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:
2003/01278

May 21, 2004

Mr. Lawrence C. Evans
Chief, Regulatory Branch
Portland District, Corps of Engineers
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation on the Effects of the Jacob Wood Water Diversion Project, Jackson County, Oregon (Corps No.: 200300531)

Dear Mr. Evans:

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 Jacob Wood Water Diversion Project, Jackson County, Oregon. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Southern Oregon/Northern California (SONC) coho salmon (*Oncorhynchus kisutch*), or destroy or adversely modify designated critical habitat. As required by section 7 of the ESA, NOAA Fisheries includes 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 contains a consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600). NOAA Fisheries concludes that the proposed action may adversely affect designated EFH for Chinook salmon. As required by section 305(b)(4)(A) of the MSA, included are conservation recommendations that NOAA Fisheries believes will avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from the proposed action. As described in the enclosed consultation, 305(b)(4)(B) of the MSA requires that a Federal action agency must provide a detailed response in writing within 30 days of receiving an EFH conservation recommendation.

If you have any questions regarding this consultation, please contact Chuck Wheeler of my staff in the Southwest Oregon Habitat Branch of the Oregon State Habitat Office at 541.957.3379.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Dominic Yballe, COE

Endangered Species Act - Section 7 Consultation
Biological Opinion

&

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

Jacob Wood Water Diversion Project,
Jackson County, Oregon
(Corps No. 200300531)

Agency:	U. S. Army Corps of Engineers
Consultation Conducted By:	NOAA's National Marine Fisheries Service, Northwest Region
Date Issued:	May 21, 2004
Issued by:	for Michael R Crouse _____ D. Robert Lohn Regional Administrator
Refer to:	**2003/01278**

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1. INTRODUCTION

1.1 Background

On October 6, 2003, NOAA's National Marine Fisheries Service (NOAA Fisheries) received a biological assessment (BA) from the Portland District of the U.S. Army Corps of Engineers (Corps) along with a letter requesting formal consultation on the effects of the Jacob Wood Water Diversion Project. The request was made pursuant to sections 7(a)(2) of the Endangered Species Act (ESA) and 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The proposed action is to construct a water diversion within the Rogue River. Besides describing the proposed operation and its likely effects on aquatic resources, the Corps employed methods described in *Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NOAA Fisheries 1996a) to conclude the project is likely to adversely affect Southern Oregon/Northern California (SONC) coho salmon (*Oncorhynchus kisutch*), an ESA-listed species.

1.2 Consultation History

On November 14, 2003, NOAA Fisheries sent a letter to the Corps requesting additional information. The request focused on the water that is being diverted from the Rogue River and the screen on the intake pipe. On January 7, 2004, Hollie Cannon of Water Rights Solutions, LLC., representing the applicant, telephoned the NOAA Fisheries Southwest Oregon Habitat Branch to discuss the request for additional information. On January 10, 2004, NOAA Fisheries received a letter from Water Rights Solutions, LLC., addressing all the points within the request for additional information.

1.3 Proposed Action

The proposed action is the issuance of a Corps permit to Jacob Wood to construct a water diversion within the Rogue River. The proposed project consists of installing and burying (4 feet into the banks of the Rogue River), a 16-inch intake pipe equipped with a fish screen. A total of 60 cubic yards of material will be removed, then replaced within the ordinary high water mark (OHWM). The work site will be isolated from flow and turbid water will be pumped into a pond. The location of the pipeline was chosen to avoid removal of any trees on the riverbank. Excavated river gravel will be used as backfill after the pipe is installed. All in-water work will be completed during summer low flow periods.

The pipe will receive water at a maximum rate of 1,400 gallons per minute from the river to gravity-feed an irrigation pond 560 feet inland. The water to be diverted is controlled by the U.S. Bureau of Reclamation (BOR) and is stored behind Lost Creek Reservoir during the winter. During the irrigation season, April 1 through October 31, the BOR will increase flow from Lost Creek Reservoir to supply the irrigation water to the diversion.

The intake pipe will be screened with a cylindrical drum screen constructed by the applicant. This screen is experimental; it has not undergone any laboratory performance testing. The screen is 5.33 feet in length and 2 feet in diameter. The screen mesh is 3/32-inch mesh. No cleaning system has been incorporated into the design; it relies on passive cleaning by the river. Weekly inspections will occur for maintenance and debris management.

1.4 Description of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area (project area) involved in the proposed action (50 CFR 402.02). The direct effects occur at or beyond the project site based on the potential for upstream or downstream effects (*e.g.* displacement, injury to, or killing of coho salmon) in the action area. Indirect effects may occur at or beyond the project site when the proposed action leads to additional activities that contribute to aquatic habitat degradation. For this consultation, the action area encompasses the construction area at river mile 129.36 of the Rogue River, and 100 feet downstream of the diversion point. This action area occurs within section 15 of T36S, R2W.

2. ENDANGERED SPECIES ACT

2.1 Biological Opinion

This biological opinion (Opinion) considers the potential effects of the proposed action on SONC coho salmon, which occur in the proposed action area. Within the Rogue River watershed, NOAA Fisheries listed the SONC coho salmon as threatened under the ESA on May 6, 1997 (62 FR 24588), and interim protective regulations were issued under section 4(d) of the ESA on July 18, 1997 (62 FR 38479). Critical habitat was designated on May 5, 1999 (64 FR 24049). Critical habitat includes all streams accessible to listed coho salmon between Cape Blanco, Oregon, and Punta Gorda, California. The designation includes all waterways, substrates, and adjacent riparian zones below long-standing, naturally-impassable barriers. The adjacent riparian zone is defined based on key riparian functions. These functions are shade, sediment, nutrient/chemical regulation, streambank stability, and input of large woody debris/organic matter.

The objective of this Opinion is to determine whether the proposed action is likely to jeopardize the continued existence of SONC coho salmon or result in destruction or adverse modification of critical habitat. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

2.1.1 Biological Information

NOAA Fisheries described the population status of the SONC coho salmon ESU in its status review (Weitkamp *et al.* 1995) and in the SONC coho salmon final listing rule (62 FR 24588, May 6, 1997).

Coho salmon are known to spawn and rear in the Rogue River basin. Adult coho salmon enter the Rogue River in early November and spawn through January. Coho salmon are distributed throughout most of the mainstem of the Rogue River, past the city of Shady Cove and in some larger tributaries. Lost Creek Dam in the Rogue River is impassable, and represents the upstream limit of distribution. The Oregon Department of Fish and Wildlife (ODFW) has identified this area as migration and rearing habitat.

Although limited data are available to assess population numbers or trends, NOAA Fisheries believes that coho salmon stocks comprising the SONC coho salmon evolutionarily significant unit (ESU) are depressed relative to past abundance. The SONC coho salmon ESU is identified as all naturally-spawned populations of coho salmon in coastal streams south of Cape Blanco and north of Punta Gorda (60 FR 38011, July 25, 1995). Biological information for SONC coho salmon can be found in species status assessments by NOAA Fisheries (Weitkamp *et al.* 1995) and by the ODFW (Nickelson *et al.* 1992).

Abundance of wild coho salmon spawners in Oregon coastal streams declined from roughly 1965 to 1975, and has fluctuated at a low level since then (Nickelson *et al.* 1992). Spawning escapements for this ESU may be less than 5% of that in the early 1900s. Contemporary production of coho salmon may be less than 10% of the historic production (Nickelson *et al.*1992). Average spawner abundance has been relatively constant since the late 1970s, but preharvest abundance has declined. Average recruits-per-spawner may also be declining. The SONC coho salmon ESU, although not at immediate danger of extinction, may become endangered in the future if present trends continue (Weitkamp *et al.* 1995). Analysis of Rogue River data by the Biological Review Team (BRT 2003) found that trends in spawner abundance are positive, but that it relates to a reduction in harvest rather than improved freshwater conditions. The BRT also stated the low occupancy rates of historical coho salmon streams between 1986 and 2000 indicates continued low abundance in the California portion of this ESU (BRT 2003).

The fish counts at Gold Ray Dam (three miles downstream of the project site) provide the best quantitative source of information available on SONC coho salmon abundance in the upper Rogue River subbasin, and may also provide an indicator of population trends of this ESU as a whole. In the eight-year period from 1993 to 2001, counts of adult SONC coho salmon at Gold Ray Dam have ranged from 756 in 1993, to 15,652 in 2000 (Table 1).

Table 1. Counts of Adult SONC Coho Salmon (wild fish as identified by ODFW) at Gold Ray Dam, 1993-2001 (COE 2001).

Year (counts from 9/15-1/31)	SONC coho salmon (wild) at Gold Ray Dam
1993-94	756
1994-95	3,265
1995-96	3,345
1996-97	3,516
1997-98	4,566
1998-99	1,310
1999-2000	1,417
2000-2001	15,652
2001-2002	16,442
2002-2003	15,995
2003-2004	8,420

Some of the most recent data on the status of the SONC coho salmon ESU can be found in a status review done by the California Department of Fish and Game (CDFG 2002). According to CDFG, the available information on coho salmon status is primarily in the form of presence-by-brood-year analyses, field surveys conducted in 2001, recent abundance trend information for several stream systems along the central and north coasts, and ocean harvest data. Considered separately, none of these lines of investigation provide conclusive evidence that coho salmon have experienced a substantial decline throughout the SONC coho ESU, either because they are limited in scope or are not particularly robust in detecting trends within specific watersheds. However, most of these indicators show declining trends, and in that respect, provide a high likelihood that populations have declined significantly and are continuing to decline. Some of the indicators show an upward trend in 2000 and 2001, but the overall trend is still downward in most cases, and most indicators of abundance show values that are much reduced from historical levels. Brown and Moyle (1991) estimated that there has been a reduction in natural spawner abundance of 85% to 94% since the 1940s. These analyses and the 2001 presence surveys indicate that some streams in this ESU may have lost one or more brood-year lineages.

While the California study was based on data from northern California watersheds, the overall trends for the ESU may be similar in the Rogue basin. Long-term (22-year) and short-term (10-year) trends in mean spawner abundance for the Rogue River Basin are upward, but these upward trends are likely due to reduced harvest (BRT 2003). Pre-harvest recruit numbers are

flat for the basin, indicating improved freshwater habitat and survival is not the likely cause for this upward trend (BRT 2003). In summary, the majority of the BRT votes for the SONC coho salmon ESU identified this ESU as "likely to become endangered."

2.1.2 Evaluating Proposed Actions

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). NOAA Fisheries must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. This analysis involves the definition of the biological requirements and current status of the listed species, and evaluation of 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 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 salmonid's life stages that occur beyond the action area. If NOAA Fisheries finds that the action is likely to jeopardize the listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

Furthermore, NOAA Fisheries evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' designated critical habitat. NOAA Fisheries must determine whether habitat modifications appreciably diminish the value of critical habitat for both survival and recovery of the listed species. NOAA Fisheries identifies those effects of the action that impair the function of any essential element of critical habitat. NOAA Fisheries then considers whether such impairment appreciably diminishes the habitat's value for the species' survival and recovery. If NOAA Fisheries concludes that the action will destroy or adversely modify critical habitat, it 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. NOAA Fisheries' critical habitat analysis considers the extent to which the proposed action impairs the function of essential biological elements necessary for juvenile and adult migration, and juvenile rearing of SONC coho salmon.

2.1.3 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed coho salmon 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

SONC coho salmon for ESA protection and also considers new available data that is relevant to the determination.

The relevant biological requirements are those necessary for SONC coho salmon to survive and recover to naturally-reproducing population levels, at which time protection under the ESA would become unnecessary. For this consultation, the biological requirements are improved habitat characteristics that function to support successful migration and juvenile rearing in the action area.

2.1.4 Environmental Baseline

In step two of NOAA Fisheries' analysis, we evaluate the relevance of the environmental baseline in the action area. Regulations implementing section 7 of the ESA (50 CFR 402.02) define the environmental baseline as the past and present effects of all Federal, state, or private actions and other human activities in the action area. The environmental baseline also includes the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation, and the effects of state and private actions that are contemporaneous with the consultation in progress.

Land uses in the action area include urban, rural, residential, agricultural, and forestry. Riparian areas and stream channels in the action area have been damaged by development activities related to these land uses throughout the watershed (FEMAT 1993, Botkin *et al.* 1995, OCSRI 1997). Habitat changes that have contributed to the decline of SONC coho salmon in the action area include: (1) Reduced biological, chemical, and physical connectivity between streams, riparian areas, floodplains, and uplands; (2) elevated fine sediment yields; (3) reduced instream large woody debris; (4) loss or degradation of riparian vegetation; (5) altered stream channel morphology; (6) altered base and peak stream flows; and (7) fish passage impediments (OCSRI 1997).

All of the following information about the environmental condition of the Rogue Basin was adapted from the Oregon Department of Environmental Quality (DEQ). Dodge Park, at Rogue River mile 138, is the closest DEQ data-gathering station to the project area. According to DEQ, the Rogue Basin and its five subbasins drain an area of diverse geology and land usage. In the past, water quality problems in the basin were identified. These problems were addressed in a small portion of the basin with the issuance of the Bear Creek Total Maximum Daily Load. However, throughout the remainder of the basin, general water quality conditions have not significantly improved, and concerns of point and non-point source pollution remain. Comparing minimum seasonal Oregon Water Quality Index (OWQI) values, water quality in the Rogue River basin ranges from good (Rogue River at the Dodge Park site) to very poor (Bear Creek at Talent). For most monitoring sites in the Rogue Basin, water quality data were routinely collected by the DEQ Laboratory in water years 1986 to 1995.

The upper Rogue River receives drainage from the Cascades and has excellent general water quality. The upper reaches of Little Butte Creek provide some of the most productive salmonid

spawning areas in the Rogue Basin. However, the lower reaches of the creek suffer from non-point source pollution, as indicated at the monitoring site near the mouth of Little Butte Creek.

The Rogue River at Dodge Park is the most upstream monitoring site in the Rogue Basin and is situated upstream of all major point sources. Water quality at this point is the best of the monitored sites within the Rogue Basin. Relatively high concentrations of total phosphates and biochemical oxygen demand occasionally limit water quality at this site. These events occur during precipitation events (organic matter is deposited with runoff) and during periods of low flow (less water available to dilute organic matter). Rogue River water quality at Dodge Park is good in the summer and excellent in the fall, winter, and spring.

Water quality at Little Butte Creek at Agate Road is consistently poor year-round. High levels of fecal coliform, total phosphates, total solids, and biochemical oxygen demand impact general water quality in Little Butte Creek all year, except during periods of high flow and low or no precipitation. This indicates the introduction of untreated animal or human waste and runoff mainly associated with non-point sources. High stream temperatures in the summer compound water quality problems by increasing chemical and biological activity. It should be noted that irrigated agriculture and range dominate land uses on Little Butte Creek. Urban runoff from Eagle Point may contribute to non-point source pollution as well.

Based on the best available information regarding the current status of SONC coho salmon range-wide, the population status, trends, genetics, and the poor environmental baseline conditions within the action area, NOAA Fisheries concludes that the biological requirements of SONC coho salmon are not currently being met. Degraded habitat, resulting from agricultural practices, forestry practices, road building, municipal activities, and residential construction, indicate many aquatic habitat indicators are not properly functioning within Rogue River. Actions that do not maintain or restore properly functioning aquatic habitat conditions would be likely to jeopardize the continued existence of SONC coho salmon.

2.1.5 Analysis of Effects

The effects analysis presented in this section is based on information in the BA and supplementary material. NOAA Fisheries expects adverse effects to SONC coho salmon to occur from exposure to turbidity, contamination during the construction, and from operation of the water diversion intake.

Although reduction of summer flow is generally of concern with most water diversion projects, this project will not decrease summer flows. The project applicant has a contract for this water with the BOR, which stores the water upstream behind Lost Creek Dam. During the winter high flow period, the BOR fills Lost Creek Reservoir. The contract water for this project is included in the water used to fill the reservoir. During the irrigation season, the BOR will increase flow from Lost Creek Reservoir to supply the contract water to the proposed diversion. If the contract water is not stored for the proposed project, it will be passed through the system during the winter when flows are not considered a limiting factor. This project will increase summer flows

between Lost Creek Dam and the proposed diversion point and will not decrease summer flows below the diversion.

Turbidity

Potential impacts to listed salmon from the proposed action include both direct and indirect effects from turbidity. Potential direct effects include mortality from exposure resulting from ground disturbance and general construction activities. A potential indirect effect includes behavioral changes resulting from elevated turbidity (Sigler *et al.* 1984, Berg and Northcote 1985, Whitman *et al.* 1982), during riverbank habitat alterations.

Suspended sediment and turbidity influences on fish reported in the literature range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorous 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 is the frequency and the duration of the exposure, not just the TSS concentration.

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 (McLeay *et al.* 1984, 1987, Sigler *et al.* 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids tend to 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 1987).

A potentially positive reported effect is providing refuge and cover from predation (Gregory and Levings 1998). In systems with intense predation pressure, this provides a beneficial tradeoff (*e.g.*, enhanced survival) to the cost of potential physical effects (*e.g.*, reduced growth). Turbidity levels of about 23 Nephalometric Turbidity Units (NTU) have been found to minimize bird and fish predation risks (Gregory 1993). Exposure duration is a critical determinant of the occurrence and importance of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids may be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjornn and Reiser 1991). However, research shows that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).

Turbidity, at moderate levels, has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al.* 1996). Newly-emerged salmonid fry may be vulnerable to even moderate amounts of turbidity (Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses

of suspended sediment (Berg and Northcote 1985). Fine, redeposited sediments also have the potential to adversely affect primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991).

For the proposed project, the probability of direct mortality is negligible because the probability of SONC coho salmon occurring within the immediate work area is extremely low, but not discountable, during the period of work. Juvenile coho salmon in this reach of the Rogue River typically reside in off-channel habitats and areas with woody structure; the work site is devoid of these features.[1] Indirect effects from turbidity created from the project are likely to occur. While the worksite will be isolated from river flow and turbid water will be pumped to an offsite pond, it is likely that some turbidity will be released to the river when the coffer dams are set up and taken down. Because the volume of water in the Rogue River is large relative to the area of impact, increases in turbidity are expected to be measurable no more than 100 feet downstream. The probability of injuries to SONC coho salmon are expected to be low because turbidity should be localized (approximately 100 feet) and brief (a few hours within one day), and the probability of exposure is low due to very few coho salmon juveniles residing in the work area.

Chemical Contamination

As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. Operation of 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, Hatch and Burton 1999). The potential for a chemical spill with the proposed project is minimal because of the limited area of impact (approximately 20 feet) and the limited time of construction (approximately one day).

Water Intake

When the water is diverted from the river into the pipe, there is potential for juvenile and fry SONC coho salmon to be impinged on the screen. The experimental screen design meets most of the requirements listed in NOAA Fisheries fish screen criteria (NOAA Fisheries 1996b) to minimize effects to coho salmon. However, the maximum diversion rate of the project (3.1 cfs) exceeds that allowed under these guidelines (1 cfs). Also, while there is no criterion in the fish screen guidelines on the distance from the internal baffle to the screen, NOAA Fisheries believes the proposed baffle is too close to the screen. Potentially, this could cause uneven distribution of flow and possibly occlude effective screen area, thus increasing the approach velocity of the screen. This would increase the likelihood for impingement. The proposed screen does not have a screen cleaning system, therefore this screen is defined by NOAA Fisheries as a passive screen

[1] Telephone conversation with Jerry Vogt, Oregon Department of Fish and Wildlife (March 30, 2004) (describing use of the project area by juvenile coho salmon).

(NOAA Fisheries 1996b). The screen designer anticipates that flow of the river past the screen will keep debris from accumulating on the screen. Under the proposed action, the screen will be checked weekly. NOAA Fisheries believes this cleaning frequency is not sufficient.[2] Debris will likely accumulate between inspections and clog the screen, reducing the effective screen area. This would increase the approach velocities of the screen and the potential for impingement. Furthermore, the applicant cannot rely on reduced flow at the delivery point to identify when the screen is occluded by debris. This is because elevated approach velocities at the screen face will occur sooner than noticeable reductions of flow at the point of use, due to the delivery distance between the point of diversion and point of delivery.[2]

The probability of SONC coho salmon injury or mortality is low, but not discountable, because the probability of SONC coho salmon juveniles near the screen is low. This is because juvenile coho salmon in this area typically reside in off channel habitats and areas with woody structure, and the work site is devoid of these features.[3] Juvenile coho salmon have a low likelihood of being attracted to the flow of the diversion because the diversion flow is less than 0.75% of the lowest every recorded flow for this reach of the Rogue River (418 cfs measured September 19, 1968, USGS 2004).

2.1.6 Critical Habitat Effects

SONC coho salmon critical habitat was designated May 5, 1999 (64 FR 24049). SONC coho salmon critical habitat encompasses accessible reaches of all rivers, including estuarine areas and tributaries, between the Mattole River in California, and the Elk River in Oregon, including all waterways and substrate below longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for at least several hundred years). The proposed action includes excavating and re-filling a bank of the Rogue River. The material excavated will be used as the fill. The work site was chosen because no trees would be impacted.

The critical habitat designation focused on essential habitat features which included spawning sites, food resources, water quality, water quantity, and riparian vegetation. The proposed actions have the potential to affect these essential features. Over the short term, temporary disturbances to the aquatic and riparian habitat may occur from the proposed activities. Over the long term, the proposed actions are expected to maintain existing environmental baseline conditions as discussed in section 2.1.5. Consequently, NOAA Fisheries does not expect that the net effect of these actions will diminish the long-term value of designated critical habitat for survival of SONC coho salmon.

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[2]Email from Melissa Jundt, NOAA Fisheries, to Chuck Wheeler, NOAA Fisheries (April 1, 2004) (discussing screen cleaning frequency).

[3]Telephone conversation with Jerry Vogt, Oregon Department of Fish and Wildlife (March 30, 2004) (describing use of the project area by juvenile coho salmon).

2.1.7 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." Other activities within the watershed have the potential to impact fish and habitat within the action area.

NOAA Fisheries is not aware of any specific future non-federal activities within the action area that would cause greater effects to listed species than presently occurs. The action area includes tracts of private lands. Land use on these non-federal lands include municipal and rural development, agricultural, and commercial forestry. Chemical fertilizers or pesticides are used on many of these lands, but no specific information is available regarding their use. NOAA Fisheries does not consider the rules governing timber harvests, agricultural practices, and rural development on non-federal lands within Oregon to be sufficiently protective of watershed, riparian, and stream habitat functions to support the survival and recovery of listed species. Therefore, these habitat functions likely are at risk due to future activities on non-federal forest lands within the basin.

Between 1990 and 2000, the human population in Jackson County increased by 23.8% (U.S. Census Bureau 2004). Thus, NOAA Fisheries assumes that future private and state actions will continue within the action area, increasing as population density rises. As the human population in the county continues to grow, demand for actions similar to the proposed project likely will continue to increase as well. Each subsequent action may have only a small incremental effect, but taken together they may have a significant effect that would further degrade the watershed's environmental baseline and undermine the improvements in habitat conditions necessary for listed species to survive and recover.

2.1.8 Conclusion

The fourth step in NOAA Fisheries' jeopardy analysis is to decide whether the proposed action, considering the above factors, is likely to appreciably reduce the likelihood of the species' survival and recovery in the wild. After reviewing the current status of SONC coho salmon, the environmental baseline for the action area, the effects of the proposed action and its cumulative effects, NOAA Fisheries has determined that the Jacob Wood Water Diversion Project, as proposed, is not likely to jeopardize the continued existence of SONC coho salmon or cause adverse modification or destruction of designated critical habitat. These conclusions were based on the following considerations: (1) The water being withdrawn from the river is winter runoff that is stored in Lost Creek Reservoir for irrigation purposes and would not have provided summer or fall flows when water flows are more limiting; (2) any turbid water from the work site that escapes into the Rogue River will be short-term and localized; (3) probability of a chemical spill is low; and (4) while the fish screen on the intake is passive and experimental, it will function at least marginally and the probability of juvenile coho salmon near the screen is low.

2.1.9 Conservation Recommendation

Section 7(a)(1) of the ESA requires Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Conservation recommendations are discretionary measures suggested to avoid or minimize adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitats, or to develop additional information. NOAA Fisheries believes the following recommendation is consistent with these obligations, and therefore should be carried out by the Corps.

NOAA Fisheries recommends that the Corps condition the permit to use a manufactured fish screen complete with automatic screen cleaning system that has been performance tested in laboratory conditions. Performance tested screens are commercially available. The automatic screen cleaning system should be cycled at least every hour during operation. If this recommendation is accepted, the number of inspections for accumulated debris on the fish screen can be significantly reduced.

Please notify NOAA Fisheries if you implement this recommendation so that we will be kept informed of actions that minimize or avoid adverse effects, and those that benefit species or their habitats.

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

SONC coho salmon migrating to and from the Upper Rogue River watershed must pass by the project site. NOAA Fisheries anticipates that the actions covered by this Opinion are reasonably certain to result in incidental take of SONC coho salmon. Despite the use of the best available

information, estimating the number of fish that might be injured or killed by the effects of the project components, is difficult, if not impossible. In such circumstances, the anticipated amount of take is characterized as unquantifiable.

In instances such as this, NOAA Fisheries designates the expected level of take in terms of the extent of take allowed. The extent of incidental take from the construction of the water diversion is limited to that which occurs in the Rogue River at the work site and 100 feet downstream. The extent of incidental take from operation of the water intake on SONC coho salmon is limited to that which occurs on the fish screen.

2.2.2 Reasonable and Prudent Measures

NOAA Fisheries believes that the following reasonable and prudent measures, are necessary and appropriate to minimize the likelihood of take of ESA-listed fish resulting from implementation of this Opinion. These reasonable and prudent measures will also minimize adverse effects to designated critical habitat. The measures described below are non-discretionary. They must be carried out so that they become binding conditions for the incidental take exemption in section 7(a)(2) to apply. The Corps has the continuing duty to regulate the activities covered in this incidental take statement. If the Corps fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the document authorizing this action, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize the likelihood of take of listed fish resulting from implementation of this Opinion.

The Corps shall:

1. Avoid or minimize incidental take from construction-related activities by applying permit conditions that require construction actions that minimize harm to aquatic and riparian systems.

2. Minimize the likelihood of incidental take from in-water work by ensuring that the in-water work area is isolated from flowing water and implemented during the approved in-water work window for this reach of the Rogue River; June 15 to August 31.

3. Ensure completion of a comprehensive monitoring and reporting program of construction activities.

4. Ensure completion of a comprehensive monitoring and reporting program to confirm the passive diversion fish screen is operating adequately.

2.2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity.

1. To implement reasonable and prudent measure #1 (construction-related activities), the Corps shall:

    a. Minimum area. Confine construction impacts to the minimum area necessary to complete the project.
    b. Earthwork. Complete earthwork as quickly as possible.
    c. Timing of in-water work. Complete all work below the OHWM between June 15 and August 31, unless otherwise approved in writing by NOAA Fisheries.
    d. Fish screens. Install, operate and maintain a fish screen according to NOAA Fisheries' fish screen criteria (NOAA Fisheries 1996b) on each water intake used for project construction, including pumps used to isolate the in-water work area.
    e. Pollution and Erosion Control Plan. Prepare and carry out a written pollution and erosion control plan to prevent pollution caused by construction operations. Submit a copy of the written plan to the Corps and to the Oregon State Habitat Office of NOAA Fisheries, at the address below, before beginning work below bankfull elevation.
        i. Plan Contents. The pollution and erosion control plan will contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.
            (1) The name and address of the party(s) responsible for accomplishment of the pollution and erosion control plan.
            (2) Practices to prevent erosion and sedimentation associated with the construction site, equipment and material storage sites, fueling operations, staging areas, and roads being decommissioned.
            (3) A description of any regulated or 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 cleanup and disposal instructions for different products, quick response containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

ii. Inspection of erosion controls. During construction, monitor instream turbidity and inspect all erosion controls, as necessary to ensure the erosion controls are working adequately.[4]

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

f. Heavy Equipment. Restrict use of heavy equipment as follows.

i. Choice of equipment. When heavy equipment will be used, the equipment selected will have the least adverse effects on the environment (*e.g.*, minimally-sized, low ground pressure equipment).

ii. Vehicle and material staging. Store construction materials, and fuel, operate, maintain and store vehicles as follows.

(1) To reduce the staging area and potential for contamination, ensure that only enough supplies and equipment to complete a specific job will be stored on site.

(2) Complete vehicle staging, cleaning, maintenance, refueling, and fuel storage in a vehicle staging area placed 150 feet or more from any stream, waterbody, or wetland, unless otherwise approved in writing by NOAA Fisheries, except as stated below.

(a) Fuel storage locations within 150 feet of the OHWM shall have containment measures in place that meet or exceed 100% containment.

(b) No auxiliary fuel tanks are stored within 150 feet of the OHWM.

(3) Inspect all vehicles operated within 150 feet of any stream, waterbody, or wetland daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by the Corps or NOAA Fisheries.

(4) Before operations begin and as often as necessary during operation, steam-clean all equipment that will be used below bankfull elevation until all visible external oil, grease, mud, and other visible contaminates are removed.

(5) Diaper all stationary power equipment (*e.g.*, generators, cranes, stationary drilling equipment) operated within 150 feet of any stream, waterbody or wetland to prevent leaks, unless suitable containment is provided to prevent potential spills from entering any stream or waterbody.

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[4] 'Working adequately' means that project activities do not increase ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream of the turbidity causing activity.

2. To implement reasonable and prudent measure #2 (isolation of in-water work area) the Corps shall ensure that:

   a. Timing of in-water work. Complete all work below the OHWM between June 15 and August 31, unless otherwise approved in writing by NOAA Fisheries.
   b. Work area isolation. During in-water work (work within the OHWM), ensure that the work area is well isolated from the active flowing stream within a coffer dam (constructed of sand bags, sheet pilings, inflatable bags, *etc.*) or similar structure, to minimize the potential for sediment entrainment. After the coffer dam is in place, any fish trapped in the isolation pool will be removed by a permitted ODFW biologist before de-watering, using ODFW-approved methods.
      i. Coffer dams. All coffer dams will be of sufficient height to not be inundated during in-water work.
      ii. Water intake structures. Any water intake structure authorized under this Opinion must have a fish screen installed, and operated and maintained in accordance with NOAA Fisheries' fish screen criteria.
         (1) Water pumped from the work isolation area will be discharged into an upland area providing over-ground flow before returning to the creek. Discharge will occur so that it does not cause erosion.
         (2) Discharges into potential fish spawning areas or areas with submerged vegetation are prohibited.
      iii. Fish Salvage. Before and intermittently during pumping to isolate an in-water work area, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.
         (1) The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish.
         (2) If electrofishing equipment is used to capture fish, comply with NOAA Fisheries' electrofishing guidelines (NOAA Fisheries 1998.)
         (3) 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.
         (4) Transport fish in aerated buckets or tanks.
         (5) Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.
         (6) Do not transfer ESA-listed fish to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.
         (7) Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.

(8) Allow NOAA Fisheries or its designated representative to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.

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

a. Salvage notice. The following notice is included as a permit condition.

> NOTICE. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Roseburg Field Office of NOAA Fisheries Law Enforcement at 541.957.3388. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

b. Written planning requirements. Before beginning any work below bankfull elevation,[5] the permittee will provide a copy of the written plans for site restoration and pollution and erosion control to the Oregon Office of NOAA Fisheries at the following address. Plan requirements are described below.

> Director, Oregon State Habitat Office
> Habitat Conservation Division
> National Marine Fisheries Service
> **Attn: 2003/01278**
> 525 NE Oregon Street
> Portland, OR 97232

c. Implementation monitoring report required. The permittee submits an implementation monitoring report to the Corps and to NOAA Fisheries, at the address below, within 120 days of completing all in-water work. The monitoring report will describe the permittee's success meeting his or her permit conditions.

d. Implementation monitoring report contents. The monitoring report will include the following information.

i. Project identification

[5] 'Bankfull elevation' means the bank height inundated by a 1.5 to 2-year average recurrence interval and may be estimated by morphological features such average bank height, scour lines and vegetation limits.

(1) Permittee name, permit number, and project name.
(2) Project location, including any compensatory mitigation site(s), by 5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
(3) Corps contact person.
(4) Starting and ending dates for work completed.

ii. Habitat conditions. Photos of habitat conditions at the project site, before, during, and after project completion.[6]
(1) Include general views and close-ups showing details of the project and project area, including pre and post construction.
(2) Label each photo with date, time, project name, photographer's name, and a comment about the subject.

iii. Project data.
(1) Work cessation. Dates work ceased due to high flows, if any.
(2) Fish screen. Evidence of compliance with NOAA Fisheries' fish screen criteria.
(3) Pollution control. A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.
(4) Site preparation.
(a) Total cleared area – riparian and upland.
(b) Total new impervious area.
(5) Isolation of in-water work area, capture and release.
(a) Supervisory fish biologist – name and address.
(b) Methods of work area isolation and take minimization.
(c) Stream conditions before, during and within one week after completion of work area isolation.
(d) Means of fish capture.
(e) Number of fish captured by species.
(f) Release site and condition of all fish released.
(g) Any incidence of observed injury or mortality of listed species.
(6) Site restoration. Photo or other documentation that site restoration performance standards were met.

e. Reinitiation contact. To reinitiate consultation, contact the Oregon State Habitat Office of NOAA Fisheries, at the address above.

[6] Relevant habitat conditions may include characteristics of channels, eroding and stable streambanks in the project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

4. To implement reasonable and prudent measure #4 (diversion fish screen), the Corps shall ensure that:

   a. Post construction hydraulic evaluations. Hydraulic monitoring shall be completed under normal operation to validate design assumptions of the experimental screen.
      i. The maximum diverted flow rate and effective screen area shall be determined.
      ii. The effectiveness of the baffle system shall be verified to ensure that flow is equally distributed through all of the screen area and that the baffle itself is not interfering with flow through any part of the screen.
      iii. River velocity past the structure (sweeping velocity) shall be verified during low flow conditions.
      iv. Verification will be conducted with ODFW personnel.
      v. Verification will be conducted using an acoustic doppler velocimeter or equivalent.
   b. Post construction maintenance and debris evaluations. During the first year of use, high intensity monitoring shall be conducted to verify that the passive screen design is functioning adequately. During the first year the Corps shall require:
      i. The screen cleaned at least two times a day.
      ii. The screen be removed from the water and inspected at least once per day.
      iii. Each cleaning and inspection include an estimation of the amount of screen area occluded by debris and the effectiveness of manual cleaning.
      iv. After the first year of monitoring and the monitoring report is submitted to NOAA Fisheries; the applicant, the Corps, and NOAA Fisheries meet to review and discuss debris cleaning effectiveness and determine the frequency and need for future monitoring.
   c. Written planning requirements. Before diverting water, the permittee shall develop a written plan for post construction hydraulic evaluations and maintenance and debris evaluations. The permittee shall provide a copy to the Oregon Office of NOAA Fisheries at the above address.
      i. At a minimum the plan shall include implementation protocols and a list of equipment.
      ii. The plan shall be submitted to NOAA Fisheries for review and approval, with a minimum of 30 days for the review process.
   d. Written reporting requirements. The permittee shall provide an annual report documenting the results of post construction hydraulic evaluations and maintenance and debris evaluations.
      i. At a minimum the plan shall include the results of all hydraulic evaluations and maintenance and debris evaluations.
      ii. The plan shall be submitted to Melissa Jundt and Chuck Wheeler C/O the address above.
      iii. The plan shall be submitted by December 31 each year.
      iv. If the hydraulic assumptions are not being met, the applicant shall modify the screen or its operation.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), requires the inclusion of essential fish habitat (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 (50CFR600.110).

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.

3.2 Identification of EFH

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km) (PFMC 1998a, 1998b). 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 1999), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 1999).

Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Pacific salmon (PFMC 1999). Casillas *et al.* (1998) provides additional detail on the groundfish EFH habitat complexes. Assessment of the potential adverse effects to these species' EFH from the proposed action is based, in part, on these descriptions and on information provided by the Corps and the ODFW.

3.3 Proposed Actions

The proposed actions are detailed above in section 1.3 of this Opinion. The action area is defined in section 1.4, and includes the construction area at mile 129.36 of the Rogue River and 100 feet downstream of the diversion point. The action area includes habitats that have been designated as EFH for various life-history stages of coho salmon and Chinook salmon (*O. tschawytscha*).

3.4 Effects of Proposed Action

As described in detail in section 2.1.5 of the Opinion, the proposed action may result in adverse effects to habitat parameters. These adverse effects are:

- Increase turbidity downstream during construction
- Potential of chemical contamination

3.5 Conclusion

NOAA Fisheries concludes that the proposed action will adversely affect EFH for coho salmon and Chinook salmon.

3.6 EFH 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 NOAA Fisheries understands that the conservation measures described in the biological assessment will be implemented, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. Reasonable and prudent measures #1 and #3 in section 2.2.2 would address the long-term adverse effects this project has on EFH. Accordingly, NOAA Fisheries recommends that the Corps implement these as recommendations to minimize the potential adverse effects to EFH.

3.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 CFR 600.920(j), 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 Corps 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(k)).

4. LITERATURE CITED

Bell, M.C. 1991. Fisheries handbook of Engineering requirements and biological criteria. Fish Passage Development and Evaluation Program. U.S. Army Corps of Engineers. North Pacific Division.

Berg, L. and T.G. Northcote. 1985. Changes In Territorial, Gill-Flaring, and Feeding Behavior in Juvenile Coho Salmon (Oncorhynchus kisutch) Following Short-Term Pulses of Suspended Sediment. Canadian Journal of Fisheries and Aquatic Sciences 42: 1410-1417.

Birtwell, I. K., G. F. Hartman, B. Anderson, D. J. McLeay, and J. G. Malick. 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.

Bjornn, T.C., and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. Pages 83-138 *in* W.R. Meehan, ed. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19:83-138.

Botkin, D., K. Cummins, T. Dunne, H. Regier, M. Sobel, and L. Talbot. 1995. Status and future of salmon of western Oregon and northern California: findings and options. Report #8. The center for the study of the environment, Santa Barbara, California.

BRT (Biological Review Team). 2003. Preliminary conclusions regarding the updated status of West Coast salmon and steelhead, Part C – Coho salmon, Co-manager review draft. West Coast Biological Review Team, Northwest Fisheries Science Center and Southwest Fisheries Science Center (February 2003). Available online at: http://www.nwfsc.noaa.gov/trt/brt/brtrpt.cfm.

Brown, L. R. and P. B. Moyle. 1991. Status of Coho Salmon in California. Report to the National Marine Fisheries Service, UC Davis, CA.

California Department of Fish and Game. 2002. Status Review of California Coho Salmon North of San Francisco: Report to the California Fish and Game Commission; Candidate Species Status Review Report 2002-3, April 2002, 336 p.

Casillas, E., L. Crockett, Y. deReynier, J. Glock, M. Helvey, B. Meyer, C. Schmitt, M. Yoklavich, A. Bailey, B. Chao, B. Johnson, and T. Pepperell,. 1988. Essential Fish Habitat West Coast Groundfish Appendix. National Marine Fisheries Service. Seattle, Washington. 778 p.

COE (U.S. Army Corps of Engineers). 2001. Rogue Basin fisheries evaluation: effects of Elk Creek dam on migratory salmonids in Elk Creek. Annual Progress Report. Portland District, Portland, Oregon.

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.

FEMAT (Forest Ecosystem Management Assessment Team). 1993. Forest ecosystem management: an ecological, economic, and social assessment. Report of the Forest Ecosystem Management Assessment Team. U.S. Government Printing Office 1993-793- 071. U.S. Government Printing Office for the U.S. Department of Agriculture, Forest Service; U.S. Department of the Interior, Fish and Wildlife Service, Bureau of Land Management, and National Park Service; U.S. Department of Commerce, National Oceanic and Atmospheric Administration and National Marine Fisheries Service; and the U.S. Environmental Protection Agency.

Gregory, R. S., and C. D. Levings. 1998. "Turbidity Reduces Predation on Migrating Juvenile Pacific Salmon." Transactions of the American Fisheries Society 127: 275-285.

Gregory, R.S. 1993. Effect of turbidity on the predator avoidance behavior of juvenile Chinook salmon (Oncorhynchus tshawytcha). Canadian J. Fish. Aquatic Sciences 50:241-246.

Hatch, A.C. and G.A. Burton Jr. 1999. Photo-induced toxicity of PAHs to *Hyalella azteca* and *Chironomus tentans*: effects of mixtures and behavior. Environmental Pollution 106(2): 157-167.

Lloyd, D. S. 1987. Turbidity as a Water Quality Standard for Salmonid Habitats in Alaska. North American Journal of Fisheries Management 7:34-45.

McLeay, D. J., G. L. Ennis, I. K. Birtwell, and G. F. Hartman. 1984. "Effects On Arctic Grayling (Thymallus arcticus) of Prolonged Exposure to Yukon Placer Mining Sediment: A Laboratory Study." Canadian Technical Report of Fisheries and Aquatic Sciences 1241.

McLeay, D. J., I. K. Birtwell, G. F. Hartman, and G. L. Ennis. 1987. "Responses of Arctic Grayling (Thymallus arcticus) To Acute and Prolonged Exposure to Yukon Placer Mining Sediment." Canadian Journal of Fisheries and Aquatic Sciences 44: 658-673.

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

Newcombe, C. P., and D. D. MacDonald. 1991. "Effects of Suspended Sediments on Aquatic Ecosystems." North American Journal of Fisheries Management 11: 72-82.

Nickelson, T.E., J. W. Nicholas, A.M. McGie, R.B. Lindsay, D.L. Bottom, R.J. Kaiser, and S.E. Jacobs. 1992. Status of anadromous salmonids in Oregon coastal basins. Unpublished manuscript. Oregon Department of Fish and Wildlife, Research and Development Section, Corvallis, and Ocean Salmon Management, Newport. 83 p.

NOAA Fisheries. 1996a Making Endangered Species Act determinations of effect for individual and grouped actions at the watershed scale. Habitat Conservation Program, Portland, Oregon. 32 p.

NOAA Fisheries. 1996b. 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. Hydropower Division, Portland, Oregon. 46 p. Available online at: http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm.

NOAA Fisheries. 1998. Backpack Electrofishing Guidelines (December 1998). Protected Resources Division, Portland, Oregon. Available online at: http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf.

OCSRI (Oregon Coastal Salmon Restoration Initiative). 1997. State of Oregon, Salem. March 10, 1997.

PFMC (Pacific Fishery Management Council), 1998a. Final Environmental Assessment/Regulatory Review for Amendment 11 to the Pacific Coast Groundfish Fishery Management Plan. October 1998.

PFMC (Pacific Fishery Management Council), 1998b. The Coastal Pelagic Species Fishery Management Plan: Amendment 8. Portland, Oregon.

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.

Redding, J. M., C. B. Schreck, and F. H. Everest. 1987. "Physiological Effects on Coho Salmon and Steelhead of Exposure to Suspended Solids." Transactions of the American Fisheries Society 116: 737-744.

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. Bjornn, and F. H. Everest. 1984. "Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon." Transactions of the American Fisheries Society 113: 142-150. 1984.

Spence, B. C., G. A. Lomnicky, R. M. Hughes, and R. P. Novitzki. 1996. An ecosystem approach to salmonid conservation. ManTech Environmental Research Services, Inc., Corvallis, Oregon, to National Marine Fisheries Service, Habitat Conservation Division, Portland, Oregon (Project TR-4501-96-6057).

U.S. Census Bureau. 2004. State and County Quickfacts: Douglas County, Oregon. Available online at http://quickfacts.census.gov/qfd/states/41/41019.html

USGS (U.S. Geological Survey) 2004. Realtime data for the Rogue River at Raygold near Central Point, Oregon. Available online at: http://waterdata.usgs.gov/nwis/uv/?site_no=14359000&PARAmeter_cd=00065,00060

Whitman, R.P., T.P. Quinn and E.L. Brannon. 1982. Influence of suspended volcanic ash on homing behavior of adult Chinook salmon. Trans. Am. Fish. Soc. 113:142-150.

Weitkamp, L.A., T.C. Wainwright, G.J. Bryant, G.B. Milner, D.J. Teel, R.G. Kope, and R.S. Waples. 1995. Status review of coho salmon from Washington, Oregon and California. National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle, Washington.