upstream of the bridge 15 m to the edge of disturbance, and downstream approximately 150 m to the lower diversion.

2.2.2 Reasonable and Prudent Measures

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of UWR chinook salmon resulting from the action covered by this Opinion. The FHWA shall require measures that will:

1. Avoid or minimize the amount of incidental take from rock placement activities in the channel of Oak Creek by requiring measures be taken to limit the duration and extent of rock placement in the action area, and to schedule such work when the fewest number of fish are expected to be present.

2. Avoid or minimize incidental take from general construction by excluding unauthorized actions and applying conditions that avoid or minimize adverse effects to riparian and aquatic systems.

3. Ensure effectiveness of implementation of the reasonable and prudent measures by requiring that all erosion control measures and plantings for site restoration, shall be monitored and evaluated both during and following construction.

2.2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the FHWA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure #1 (rock placement), the FHWA shall ensure that:

    a. Conservation goal. All actions intended for streambank protection will also provide the greatest degree of natural stream function achievable through maintenance of existing natural features.
    b. Rock Placement. Large wood will be included as an integral component of the roughened chute.
        i. Large wood must be intact, hard, and undecayed to partly decaying with untrimmed root wads to provide functional refugia habitat for fish. Use of decayed or fragmented wood found laying on the ground or partially sunken in the ground is not acceptable. Large wood should be a minimum of 450 millimeters diameter at breast height. This large wood must not come from the riparian area.
        ii. Rock may be used for the following purposes and structures.
            (1) As ballast to anchor or stabilize large woody debris components of a structural component of the new channel.
            (2) The downstream end of the chute will be keyed in with large enough boulders to anchor into the bedrock and stabilize the channel.
            (3) Rock must be evenly graded and mixed as it is put into place.
            (4) When the low-flow channel is designed, the outside curves should be constructed (soft spots) so that natural flow processes can create pool habitat.
    c. After completion of the project, the existing channel should be re-watered in a way that will not significantly impact water quality or cause fish stranding.
        i. The diversion pipe shall be maintained in place while slowly dismantling the upper and lower dams. This will allow the new channel to slowly water-up, while still maintaining flow in the lower channel below the project. Because the area above the upper dam has temporarily expanded

usable habitat for fish, slowly ramping the water will allow fish to enter the actual low-flow channel.

ii. An ODOT or ODFW biologist shall be on site to monitor for fish stranding during this process.

iii. The existing flow downstream of the project will be maintained throughout the construction.

d. Any pump used for dewatering or diverting authorized under this Opinion must have a fish screen installed, operated and maintained in accordance to NOAA Fisheries' fish screen criteria.

2. To implement reasonable and prudent measure #2 (general conditions for construction, operation and maintenance), the FHWA shall ensure that:

a. Timing of in-water work. In-water work will be completed between July 1 and September 30, a period of time when presence of ESA-listed fish is expected to be low. Downstream fish passage will be maintained throughout the project, however, the stream will likely have little flow during construction. All work must be completed within these dates unless otherwise approved in writing by NOAA Fisheries.

b. Cessation of work. Project operations will cease under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

c. Fish screens. All water intakes used for a project, including pumps used to isolate an in-water work area, will have a fish screen installed, operated and maintained according to NOAA Fisheries' fish screen criteria.[1]

d. Fish passage. Passage will be provided for any adult or juvenile salmonid species present in the project area during construction, and after construction for the life of the project. Upstream passage is not required during construction if it did not previously exist.

e. Pollution and Erosion Control Plan. A Pollution and Erosion Control Plan will be prepared and carried out to prevent pollution related to construction operations. The plan must be available for inspection on request by FHWA or NOAA Fisheries.

i. Plan Contents. The Pollution and Erosion Control Plan must contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

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[1] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

(1) Practices to prevent erosion and sedimentation associated with access roads, stream crossings, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations and staging areas.

(2) Practices to confine, remove and dispose of excess concrete, cement and other mortars or bonding agents, including measures for washout facilities.

(3) A description of any hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

(4) A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(5) Practices to prevent construction debris from dropping into any stream or waterbody, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

ii. Inspection of erosion controls. During construction, all erosion controls must be inspected daily during the rainy season and weekly during the dry season to ensure they are working adequately.[2]

(1) If inspection shows that the erosion controls are ineffective, work crews must be mobilized immediately to make repairs, install replacements, or install additional controls as necessary.

(2) Sediment must be removed from erosion controls once it has reached 1/3 of the exposed height of the control.

f. Construction discharge water. All discharge water created by construction (*e.g.*, concrete washout, pumping for work area isolation, vehicle wash water) will be treated as follows.

i. Water quality. Facilities must be designed, built and maintained to collect and treat all construction discharge water using the best available technology applicable to site conditions. The treatment must remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present.

ii. Discharge velocity. If construction discharge water is released using an outfall or diffuser port, velocities must not exceed 4 feet per second.

iii. Spawning areas. No construction discharge water may be released within 300 feet upstream of active spawning areas.

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[2] "Working adequately" means no turbidity plumes are evident during any part of the year.

g. Preconstruction activity. Before significant[3] alteration of the project area, the following actions must be completed.

i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite.

(1) A supply of sediment control materials (*e.g.*, silt fence, straw bales[4]).

(2) An oil-absorbing, floating boom whenever surface water is present.

iii. Temporary erosion controls. All temporary erosion controls must be in-place and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

h. Heavy Equipment. Use of heavy equipment will be restricted as follows.

i. Choice of equipment. When heavy equipment must be used, the equipment selected must have the least adverse effects on the environment (*e.g.*, minimally-sized, rubber-tired).

ii. Vehicle staging. Vehicles must be fueled, operated, maintained, and stored as follows.

(1) Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place in a vehicle staging area placed 150 feet or more from any stream, waterbody, or wetland.

(2) All vehicles operated within 150 feet of any stream, waterbody, or wetland must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired in the vehicle staging area before the vehicle resumes operation. Inspections must be documented in a record that is available for review on request by FHWA or NOAA Fisheries.

(3) All equipment operated instream must be cleaned before beginning operations below the bankfull elevation to remove all external oil, grease, dirt, and mud.

iii. Stationary power equipment. Stationary power equipment (*e.g.*, generators, cranes) operated within 150 feet of any stream, waterbody or

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[3] "Significant" means an effect can be meaningfully measured, detected or evaluated.

[4] When available, certified weed-free straw or hay bales must be used to prevent introduction of noxious weeds.

wetland must be diapered to prevent leaks, unless otherwise approved in writing by NOAA Fisheries.

i. Site preparation. Native materials will be conserved for site restoration.
   i. If possible, native materials must be left where they are found.
   ii. Materials that are moved, damaged, or destroyed must be replaced with a functional equivalent during site restoration.
   iii. Any large wood,[5] native vegetation, weed-free topsoil, and native channel material displaced by construction must be stockpiled for use during site restoration.

j. Isolation of in-water work area. If adult or juvenile fish are reasonably certain to be present, the work area will be well isolated from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials. The work area will also be isolated if in-water work may occur within 300 feet upstream of spawning habitats. Water management plans must be approved in writing by NOAA Fisheries before the start of isolation.

k. Capture and release. Before and intermittently during pumping to isolate an in-water work area, an attempt must be made to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.
   i. A fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish must conduct or supervise the entire capture and release operation.
   ii. If electrofishing equipment is used to capture fish, the capture team must comply with NOAA Fisheries' electrofishing guidelines.[6]
   iii. The capture team must handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.
   iv. Captured fish must be released as near as possible to capture sites.
   v. ESA-listed fish may not be transferred to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.
   vi. Other Federal, state, and local permits necessary to conduct the capture and release activity must be obtained.

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[5] For purposes of this Opinion only, "large wood" means a tree, log, or rootwad big enough to dissipate stream energy associated with high flows, capture bedload, stabilize streambanks, influence channel characteristics, and otherwise support aquatic habitat function, given the slope and bankfull width of the stream in which the wood occurs. See, Oregon Department of Forestry and Oregon Department of Fish and Wildlife, *A Guide to Placing Large Wood in Streams*, May 1995 (www.odf.state.or.us/FP/RefLibrary/LargeWoodPlacemntGuide5-95.doc).

[6] National Marine Fisheries Service, *Backpack Electrofishing Guidelines* (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

vii. NOAA Fisheries or its designated representative must be allowed to accompany the capture team during the capture and release activity, and must be allowed to inspect the team's capture and release records and facilities.

l. Earthwork. Earthwork (including excavation, filling and compacting) will be completed as quickly as possible.

i. Site stabilization. All disturbed areas must be stabilized, including obliteration of temporary roads, within 12 hours of any break in work unless construction will resume work within 7 days between June 1 and September 30, or within 2 days between October 1 and May 31.

ii. Source of materials. Boulders, rock, woody materials and other natural construction materials used for the project must be obtained outside the riparian area.

m. Site restoration. All streambanks, soils and vegetation disturbed by the project are cleaned up and restored as follows.

i. Restoration goal. The goal of site restoration is renewal of habitat access, water quality, production of habitat elements (such as large woody debris), channel conditions, flows, watershed conditions and other ecosystem processes that form and maintain productive fish habitats.

ii. Revegetation. Areas requiring revegetation must be replanted before the first April 15 following construction with a diverse assemblage of species that are native to the project area or region, including grasses, forbs, shrubs and trees.

iii. Remediation work. All remediation work shall be completed during the in-water work period and equipment must be above OHW.

iv. Pesticides. No pesticide application is allowed, although mechanical or other methods may be used to control weeds and unwanted vegetation.

v. Fertilizer. No surface application of fertilizer may occur within 50 feet of any stream channel.

3. To implement reasonable and prudent measure #3 (monitoring and reporting), the FHWA shall ensure that:

a. Within 120 days of completing the project, the FHWA shall ensure submital of a monitoring report to NOAA Fisheries describing the FHWA's success meeting their permit conditions. This report will consist of the following information.

i. Project identification.

(1) Project name.

(2) Starting and ending dates of work completed for this project.

(3) The FHWA contact person.

ii. Isolation of in-water work area. All projects involving isolation of in-water work areas must include a report of any seine and release activity including:
   (1) The name and address of the supervisory fish biologist.
   (2) Methods used to isolate the work area and minimize disturbances to fish species.
   (3) Stream conditions before and following placement and removal of barriers.
   (4) The means of fish removal.
   (5) The number of fish removed by species.
   (6) The location and condition of all fish released.
   (7) Any incidence of observed injury or mortality.

iii. Pollution and erosion control. A summary of all pollution and erosion control inspection reports, including descriptions of any failures experienced with erosion control measures, efforts made to correct them and a description of any accidental spills of hazardous materials.

iv. Site restoration. Documentation of the following conditions:
   (1) Finished grade slopes and elevations.
   (2) Log and rock structure elevations, orientation, and anchoring, if any.
   (3) Any changes in planting composition and density.
   (4) A plan to inspect and, if necessary, replace failed plantings and structures, including the compensatory mitigation site.
   (5) Adaptive Management. During the monitoring period the stream channel should be maintained to remedy problems associated with fish passage and stability. This includes stabilizing deflection points, replacement plantings, and replacing structures vital to fish passage.

v. Photographic documentation of environmental conditions at the project site before, during and after project completion.
   (1) Photographs will include general project location views and close-ups showing details of the project area and project, including pre- and post-construction.
   (2) Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
   (3) Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

vi. Monitoring. On an annual basis, for five years after completing the project, the FHWA shall ensure submital of a monitoring report to NOAA Fisheries describing the FHWA's success in meeting their habitat restoration goals of any riparian plantings. This report will consist of the following information.

(1) Project identification.
   (a) Project name.
   (b) Starting and ending dates of work completed for this project.
   (c) The FHWA contact person.

(2) Riparian restoration. Documentation of the following conditions.
   (a) Any changes in planting composition and density.
   (b) A plan to inspect and, if necessary, replace failed plantings and structures.

(3) Hydrology monitoring of the new channel. Documentation of the following elements.
   (a) Water velocity profiles throughout the channel during low, medium and migratory flows.
   (b) Observations of juvenile and adult fish usage and passage.
   (c) Survey of the channel to determine whether goals were met on design and if improvements can be made to enhance fish passage or what remediation needs exist..
   (d) Because this roughened chute is experimental and may have hydraulic changes associated with it, the streambanks downstream to the Mary's River must be monitored on an annual basis to ensure there is no damage associated with the armoring of the streambed.

vii. Monitoring reports will be submitted to:

NOAA Fisheries
Oregon State Habitat Office
Attn: 2004/00151
525 NE Oregon Street, Suite 500
Portland, OR 97232-2778

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The objective of the essential fish habitat (EFH) consultation is to determine whether the proposed actions may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

3.2 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: 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 600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- 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;

- NOAA Fisheries shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH;

- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall 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 the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, regardless of its location.

3.3 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for Federally-managed fisheries within the waters of Washington, Oregon, and California. Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other waterbodies 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), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years) (PFMC 1999).

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 the potential adverse effects to these species' EFH from the proposed action is based on this information.

The Pacific Fisheries Management Council (PFMC) has designated EFH for three species of 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 waterbodies 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), 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 on this information.

3.4 Proposed Action

The proposed action is detailed above in section 1.2. The action area for this consultation includes the streambed and streambank of Oak Creek, extending upstream 15 m to the upper diversion and downstream approximately 150 m to the lower diversion. This area has been designated as EFH for chinook and coho salmon.

3.5 Effects of Proposed Action

NOAA Fisheries believes the implementation of the Oak Creek Roughened Chute Project is likely to adversely affect EFH for chinook salmon. Information submitted by the FHWA in its request for consultation and additional information provided by ODFW is sufficient for NOAA Fisheries to conclude that the effects of the proposed action are transient, local, and of low intensity and are likely to adversely EFH in the short term, however over the long term will provide fish passage that will benefit juvenile and adult chinook and coho salmon. NOAA Fisheries also believes that this fish passage project will provide a beneficial effect and the conservation measures proposed as an integral part of the action would avoid, minimize, or otherwise offset potential adverse impacts to designated EFH.

3.6 Conclusion

NOAA Fisheries believes that implementation of the roughened chute fish passage project in Oak Creek will adversely affect designated EFH for chinook and coho salmon in the short term and will beneficially affect designated EFH in the long term by enhancing fish passage.

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project in the BA by the FHWA, all of the reasonable and prudent measures and terms and conditions contained in sections 2.2.2 and 2.2.3 (respectively) are applicable to EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH conservation recommendations.

3.8 Statutory Response Requirement

Please note that the MSA (section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

3.9 Supplemental Consultation

The FHWA must reinitiate EFH consultation with NOAA Fisheries if either the action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

4. LITERATURE CITED

Section 7(a)(2) of the ESA requires biological opinions to be based on "the best scientific and commercial data available." This section identifies the data used in developing this Opinion.

Birtwell, I. K., G. F. Hartman, B. Anderson, D. J. McLean and J. G. Malic. 1984. A brief investigation of Arctic Grayling (*Thymallus arcticus*) and aquatic invertebrates in the Minto Creek drainage, Mayo, Yukon Territory: an area subjected to placer mining. Canadian Technical Report of Fisheries and Aquatic Sciences 1287.

Busby, P.J., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz, and I. V. Lagomarsino. 1996. Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California. NOAA Technical Memorandum NOAA Fisheries-NWFSC-27. August. (Available @ www.nwr.noaa.gov , under Protected Resources Division, Status Reviews).

DeVore, P. W., L. T. Brooke and W. A. Swenson. 1980. The effects of red clay turbidity and sedimentation on aquatic life in the Nemadji River system. Impact of nonpoint pollution control on western Lake Superior. S. C. Andrews, R. G. Christensen, and C. D. Wilson. Washington, D.C., U.S. Environmental Protection Agency. EPA Report 905/9-79-002-B.

Lloyd, D.S. 1987. Turbidity as a water quality standard for habitats in Alaska. North American Journal of Fisheries Management 7:34-35.

Myers, J.M., R.G. Kope, G.J. Bryant, D.Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California. NOAA. Technical Memorandum NOAA Fisheries-NWFSC-35. February. (Available @ www.nwr.noaa.gov, under Protected Resources Division, Status Reviews).

NOAA Fisheries (National Marine Fisheries Service) 1996. Making Endangered Species Act determinations of effect for individual and grouped actions at the watershed scale. Habitat Conservation Program, Portland, Oregon.

National Marine Fisheries Service (NOAA Fisheries). 1997. Status Review Update for Deferred and Candidate ESUs of West Coast Steelhead. December. (Available @ www.nwr.noaa.gov under Protected Resources Division, Status Reviews).

National Marine Fisheries Service (NOAA Fisheries). 1999. The Habitat Approach: Implementation of Section 7 of the Endangered Species Act fo Actions Affecting the Habitat of Pacific Anadromous Salmonids. Guidance memorandum from Assistant Regional Administrators for Habitat Conservation and Protected Resources to staff. 3 pages. August. NOAA Fisheries, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232-2737. (Available @ www.nwr.noaa.gov , under Habitat Conservation Division, Habitat Guidance Documents).

National Marine Fisheries Service (NOAA Fisheries). 2000. Designated Critical Habitat: Critical Habitat for 19 Evolutionarily Significant Units of Salmon and Steelhead in Washington, Oregon, Idaho, and California. Federal Register. Vol. 65, No. 32, pages 7764-7787. Final Rule. February 16. (Available @ www.nwr.noaa.gov , under ESA Information, Federal Register Notices).

Neff, J.M. 1985. Polycyclic aromatic hydrocarbons. Pages 416-454 in G.M. Rand and S.R. Petrocelli. Fundamentals of aquatic toxicology,. Hemisphere Publishing, Washington, D.C.

PFMC (Pacific Fishery Management Council). 1999. Amendment 14 to the Pacific coast salmon plan. Appendix a: Description and identification of essential fish habitat, adverse impacts and recommended conservation measures for salmon. Portland, Oregon.

Scannell, P.O. 1988. Effects of elevated sediment levels from placer mining on survival and behavior of immature arctic grayling. Alaska Cooperative Fishery Unit, University of Alaska. Unit Contribution 27.

Servizi, J. A. and Martens, D. W. 1991. Effects of temperature, season, and fish size on acute lethality of suspended sediments to coho salmon. Canadian Journal of Fisheries and Aquatic Sciences 49:1389-1395.

Sigler , J. W., T.C. Bjorn and F.H. Everest. 1984. Effects of chronic turbidity on density and growth of steelhead and coho salmon. Trans. Am. Fish. Soc. 111:63-69.