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National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
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NMFS Tracking No.:
2002/01000

October 3, 2003

Thomas F. Mueller
Corps of Engineers
Regulatory Branch-CENWS-OD-RG
Post Office Box 3755
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7 Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Captain New Pier and Bulkhead (COE No. 200101247)

Dear Mr. Mueller:

The attached document transmits NOAA's National Marine Fisheries Service (NOAA Fisheries) Biological Opinion (Opinion) and Magnuson-Stevens Fishery Conservation and Management Act (MSA) Essential Fish Habitat (EFH) consultation on the U.S. Army Corps of Engineers' (COE) proposed issuance of a 404 permit to Mr. Captain for a new pier and new bulkhead in Lake Washington. The consultations are in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1536), and section 305(b)(2) of the MSA (16 U.S.C.1855).

This Opinion is the result of an analysis of effects of the proposal on Puget Sound chinook in Lake Washington. The Opinion and EFH consultation are based on information provided in the Biological Evaluation (BE) and other information sent to NOAA Fisheries by the COE via telephone conversations, e-mail, and fax. A complete administrative record of this consultation is on file at the Washington Habitat Branch Office.

NOAA Fisheries concludes that implementation of the proposed projects is not likely to jeopardize the continued existence of Puget Sound chinook. In your review, please note that the incidental take statement, which includes reasonable and prudent measures and terms and conditions, was designed to minimize take. NOAA Fisheries also concludes that the project will adversely affect EFH; conservation recommendations can be found in section 3.0 of the attached document.

If you have any questions regarding this correspondence or the attached document, please contact Kitty Nelson of the Washington Habitat Branch Office at (206) 526-4643.

Sincerely,

For Michael R Crouse

D. Robert Lohn
Regional Administrator

Enclosure

cc: Susan Powell, COE
Mr. Tom Captain

Endangered Species Act - Section 7

Biological Opinion

and

Magnuson-Stevens Fishery Conservation and Management Act

Essential Fish Habitat Consultation

Captain, New Pier and Bulkhead in Lake Washington,
Mercer Island, Washington

NMFS Tracking No: 2002/01000

Agency: U.S. Army Corps of Engineers

Consultation Conducted By: National Marine Fisheries Service
Northwest Region

Issued By: for Michael R Crouse

D. Robert Lohn
Regional Administrator

Date Issued: October 3, 2003

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Background Information 1
1.2 Consultation History 1
1.3 Description of the Proposed Action 1
1.3.1 Conservation Measures 2
1.3.2 Construction Methods 3
1.3.3 Monitoring Plan 3
1.4 Description of the Action Area 3

2.0 ENDANGERED SPECIES ACT - BIOLOGICAL OPINION 4
2.1 Evaluating the Proposed Action 4
2.1.1 Biological Requirements 4
2.1.2 Status of the Species 5
2.1.3 Environmental Baseline 6
2.1.4 Relevance of Baseline to Status of the Species 9
2.2 Effects of the Proposed Action 9
2.2.1 Direct Effects 9
2.2.2 Indirect Effects 13
2.3 Cumulative Effects 14
2.4 Conclusion 14
2.5 Reinitiation of Consultation 14
2.6 Incidental Take Statement 15
2.6.1 Amount or Extent of the Take 15
2.6.2 Reasonable and Prudent Measures 16
2.6.3 Terms and Conditions 16
2.7 Conservation Recommendations 17

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT 17
3.1 Background 17
3.2 Identification of Essential Fish Habitat 18
3.3 Proposed Actions 18
3.4 Effects of Proposed Action 19
3.5 Conclusion 19
3.6 Essential Fish Habitat Conservation Recommendations 19
3.7 Statutory Response Requirement 19
3.8 Supplemental Consultation 20

4.0 REFERENCES 21

Attachment 1 Draft Lake Matrix, NOAA Fisheries, January 2003

1.0 INTRODUCTION

1.1 Background Information

The U.S. Army Corps of Engineers (COE) proposes to issue a permit under section 10 of the Rivers and Harbors Act, and section 404 of the Federal Clean Water Act (CWA), that would allow construction of a new pier, new boatlift, and new rock bulkhead on the southwest corner of Mercer Island in the southern part of Lake Washington. This document has been prepared in response to a request from the COE for consultation under section 7 (16 U.S.C. 1536) of the Endangered Species Act of 1973, as amended (ESA), and the Essential Fish Habitat (EFH) requirement (16 U.S.C. 1855) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). This document transmits the NOAA's National Marine Fisheries Service (NOAA Fisheries) Biological Opinion (Opinion) and EFH consultation based on our review of the effects of the proposed project.

1.2 Consultation History

On August 19, 2002, NOAA Fisheries received a Biological Assessment (BA) and EFH Assessment from the COE, requesting ESA section 7 formal consultation and EFH consultation for a new pier, boatlift and bulkhead project proposed by Mr. Tom Captain.

The COE determined that the proposed project "may affect, [but is] not likely to adversely affect Puget Sound (PS) chinook." The COE stated that the letter initiating informal consultation would also serve to initiate formal consultation if NOAA Fisheries found the proposed action would be likely to adversely affect PS chinook.

On September 13, 2002, NOAA Fisheries responded to the COE request for consultation with a determination that the project, as proposed, was likely to adversely affect PS chinook and their habitat. On September 23, 2002, the COE responded with some changes to the proposed project. However, NOAA Fisheries determined that the proposed action is "likely to adversely affect PS chinook and their habitat" based on the fact that the proposed pier and bulkhead permanently changes vegetated shoreline and nearshore habitat.

The following Opinion is based on information in the final BA (dated September 27, 2001; received on August 19, 2002) and responses to NOAA Fisheries' questions dated September 23, 2002 and January 27, 2003. On January 22, 2003, a site visit was conducted by staff from the COE and NOAA Fisheries. On April 8, 2003, a final meeting between the applicant, COE, and NOAA Fisheries occurred. Additional changes were made to the project by the applicant on June 12, 2003 and June 30, 2003. On June 30, 2003, formal consultation was initiated.

1.3 Description of the Proposed Action

Mr. Tom Captain owns the subject property, which is located along the southwest shoreline of Mercer Island in southern Lake Washington. The COE proposes to issue a permit to Mr. Captain to construct a new pier, new boatlift, new bulkhead and other shoreline modifications. The

original proposal of September 27, 2001 included a pier with a 6-foot wide walkway, 10 feet of grating, eight prisms and two mooring pilings. The proposal included a bulkhead to be located at the ordinary high water (OHW) line on the northern part of the property but elevated slightly above OHW to form a cove on the southern part of the property. Shoreline and emergent vegetation was also proposed. The project was modified by the applicant during formal consultation; the revised proposal is described below.

The proposed new pier is 100 feet long by 4 feet wide with a 20-foot long by 8-foot wide ell at the end of the pier. The applicant proposes to grate the entire surface of the pier to provide 60% open space. The pier bottom of the pier will be 2 feet above OHW, and will be installed in an east/west orientation. The pier structure will be built with ammoniacal copper zinc arsenate (ACZA) or copper-8-quinolinolate (K-8) treated wood. A maximum of 15 five-inch diameter steel pilings will be driven into the substrate with a vibratory hammer to support the entire structure. The steel pilings will be spaced 18 feet apart. One existing relic piling will be removed from the shoreline.

The overwater coverage of the pier will be 720 square feet. The pier will alter approximately 4 feet of shoreline at the connection point to the land. Mr. Captain will install a new boatlift along the southern side of the pier in about 12 feet of water. The dimensions of the boatlift are 4 feet wide by 14 feet long by 10 feet tall. The boatlift will support an 18-foot boat.

A new 75-foot riprap bulkhead is intended to stop future erosion on the north side of the new pier, support the pier, and border a constructed cove on the south side of the pier. The bulkhead north of the pier will be located a minimum of one vertical foot higher (landward) than the OHW. Willow (*Salix sp*) will be planted in coir lifts in front of, and the length of, the northern bulkhead. No more than 25 cubic yards of sand and pea gravel, matching the existing substrate size and slope, will be placed over the coir lift and in front of the bulkhead. A large log about 2 feet in diameter and 10 feet long, that provides protection from wave action to the existing bank on the north end of the property, will be moved south of the pier. The southern bulkhead will also be constructed one vertical foot higher than the OHW landward, with riprap at a three-to-one slope and buried 18 to 24 inches below the surface of the substrate. Forty-four cubic yards of plants and soil will be excavated from the site and deposited in an approved upland disposal site. Twenty cubic yards of crushed rock will backfill the entire bulkhead. About 6.5 cubic yards of sand will be placed upland of the OHW to provide substrate in the beach cove. Overhanging vegetation will be planted the length of the shoreline.

1.3.1 Conservation Measures

Mr. Captain has proposed conservation measures to minimize impacts of the proposed project. He proposes to remove native willow (*Salix sp*) and non-native vegetation including blackberries (*Rubus sp*) and ivy (*Coccinia sp*) from the shoreline to build the bulkhead and grade the slope. He proposes to replant the shoreline with native vegetation including vine maple (*Acer circinatum*), redtwig dogwood (*Cornus stolonifera*), shore pine (*Pinus contorta*), Indian plum (*Oemleria cerasiformis*), and ninebark (*Physocarpus opulifolius*). Two 8-foot patches of

hardstem bulrush (*Scirpus acutus*) and common rush (*Juncus effusus*) will be planted in shallow water on both ends of the constructed cove south of the new pier to provide refuge habitat for juvenile fish.

The project will be constructed and conservation measures implemented between July 15 and December 31, in order to avoid effects to migrating and rearing chinook salmon.

1.3.2 Construction Methods

The pier and bulkhead construction will be conducted from a barge. Construction of the entire project will take four weeks. The barge will not be allowed to ground out on the lake-bed at any time during construction. A silt containment barrier will be installed around the site and will be maintained in good working order for the duration of the shoreline work. An erosion control barrier will be installed landward of OHW to prevent sediment from reaching the water during construction in the riparian area. Pilings will be driven with a vibratory hammer; installation will occur over a five-day period.

Plastic tarps will cover exposed soils to avoid erosion from the land during rainy weather. Temporary revegetation, such as hydroseeding, will stabilize the soil. Material and waste will be kept out of the water and all decking cut-offs will be caught with fishing nets and removed from the site. All construction materials will be removed, and the area restored after construction activities are complete.

1.3.3 Monitoring Plan

Mr. Captain will ensure an 80% survival of planted terrestrial vegetation after five years, and will make good faith efforts to establish the emergent vegetation. He will photographically monitor riparian and emergent vegetation from permanent photo locations for five years, and will provide the COE an annual statement of the condition of the riparian and emergent vegetation. Photographs will be taken twice yearly, once at low water during December or January and once at high water during June or July. The statement and photographs will be submitted to the COE by February 28 of each year of the monitoring period.

1.4 Description of the Action Area

The ESA implementing regulations define "action area" 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(d)). The action area for this project includes the open water of the lake, and shorelines of Mercer Island and Lake Washington, because this area will be indirectly affected by the boats that are to be moored at the new pier. Activities occurring under the proposed action would occur within a portion of the range of chinook salmon, including rearing and migrating habitat along the perimeters of Lake Washington, Lake Union, and the Lake Washington Ship Canal to Puget Sound.

2.0 ENDANGERED SPECIES ACT - BIOLOGICAL OPINION

The objective of this ESA consultation is to ensure that federally funded or approved activities are not likely to jeopardize the continued existence of PS chinook. Puget Sound chinook is an Evolutionarily Significant Unit (ESU), a distinct population segment of chinook salmon, the preservation of which is necessary to maintain genetic diversity of chinook. Critical habitat is not currently designated for PS chinook, therefore, that analysis will not be presented in this document. The standards for determining jeopardy as described in section 7(a)(2) of the ESA are further defined in 50 CFR 402.14.

2.1 Evaluating the Proposed Action

In its jeopardy analysis, NOAA Fisheries determines if the proposed action will impair the listed species' potential to survive and recover. This analysis involves the initial steps of (1) defining the biological requirements, and (2) evaluating the relevance of the environmental baseline to the species' current status. NOAA Fisheries must then consider the estimated level of injury and 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. Significant impairment of recovery efforts or other adverse effects which rise to the level of jeopardizing the "continued existence" of a listed species can be the basis for issuing a "jeopardy" opinion (50 CFR 402.02). If a determination of jeopardy is made, NOAA Fisheries must identify any reasonable and prudent alternatives to the proposed action that would not jeopardize the species.

2.1.1 Biological Requirements

The biological requirements are those conditions necessary for the Puget Sound ESU of chinook salmon to survive and recover to naturally reproducing population levels, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become or continue to be self-sustaining in the natural environment.
The biological requirements for salmonids can be defined as habitats that have properly functioning conditions (PFC) relevant to any chinook life stage. Habitat conditions include all parameters of NOAA Fisheries' draft matrix of pathways and indicators for lakes (lakes matrix) (Attachment 1). The specific biological indicators affected by the proposed action are physical barriers (migration), habitat structural complexity (woody debris, submergent, and emergent vegetation), riparian vegetation structure, substrate composition, chemical contamination (from treated wood) and non-native species.

During their residence in and migration through Lake Washington, juvenile chinook require refugia for resting, feeding, growth, and predator avoidance. Recent studies by the U.S. Fish and Wildlife Service (USFWS) indicate that juvenile chinook need a diverse habitat including open water areas and areas with woody debris to meet these requirements (Tabor and Piaskowski

2001). The smallest juvenile chinook are only found along shallow shorelines with small substrates such as sand and gravel both during the day and night. The smallest juveniles also used woody debris and overhanging vegetation as resting sites and for refuge from predators. As they grow, chinook avoid overwater structure, riprap, and bulkheads, and move into deeper water.

2.1.2 Status of the Species

In 1998, NOAA Fisheries completed a status review of chinook salmon from Washington, Idaho, Oregon, and California, which identified fifteen distinct species (ESUs) of chinook salmon in the region (Myers *et al.* 1998). After assessing information concerning chinook salmon abundance, distribution, population trends, risks, and protection efforts, NOAA Fisheries determined that chinook salmon in the Puget Sound ESU are at risk of becoming endangered in the foreseeable future. Subsequently, NOAA Fisheries listed PS chinook salmon as threatened (March 1999, 64 FR 14308). This listing extends to all naturally spawning chinook salmon populations residing below natural barriers (e.g., long-standing, natural waterfalls) in the Puget Sound region from the North Fork Nooksack River to the Elwha River on the Olympic Peninsula, inclusive.

In 2003, the estimates of trends in natural spawning escapements for PS chinook populations are similar to the previous status review of PS chinook conducted with data through 1997 (BRT 2003). The long-term trends in abundance and median population growth rates for naturally spawning populations of chinook in the Puget Sound ESU both indicate that about half of the populations of chinook in Puget Sound are declining and half are increasing in abundance (BRT 2003). The long-term population growth rates (Lambda at 1.0) indicate that most populations are just replacing themselves.

Historically, 31 quasi-independent populations of chinook comprised the PS chinook ESU. Recently, the Puget Sound Technical Recovery Team (PSTRT), an independent scientific body convened by NOAA Fisheries to develop technical delisting criteria and guidance for salmon delisting in Puget Sound, identified 22 geographically distinct populations of chinook salmon remaining in the Puget Sound ESU (PSTRT 2001, 2002; BRT 2003). The populations that are presumed to be extirpated were mostly the early-returning chinook (spring-type chinook), and most of these fish returned to the mid to southern parts of Puget Sound, Hood Canal and the Strait of Juan de Fuca. The extant population designations are preliminary and may be revised based on additional information or findings of the PSTRT. Through the recovery planning process, NOAA Fisheries will define how many and which naturally spawning populations of chinook salmon are necessary for the recovery of the ESU as a whole (McElhany *et al.* 2000).

The PSTRT has determined chinook in the north Lake Washington tributaries and the Cedar River are geographically distinct from chinook in other Puget Sound streams and from each other (NMFS 2001). Analysis of genetic data has shown that the Cedar River chinook population is genetically divergent from the North Lake Washington population, and that chinook salmon sampled from Bear Creek and Issaquah Creek are genetically similar to each

other (Marshall 2000). The geographic separation between spawning areas in north Lake Washington and the Cedar River support the genetic separation of the two populations (NMFS 2001).

2.1.2.1 Status of the Species in the Action Area

Lake Washington chinook salmon are among weaker key stocks in the mix of Puget Sound chinook populations (PSTRT 2001, 2002; WDFW 2001). Escapement to the Cedar River has been consistently below the goal of 1,200 spawners and fell below 200 during two of the past ten years. Spawning escapements for PS chinook in the Cedar River ranged between 681 in 1995 and 120 in 2000 with an average escapement of 398 between 1987 and 2000 (PSTRT 2001). During the fall of 2001, the preliminary estimate of escapement to the Cedar River index reach exceeded 800, the largest return since 1987 (WDFW 2002). Escapement to the Cedar River for 2002 was estimated at 600 (Mike Mahovlich, biologist, MIT, pers. comm., December 10, 2002). Average escapement to the north Lake Washington tributaries was 194 between 1987 and 2001. Estimated escapement goals for the recovery plan have not yet been established for Lake Washington populations (PSTRT 2002).

All juvenile and adult chinook from the Lake Washington watershed migrate through the Ship Canal and Lake Washington to and from their spawning grounds. The close proximity of the project to the Cedar River and May Creek (where chinook also spawn and rear) suggests that the Cedar River population is the primary population that will be affected by the proposed project. Thus, although the north Lake Washington chinook population also migrates throughout the lake, only the Cedar River chinook population will be discussed in the remainder of this Opinion.

Habitat alterations and availability are clearly understood to impose an upper limit on the production of naturally spawning populations of salmon. The National Research Council Committee on Protection and Management of Pacific Northwest Anadromous Salmonids identified habitat problems as a primary cause of declines in wild salmon runs (NRC 1996). Some of the habitat impacts identified were: the fragmentation and loss of available rearing habitat; degradation of water quality; removal of riparian vegetation; and decline of habitat complexity (NMFS 1998; NRC 1996), all of which occur in Lake Washington.

2.1.3 Environmental Baseline

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

Lake Washington waters cover 28.0 square miles and the shoreline length is about 72 miles. In the southern half of the lake is Mercer Island, which has an area of 6.5 square miles and accounts

for about 19% of the lake's total shoreline. Lake Washington has sustained a long and substantial history of human alteration. In 1897, Bowers described Lake Washington as follows: "Nearly all the hills are covered with a dense growth of trees, except where clearings have been made for homes and settlements. The shoreline in nearly all parts is fringed with a dense undergrowth of brush and small trees; tule grass is found at every low point and light indentation....only in a few places along the shore of the entire lake is the bottom sufficiently free from snags, fallen trees, and other material to permit the successful hauling of nets." Currently, over 78% of the lake shoreline has been developed for residential land use (Tabor and Piaskowski 2001).

Since the early 1900s, large scale and small scale hydraulic changes have been made to the Lake Washington system. In 1916, the elevation of Lake Washington was lowered from the construction of the Lake Washington Ship Canal and Government Locks, and the Cedar River was diverted from the Black River into Lake Washington and to Puget Sound via the Ship Canal. The approximate 9-foot reduction in lake level eliminated much of the available shallow-water and fresh-water marsh habitat, and decreased the length of the shoreline of Lake Washington. Over 9.5 miles of shoreline and an estimated 1,013 acres of wetland in Lake Washington were lost (Chrzastowski 1983). In addition to the loss of shoreline habitat, currently about 71% of the existing lakeshore is armored with bulkheads or riprap, and approximately 2,737 residential piers have been built (Toft 2001). On average, 36 piers occur per mile, or one pier for every 146 feet of shoreline (Toft 2001).

When the lake level was lowered, the Black River was disconnected from the Lake Washington system. The Black River currently flows at a much reduced volume into the Green River, and is located in an entirely different watershed. The Cedar River is now the primary source of fresh water to Lake Washington, the other source being the Sammamish River at the north end of the lake. Other major structural changes to the system included the connection of Lake Union to Lake Washington via the Montlake Cut, and the enlargement of the former outlet of Lake Union to form the Fremont Cut (Kahler 2000).

The Lake Washington Ship Canal and Chittenden Locks were constructed near the western end of Salmon Bay. This structural change converted the former saltwater inlet to a freshwater channel and effectively eliminated over 4 miles of estuarine habitat, removing the primary habitat where juvenile chinook acclimate to salt water (Chrzastowski 1983). The Ship Canal and Chittenden Locks provide navigable access between Lake Washington and Puget Sound for commercial and pleasure craft. In the winter months, the water level is drained down to an established lower limit in order to facilitate clean-up and pier repairs along the Ship Canal and the shores of Lake Washington (Chrzastowski 1983).

The diversion of the Cedar River, and drop in water level of Lake Washington, affected both the fish populations and habitat conditions (Kahler 2000). Cedar River fish stocks previously adapted to a riverine migration and an extensive estuary were abruptly routed into Lake Washington, a change that required a different migration through the lake and a swift transition into the colder, more saline conditions below the Chittenden Locks.

Habitat conditions in Lake Washington have also substantially changed around the lake shoreline and the riparian boundary. The COE regulates the water level in Lake Washington to provide fresh water to operate the locks, to maintain stable lake levels during flooding periods, and for maintenance. Consequently, Lake Washington is managed like a reservoir to fluctuate only 2 feet, rather than the 7-foot fluctuation that was common historically. Because of the COE operations, the normal high water/low water regime has been reversed from natural conditions so that the water level is high in the summer and low in the winters. The hardstem bulrush and willow that once dominated the shoreline community has been replaced by developed shorelines with landscaped yards (Kahler 2000). A consequence of the loss of natural shoreline is a reduced the amount of complex shoreline features such as overhanging vegetation, submerged root systems, emergent vegetation, woody debris, and substrate.

The COE regulation of the water level in the Lake Washington system has not similarly affected the shoreline of Lake Union because the historical water-level fluctuation was similar to the present. Rather, losses of wetland and shoreline vegetation in Lake Union are attributable to filling and shoreline development (Kahler 2000).

The species composition (plants and animals) that live in and around Lake Washington has also changed dramatically with the introduction of non-native plants and animals during the later half of the nineteenth century. At least 15 species of non-native fish have been introduced to Lake Washington (Ajwani 1956). In 1918, largemouth bass (*Micropterus salmoides*), a non-native predator of juvenile chinook were introduced into Lake Washington (Pfeifer 1992). Introduction of smallmouth bass (*Micropterus dolomieui*) occurred later, possibly during the early 1960s (Pflug 1981). Smallmouth bass have been documented to prey on juvenile chinook (Pflug 1981). Another non-native predator of chinook is the yellow perch (*Perca flavescens*).

Many non-native invasive plants such as Eurasian milfoil (*Myriophyllum spicatum*) and reed canary grass (*Phalaris arundinacacea*) are found in the lake or in the riparian buffer. Eurasian milfoil in particular may be harmful to juvenile fish. Dissolved oxygen levels under dense patches of Eurasian milfoil and fragrant white water lily (*Nymphaea odorata*) (consistently less than 4 milligrams per liter (mg/L)) were lethal to caged steelhead trout in Lake Washington (Frodge *et al.* 1995). Bjornn and Reiser (1991) concluded that salmonids may be able to survive when dissolved oxygen concentrations are relatively low (less than 5 mg/L), but growth, food conversion efficiency, and swimming performance will be adversely affected.

2.1.3.1 Factors Affecting Species in the Action Area

The human activities are one of the primary causes of the decline of salmon throughout the Pacific Northwest (Myers *et al.* 1998; NRC 1996). Identified habitat impacts in the action area are: estuarine loss; loss of large woody debris (LWD); and blockage or passage problems associated with dams or other structures (March 9, 1998, 64 FR. 11494). Land-use activities associated with urban development, among others, have significantly altered fish habitat quantity and quality (Myers *et al.* 1998). Impacts associated with these activities included elimination of rearing habitat, removal of vegetation, and elimination of LWD recruitment (Myers *et al.* 1998).

Long-term declines in distribution and abundance of chinook may be attributed to significant historic structural and hydrologic changes, water withdrawals and impoundments, urbanization, habitat degradation, and habitat accessibility in the action area and throughout the watershed. Continuing development on the shoreline in the action area also affects salmonid habitat. In the action area, habitat functions that will be affected by the proposed action include changes to shoreline vegetation and riparian structure, substrate composition, structural complexity, habitat access, non-native species and chemical contamination through the use of treated wood.

2.1.4 Relevance of Baseline to Status of the Species

Presently, the biological requirements of PS chinook are not being met under the environmental baseline. The factors for decline that contributed to the need for listing the ESU continue to be present in the action area as baseline conditions. Factors for decline of PS chinook include anthropogenic activities which have blocked or reduced access to historical spawning grounds and altered downstream flow and thermal conditions. In general, upper tributaries have been impacted by forest practices while lower tributaries and mainstem rivers have been impacted by agriculture and/or urbanization. Diking for flood control, draining and filling of freshwater and estuarine wetlands, and sedimentation due to forest practices and urban development are cited as problems throughout the ESU (Myers *et al.* 1998).

As a general matter, to improve the status of the listed species, significant improvements in the habitat conditions are needed. Conditions along the shoreline need to improve to allow natural processes to occur, allowing habitat formation and maintaining water quality necessary to sustain fish. Specifically, riparian vegetation, inwater vegetation and woody debris need to be reestablished in and around the shoreline. Additionally, because armoring of the shoreline changes shoreline gradients and sediment supplies to the lake, a decrease in structural armoring is needed to allow natural processes to occur, and to reestablish shoreline conditions that juvenile salmon prefer. To improve the status of chinook, improvements in the quality and quantity of the species' migration and rearing habitats are needed. These actions could enhance salmonid production and survival in the basin.

2.2 Effects of the Proposed Action

The ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on threatened or endangered species or habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline" (50 CFR 402.02). These effects, when added to the effects on listed species from the baseline condition, together with cumulative effects, are analyzed to determine whether or not a project will jeopardize the continued existence of a listed species.

2.2.1 Direct Effects

Direct effects are the immediate effects of the project on the species or its habitat. Direct effects result from the agency action and include the effects of interrelated actions and interdependent actions. Future Federal actions that are not a direct effect of the action under consideration (and

not included in the environmental baseline or treated as indirect effects) are not evaluated as they would be the subject of future consultation under ESA section 7.

The direct effects of new piers include those from: shade and structure from the new pier; shade from boats moorage, which is an interdependent activity; shoreline modification where the pier is connected to land; chemical contamination from treated wood; the construction impacts of turbidity; and pile-driving noise.

2.2.1.1 Shade and Structure

The effects on juvenile chinook of shade produced from piers in Lake Washington are not well understood, but chinook behavior around piers has been recently observed. Tabor and Piaskowski (2001) observed schools of out-migrating chinook swim around piers rather than under them, presumably because of the change in light level and/or presence of predators. Tabor and Piaskowski (2001) found that larger juvenile chinook avoided overwater structure both at night and during the day when shade is produced. Pier avoidance may pose a greater risk from predation, as chinook travel around piers into deeper water. NOAA Fisheries knows of no research that has focused on determining what level of light is a barrier to, or causes changes in, juvenile migration or foraging behavior in Lake Washington. If changes to migration and foraging behavior caused by piers and shading negatively affect chinook the large number of existing piers and other structure that exist in the lake magnify that effect.

New piers with boats moored alongside will create shade in the near-shore area. Shade from piers typically produces a distinct, straight line, light/dark interface, in contrast to shade from trees, which usually produce a mottled shading effect on the water. Visiting or resident boats moored along the north side of the pier will also produce shade in the near-shore, an area that is most important to chinook rearing. The existing 18-foot boat will be moored on the boatlift when not in use, which reduces shading, compared to boat moorage in the water.

Mr. Captain's new pier will have a narrow walkway 4 feet wide, is fully grated to provide 60% open space and has a minimal number of small diameter of pilings. Although these measures are expected to minimize shading and structure, it is not known if these measures are sufficient to avoid effects to near-shore habitat for juvenile chinook.

2.2.1.2 Shoreline Conditions

The proposed construction of the new pier and bulkhead will change the shoreline conditions. The shoreline at the site is deeply undercut and covered with vegetation along 90% of the project area (Shapiro and Associates, 2001). The existing native willows (*Salix sp*), non-native blackberries (*Rubus sp*), and non-native ivy (*Coccinia sp*) protect the existing bank from erosion by wave action. The existing plants at the shoreline overhang the water and provide cover in the form of complex root systems in the water for juvenile fish. The leaf litter and terrestrial insects from riparian vegetation can contribute substantially to the prey for fish and to lake nutrient cycles (Schindler and Scheuerell 2002; Koehler 2002).

While the applicant will remove this existing vegetation, reducing the amount of cover and prey base available to juvenile fish, he proposes to place native vegetation that will overhang the water, to be planted at a width of 10 feet, behind the bulkhead. Willows will be planted in coir lifts in front of the riprap, to provide habitat for chinook, trap sediment, and maintain a shallow sloping gradient. The willows, if they survive, are expected to reduce the effects of wave erosion in front of the bulkhead, in addition to providing cover and habitat (to substitute for the loss of existing exposed root systems) in this location. The proposed replanting means that the loss functions provided by overhanging vegetation will be temporary, as a time lag will occur before the newly planted vegetation is as productive as the original vegetation, in terms of providing cover and equivalent amounts of leaf litter and insect matter to the lake ecosystem. If the willows do not survive, substrate erosion from waves at the foot of the bulkhead will cause the shoreline gradient to steepen and reduce shallow water habitat (COE 1989; Downing 1983). This shoreline modification on the north side of the property will, however, permanently remove the undercut bank and plant root systems growing in the water, which currently provide cover and protection for fish. Also, natural sediment from the shoreline that would nourish the lake shore substrate will be blocked from reaching the lake in the future by the bulkhead (COE 1989; Downing 1983).

A 4-foot wide pier will be attached to the shoreline on riprap in the middle of the lot. The shoreline where the pier is attached will be modified to preclude suitable shoreline habitat for juvenile fish for the life of the pier and bulkhead because no plants will be growing in this area and the shoreline will be armored with rock. An existing log will be moved to the south side of the pier and will provide nutrients to the benthic community and food chain in that location (Schindler and Scheuerell 2002; Koehler 2002) A pathway will be installed from the south end of the property to the pier, parallel to the proposed beach cove.

South of the pier, Mr. Captain proposes to construct a sandy beach cove along 44 linear feet of the shoreline. Six and a half cubic yards of sand will be placed upland of the OHW. The beach cove will be bordered by a 38-foot riprap bulkhead and planted with 15 linear feet of vegetation about 5-10 feet in width. Two 8-foot patches of hard-stem bulrush will be planted in the water at either end of the cove. The effects of the constructed beach cove on the southern portion of the property are similar to those at the northern part, in that existing habitat that provides food, protection and cover for fish will be permanently replaced. At this location, the applicant has proposed to set the bulkhead one vertical foot above (landward) OHW, install the sandy beach, and plant overhanging and emergent vegetation. The bulkhead will preclude the root systems of the overhanging plants from growing into the water and will preclude natural nourishment of shoreline substrate. The emergent vegetation should reduce some project impacts by eventually providing refuge from predators and organic matter to the lake ecosystem, if the plants survive in this location. The shallow beach gradient will provide an area for wave energy dissipation and a substrate type that chinook have been documented to favor (Tabor and Piaskowski 2001), however, this area will likely need substrate supplementation over time to maintain a shallow gradient.

2.2.1.3 Water Quality

The construction of the pier, the presence of the pier, and use of the pier, will degrade water quality. Pier installation will mobilize sediments in the water column, temporarily increasing local turbidity levels in the immediate vicinity (several feet) of the construction activities. This condition will, however, be short-lived, and have a low potential for causing harm to chinook, because the spatial scale of the pier installation will be small, restrictions on piling spacing will limit the overall number of pilings installed, and installation will occur when listed species are least likely to be present near the project site. Treated wood will release contaminants into the water. While steel pilings are proposed, ACZA treated wood is proposed for the surface of the pier. Rainwater that falls on the treated wood will drain directly into Lake Washington causing some unknown level of contamination. The effects on fish from water and sediment contamination from treated wood use in Lake Washington specifically are unknown. It is generally known, though, that treated wood used for pier decking does release contaminants into freshwater and saltwater. Wood treatments include ammoniacal copper zinc arsenate (ACZA) and chromated copper arsenate (CCA) (Posten 2001). Contaminants associated with ACZA and CCA treated wood include copper, arsenate, zinc and chromate, of which copper provides the greatest risk to aquatic organisms. Direct exposure to the contaminants occurs as salmon migrate past installations with treated wood or when juveniles rear near piers constructed with treated wood. Indirect exposure occurs through ingestion of other organisms that have been exposed (Posten 2001). Leaching rates of contaminants from treated wood is highly variable and dependent on many factors (Posten 2001). Consequently, Posten (2001) recommends that use of treated wood for each individual situation needs to be evaluated independently. However, Posten also recommends that assessment of potential impacts of the use of treated wood should include cumulative impact assessment.

Polycyclic aromatic hydrocarbons (PAHs) are commonly released from petroleum based contaminants used in outboard motors such as fuel, oil, and some petroleum-based hydraulic fluids. At high levels of exposure PAHs can cause acute toxicity to salmonids as well as acute and chronic sublethal effects to other aquatic organisms (Neff 1985). The PAHs may cause a variety of harmful effects (cancer, reproductive anomalies, immune dysfunction, and growth and development impairment) to exposed fish (Johnson 2000; Johnson *et al.* 1999; Stehr *et al.* 2000). It is not expected that increased concentrations of PAHs will produce measurable harm to PS chinook in Lake Washington.

The use of treated wood for pier construction, and the operation of boats at the pier site, may introduce some toxicants that further degrade the environmental baseline and habitat conditions of Lake Washington. These water quality effects are not expected to harm listed chinook.

2.2.1.4 Pile-Driving Noise

Pile driving, especially with a free-fall hammer or impact hammers, typically causes temporary, intense under-water noise. Free-fall hammers produce sharp spikes of sound which can easily reach levels that harm fishes, and the larger hammers produce more intense sounds. The extent to which the noise will disturb fishes will be related to the distance between the sound source and affected fish, and also by the duration and intensity of the pile-driving operation. The noise caused by free-fall pile-driving would likely elicit a startle response from chinook near the sound

source. After the initial strikes, the startle response wanes and the fish may remain within the field of a potentially-harmful sound (Dolat 1997; NOAA Fisheries 2002). Salmonids may be physically harmed by peak sound pressure levels that exceed 180 dB (re: 1 micropascal), while behavior may be disrupted at root-mean-squared (rms) sound pressure levels that exceed 150 dB (re: 1 micropascal) (NOAA Fisheries 2003).

For the proposed actions, pile-driving sound is expected to have a minimal impact on listed fish because the applicant will be installing the piles with a vibratory hammer that produces much lower decibel levels than impact hammers. Pilings will be installed over five days and the probability of take will be minimized by the small size of the pilings (5-inch diameter), the small number of pilings (15) to be installed, and the use of a vibratory hammer. Pile driving will occur within the COE/NOAA Fisheries/USFWS designated work window when listed species are least likely to be present near the project site, minimizing the potential for adverse effects.

2.2.2 Indirect Effects

Indirect effects are caused by or result from a proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the action. Indirect effects might include other Federal actions that have not undergone section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or be a logical extension of the proposed action (50 CFR 402.02).

2.2.2.1 Littoral Productivity

Piers may also have some general effects on littoral productivity. Constructing a new pier casts shade over the water. The shade that piers create may inhibit the growth of native aquatic macrophytes, epibenthic algae and pelagic phytoplankton. Shading may also reduce growth of invasive, non-native macrophytes such as milfoil.

Macrophytes are the foundation for most freshwater food webs and their presence or absence affects many higher trophic levels (*e.g.*, invertebrates and fishes). Consequently, the shade from piers may affect local plant/animal community structure and species diversity, as well as the overall productivity of littoral environments (White 1975; Kahler *et al.* 2000). However, NOAA Fisheries does not know to what degree the proposed action will affect listed native species through changes in productivity and trophic interactions.

2.2.2.2 Boating Activity

A new residential pier incrementally increases levels of boating activity in the lake. Boating activity may have several impacts on listed salmonids and aquatic habitat. Engine noise, propellor wash, and the physical presence of boat hulls may disturb or displace nearby fishes (Mueller 1980; Warrington 1999a). Boat traffic may also cause: (1) increased turbidity in shallow waters; (2) uprooting of aquatic macrophytes in shallow waters; (3) aquatic pollution (through exhaust, fuel spills, or release of petroleum lubricants); and (4) shoreline erosion (Warrington 1999b).

These boating impacts potentially affect listed fish in a number of ways. Turbidity may injure or stress fishes by affecting their gills. Increased wave action could displace juveniles from feeding along the shoreline, and increase shoreline erosion when the lake would be expected to be relatively calm. The loss or change in aquatic macrophytes may expose salmonids to predation, decrease littoral productivity, or alter trophic interactions. NOAA Fisheries does not expect these effects to produce measurable take to listed species.

2.3 Cumulative Effects

Cumulative effects are defined as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 CFR 402.02). Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

In the action area for this project, NOAA Fisheries does not expect further major riparian buffer degradation because all of the land is currently developed for residential purposes and native vegetation has already been removed or is publicly owned and used as park land.

2.4 Conclusion

NOAA Fisheries concludes that the proposed action, when considered together with effects from the baseline, and cumulative effects, is not likely to jeopardize the continued existence of PS chinook. NOAA Fisheries bases its conclusion on the fact that, while the construction and installation of the proposed pier and bulkhead may degrade some baseline habitat functions locally, it will not appreciably reduce the functioning of already impaired habitat or retard the long-term recovery of currently impaired habitat. The non-jeopardy determination is based on Mr. Captain's use of improved design criteria incorporating the following features: (1) minimal 4-foot walkway; (2) pier deck elevated a minimum of two feet above the OHW COE Datum; (3) limited number of small diameter steel pilings; (4) pier surface that allows 60% open surface for light transmission; (5) installation of emergent and shoreline vegetation (6) and installation of bulkhead one vertical foot above the OHW.

2.5 Reinitiation of Consultation

As provided in 50 CFR 402.16, where discretionary Federal agency involvement or control over the action has been retained by the action agency (or is authorized by law) consultation must be reinitiated if: the amount or extent of incidental take is exceeded; 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; the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The proposed action will add 560 square feet of overwater structure and 200 cubic feet of inwater piling structure, not including the boat lift. This project will also modify 75 lineal feet of shoreline and riparian habitat. If the extent of construction should exceed from these limits, or if the revegetation is not carried out as proposed, effects not previously considered would result, work must stop, and the COE must reinitiate consultation.

2.6 Incidental Take Statement

Section 9 of the ESA prohibits the take of listed species. The prohibition is extended to threatened species by rules promulgated under section 4 of the ESA. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. 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, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). Harass is defined as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breading, feeding, or sheltering (50 CFR 17.3).

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(o)(2), incidental take is not considered prohibited provided that such taking is in compliance with the terms and conditions of the section 7(b)(4) incidental take statement.

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

The measures described below are non-discretionary. For the exemption in section 7(o)(2) to apply, the measures must be implemented by the action agency or become binding conditions of any grant or permit issued to the applicant, as appropriate. The COE has a continuing duty to regulate the activity covered in this incidental take statement. If the COE fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

2.6.1 Amount or Extent of the Take

Listed chinook use the action area for migratory and rearing activities. Fresh (2001) notes that a few juveniles of every cohort remain in Lake Washington for an additional year, therefore, take of these listed fish is reasonably likely to occur incidental to the proposed action, despite measures included in the proposed to reduce this likelihood. Because fish presence is dependent upon a variety of fluctuating factors, such as age, size, prey availability, etc., despite the use of the best scientific and commercial data available, NOAA Fisheries cannot estimate the number of fish that would be present in the action area or the project site either during construction or in

subsequent years. Therefore, NOAA Fisheries cannot estimate the number of chinook that may be injured or killed as a consequence of this project.

NOAA Fisheries believes incidental take of listed chinook, in the form of harm, will result from the detrimental effects of the new pier and new bulkhead. The spatial extent of changes to fish habitat serve as a surrogate for estimating the amount of take. As such, the following spatial estimates represent the limits on incidental take that will be exempted through this Incidental Take Statement: the proposed action will add approximately 560 square feet of overwater structure, 200 cubic feet of inwater piling structure, (not including the boat lift), and 75 lineal feet of new bulkhead to the shoreline.

2.6.2 Reasonable and Prudent Measures

NOAA Fisheries believes the following reasonable and prudent measures are necessary and appropriate to minimize take:

1. The COE shall ensure the extent of shoreline vegetation loss is minimized;

2. The COE shall ensure that the existing shoreline gradient in front of the bulkheads does not steepen after project installation;

3. The COE shall will ensure that habitat functions are not degraded by permitted projects.

2.6.3 Terms and Conditions

To comply with ESA section 7 and be exempt from the prohibitions of ESA section 9, the COE, its applicant, or both, must comply with the terms and conditions that implement the Reasonable and Prudent Measures. These terms and conditions are non-discretionary.

To implement all reasonable and prudent measures, the COE shall integrate into its permit the following terms and conditions:

1. To implement reasonable and prudent measure No.1, the COE shall:

    a. require that the vegetative plantings extend to a depth of 10 feet along the entire width of the property; and

    b. require vegetative plantings concurrent with bulkhead installation, or if this is beyond the dormant season, within one year of the bulkhead installation.

2. To implement reasonable and prudent measure No. 2, the COE shall:

    a. require that the existing shoreline gradient and substrate size be maintained, in front of the north and south bulkhead, in the event scour occurs.

b. provide access by NOAA Fisheries for purposes of gathering data on under-pier light transmission, efficacy of willow and emergent plant growth, shoreline gradient changes and fish use.

3. To implement reasonable and prudent measure No. 3, the COE shall monitor the project site annually for a period of 5 years after planting, to ensure permit conditions have been adhered to and notify NOAA Fisheries of any permit deviations. The COE shall ensure that 100% of trees have survived and other vegetation has achieved at least 80% survival five years after planting.

2.7 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the Act by carrying out programs for the conservation of endangered and threatened species. The conservation recommendations offered by NOAA Fisheries in this document are discretionary agency activities intended to minimize or avoid adverse effects of a proposed action on listed species or, to help implement recovery plans, or to develop additional information.

NOAA Fisheries encourages the COE to evaluate the effectiveness of planting emergent vegetation associated with COE permitted projects for juvenile chinook use.

NOAA Fisheries encourages the COE to explore ways to improve salmonid habitat and ecosystem function in the action area to compensate for habitat impacts associated with piers and boating activity.

NOAA Fisheries requests notification should either of these conservation recommendations be implemented, so that additional actions minimizing or avoiding adverse effects of the project or benefitting listed species or their habitats can be recorded.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The MSA established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2));

- NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (section 305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within

30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries' EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (section 305(b)(4)(B)).

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

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

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

3.2 Identification of Essential Fish Habitat

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally-managed Pacific salmon: chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*), and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (*i.e.* natural waterfalls in existence for several hundred years) (PFMC 1999). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999; see: http://www.pcouncil.org/salmon/salother/a14.html). 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 1.3 and 1.4 of this document. The action area includes habitats that have been designated as EFH for various life-history stages of chinook and coho salmon.

3.4 Effects of Proposed Action

As described in detail in section 2.1.6 of the Opinion, the proposed action may result in short- and long-term adverse effects to a variety of habitat parameters. These adverse effects are:

1. Steepening of nearshore gradient.

2. Loss of riparian habitat.

3. Increased underwater noise associated with pile driving in the vicinity of the project.

4. Decrease in water quality from pier construction and boat operations.

5. Long-term reduction in littoral productivity.

3.5 Conclusion

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

3.6 Essential Fish Habitat Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions that would adversely affect EFH. While NOAA Fisheries understands that the conservation measures described in the BA will be implemented by the COE, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. To minimize the remaining adverse and aggregate effects to designated EFH for Pacific salmon from shade and structure, NOAA Fisheries recommends that the COE implement the following:

1. To minimize the adverse effect of installing a new bulkhead at the shoreline, the COE should ensure that the shoreline gradient and substrate be maintained, in front of the north and south bulkhead, in the event scour occurs.

2. To minimize the effect of loss of shoreline vegetation, the COE should ensure that the vegetative plantings extend to a depth of ten feet the entire width of the property.

3. To ensure the success of vegetation plans proposed, the COE should monitor the pier annually to ensure permit conditions have been adhered to, and notify NOAA Fisheries of any permit deviations.

4. The COE should ensure that vegetation plans have achieved at least 80% planting survival by replacing any dead plants found during the five years of monitoring after planting.

3.7 Statutory Response Requirement

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

3.8 Supplemental Consultation

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

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