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:
2001/00451

July 19, 2002

Mr. Lawrence C. Evans
U.S. Army Corps of Engineers
Regulatory Branch, CENWP-CO-GP
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 for the Oregon City Bank Stabilization Project along the Clackamas River, at Oregon City, Clackamas County, Oregon.

Dear Mr. Evans:

Enclosed is the biological opinion (Opinion) prepared by the National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of the proposal by the U.S. Army Corps of Engineers (COE) to authorize the Oregon City Bank Stabilization Project along the Clackamas River, at Oregon City, Clackamas County, Oregon. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Upper Willamette River (UWR) chinook salmon *(Oncorhynchus tshawytscha)*, Lower Columbia River (LCR) chinook salmon *(O. tshawytscha)*, and Lower Columbia River (LCR) steelhead *(O. mykiss)* in the project area. As required by section 7 of the ESA, NOAA Fisheries has included reasonable and prudent measures with nondiscretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the potential for incidental take associated with these actions.

This Opinion also serves as consultation on essential fish habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and its implementing regulations (50 CFR part 600).

If you have any questions regarding this consultation, please contact Jim Turner of my staff in the Oregon Habitat Branch at 503-231-6894.

Sincerely,

for Michael R Course

D. Robert Lohn
Regional Administrator

cc: Willa Nehlsen - US FWS
Jim Grimes - ODFW
Mike McCabe - DSL
Tom Melville - DEQ
Yvonne Vallette - EPA

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

Biological Opinion

Oregon City Bank Stabilization Project,
Clackamas River, Oregon City, Clackamas County, Oregon

Agency:	U.S. Army Corps of Engineers
Consultation Conducted By:	NOAA Fisheries, Northwest Region
Date Issued:	July 19, 2002
Issued by:	for Michael R Course D. Robert Lohn Regional Administrator
Refer to:	**2001/00451**

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1. ENDANGERED SPECIES ACT

1.1 Background

On April 23, 2001, the National Marine Fisheries Service (NOAA Fisheries) received a request from the U.S. Army Corps of Engineers (COE) for Endangered Species Act (ESA) section 7 consultation for the Oregon City Bank Stabilization Project along the Clackamas River, at Oregon City, Clackamas County, Oregon. In the April 20, 2001, letter, the COE determined that the Upper Willamette River (UWR) chinook salmon (*Oncorhynchus tshawytscha*), Lower Columbia River (LCR) chinook salmon (*O. tshawytscha*), and Lower Columbia River (LCR) steelhead (*O. mykiss*) may occur within the project area and that this species may be affected by the proposed project. Because the proposed action would result in short-term temporary increases in turbidity and fine sediments, would restrict natural stream processes and movement, would modify rearing habitat, and would displace juvenile fish listed under the ESA, the COE determined that the proposed action may adversely affect these species and requested formal consultation.

The proposed action to stabilize approximately 300 feet of eroding streambank along the Clackamas River with rock rip-rap is a result of various planning efforts by the City of Oregon City (the City). The current proposal reflects substantial discussions, analysis, and reconsideration of the need and purpose of the project relative to ESA-listed fish species. The scope of the current proposal has been reduced from what was originally proposed.

The City purchased the riparian property along the Clackamas River in the 1990s for the purposes of open space and economic development. This property is adjacent to city water treatment facilities and has been previously used for industrial purposes, including lumber processing, cement processing, and gravel mining operations which resultied in an abandoned gravel mining pit, now inundated by the Clackamas River. Prior to the industrial land use, the project area had been used for agriculture. The City has recently completed a master plan for the area, with the primary focus on open space and natural areas. This land use is expected to be compatable with the planned expansion of the water treatment facilities.

Erosion along the banks of the Clackamas River has occurred over the past as evident from historic aerial photos and remnant “bank protection” armoring using large concrete blocks connected by long steel cables and draped over the bank. The City observed significant bank failures along the south bank, where large sections of streambank were slabing off after the 1996 floods. The City determined that bank stabilization was necessary and initiated a study to determine the best course of action. The study indicated that noticable erosion began in the 1960s, in apparent association with the gravel operations in the floodplains adjacent to the river. The storm events of 1996 exacerbated the situation, resulting in lateral stream movement of approximately 100 feet to the south for many hundreds of feet along the stream. The City’s study focused on various alternatives to stop further erosion and the potential for an uncontrolled avulsion of the Clackamas River into the Cove. The study incorporated hydraulic models to assess flow conditions and erosion potential at different locations and under different flow

scenarios. Stabilizing the existing bank in place using rock rip-rap, soil grids, and native vegetation was recommended by the consulting team that conducted the hydraulic study.

NOAA Fisheries became aware of the intended action in December of 2000. Oregon City held a meeting to go over various considerations for stopping bank erosion at the site. The City presented the study results and discussed the report, "Clackamette Cove-Clackamas River Bank Stabilization Project -- Phase 1" dated October 2000. A number of state and federal agencies were present, and provided various comments concerning the potential impacts to natural resources, discussed alternatives, and reviewed the regulatory processes. NOAA Fisheries discussed the importance of understanding current conditions supporting fish species listed under the ESA, and the site potential that may be affected by the proposed action. NOAA Fisheries emphasized the need to incorporate the concept of properly functioning conditions (PFC) into the project design as a means to ensure that the proposed action would be consistent with needs of the listed fish and comply with the ESA.

The proposed action requires federal authorization from the COE under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act. The authorization is a Federal action, requiring consultation under the ESA. The COE initiated consultation with NOAA Fisheries through a letter received on April 23, 2001. The COE described the proposed action as including over 710 feet of rock rip-rap with the incorporation of bioengineering practices. The rock toe would extend up the bank to above the ordinary high water line with the upper bank consisting of soil grids that incorporate native trees and shrubs along the most erosive section of the bank. Root wads would be incorporated into the rock face. A biological assessment (BA) was prepared by the City of Oregon City, and included with the COE request for consultation.

NOAA Fisheries actively coordinated with the COE and applicant regarding the proposed action and request for consultation. Upon initial review of the request for consultation, NOAA Fisheries determined that the request for consultation was insufficient and that additional information and further assessment of the effects of the action were necessary. NOAA Fisheries notified the COE of the potential for adverse modification to critical habitat from the use of rock rip-rap on July 2, 2001. A meeting was held on July 5th to review the project with the applicant and various agencies. The COE was not present at this meeting. NOAA Fisheries expressed substantial concerns to the City that the proposed action would not maintain properly functioning habitat conditions (NMFS 1996) considered vital to ESA-listed fish, and would potentially result in adverse modification of critical habitat or jeopardize ESA-listed fish species. NOAA Fisheries explained the concept of jeopardy and the need to carefully reconsider the design process to determine if any alternative actions could be undertaken that would reduce potential adverse effects. NOAA Fisheries reiterated concerns and recommendation made during the December 2000 meeting. The COE was notified on July 12, 2001, that a jeopardy potential existed for the proposed action, and that substantial additional information would be necessary. Additional information was provided to NOAA Fisheries by Oregon City on July 13, 2001. A second meeting was held on July 17, 2001, to look at the project site and discuss the current erosion of the streambank, the City's interests and needs, and to pursue options that might reduce the potential adverse effects and lessen the likelihood that the proposed action would jeopardize

the ESA listed species. On July 18, 2001, the City indicated the need to continue with the original proposal without further consideration of alternatives. A final meeting was held on August 1, 2001, to review previous discussions, evaluate the site, and discuss the importance of retaining natural stream processes, including stream migration, for the survival and recovery of the species. NOAA Fisheries letter requesting additional information was sent to the COE on August 28, 2001. NOAA Fisheries received the COE and the City of Oregon City response on February 27, 2002. With this response, NOAA Fisheries considered the COE request for consultation complete.

NOAA Fisheries evaluated the February 27 information provided by the COE. Based on that information, NOAA Fisheries presented the COE and the City preliminary findings on June 4, 2002. During that discussion, NOAA Fisheries indicated that the proposed action had a substantial adverse effect on listed fish, and would likely impair PFC, yet the significance of these effects on survival and recovery of the species was not clear at that time. Further discussions were held on the potential to mitigate adverse effects through habitat improvements in the abandoned gravel pit, and the need to take explicit actions to minimize potential take of ESA-listed fish in the conditions for the incidental take statement that would be required of the COE and the City. Additional discussions continued when it became apparent that conditions to minimize take would likely be impracticable for the City. NOAA Fisheries presented three options for proceeding. One of the options limited the scope of the proposal to only that which is necessary to stop the potential uncontrolled avulsion of the Clackamas River into the cove, and modify the upper bank to incorporate stream, floodplain, and riparian habitat features. The City indicated in a letter received by NOAA Fisheries on June 24, 2002, that they would reduce the scope of the project, limiting the use of rock rip-rap to approximately 350 feet of streambank and slope, and plant the 400 feet of streambank upstream.

This biological opinion (Opinion) is being prepared as a conclusion to the ESA section 7 consultation process. The objective of this Opinion is to determine whether the action to stabilize the streambank along the Clackamas River is likely to jeopardize the continued existence of UWR chinook salmon, LCR chinook salmon, and LCR steelhead.

1.2 Proposed Action

The COE proposes to authorize the Oregon City Bank Stabilization Project along the Clackamas River, at Oregon City, Clackamas County, Oregon. The proposed action is intended to stop bank erosion. The proposed action is needed to stop the loss of streambank and riparian property, and to prevent the potential uncontrolled avulsion of the Clackamas River into an abandoned gravel pit. The City had originally intended to use part of the property for economic development. Since the original proposal, the intended use has changed with emphasis on open space, education and recreation. The City remains interested in preserving the public uses and benefits of the site and allowing for potential habitat improvements.

The proposed action includes stabilizing the approximately 350 feet of streambank with the most severe erosion using rock rip-rap along the toe of bank. The upper bank will be stabilized using

reinforced soil wraps and planted with native trees and shrubs. Upstream of the proposed action, the streambanks will remain as is with some minor plantings of native vegetation.

The proposed action will affect approximately 350 feet of bank along the Clackamas River, and will entail substantial excavation of the streambed and bank to allow for the construction of the rock toe and the reconstruction of the upper bank. The existing streambank material will be excavated from the top of bank to create access to the stream bed and the lower bank. Approximately 3,000 cubic yards of upper bank will be excavated temporarily setting the bank back 10-20 feet, and creating a work bench from which heavy equipment will be able to access the streambed and lower bank. Approximately 2,000-3,000 cubic yards of streambed and lower bank material will be excavated to construct a toe trench approximately 11 feet below grade and setback the lower bank. Rip-rap of a 1.5- to 3.5-foot diameter rock will be placed within this excavated toe trench and laid up the bank to approximately two feet above the ordinary high water elevation. Large wood with root wads attached will be integrated into the rock structure as it is being built. Large individual rocks of a 3- to 4- foot diameter will be irregularly placed out from the toe of the slope into the active stream after the placing the rip-rap. To complete the lower section, soil cells wrapped in reinforced fiber materials will be assembled on site and stacked on top of the rock and work bench area in order to reconstruct a sloped upper bank of 1.5 to 3 feet horizontal, to one-foot vertical, planted with native trees and shrubs.

The action area for this proposed project extends beyond the immediate project site. The action area is defined by NOAA Fisheries regulations (50 CFR 402) as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The applicant has described the action area as the immediate project vicinity along the 700 feet of bank line. NOAA Fisheries expects the effects from construction to increase turbidity and sedimentation downstream, and to increase the loss of rearing habitat and displacement of adult and juvenile ESA-listed fish in the stream reach. For this proposed project, NOAA Fisheries considers the action area to include the immediate project site, located at approximately river mile 0.6, and to include the stream section downstream to the mouth of the river, and upstream 2000 feet to include significant rearing habitat.

Conservation measures have been proposed by the City including: (1) Implementing erosion control measures; (2) maintaining fish passage and habitat access; (3) revegetating all disturbed areas and open ground; and, (4) conducting work during the Oregon Department of Fish and Wildlife (ODFW) in-water work period.

1.3 Biological Information

The proposed project and action area is within the range of UWR chinook salmon, LCR chinook salmon and LCR steelhead. The listing status, and protective regulations and life history references for these species are summarized in Table 1.

Table 1. Listing status, and protective regulations and life history references for species considered in this Opinion.

Species (Biological References)	*Listing Status (T-Threatened, E-Endangered)*	*Protective Regulations*
UWR chinook salmon (Myers et. al. 1998)	March 24, 1999, 64 FR 14308 (T)	July 10, 2000, 65 FR 42422
LCR chinook salmon (Healey 1991, Myers et. al. 1998)	March 24, 1999, 64 FR 14308 (T)	July 10, 2000, 65 FR 42422
LCR steelhead (Busby et. al. 1995, Busby et. al. 1996)	March 19, 1998, 63 FR 13347 (T)	July 10, 2000, 65 FR 42422

The UWR chinook salmon, LCR chinook salmon and LCR steelhead have been substantially affected by past actions limiting distribution and viability of their populations. The abundance of UWR spring chinook salmon has significantly declined from the 1950's to the present. The short-term trend indicates strong continual decline. The Clackamas River is the primary natural production area for the UWR chinook below the Willamette River Falls at Oregon City. Current spring chinook salmon population are primarily of hatchery origin. The LCR chinook salmon within the Clackamas River consist of fall-run "tule"stock. LCR chinook salmon have also significantly declined. Naturally-producing populations of LCR chinook salmon are primarily located in the lower Clackamas River.

Run timing for adult UWR chinook salmon entering the Clackamas River is March and April, for LCR chinook salmon it is August and September, and for LCR steelhead it is February through May. Juvenile out migration for UWR and LCR chinook salmon is primarily April through May, and October through November (ODFW 1992). Peak juvenile out migration for LCR steelhead is April though June (ODFW 1992).

Habitat loss has contributed to the decline of UWR chinook salmon, LCR chinook salmon and LCR steelhead. Essential stream features critical to the survival and recovery of these species are: Substrate, water quality, water quantity, flow characteristics, in-stream structure, food, riparian vegetation, and access to habitat. For the proposed action, NOAA Fisheries is concerned with: Altered habitat parameters of abundance, access to spawning habitat, secondary and high water channels, hydrology and flooding patterns, connection to the floodplain, vegetated riparian areas, water temperature, low turbidity, and suspended sediment.

1.4 Evaluating Proposed Action

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR 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 initial steps of defining the biological requirements of the listed species, and evaluating the relevance of the environmental baseline to the species' current status.
Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed

species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area. If NOAA Fisheries finds that the action is likely to jeopardize, 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' 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 feature 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 adversely modify critical habitat, it must identify any reasonable and prudent measures available.

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 elements necessary for migration, spawning, and rearing of the listed and proposed species under the existing environmental baseline.

1.4.1 Biological Requirement

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed 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 to the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that is relevant to the determination.

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

For this consultation, the biological requirements are improved habitat characteristics that function to support successful rearing and migration. The current status of the indicated fish species, based upon their risk of extinction, has not significantly improved since the species were listed.

1.4.2 Environmental Baseline

The Clackamas River flows approximately 80 miles from its origin on the western slopes of the Cascade Mountains, to its confluence with the Willamette River. The average annual rainfall in the lower basin is 60 inches, with nearly six inches of snowfall. The upper basin has an average accumulative rainfall of 70 inches, with 100 inches of snowfall. Flow in the tributary streams can fluctuate significantly as a result of low-frequency severe runoff conditions and periods of drought.

Site potential can be interpreted from both current site conditions, the available historic information, and is described in the BA with supporting information. For the proposed project site, NOAA Fisheries would consider PFC to include a dynamic stream system with relatively high bed load movement of cobble and gravel (evident in the gravel deposits in the stream terraces and at the confluence with the Willamette River). The confluence of the Clackamas River with the Willamette River would form a depositional area for gravel. This would form a mixed channel system with interspersed lateral and instream bars and islands that would be subject to channel changes and reworking of bar deposits. The channel is fixed in a number of locations by bedrock features, and migrates between these fixed points with a constrained sinuous pattern. Historic conditions would have included a greater number and quantity of gravel deposits at the mouth of the Clackamas River, and greater channel migration in the unconsolidated sediment. This is evident from historic observations of the Clackamas River and other major tributaries in the Willamette River basin with substantial bed load sediment. Secondary channels and floodplain features would exist in a limited extent along the perimeter of the stream. The river has experienced substantial recent downcutting that would further limit the extent and duration of flooding and available high water habitat. The riparian areas would be composed of mixed hardwood and coniferous forests and wetlands. Stream terraces would be subject to flooding during extreme events, and would contain emergent wetlands and hardwood swales. Water quality would be high, dominated by clear, cold water with substantial inter-gravel flows. Large wood in the form of single logs to complex log jams with associated in-stream pool/riffle habitat would be expected to be common.

The baseline conditions reflects past and ongoing activities that have affected the UWR chinook salmon, LCR chinook salmon, and LCR steelhead. The proposed action area, as defined above, is smaller than the complete range of the ESA-listed species. The current conditions within the action area include loss of complex instream habitat structure, degradation of water quality including increased temperature, turbidity, and suspended sediment, modification of hydrology resulting in shifting of distribution, amplitude, and duration of floods, channelization of the stream bed, hardening of the streambanks, removal of large woody debris, loss of floodplain, loss of riparian forests and wetlands. As described in the BA and supporting information, current conditions are not providing the function that support listed fish in the past and that would be expected naturally occur without human disturbance, based on NOAA Fisheries approach for evaluating effects (NMFS 1996).

The baseline conditions have been affected by urbanization, flood control, agricultural and forest practices. Within the proposed action area the land use is predominantly urban. This has resulted in current baseline conditions as presented in the BA, including: Limited riparian vegetation, a high percentage of impervious surface within the watershed, constrained and channelized streams, high water temperature, limited floodplain and off-channel habitat, moderate stream habitat diversity, and lack of large wood and instream habitat structure.

Current conditions have limited restoration potential at this site. Gravel mining, channel hardening and simplification, downcutting of the channel, urbanization with increasing impervious surfaces, loss of riparian habitat, and upstream dams with managed flows have all changed certain fundamental conditions that affect potential to reach PFC as defined by historic conditions. Yet, significant options to restore functional elements remain. Considering the setting, the confluence area provides higher potential habitat diversity based on the varied physical conditions of the two river systems. Some high water channels and floodplain features remain in the vicinity with potential to restore physical process and enhance habitat features. Increasing gravel deposits and a potential to reestablish a more complex channel/island system is evident. Large wood and jams can be reintroduced with highly stable configurations, and some remaining riparian areas can be reforested. The interactions with the Willamette River and tidal influences are important. Increasing potential connectivity of these river systems can provide benefits to salmonids. The abandoned gravel pit provides opportunities to create greater habitat complexity and recreate an associated secondary channel with gravel island features and floodplain and riparian wetlands.

Based on the best available information regarding the current status of UWR chinook salmon, LCR chinook salmon and LCR steelhead range-wide, and the population status, trends, and genetics; and the poor environmental baseline conditions within the action area, NOAA Fisheries concludes that the biological requirements of UWR chinook salmon, LCR chinook salmon and LCR steelhead within the action area are not currently being met. Actions that do not maintain or restore properly functioning aquatic habitat conditions would be likely to jeopardize the continued existence of UWR chinook salmon, LCR chinook salmon and LCR steelhead

1.5 Analysis of Effects

1.5.1 Effects of Proposed Actions

The effects determination in this Opinion was made using a method for evaluating current aquatic conditions, the environmental baseline, and predicting effects of actions on them. This process is described in the document *Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996).

The proposed action has the potential to cause the following impacts to UWR chinook salmon, LCR chinook salmon and LCR steelhead:

Construction Effects. Construction activities associated with streambank protection may facilitate the transport of sediment into the stream channel and increase turbidity by precipitation run-off and/or by high stream flows. Sediment has the potential to degrade salmonid spawning and incubation habitat, and fine, redeposited sediment has the potential to adversely affect primary and secondary productivity (Spence *et al.* 1996), and to reduce cover for juvenile salmonids (Bjornn and Reiser 1991).

The effects of suspended sediment and turbidity on fish are reported in the literature as ranging from beneficial to detrimental (see below). 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 are the season, frequency, and the duration of 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 moving laterally and downstream in order 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, except when the fish need to traverse these streams along migration routes (Lloyd *et al.* 1987). However, a potentially positive reported effect of turbidity is that it provides refuge and cover from predation (Gregory and Levings 1988).

Fish that remain in turbid waters experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998). In systems 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 flood events, 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, research indicates that chronic exposure can cause physiological stress responses which can increase maintenance energy, and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).
At moderate levels, turbidity 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. Turbidity might 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).

Larger juvenile and adult salmon appear to be little affected by ephemerally-high concentrations of suspended sediments that occur during most storms and episodes of snowmelt. However, other research demonstrates that feeding and territorial behavior can be disrupted by short-term exposure to turbid water. Localized increases of turbidity during in-water work will likely displace fish in the project area and disrupt normal behavior. Therefore, there is a low probability of direct mortality from turbidity associated with the proposed activities because the turbidity should be localized and brief and juvenile salmon are not expected to occur within the project area during the time of the proposed construction.

Habitat Effects. The use of rock rip-rap to stabilize streams can substantially alter both site conditions and adjacent streambed and bank habitat, thereby significantly reducing suitability of the habitat for salmonids. Although rock rip-rap can provide some habitat features used by salmonids, such as inter-rock space, there is an increasing evidence that in comparison to natural banks, fish densities at rock rip-rap banks are reduced (Schmetterling 2001). The use of rock rip-rap to stop bank erosion by its nature tends to change streambed and bank characteristics, and can effectively change the physical processes that maintain a dynamic equilibrium of stream system form and function.

A comparative review of effects of rip-rap (Schmetterling 2001) has indicated that fish densities at stream locations with rip-rap banks are reduced as compared to areas with natural banks. This is true even when compared to actively eroding cut banks (Michny and Deibel 1986, Schaffter *et al.* 1983). The use of rip-rap either results in site characteristics that limit suitability for fish at various life stages (Beamer and *Henderson* 1998, Peters *et al.* 1998, Li *et al.* 1984, North *et al.* 2002), or perpetuates detrimental conditions that may restrict or limit fish production, such as channelizing the stream (Knudson and Dilley 1987). Even when rock may contribute to habitat diversity within the alluvial stream system, at the project site habitat complexity is simplified and beneficial biological response is of limited duration with greater variability (Schmetterling 2001, Beamer and Henderson 1998, Peters *et al.* 1998, Andrus *et al.* 2000). The effect of rock rip-rap varies with fish species and age class. Chinook salmon are effectively displaced from rip-rap sites, although there is some limited occurrence of chinook salmon associated with rock barbs during spring flows. (Beamer and Henderson 1998, Peters *et al.* 1998, Li *et al.* 1984, North *et al.* 2002). Rainbow trout (and by inference steelhead) were not as affected as chinook salmon, showing a limited preference for rip-rap and rock barbs (Beamer and Henderson 1998, Peters *et al.* 1998, Li *et al.* 1984, Andrus *et al.* 2000). Decreases in juvenile fish densities were more evident than adults, including juvenile rainbow trout (Beamer and Henderson 1998, Li *et al.* 1984). Rock rip-rap can also result in increased densities of predatory fish (Knudson *et al.* 1987, Andrus *et al.* 2000, North *et al.* 2002).

The use of rock rip-rap effectively changes the localized hydraulics, substrate, and available food and cover for fish at stream sites where it is used. There is an indication that the flow regimes

created by rock rip-rap significantly disrupt juvenile fish. Juvenile fish are associated with lower velocity flows at the streambed interface, holding for food, finding potential hiding places in the gravels, and/or avoiding larger predatory fish in deeper waters. Rock rip-rap can disrupt flows, reduce food delivery and create difficult swimming for smaller fish (Michny and Deibel 1986, Schaffter *et al.* 1983). During higher spring flows, juvenile chinook salmon were found behind spur dikes (Li *et al.* 1984, Andrus *et al.* 2000).

These features can provide a simplified flow modulator for a limited period of time. Complex large wood associated with banklines, even at rip-rap banks, demonstrate more flow modulation over greater time frames at different water elevations, as well as providing the small intricate space for juveniles to escape predation (Peters *et al.* 1998, Beamer *et al.* 1998). In general, juveniles tend to hug the banks during winter and spring (seeking refuge from higher flows and food and cover) and tend to move to the main channel during summer. Adults tend to be more oriented to the deep channel, and utilize eddy lines and flow deflectors (Andrus *et al.* 2000, Li *et al.* 1984). Where more natural bankline features occur, and shallow water gravel benches or large complex wood deposits have been either maintained or incorporated into rip-rap, fish densities are improved (Beamer and Henderson 1998, Peters *et al.* 1998, Michny and Deibel 1986, Schaffter *et al.* 1983). The proposed incorporation of large wood into the rip-rap should minimize the effects of the rip-rap placement.

Stream Process Effects. Rip-rap not only modifies the streambed and bank habitat, but as its primary purpose, it stops natural stream processes that maintain a functioning stream system. By "fixing" the stream, rock rip-rap limits habitat formation and transitions that result from dynamic stream processes. This reduces the likelihood that adverse effects from rip-rap would be mitigated over time. Stream migration, channel changes, flooding, ground water interchange, gravel supply, large wood supply are significant elements of natural stream processes that can be impacted by rip-rap. It is generally understood that vegetated stream edges, floodplains, and riparian areas contribute to supporting fish and the stream system as a whole. This is true of the subsurface hyporheic zone (Bolton and Shellberg 2001). Stream erosion and adjustments are natural processes for which fish have adapted. Irregular disturbances, man-caused or otherwise, are part of the process and the relative stream response to these disturbances can be is predicable in some cases. A typical channel degradation or significant alteration is followed by formation over time of various stream system features that existed before the alteration, including floodplain and stable vegetate hillslopes and riparian areas. (Bolton and Shellberg 2001). Stabilizing banks with rock rip-rap fixes the stream in place, and limits any adjustment processes and/or formation of natural stream features.

Site Specific Effects. The proposed action would modify the streambed and bank from below the toe of slope to approximately the line of ordinary high water. The actively eroding streambank is composed of cobble and gravel at the toe of the bank, covered by deposits of fine sediments and soils. The erosion process is the result of channel movement southward creating a vertical cut bank with a gentle convex curve. Slight variations in curvature are evident. The upper bank (composed of fine sediments) remains unstable. The fine sediment from the upper bank that enters the stream is easily transported downstream. The lower bank is composed of

cobble/gravel, and is undercut during high flows and forms a moderately steep streambed and bank. The channel along the eroding bank is deep and long, with high flow velocity during winter and spring high water events.

The stream system has been constrained by exposed bedrock and by various instream structures. Not highly meandering, the system does demonstrate regular movement and formation of lateral and channel gravel bars with subsequent formation of vegetated floodplain and riparian areas. The river exhibits down cutting and gravel accretion at different location in the same section. Historic information shows changes in stream and riparian features. Hillslope adjustment and floodplain terraces upstream and downstream of the project site are indicative of typical stream readjustments (Bolton and Shellberg 2001).

The proposed action will modify the streambed and bank replacing the cobble/gravel substrate with large angular rock. An irregular bankline will be created with the placement of large rock clusters in the channel at the bank line and the integration of large trees with extended root wads at lower elevation in the bank. The channel shape would be expected to remain the same with some localized variation of flows and potential deposition of coarse bed load downstream of the rock clusters and root wads. Juvenile chinook and steelhead would be most affected relative to current conditions. The formation of floodplain and riparian forest to the extent that would be expected to occur naturally would be impaired. This would be expected to limit rearing habitat by restricting sources of gravel and large wood into the stream and by limiting the formation of high water floodplain habitat.

The proposed action includes features to reduce adverse effects of stabilizing the bank with rock rip-rap and potential take of ESA-listed fish. Stabilizing the eroding bank will stop the stream from an unnatural avulsion into the adjacent abandoned gravel mining pit. An uncontrolled avulsion could significantly change the stream conditions that currently support salmonids. The incorporation of large wood root wads and rock clusters in a complex pattern along the stream edge at various water elevations will create habitat conditions beneficial to chinook salmon and steelhead with the potential to increase fish use at the site.

The negative effects of these activities on UWR chinook salmon, LCR chinook salmon and LCR steelhead will be avoided or minimized by carrying out construction methods and approaches included in the project design and in the proposed conservation measures. These measures include: (1) Implementing an erosion control and pollution control measures to limit discharge of fine sediments or other pollutants into the stream; (2) maintaining fish passage during construction; (3) revegetating all disturbed areas and bare ground with native plants; and (4) conducting work during the ODFW in-water work period.

1.5.2 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." For the purposes of this analysis, the general action area is the applicant's property. Other activities within the watershed have the potential to impact fish and habitat within the action area. Future federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes.

NOAA Fisheries is not aware of any significant change in non-federal activities that are reasonably certain to occur. NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years.

1.6 Conclusion

After reviewing the current status of UWR chinook salmon, LCR chinook salmon and LCR steelhead, the environmental baseline for the action area, the effects of the proposed Oregon City Bank Stabilization Project and the cumulative effects, it is the NOAA Fisheries' opinion that this project, as proposed, is not likely to jeopardize the continued existence of the UWR chinook salmon, LCR chinook salmon and LCR steelhead. NOAA Fisheries applied its evaluation methodology (NMFS 1996) to the proposed action and found that it would cause a short-term increase in turbidity and suspended sediments, with displacement of juvenile fish, as well as long-term changes to stream habitat that create salmonid rearing spaces, reduce the risk of an uncontrolled avulsion of the Clackamas River, and allow for development of forested riparian areas. This conclusion is based on findings that the proposed action will minimize death or injury to UWR chinook salmon, LCR chinook salmon and LCR steelhead by: (1) Implementing erosion control during construction; (2) maintaining fish passage and habitat access; (3) revegetating all disturbed areas and open ground; and (4) conducting work during ODFW in-water work period. Thus, the proposed action is not expected to impair properly functioning habitats, appreciably reduce the functioning of already impaired habitats, or retard the long-term progress of impaired habitats toward proper functioning condition essential to the long-term survival and recovery at the population or ESU level.

1.7 Reinitiation of Consultation

This concludes formal consultation on the Oregon City Bank Stabilization Project. As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or not considered in this Opinion; or (4) a new species is listed or is designated that may be affected by the action. In instances where the amount or extent of authorized

incidental take is exceeded, any operations causing such take must cease pending re-initiation of consultation.

2. INCIDENTAL TAKE STATEMENT

Section 9 and rules promulgated under section 4(d) of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. "Harass" is defined as actions that create the likelihood of injuring listed species by annoying it to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. "Incidental take" is take of listed animal species that results from, but is not the purpose of, the federal agency or the applicant carrying out 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 prohibited taking provided that such taking is in complicance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

2.1 Amount or Extent of the Take

NOAA Fisheries anticipates that the action covered by this Opinion is reasonably certain to result in incidental take of the indicated fish species because of detrimental effects from increased sediment levels (non-lethal) and the potential for direct incidental take during in-water work (lethal and non-lethal). Effects of actions such as these are largely unquantifiable in the short term, and are not expected to be measurable as long-term effects on habitat or population levels. Therefore, even though NOAA Fisheries expects some low level incidental take to occur due to the actions covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NOAA Fisheries to estimate a specific amount of incidental take to the species themselves. In instances such as these, the NOAA Fisheries designates the expected level of take as "unquantifiable." Based on the information in the BA, NOAA Fisheries anticipates that an unquantifiable amount of incidental take could occur as a result of the actions covered by this Opinion. The extent of the take is limited to the project action area.

2.2 Reasonable and Prudent Measures

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to avoid or minimize take of the above species:

1. Minimize take of listed fish by implementing erosion control measures during construction to contain and limit the discharge of fine sediment to adjacent streams and wetlands.

2. Minimize take of listed fish by restoring or enhancing stream and riparian habitat to minimize and compensate for unavoidable impacts and adverse effects to listed fish.

3. Minimize take of listed fish by revegetating disturbed and exposed ground by planting and seeding with native vegetation to secure soils and provide long-term stability.

4. Ensure the effectiveness of these minimization measures by implementing and completing a comprehensive monitoring plan.

2.3 Terms and Conditions

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

1. To implement Reasonable and Prudent Measure #1 (contain and limit the discharge of fine sediment to the adjacent stream, maintain fish passage and timing construction), the COE shall require that:
   a. Before significant[1] alteration of the project area, the following actions must be completed.
      i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.
      ii. Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite.
         (1) A supply of sediment control materials (e.g., silt fence, straw bales[2]).
         (2) An oil absorbing floating boom whenever surface water is present.
      iii. Temporary erosion controls. All temporary erosion controls must be in-place and appropriately installed downslope of project activity within the riparian area until site restoration is complete.
   b. Heavy Equipment. Use of heavy equipment will be restricted as follows.

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

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

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

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

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

(2) All vehicles operated within 150 feet of any stream, water body or wetland must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired in the vehicle staging area before the vehicle resumes operation.

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

iii. Stationary power equipment. Stationary power equipment (*e.g.*, generators, cranes) operated within 150 feet of any stream, water body or wetland must be diapered to prevent leaks.

c. Site preparation. Native materials will be conserved for site restoration.

I. If possible, native materials must be left where they are found.

ii. Materials that are moved, damaged or destroyed must be replaced with a functional equivalent during site restoration.

iii. Any large wood, native vegetation, weed-free topsoil, and native channel material displaced by construction must be stockpiled for use during site restoration.

d. All disturbed and exposed ground shall be covered with erosion protection material to control surface erosion.

e. Silt fences and sediment barriers shall be placed though out the construction area down slope of all activities and within all drainage channels and swales to contain fine sediments within the construction area that may be transported off site through surface water discharges.

f. Surface water runoff from the all construction areas shall be filtered or otherwise treated to remove all silts prior to being discharged offsite.

g. All silt fences and sediment barriers shall be maintained to operated effectively throughout the project life, and all retained sediments shall be stabilized in some manner prior to completion of the project or removal of the silt fences and sediment barriers.

h. All in-water work shall be conducted during the ODFW preferred in-water work period or as approved by a NOAA Fisheries biologist.

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

j. Fish passage shall not be impaired during construction.

k. Large wood and trees shall be integrated into rock rip-rap placed along the bank.

2. To implement Reasonable and Prudent Measure #2 (restoring or enhancing stream and riparian habitat), the COE shall require that:
    a. The bank shall be set back beginning at or below ordinary high water elevation an average of 20 feet over the project length to create a highwater/floodplain bench.
        i. The setback shall be sloped to 5:1 or less.
        ii. The setback shall incorporate stream gravel, wrapped soil cells, and planted with native shrubs as practicable.
        iii. The site preparation and placement of the rock rip-rap shall be done to maintain a non-linear, irregular bankline.
    b. Large wood with root wads attached will be integrated into the rock rip-rap to increase complexity and add wood structure.
        i. The logs will be placed at water elevations 3-foot below the ordinary high water level and lower.
        ii. The logs will be placed in groupings of 2 to 3 in close proximity and be placed in a crossing or overlapping fashion to create an irregular asymmetrical feature.
    c. Rock boulders shall be placed along the face of the rip-rap into the channel 4-6 feet from the toe of the bank and be place in groups of 2-3 and place irregularly averaging one grouping every 30 feet.

3. To implement Reasonable and Prudent Measure #3 (revegetating disturbed and exposed ground), the COE shall require that all disturbed or bare ground be planted before the first April 15 following construction with a diverse assemblage of species that are native to the project area region.

4. To implement Reasonable and Prudent Measure #4 (monitoring and reporting), the COE shall ensure that:
    a. Implementation monitoring. Ensure that each permittee submits a monitoring report to the Corps within 120 days of project completion describing the permittee's success meeting his or her permit conditions. Each project level monitoring report will include the following information.
        i. Project identification
            (1) Permittee name, permit number, and project name.
            (2) Category of activity
            (3) 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
            (4) Corps contact person.
            (5) Starting and ending dates for work completed

ii. Photo documentation. Photo of habitat conditions at the project and any compensation site(s), before, during, and after project completion.[3]
   (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. Other data. Additional project-specific data, as appropriate for individual projects.
   (1) Work cessation. Dates work cessation was required due to high flows.
   (2) A summary of pollution and erosion control inspections, including any erosion control failure, hazardous material spill, and correction effort.
   (3) Site preparation.
      (a) Total cleared area – riparian and upland.
      (b) Total new impervious area.
   (4) Site restoration.
      (a) Finished grade slopes and elevations.
      (b) Log and rock structure elevations, orientation, and anchoring.
      (c) Planting composition and density.
      (d) A five-year plan to:
         (i) Inspect and, if necessary, replace failed plantings to achieve 100% survival at the end of the first year, and 80% survival or 80% coverage after five years (including both plantings and natural recruitment).
         (ii) Control invasive non-native vegetation.
         (iii) Protect plantings from wildlife damage and other harm.
         (iv) Provide the Corps annual progress reports.

3. MAGNUSON-STEVENS ACT

3.1 Background

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

[3] 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.

3.2 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), requires the inclusion of EFH descriptions in federal fishery management plans. In addition, the MSA requires federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (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.

3.3 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. The 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 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), 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.

Detailed descriptions and identifications of EFH for the groundfish species are found in the Final Environmental Assessment/Regulatory Impact Review for Amendment 11 to The Pacific Coast Groundfish Management Plan (PFMC 1998a) and the NOAA Fisheries Essential Fish Habitat for West Coast Groundfish Appendix (Casillas *et al.* 1998). Detailed descriptions and identifications of EFH for the coastal pelagic species are found in Amendment 8 to the Coastal Pelagic Species Fishery Management Plan (PFMC 1998b). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of the potential adverse effects to these species' EFH from the proposed action is based on this information.

3.4 Proposed Actions

The proposed actions are detailed above in section 1.2. The action area includes the section of the Clackamas River from its mouth to 2000 feet above the upstream end of the project. This area has been designated as EFH for various life stages of chinook and coho salmon.

3.5 Effects of Proposed Action

As described in detail in section 1.5, the proposed activities may result in detrimental short- and long-term adverse effects to certain habitat parameters. Excavation of river bottom material will result in disturbance of the substrate and a temporary increase in turbidity.

3.6 Conclusion

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

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the Magnuson-Stevens Act, NOAA Fisheries is required to provide EFH conservation recommendations for any federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the COE, all of the Reasonable and Prudent Measures and the Terms and Conditions contained in sections 2.2 and 2.3 are applicable to EFH. Therefore, NOAA Fisheries incorporates each of those measures

here as EFH recommendations.

3.8 Statutory Response Requirement

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

3.9 Supplemental Consultation

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

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