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

Refer to:
OHB2001-0087-FEC

April 26, 2002

Mr. Lawrence C. Evans
Portland District, Corps of Engineers
CENWP-OP-GP (Monical)
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Act Essential Fish Habitat Consultation for the Fishhawk Lake Maintenance Dredging Project, Nehalem River Basin, Clatsop County and Columbia County, Oregon (Corps No. 2000-00578)

Dear Mr. Evans:

Enclosed is a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of maintenance dredging Fishhawk Lake. In this Opinion, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of Oregon Coast coho salmon (*Oncorhynchus kisutch*) or destroy or adversely modify its designated critical habitat. As required by section 7 of the ESA, NMFS has included reasonable and prudent measures with nondiscretionary terms and conditions that NMFS believes are necessary to minimize incidental take associated with this action.

This Opinion also serves as consultation on Essential Fish Habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations at 50 CFR Part 600. In this consultation, NMFS concludes that the proposed action may adversely affect designated EFH for coho salmon and chinook salmon (*O. tshawytscha*). NMFS has included conservation recommendations to avoid, minimize, or otherwise offset affects to designated EFH produced by this project.

If you have questions regarding this consultation, please contact Rob Markle of my staff, in the Oregon Habitat Branch, at 503.230.5419.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

Endangered Species Act - Section 7 Consultation & Magnuson-Stevens Act Essential Fish Habitat Consultation

BIOLOGICAL OPINION

Fishhawk Lake Maintenance Dredging Project
Nehalem River Basin, Clatsop County and Columbia County, Oregon (Corps No. 2000-00578)

Agency: Army Corps of Engineers, Portland District

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Date Issued: April 26, 2002

Issued by: For Michael R Crouse
D. Robert Lohn
Regional Administrator

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1. ENDANGERED SPECIES ACT

1.1 Background

On April 9, 2001, the U.S. Army Corps of Engineers (Corps) requested formal consultation under section 7 of the Endangered Species Act (ESA) on a 5-year permit pursuant to section 404 of the Clean Water Act for the Fishhawk Lake Maintenance Dredging Project located in the Nehalem River Basin in Clatsop County and Columbia County, Oregon.

NMFS regrets the lengthy delay in responding to your request. Changes in personnel assignments and the legal status of the subject species, as well as overall workload, contributed to the time NMFS took to complete the consultation. We apologize for any inconvenience caused by this delay.

This biological opinion (Opinion) considers the potential effects of the proposed action on Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*). The subject action will occur within designated critical habitat for this species. The National Marine Fisheries Service (NMFS) listed OC coho salmon as threatened on August 10, 1998 (63 FR 42587), and designated critical habitat for the species on February 16, 2000 (65 FR 7764). NMFS issued protective regulations for this species on July 10, 2000 (65 FR 42422).

The objective of this Opinion is to determine whether the proposed action is likely to jeopardize the continued existence of OC coho salmon, or destroy or adversely modify designated critical habitat for this species. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

1.2 Proposed Action

The proposed action consists of pipeline dredging up to 20,000 cubic yards of sediment from Fishhawk Lake, a manmade waterbody, annually for a period of five years. While the Corps does not regulate the dredging, they do regulate the discharge of return water into the lake under section 404 of the Clean Water Act. The Fishhawk Lake Recreation Club (Club) will conduct the dredging. The purpose of the action is to maintain lake depth for recreational use (T. Monical, Corps, personal communication, 5 April 2002). The action will not alter the maximum lake depth of 15 feet (T. Monical, Corps, personal communication, 11 April 2002).

Disposal of dredged material will occur at two locations. The disposal site for sediments from the east end of the lake is located on the north bank of Fishhawk Creek. Return water passes through a minimum of two settling areas before being discharged into Fishhawk Creek approximately 200 feet upstream of the lake. Sediments from the north side of the lake are placed in a settling pond and run through a vegetated ditch before discharging into a small tributary to the lake. As the disposal sites reach capacity, the sediment is hauled off site. Before moving the material offsite, the Club is required to notify the Corps and provide documentation that indicates the disposal site is not a wetland or has a Corps permit authorizing the discharge.

Included in the information provided to NMFS by the Corps is a plan entitled *Fishhawk Lake Estates - Dredging and Settling System*, developed by the Club that describes the dredging protocols and settlement pond system to be used at Fishhawk Lake.

The Corps has incorporated four conservation measures (see Part III, Section C in the biological assessment [BA]) into their proposed action to minimize potential impacts. Those measures include implementing the *Fishhawk Lake Estates - Dredging and Settling System*, conducting actions in the preferred in-water work period, managing sediments, and using offsite disposal areas for dredged sediments. Furthermore, the Club will work with the Oregon Department of Fish and Wildlife (ODFW) to minimize effects. With ODFW concurrence, dredging is proposed to occur outside the preferred in-water work window in areas less than -10 feet depth when mid-column water temperatures exceed 66°F.

The Corps has allowed the Club to work outside the in-water work period in the past. The decision to extend the work window has been made by the Corps on a case-by-case basis, following an established protocol. The requests have been first forwarded to the local ODFW biologist, who considered it in light of water temperature, rainfall volumes, the developmental stage of coho and chinook salmon, and their migration times. ODFW then coordinated the request with the Corps and NMFS. When dredging outside of the preferred window, the operator adhered to a set procedure for warm water dredging that is described in *Fishhawk Lake Estates - Dredging and Settling System*. The Corps proposes to include the above procedure for modifying the work window in the permit that is the subject of this consultation.

1.3 Biological Information and Critical Habitat

Although there are currently limited data to assess population numbers or trends, all coho salmon stocks comprising the OC coho salmon evolutionarily significant unit (ESU) apparently are depressed relative to past abundance. The status and relevant biological information concerning OC coho salmon are well described in the proposed and final rules from the Federal Register (60 FR 38011, July 25, 1995; and 63 FR 42587, August 10, 1998, respectively), and Weitkamp *et al.* (1995).

Abundance of wild coho salmon spawners in Oregon coastal streams declined during the period from about 1965 to roughly 1975 and has fluctuated at a low level since that time (Nickelson *et al*. 1992). Spawning escapements for this ESU may be at less than 5% of abundance from 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 OC coho salmon ESU, although not at immediate danger of extinction, may become endangered in the future if present trends continue (Weitkamp *et al*. 1995).

The bulk of production for the OC coho salmon ESU is skewed to its southern portion where the coastal lake systems (e.g. Tenmile, Tahkenitch, and Siltcoos Basins) and the Coos and Coquille

Rivers are more productive. Nehalem River coho salmon populations have been characterized as depressed (e.g., spawning habitat underseeded, declining trends, or recent escapements below long-term average) and at moderate risk of extinction (Weitkamp *et al.* 1995). A recent estimate of average annual wild coho salmon spawner abundance in the Nehalem River is 3,107 spawners (n=11) with a range of 1,173 spawners (1997) to 14,518 spawners (2000) (ODFW 2001). Preliminary 2001 return estimates indicate approximately 22,800 wild coho salmon spawners (J. Sheahan, ODFW, personal communication, 1 April 2002). Historic coho salmon runs were estimated to be approximately 188,000 adults (circa 1890) (LNWC 2002).

Coho salmon spawning within the Nehalem River is geographically fragmented, which can lower genetic variation and may impede recovery (ODFW 1995). Marginal spawning habitat may only be used in years when coho abundance is high. The BA indicates that ODFW considers Fishhawk Creek as a core coho salmon stream with four times the coho salmon (fish $mile^{-1}$) than any other Nehalem River tributary. An effort to exterminate predatory non-native bass (*Micropterus* sp.) and bluegill (*Lepomis macrochirus*) in Fishhawk Lake during 1996 was largely successful (J. Sheahan, ODFW, personal communication, 29 March 2002).

Coho salmon from the Nehalem River appear resistant to *Ceratomyxa shasta* (Weitkamp *et al.* 1995). While resistance to *C. shasta* is common in Columbia River stocks, the resistance in the Nehalem stock is unique within coastal systems. Information suggests *C. shasta* presence within Oregon's coast systems is limited to the Rogue and Nehalem Rivers (Bartholomew 2001). *C. shasta* "causes losses in wild and domestic trout and salmon of all ages and sizes and has been reported as a significant contributor to prespawning mortality among infected adult fish" (Bartholomew 2001). Busby *et al.* (1996) state that due to *C. shasta* past hatchery practices may have adversely affected wild Nehalem River coho salmon stocks:

> ...the widespread stock transfer of Trask River coho salmon into the Nehalem River resulted in reduced fitness of the total fish population. The Trask River coho lacked resistance to the disease *Ceratomyxa shasta*, which was present in the Nehalem basin. Progeny of hatchery coho showed no resistance to the disease, while hatchery/wild hybrid coho showed an intermediate susceptibility to *C. shasta*. Therefore, as hatchery coho spawned with wild fish they reduced survival considerably.

Timing of adult coho salmon river entry is largely influenced by river flow. Coho salmon normally wait for fall freshets before entering rivers. In the Nehalem **River, adults return between late September and mid-January (J. Sheahan, ODFW, personal communication, 3 May 2000) with peak upstream migration** usually **occurring in October when** the fall rains return (Weitkamp *et al*. 1995). OC coho **salmon spawn in the Nehalem River basin between early November and late January with peak spawning occurring in late November to early December (Weitkamp *et al*. 1995)**. Juvenile coho salmon rear for one year in fresh water before migrating to the ocean. Juvenile OC coho **salmon migrate out of the Nehalem River basin as smolts between early March and mid-May (J. Sheahan, ODFW, personal communication, 3 May 2000)**. Peak outmigration typically occurs in mid-April or earlier (Weitkamp *et al*. 1995).

During the proposed action, juvenile coho salmon are expected to be present in Fishhawk Lake and affected streams. Peak juvenile presence is likely during winter rearing and spring outmigration. During summer, largely due to elevated water temperatures, juvenile presence in the lake is at a minimum. Juveniles present during summer are likely to seek temperature refuge in lake depths or at stream inflow points. Adult coho salmon are not expected to be present during any phase of the proposed action.

Critical habitat for OC coho salmon includes Oregon coastal river basins (freshwater and estuarine areas) between Cape Blanco and the Columbia River. Freshwater critical habitat includes all waterways, substrates, and adjacent riparian areas 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 coho salmon habitat. Riparian areas include areas adjacent to a stream that provide the following functions: shade, sediment, nutrient or chemical regulation, streambank stability, and input of large woody material (LWM) or organic matter.

1.4 Evaluating Proposed Actions

1.4.1 Biological Requirements

The first step in the methods NMFS uses for applying the ESA section 7(a)(2) to listed salmon is to define the biological requirements of the species most relevant to each consultation. NMFS 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, NMFS starts with the determinations made in its decision to list OC coho salmon under the ESA (Weitkamp *et al*. 1995) and also considers new data available that are relevant to the determination.

The relevant biological requirements are those necessary for OC coho salmon to survive and recover to naturally-reproducing population levels at which protection under the ESA will 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 habitat characteristics that function to support successful spawning, rearing and migration. The current status of the OC coho salmon, based upon their risk of extinction, has not significantly improved since the species was listed and, in some cases, their status may have worsened.

1.4.2 Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species or its habitat and ecosystem within 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 involved in the action (50 CFR 402.02). 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 effects may occur throughout the watershed where actions described in this Opinion lead to additional activities or affect ecological functions contributing to habitat degradation. For this consultation, the action area includes the affected streambed, bankline, lakebed, and aquatic areas in: Fishhawk Lake; Fishhawk Creek, from the east-end disposal area downstream a distance of approximately 200 feet to Fishhawk Lake; and Fishhawk Lake Tributary A, from the north-end disposal area downstream an undisclosed distance (provided diagram suggests a distance of several hundred feet) to Fishhawk Lake.

The Nehalem River originates in the Oregon Coast Range and flows 118.5 miles to the Pacific Ocean (Johnson 1999). The watershed is 855 square miles and predominately consists of coniferous forests. Lower reaches include marshlands and estuaries. Most precipitation in the Nehalem River Basin occurs as rain, with approximately 78% falling from October through March (WRCC 2001).

State and private lands represent 98% of the land holdings within the watershed. The state of Oregon owns 38% and private parties own 60%. The remaining 2% is under Federal ownership (Bureau of Land Management). The dominate land-use within the Nehalem watershed is forestry (92% of land). Private timber company lands comprise 47% of the watershed. Longview Fibre (21%) and Willamette Industries (17%) are the largest private land owners (Johnson 1999). Fishhawk Lake is a manmade lake controlled by an approximately 35-foot high earthen dam (circa 1969) (Johnson 1999). Fish passage at the dam is provided by a ladder built into the dam. The lake was developed for recreational use and holds approximately 982 acre feet of water (Johnson 1999). The drainage area above the dam is approximately 18 square miles (Johnson 1999).

The Nehalem River Watershed Assessment indicates that riparian buffers along upper Fishhawk Creek (above Fishhawk Lake) are in *poor condition* (Johnson 1999). Buffers typically consist of young trees and approximately 50% of the buffer strips are less than 30 feet wide with vegetation periodically absent along stream banks (Johnson 1999). The assessment indicates that riparian area improvement in the Fishhawk Creek drainage should be one of the highest priorities in the Nehalem River watershed.

For OC coho salmon, sedimentation is a key factor that has degraded fish habitat in western Oregon (FEMAT 1993, OCSRI 1997). Large wood in streams functions to reduce stream velocity and erosion, as well as to control bedload transport by forming sediment-trapping pools. On forested lands in the Oregon Coast Range, non-random surveys conducted by the Oregon Forest Industries Council indicate that only 17% of the area's stream miles had *desirable* (as defined by ODFW) amounts of large wood, and that only 23% had *desirable* volumes of large wood (OCSRI 1997). Large riparian conifers were at desirable levels along less than 1% of the streams on industrial and non-industrial private forest lands (OCSRI 1997).

Thom *et al*. (1999) describe results of a survey of randomly-selected sites in western Oregon in 1998. Survey sites were compared with reference reaches located mainly in unmanaged

watersheds and wilderness areas, primarily in the upper portions of watersheds and on Federal lands. The areal extent of silt and sand on the surface of low gradient riffles was selected to typify potential accumulation of fine sediments in a stream. All of the areas had higher fine sediment levels than the reference reaches. Over 70% of the sites surveyed in the North Coast area had over 20% fine sediments in low gradient riffle units. The number of riparian conifers observed also differed markedly from the reference reaches. All of the areas showed low conifer numbers compared to reference reaches, with over 30% of the stream lengths surveyed having no large conifers in the riparian zone.

Elevated water temperatures also are a concern on forest lands in Oregon, and numerous forest streams are included on Oregon's 303(d) list of water bodies that do not meet the state's water temperature standard. Neither Fishhawk Lake or Fishhawk Creek is not listed on the 303(d) list, but thermal stratification occurs annually in the lake during summer (J. Sheahan, ODFW, personal communication, 29 March 2002) and temperatures in Fishhawk Creek have been documented to exceed 64°F (Johnson 1999). Nehalem River is listed as temperature limited from its mouth to Rock Creek, which includes the Fishhawk Creek confluence at approximately rivermile 65.8 (ODEQ 2002). Temperatures above 60°F can adversely affect coho salmon by contributing to increased pre-spawning mortality, out-migration from unsuitable areas, increased disease virulence, reduced disease resistance, and the delay, prevention or reversal of smoltification (McCullough 1999, ODEQ 1995, Marine 1992, Berman 1990).

In 2000, herbicide was applied to the lake to control milfoil. ODFW monitored the herbicide application and noted no fish mortality, and no dissolved oxygen or temperature problems (J. Sheahan, ODFW, personal communication, 18 July 2000).

The biological requirements of this ESU are not being met under the environmental baseline. The status of OC coho salmon is such that there must be a significant improvement in overall environmental conditions they experience, including the condition of designated critical habitat, over those currently available under the environmental baseline for the coast.

1.5 Analysis of Effects

1.5.1 Effects of Proposed Actions

Potential effects to listed salmonids from the proposed action include entrainment of juvenile fish, lethal and sublethal effects from degraded water quality (e.g., increased turbidity or contaminants), the short-term reduction of benthic food sources, and the alteration of habitat elements. A beneficial indirect effect may be predator reduction.

1.5.1.1 Entrainment

The proposed hydraulic suction dredging may entrain juvenile salmonids. When juvenile salmonids come within the "zone of influence" of the cuttinghead, they may be drawn into the suction pipe (Dutta 1976, Dutta and Sookachoff 1975). Dutta (1976) reported that salmon fry

were entrained by suction dredging in the Fraser River and recommended that suction dredging during juvenile migration be controlled. Almost 99% of entrained juveniles were killed in studies by Braun (1974a, 1974b).

The Corps' Portland District conducted extensive sampling within the Columbia River in 1985-88 (Larson and Moehl 1990) and again in 1997 and 1998. In the 1985-88 study no juvenile salmon were entrained, and in the 1997-98 study only two juvenile salmon were entrained. Examination of fish entrainment rates in Grays Harbor from 1978 to 1989 detected only one juvenile salmon entrained (McGraw and Armstrong 1990). Dredging was conducted outside peak migration times. No evidence of fish mortality was found while monitoring dredging activities along the Atlantic Intracoastal Waterway (Stickney 1973).

Entrainment during the proposed action, while possible, is not anticipated to affect a large number of juvenile coho salmon. The proposed conservation measures (e.g., season of work and temperature criteria) should reduce the likelihood that individuals will be present in the work area during dredging. Age-1 juveniles should have outmigrated from the area by mid-June. Remaining age-0 juveniles are likely to be seeking thermal refugia either upstream, downstream, or in cooler regions of the lake (e.g., hypolimnion or near stream inlets) depending on the suitability of those areas at the time of disturbance. Other measures (e.g., phased start-up procedure) will give juveniles an opportunity to vacate the immediate area prior to dredging.

1.5.1.2 Water Quality

Turbidity

In areas of coarse sand, NMFS expects the amount of turbidity generated from the dredging process to be very small and confined to the area close to the cuttinghead. In areas of fine and medium-grained sediments, increased turbidity and resuspension of toxic sediments during dredging may be a problem. In addition, dredge operation procedures may have a large effect on the resultant turbidity. Turbidity is minimized when the cuttinghead is operated at the sediment surface and not allowed to be deeply buried. If operated deep in the sediment layer, large quantities of suspended sediment may be generated when overlaying sediments collapse into the vacated area below.

The influences of turbidity, a function of both suspended and colloidal solids, on fish reported in the literature range from beneficial to detrimental. Turbidity, in the form of elevated total suspended solids (TSS), has 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 reduce 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).

Behavioral avoidance of turbid waters may be one of the most important effects of elevated suspended sediments (Scannell 1988, Birtwell *et al*. 1984, DeVore *et al*. 1980). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (Servizi and Martens

1991; Scannell 1988; Lloyd 1987; McLeay *et al*. 1984 & 1987; Sigler *et al*. 1984). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, except when the fish must traverse these streams along migration routes (Lloyd *et al*. 1987).

A potential positive effect of increased turbidity is providing refuge and cover from predation. Fish that remain in turbid waters experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998). In habitats with intense predation pressure, this provides a beneficial trade-off (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 magnitude 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 floods, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjorn and Reiser 1991). However, chronic exposure can cause physiological stress that can increase maintenance energy and reduce feeding and growth (Servizi and Martens 1991, Lloyd 1987, Redding *et al*. 1987).

Turbidity, at moderate levels, has the potential to reduce 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, 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 reduce primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991).

The proposed action will result in elevated turbidity levels that may cause avoidance behavior and feeding changes in coho salmon, particularly in areas with high clay content. These effects will likely be minimal due to the relative low abundance of listed salmonids in the project area during the proposed action, the use of conservation measures to minimize turbidity (e.g., return water treatment), and the fact that turbid waters are not anticipated to escape downstream from the lake. However, areas of high clay content are known to cause extended periods of turbidity and therefore remain a concern.

Contaminants

As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. Operation of the dredge equipment requires the use of fuel, lubricants, etc., which if spilled into a water body or the adjacent riparian zone could injure or kill aquatic organisms. Petroleum-based contaminants (such as fuel, oil, and some hydraulic fluids) contain polycyclic aromatic hydrocarbons which can cause acute toxicity to salmonids at high levels of exposure, and can cause lethal and sublethal effects to aquatic organisms (Neff 1985).

The proposed action may result in elevated petroleum contamination that may affect coho salmon. These effects are difficult to evaluate since theoretically the project will prevent such pollution. Realistically, some minor contamination is likely to result, but barring a system failure or accident, such contamination is not likely to elicit a significant biological response.

Another potential source of contaminants is resuspension of sediments. Contaminants frequently collect and are stored in the sediments of low velocity areas. If contaminants are present in sediments, dredging increases the exposure risk to fish. Direct and indirect adverse effects may be exhibited at very low concentrations for some contaminants (Brewer *et al*. 2001, Moore and Waring 2001, Beauvais *et al*. 2000, Scholz *et al*. 2000, Johnson 1999, NMFS 1998, Waring and Moore 1997, Zuranko *et al*. 1997, Moore and Waring 1996, Meador 1991). Sediment testing assists in identify areas of concern and should be conducted periodically in dredging sites to establish the quality of the dredged material. Testing is particularly warranted in marinas, industrial docks, and other high-use areas.

NMFS does not anticipate the proposed action will result in increased contaminant exposure. Sediments deposited in the lake originate in the upper watershed, which is dominated by forest lands with dispersed rural residential land use. Herbicide use is a common practice on forest lands and downstream transport of herbicides has been documented in the region. Fishhawk Lake is a moderate-use area with numerous residences. The condition of lake sediments has not be determined, but the ODFW believes the "potential of detectable contamination is minimal" (J. Sheahan, ODFW, personal communication, 1 April 2002).

1.5.1.3 Food

The removal of lakebed sediments removes benthic invertebrates residing in those sediments and may deplete a prey source for juvenile coho salmon. Benthic invertebrate populations vary seasonally and are thought to recolonize areas within months (McCabe *et al*. 1998). However, repeated dredging may depress benthic invertebrate populations for long periods. Short-term, small-scale dredging are acknowledged to affect benthic communities less than long-term, large-scale projects (McCabe *et al*. 1998).

Salmonids frequently feed in flow transition zones such as riffle crests or where streams enter lakes. These areas provide valuable feeding sites since they allow high feeding rates at a low energy expenditure as prey items are delivered from upstream sources. Disturbances in these areas are likely to temporarily or permanently, depending on the activity duration, displace rearing individuals. Displacement may reduce prey intake by fish and adversely affect growth and/or survival.

Conversely, agitation of lake sediments may also have beneficial effects. Short-term increases in prey availability may result as benthic invertebrates become uncovered or suspended in the water column. Unfortunately, such availability is associated with increased turbidity and though unlikely, may lure feeding fish into the area near the dredge cuttinghead where they may become entrained.

The proposed action will result in reductions in prey sources via physical removal and during dredging adjacent to stream mouths, displacement of feeding juveniles. These effects will likely be minimal due to the relative low abundance of listed salmonids in the project area during the proposed action and the use of conservation measures (e.g., temperature criteria for dredging in areas <10 feet depth).

1.5.1.4 Habitat Elements

The proposed action will disturb aquatic habitat in the short and long-term through substrate excavation. Activities associated with the proposed action may alter and destabilize the area locally and offsite, and alter system hydraulics and channel characteristics critical to properly functioning salmonid habitat.

Depending on specific site conditions, dredging near stream mouths may destabilize upstream reaches. In extreme cases, headcutting may scour salmon redds, reduce spawning area, or reduce floodplain connectivity.

Periodic removal of accumulated sediments via dredging may convert shallow water habitats to deeper water. Such conversions risk affecting plant and animal assemblages uniquely adapted to the particular site conditions these shallow habitats offer. The increased depth may adversely affect aquatic vegetation providing refugia and associated prey species for juvenile salmonids and other fish species. Conversely, in some cases, increased depth may improve summer survival by providing thermal or predator refuge (Harvey and Lisle 1998). Due to the shallow depth of the lake (maximum depth 15 feet), habitat conversion is not a significant risk to listed salmon.

The Corps has not presented any information to dismiss concerns over headcutting of lower stream reaches resulting from dredging near stream inlets, or bank stability from near-shore dredging. However, based on the limited scope of the proposed action, that the action is proposed to occur in a lacustrine environment, the action does not constitute a new disturbance activity, and that no effects to riparian vegetation have been identified, NMFS expects the habitat effects to be minimal, and short-term in nature.

1.5.1.5 Predation

Non-native bass and bluegill presence continues in Fishhawk Lake, though greatly reduced due to the 1996 eradication efforts. These species are known to prey on juvenile salmonids and may have significant effects on rearing coho salmon populations. Dredging in shallow waters prior to July 1 is likely to disrupt bass and bluegill spawning and assist in keeping their populations in control (J. Sheahan, ODFW, personal communication, 29 March 2002).

1.5.2 Effects on Critical Habitat

NMFS designates critical habitat based on physical and biological features that are essential to the listed species. Essential features of designated critical habitat that could be affect by the project are substrate, water quality, food, and safe passage. Effects to critical habitat from these categories are included in the effects description expressed above in section 1.5.1, *Effects of Proposed Action*.

1.5.3 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 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." Future Federal actions, including the ongoing operation of hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed action.

NMFS is not aware of any specific future non-Federal activities within the action area that would cause greater affects to listed species than presently occurs. NMFS assumes that future private and state actions will continue at similar intensities as in recent years. As the human population in the state continues to grow, it is foreseeable that demand for actions similar to the subject project will continue to increase as well. Each subsequent action by itself may have only a small incremental effect, but taken together they may be expected to 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.

1.6 Conclusion

After reviewing the current status of the listed species, the environmental baseline for the action area, the effects of the proposed dredging and disposal, and cumulative effects, NMFS has determined that the Fishhawk Lake Maintenance Dredging Project, as proposed, is not likely to jeopardize the continued existence of OC coho salmon, and is not likely to destroy or adversely modify designated critical habitat for this ESU. This determination is based, in part, on incorporation of best management practices (BMPs) into the proposed project design (e.g., water temperature criteria for dredging shallow water areas, dredge operation procedures, and cessation of dredging when settling ponds become full), but also on the following considerations: 1) Dredging will occur when listed species are present in relatively low numbers and the risk of entrainment is reduced, 2) the dredging does not constitute a new disturbance, and 3) return water from the dredged material disposal sites will not result in increases of stream turbidity.

1.7 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and

endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitats, or to develop additional information. NMFS believes the following conservation recommendation is consistent with these obligations, and therefore should be carried out for the subject action conducted under Corps authorization:

1. The Corps should not allow dredging of areas adjacent to stream inflows where upstream headcutting may result.

2. The Corps should require sediment testing to occur at least once during the 5-year permit period to establish the quality of Fishhawk Lake sediments.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects, or those that benefit listed salmon and their habitats, NMFS requests notification of any actions leading to the achievement of these conservation recommendations.

1.8 Reinitiation of Consultation

This concludes formal consultation on these actions in accordance with 50 CFR 402.14(b)(1). Reinitiation of consultation is required: (1) If the amount or extent of incidental take is exceeded; (2) the action is modified in a way that causes an effect on the listed species that was not previously considered in the biological assessment and this Opinion; (3) new information or project monitoring reveals effects of the action that may affect the listed species in a way not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

2. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered species and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by NMFS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, and sheltering (50 CFR 217.12). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered to be a prohibited taking under the ESA provided that such taking is in compliance with the term and conditions of this incidental take statement.

2.1 Amount or Extent of Take

NMFS anticipates that the proposed action covered by this Opinion is reasonably certain to result in incidental take of listed species due to dredging. Effects of actions such as these are largely unquantifiable in the short term, but are likely to be largely limited to non-lethal take in the form of behavior modification (e.g., avoidance behavior and feeding changes). The effects of these activities on population levels are also largely unquantifiable and are unlikely to be measurable in the long-term.

Therefore, even though NMFS expects some low level of non-lethal incidental take to occur due to the action covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take to the species themselves. In instances such as this, NMFS designates the expected level of take in terms of the extent of take allowed. Therefore, NMFS limits the extent of allowable incidental take during construction to that aquatic area of Fishhawk Lake, and in Fishhawk Creek and Fishhawk Lake Tributary A from the disposal site return water outfall downstream to Fishhawk Lake (approximately 200-foot reach of both streams). Incidental take occurring beyond these areas is not authorized by this consultation. This incidental take statement terminates at the conclusion of the 5-year period permitted by the Corps.

2.2 Reasonable and Prudent Measures

NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of the above species. Minimizing the amount and extent of take is essential to avoid jeopardy to the listed species.

1. Minimize the likelihood of incidental take associated with fish disturbance, dredging, and dredged material disposal by applying permit conditions to avoid or minimize disturbance to riparian and aquatic systems.

2. Ensure this biological opinion is meeting its objective of minimizing the likelihood of take from permitted activity by requiring comprehensive monitoring and reporting.

2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, 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 (monitoring and reporting), the Corps shall ensure that:
    a. <u>In-water work</u>.
        i. Work shall take place during the recommended ODFW in-water work period (July 1 through August 31), except as follows:
            (1) When temperatures exceed 66°F in areas less than -10 feet deep, dredging may occur during June 15 - September 15;

(2) No dredging shall occur outside the ODFW in-water work window within 200 feet of the Fishhawk Creek inlet.

ii. No in-water work shall take place outside the in-water work periods described above without prior written authorization from the Corps (in consultation with NMFS).

iii. A turbidity curtain shall be used to isolate turbidity when dredging in areas of known high clay content.

(1) The curtain shall remain in place until the containment area approaches the background turbidity levels of the lake.

(2) No exceptions to this condition shall be allowed without prior written authorization from the Corps (in consultation with NMFS).

(a) Any request must include the rationale for why the exception will not constitute an adverse affect to the listed species.

iv. Dredging along the lake perimeter shall be done in a manner to prevent sloughing of the bank. The finished grade shall be left at a stable slope to prevent bank failure.

b. Pollution Control.

i. A Pollution Control Plan (PCP) is developed to prevent point-source pollution related to construction operations that satisfies all pertinent requirements of Federal, state and local laws and regulations, and the requirements of these conservation measures.

ii. An oil absorbing, floating boom shall be available on-site during all phases of construction.

c. Hydraulic dredge operation.

i. When using a hydraulic dredge, the dredge intake must be operated at or below the surface of the material being removed, but may be raised a maximum of 3 feet above the bed for brief periods of purging or flushing. At no time shall the dredge be operated at a level higher than 3 feet above the bed.

ii. Dredging will cease when settling pond residence time is insufficient to prevent the discharge of turbid waters to recipient streams.

iii. Offsite disposal of dredged material shall occur in upland areas that will not allow entry into any waterway or wetland, except when permitted by the Corps in consultation with NMFS.

2. To Implement Reasonable and Prudent Measure #2 (monitoring and reporting), the Corps shall ensure that:

a. Annually, within 30 days of completing the project for each year's dredging event, the applicant will submit a monitoring report to the Corps and NMFS describing the applicant's success meeting their permit conditions. This report will consist of the following information.

i. Project identification.

(1) Permit number;

(2) applicant's name;

(3) project name;
(4) project location by 5th field hydrological unit code (HUC) and latitude and longitude;
(5) starting and ending dates for work performed under the permit; and
(6) the Corps contact person.

ii. Indicate the actual volume of dredged material removed and disposed.

iii. Indicate any incidence of clay suspension, including extent and duration of turbidity.
(1) Identify location of initial suspension.
(2) Include extent and duration of turbidity.
(3) Include diagram indicating the turbidity curtain placement, and the success of the curtain to contain turbidity.

iv. The occurrence and duration of any discharges of turbid waters from the dredged material disposal area to a stream, and efforts made to control it.

v. A copy of the pollution control inspection reports, a description of any accidental spills of hazardous materials, and efforts made to control accidental spills.

b. The monitoring report shall be submitted to:

National Marine Fisheries Service
Habitat Conservation Division
Attn: OSB2001-0087-FEC
525 NE Oregon Street, Suite 500
Portland, OR 97232

c. If a dead, injured, or sick endangered or threatened species specimen is located, initial notification must be made to the National Marine Fisheries Service Law Enforcement Office, at the Vancouver Field Office, 600 Maritime, Suite 130, Vancouver, Washington 98661; phone: 360.418.4246. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered and threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed.

3. MAGNUSON-STEVENS ACT

3.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to

identify, conserve, and enhance essential fish habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

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

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g*., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

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

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

3.2 Identification of EFH

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Federally-managed Pacific salmon: chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several

hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

3.3 Proposed Actions

The proposed action and action area are detailed above in Sections 1.2 and 1.4.2, respectively, of this biological opinion. The action area includes habitats that have been designated as EFH for various life-history stages of coho and chinook salmon.

3.4 Effects of Proposed Action

As described in detail in Section 1.5 of this biological opinion, the proposed action may result in short- and long-term adverse effects to a variety of habitat parameters. These adverse effects are:

Effect #1: Fish Entrainment - Dredging may entrain and kill fish and other species, including salmonid prey species, present in the work area. The disturbance caused by dredging will likely cause fish to avoid the work site.

Effect #2: Turbidity - Dredging and sediment removal will increase turbidity and will temporarily reduce populations of less-mobile benthic organisms. An increase in turbidity can harm fish.

Effect #3: Contaminants - Dredging may also cause the accidental release of fuel oil and other contaminants into the water or suspension of contaminants stored in lake sediments. Salmon exposed to contaminants may elicit lethal or sublethal effects.

Effect #4: Prey - Dredging and sediment removal will temporarily reduce populations of less-mobile benthic organisms.

Effect #5: Headcutting - Dredging near stream inlets may destabilize upstream reaches. Headcutting may scour salmon redds, reduce spawning area, or reduce floodplain connectivity.

Effect #6: Habitat Conversion - Removal of accumulated sediments may convert shallow water habitats to deeper water affecting plant and animal assemblages. Due to the shallow nature of the lake, habitat conversion is unlikely to be a significant risk.

3.5 Conclusion

NMFS concludes that the proposed action would adversely affect designated EFH for coho and chinook salmon.

3.6 EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NMFS is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. While NMFS understands that the conservation measures described in the biological assessment will be implemented by the Corps, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. However, the *Conservation Recommendations* in Section 1.7 and the *Terms and Conditions* outlined in Section 2.3 are generally applicable to designated EFH for coho and chinook salmon, and largely address these adverse effects. Consequently, NMFS recommends that they be adopted as EFH conservation measures.

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 NMFS' 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 NMFS 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 NMFS' EFH conservation recommendations (50 CFR 600.920(k)).

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