



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Northwest Region  
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Seattle, WA 98115

Refer to NMFS No:  
2010/00231

February 3, 2011

Kevin Moynahan  
Chief, Regulatory Branch  
*Attn: James Holm*  
Portland District, Corps of Engineers  
CENWP-OP-GP  
P.O. Box 2946  
Portland, Oregon 97208-2946

Re: Endangered Species Act Biological Opinion and Magnuson-Stevens Fishery  
Conservation and Management Act Essential Fish Habitat Conservation  
Recommendations for the ZRZ Realty Company Contaminant Cleanup, Multnomah  
County, Oregon (6<sup>th</sup> Field HUC: 170900120302) (COE No. NWP-2007-962)

Dear Mr. Moynahan:

The enclosed document contains a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the proposed issuance of a permit by the U.S. Army Corps of Engineers (COE) under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act to ZRZ Realty Company for contaminant cleanup at river mile 14 in the Willamette River, Multnomah County, Oregon.

In this Opinion, NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River (UWR) Chinook salmon, LCR coho salmon (*O. kisutch*), LCR steelhead (*O. mykiss*), and UWR steelhead or result in the destruction or adverse modification of designated critical habitat for LCR Chinook salmon, UWR Chinook salmon, LCR steelhead, and UWR steelhead. Critical habitat has not been proposed or designated for LCR coho salmon.

As required by section 7 of the ESA, NMFS is providing an incidental take statement with the Opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the COE and ZRZ Realty must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of listed species.

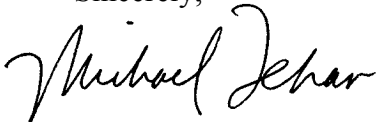


This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. The conservation recommendations are a subset of the ESA take statement's terms and conditions. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the EFH conservation recommendations, COE must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we request that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

If you have questions regarding this consultation, please contact Genevieve Angle in the Willamette Basin Habitat Branch of the Oregon State Habitat Office at 503.231.2223.

Sincerely,

  
for William W. Stelle, Jr.  
Regional Administrator

cc: Paul Fishman, NES  
Scott Manzano, DEQ  
Mike McCabe, Oregon DSL  
Corey Saxon, DEQ

Endangered Species Act  
Biological Opinion

and

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

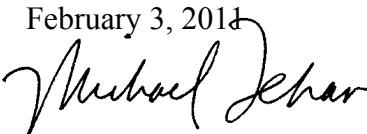
ZRZ Realty Company Contaminant Cleanup  
Multnomah County, Oregon  
(6<sup>th</sup> Field HUC: 170900120302) (COE No. NWP-2007-962)

Lead Action Agency: U.S. Army Corps of Engineers

Consultation  
Conducted By: National Marine Fisheries Service  
Northwest Region

Date Issued: February 3, 2014

Issued by:

  
for William W. Stelle, Jr.  
Regional Administrator

NMFS No.: 2010/00231

## TABLE OF CONTENTS

INTRODUCTION .....	1
Background and Consultation History .....	1
Description of the Proposed Action .....	2
Action Area .....	7
ENDANGERED SPECIES ACT BIOLOGICAL OPINION .....	7
Status of the Species and Critical Habitat .....	8
Environmental Baseline .....	13
Species Within the Action Area .....	14
Critical Habitat Within the Action Area .....	14
Effects of the Action .....	15
Species Within the Action Area .....	17
Critical Habitat Within the Action Area .....	21
Cumulative Effects .....	23
Synthesis and Integration of Effects .....	24
Species at the Population Scale .....	24
Critical Habitat at the Watershed Scale .....	26
Conclusion .....	26
Incidental Take Statement .....	27
Amount or Extent of Take .....	27
Reasonable and Prudent Measures .....	28
Terms and Conditions .....	29
Conservation Recommendations .....	33
Reinitiation of Consultation .....	33
MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT .....	34
Essential Fish Habitat Conservation Recommendations .....	34
Statutory Response Requirement .....	34
Supplemental Consultation .....	35
DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW .....	35
LITERATURE CITED .....	37

## INTRODUCTION

This document contains a biological opinion (Opinion) that was prepared by National Marine Fisheries Service (NMFS) in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, *et seq.*), and implementing regulations at 50 CFR 402.<sup>1</sup> It also contains essential fish habitat (EFH) conservation recommendations prepared by NMFS in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, *et seq.*) and implementing regulations at 50 CFR 600. The Opinion and EFH conservation recommendations are both in compliance with section 515 of the Treasury and General Government Appropriations Act of 2001 (Data Quality Act) (44 U.S.C. 3504 (d)(1) and 3516), and underwent pre-dissemination review. The administrative record for this consultation is on file at the Oregon State Habitat Office in Portland, Oregon

### Background and Consultation History

The U.S. Army Corps of Engineers (COE) proposes to issue a permit under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act to ZRZ Realty Company for contaminant cleanup at river mile 14 along the Willamette River in Multnomah County, Oregon. In 2009, the applicant's agent began meeting with NMFS to discuss the project design. In October and December of 2009, NMFS provided comments to the applicant regarding the current design of the project and proposed project changes such as laying back the bank that would result in improved habitat conditions for ESA-listed species.

On January 29, 2010, the COE requested formal consultation under the ESA and MSA. The COE determined that the proposed project is likely to adversely affect Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River (UWR) Chinook salmon, LCR coho salmon (*O. kisutch*), LCR steelhead (*O. mykiss*), and UWR steelhead and their designated critical habitats. Critical habitat has not yet been proposed or designated for LCR coho salmon. The COE also determined that the proposed project is likely to adversely affect essential fish habitat for Chinook and coho salmon.

NMFS met with the COE and the applicant's agent in May, July, August, September, and December of 2010 to discuss project alternatives to improve habitat for ESA-listed species (such as minimizing the amount of rock armor placed below ordinary high water, laying back the bank, and off-site mitigation opportunities), the consultation process and the complicated analysis of effects. Final design modifications were received by NMFS on December 23, 2010. The use of habitat equivalency analysis to evaluate the proposed action was also discussed with the COE and the applicant, however the analysis was not completed because the habitat values to use in the analysis have not yet been finalized.

NMFS concurs with the COE's determination that the proposed project is likely to adversely affect LCR Chinook salmon, UWR Chinook salmon, LCR coho salmon, LCR steelhead, and UWR steelhead and their designated critical habitats.

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<sup>1</sup> With respect to designated critical habitat, the following analysis relied only on the statutory provisions of the ESA, and not on the regulatory definition of "destruction or adverse modification" at 50 CFR 402.02.

## **Description of the Proposed Action**

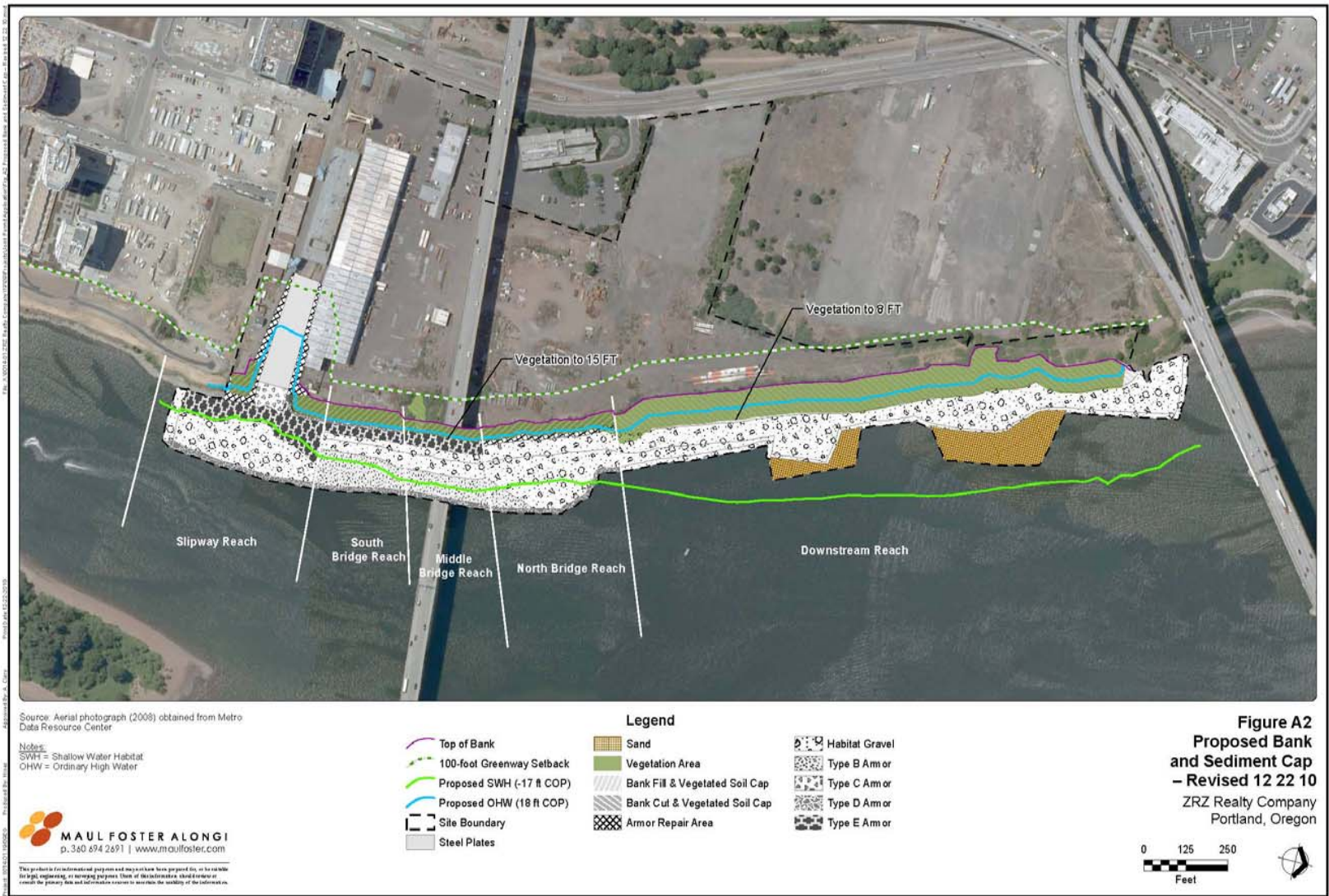
The proposed action involves the placement of a cap to remediate contamination over approximately 16.28 acres (12.94 acres below ordinary high water), spanning over 3,095 feet of shoreline between river miles 13.6 and 14.2 on the west bank of the Willamette River (Figure 1). The site has a history of heavy industrial use, and the southern end of the project site is still used by Zidell Marine Corporation for barge construction.

Within the project area, the biological assessment (BA) identifies 4 reaches: the slipway reach, the south bridge reach (including the middle bridge reach from Figure 1 above), the north bridge reach and the downstream reach. Due to different topography, hydrodynamics and contaminant concentrations, different capping methods are proposed in each of the reaches.

Bank excavation (both above and below ordinary high water) to improve slope stability and for cap placement is proposed in the slipway, south bridge and north bridge reaches. The entire vertical profile of the bank will be excavated in the north slipway and south bridge reaches, and the bank above the existing armor at +15 feet City of Portland (COP) datum to the top of bank will be excavated in the north bridge reach. The excavation will occur in July and August when water levels are low, so most of the excavation is expected to be completed on dry ground. The lower boundary of the bank excavation will most likely extend below the anticipated water level by 2 to 3 feet. Excavation will be conducted using a standard excavator. A turbidity curtain will be placed in the nearshore area around the bank to isolate the excavation area from the river. Additional excavation will take place on all reaches of the bank to remove hot spots of contamination. If any former operational structures are encountered during excavation, they will be decommissioned.

Once the excavation is completed, a demarcation geogrid will be placed on the slope to provide a visual indicator that the soils below may contain hazardous materials. Placement of the demarcation geogrid will follow the hazardous material mapping previously completed. Soil from the bank excavation that is not from a hot spot may be placed in the interior of the site on a plastic liner or loaded on a transport truck and hauled to a permitted landfill for disposal. Soils with contamination exceeding hot spot concentrations will be disposed of off-site in accordance with applicable state and Federal regulations.

Dredging will occur in the slipway reach in limited areas from the top of the slipway to the mouth to ensure adequate clearance for the continued launching of barges. A standard excavator or clamshell dredge will be used. The entire slipway will be isolated with a turbidity curtain during dredging. Dredged material will be dewatered over, and infiltrated into, existing soils in the interior upland area of the ZRZ site, in an area contained by a soil berm and silt curtain.



**Figure 1.** The proposed cap between river miles 13.6 and 14.2 on the west bank of the Willamette River. The bridge on the right is the Marquam Bridge, the bridge on the left is the Ross Island Bridge and the north end of Ross Island is visible in the lower left corner. The various reaches (described below) are delineated and the proposed surface substrate after capping is described in the legend.

There are four stormwater outfalls (two private and two owned by the City of Portland) in the action area. In the slipway and south bridge reaches, private stormwater pipes will be modified so that the pipes do not extend beyond the edge of the final bank surface once excavation and capping have taken place. City outfall number 6 in the south bridge reach is expected to be decommissioned as a contaminant source control measure. City outfall 7b will remain in use and the cap around it will incorporate an armored swale lined with a 6-inch layer of Aquablock to convey outfall discharge to the edge of the sediment cap. Any unsurveyed outfalls found (there are two shown on historical drawings, but not found during site reconnaissance visits) will be plugged and capped.

Several in- and over-water structures, as described below, will be removed as part of the proposed action. A moored crane barge, floating dock and gangway will be removed from the slipway reach. Two derelict ship bows will also be removed from the slipway reach, and 2,200 treated wood piles and remnant dock stringers will be removed from the downstream reach. The treated wood piles will be cut with a hydraulic saw or shears at the mudline (to avoid mobilization of contaminants) and covered with fill. All wood debris created during cutting will be contained within a floating boom deployed around the work area. Debris in the water and on the bank will be retrieved after cutting is completed each day and disposed of appropriately. Finally, shoreline debris such as concrete, old ballast material, wiring and tubing will be removed from the slipway, south bridge and north bridge reaches.

The bank and sediment cap placement will consist of several different components. In the south slipway and north bridge reaches, existing bank armor will be repaired. In the north slipway and south bridge reaches, a replacement cap consisting of rock armor on top of a layer of filter gravel and filter fabric will be placed. In the north bridge reach, existing armor will be removed above the +15 feet COP datum elevation. A vegetated biotechnical soil cap covered with a turf reinforcement mat and planted with native vegetation will be placed on the upper bank in the slipway, south bridge and north bridge reaches.

Fill will be placed over the existing armored bank and 6 to 10 inches of clean sand will be placed over the sediment in the downstream reach. A low-profile cap (a reactive core mat for chemical absorption covered by a geotextile cushion layer and a rock armor layer) will be placed over the sediment and over the slipway ramp surface in the slipway reach. Also in the slipway reach, an armored thin cap consisting of 10 inches of sand covered by 6 inches of filter gravel and 2 feet of rock armor will be placed.

A sand cap consisting of 2 to 18 feet of sand (depending on the location), covered by a layer of filter gravel and rock armor will be placed in all reaches. Rounded gravel with a maximum diameter of 2.5 inches will be placed over the rock armor in the downstream reach between elevation +10 feet COP datum and the eastern edge of the armored sediment cap. Rounded gravel with a maximum diameter of 2.5 inches will also be placed over much of the rock armor in the bridge reaches and the slipway reach (Figure 1). In two areas of the downstream reach, a thin cap consisting of a minimum 6 inches of sand with no rock armor will be placed. Clean dredge sand will be brought to the site by barge for construction of the cap. Measures will be taken to minimize mixing of the cap sand with the contaminated sediment during placement (slow placement of a thin layer of cap sand before bulk placement using global positioning

system (GPS)-guided clamshell placement from a barge, reverse dredge, or other similar technique). To protect the cap, rock armor will be placed around the edge of the cap to prevent scouring and all reaches will be covered under the United States Coast Guard Notice to Mariners to limit the size of vessels and activities near the cap area.

After construction is completed, the area from +8 feet COP datum in the downstream reach and from +15 feet COP datum in other reaches to the top of the bank (approximately +30 feet COP) will be landscaped with native vegetation. In the downstream reach, bioengineering techniques such as coir fabric, hydroseeding, fascines of shrub cuttings and coir logs will provide short-term erosion control until planted trees, shrubs and groundcover are established. No rock will be used in this area.

After the construction of the cap and all other project components are completed, there will be ongoing monitoring and maintenance of the cap as required by the Oregon Department of Environmental Quality (ODEQ) to make sure the cap is functioning as intended (isolating contaminants) and remains structurally sound.

For details on the proposed action, please refer to the BA (SWCA 2009) and the Detailed Project Description (Maul Foster & Alongi 2009) contained in Attachment A of the Joint Permit Application for this action.

ZRZ Realty Company has proposed the following measures to minimize the effects of their proposed action:

- In-water work will occur during the established Oregon Department of Fish and Wildlife (ODFW) in-water work period for the lower Willamette River: July 1–October 31.
- An Erosion and Sediment Control Plan will be completed as part of the ODEQ 1200C NPDES permit for construction activities. The plan will address erosion and sediment controls, hazardous materials management, spill response, and reporting.
- Areas for storing fuels and potentially hazardous materials, refueling, and equipment servicing will be at least 150 feet away from the work area.
- Perimeter sediment control best management practices (BMPs) (*e.g.*, sediment fences, straw bale barriers) will be used to prevent movement of soil from uplands into the Willamette River.
- Erosion prevention BMPs such as plastic sheeting, erosion control blankets, compost berms, or other effective methods will be employed to contain disturbed soil areas during rain events, high winds, or times when the soil will not be moved for more than 48 hours.
- Erosion control devices will be inspected daily during rainy periods and weekly during dry periods. If inspection shows that the erosion controls are ineffective, work crews will be mobilized immediately to make repairs, install replacements, or install additional controls as necessary.
- A supply of erosion control materials (*e.g.*, silt fences and straw bales) will be provided to respond to sediment emergencies. Sterile straw bales will be used when available to prevent introduction of exotic plants. The contractor will maintain spill containment kits on-site for cleanup of both dry-land spills and spills into waterways.

- Excess or waste materials will not be disposed of waterward of the OHW line or allowed to enter waters of the state.
- Streambanks, soils, and vegetation will be restored upon completion of construction using native plants appropriate for habitats at the site.
- Excavated contaminated materials will be disposed of at a permitted landfill facility or managed onsite consistent with the Record of Decision. Sediment placed on-site will be managed in accordance with the Soil Management Plan to be completed as part of the final design. The design of on-site sediment management systems will also be completed as part of the final design.
- A hydraulic saw or shears (as opposed to pneumatic tools) will be used to cut piles to minimize sound levels in the aquatic environment.
- Hydraulic machinery used to cut pilings will use biodegradable hydraulic fluid to minimize potential impacts to aquatic environments should a leak occur.
- Localized turbidity curtains will be used where possible to isolate dredge areas where polychlorinated biphenyls (PCBs) have been detected in sediment samples at concentrations greater than 2,000 µg/kg.
- Localized turbidity curtains will be deployed during dredging work at the mouth of the slipway and at the base of the bank excavation near the shore.
- Turbidity will be monitored in real time at three locations (one upstream and two downstream of the site) with recording depth at mid water column. Measures to reduce turbidity will be taken if the allowed turbidity level is exceeded.
- Dredging will occur in the summer when water levels are lowest to minimize work below the water surface.
- An excavator will be used on the bank and either an excavator or suction dredge will be used in the slipway. Use of an excavator would minimize potential entrainment of fish in the dredged materials, and monitoring for fish would likely be unnecessary.
- Dredged material will be dewatered in the upland area of the ZRZ site, in an area contained by a soil berm and silt curtain. Material will dewater over, and infiltrate into, existing soils. If a suction dredge is necessary, dredged materials will be passed through a geotextile sock or dewatering cell that allows water to decant through a filter material.
- Operational requirements will be implemented to limit resuspension of fine materials during removal (slow dredge movements, limiting work directly over water, minimize allowable fall height during placement of materials, etc.).
- A thin layer of sand will be applied to the sediment cap area at a low falling velocity prior to full cap installation to reduce the potential for sediment resuspension and downstream migration of contaminants as construction progresses.
- A floating boom will be deployed around the pile cutting area to contain wood debris created during removal.

NMFS relied on the foregoing description of the proposed action, including all features identified to reduce adverse effects, to complete this consultation. To ensure that this draft Opinion remains valid, NMFS requests that the action agency or applicant keep NMFS informed of any changes to the proposed action.

## Action Area

Action area means 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). For this consultation, the action area includes the project footprint, the riverbed, and the riverbank west to the proposed top of bank along the Willamette River between river miles 13.6 and 14.2. The footprint of the project area ranges from 70 feet to 850 feet wide (east-west) and is 3,095 feet long (north-south), extending from just off the north end of Ross Island to just upriver of the Marquam Bridge. Furthermore, due to the flow and tidal influences in the lower Willamette River, the action area includes the river extending 1,500 feet downstream of the project area and 1,500 feet upstream of the project area. These numbers are based on the possible extent of turbidity and contaminant dispersion that the COE expects during construction with the use of the control measures described above.

The ESA-listed species described in Table 1 use the action area for adult migration, and juvenile rearing and migration. Critical habitat has been designated for all species in Table 1 except for LCR coho salmon. The action area is designated EFH for Chinook salmon and coho salmon (PFMC 1999), and is an area where the environmental effects of the proposed action may adversely affect EFH of those species.

**Table 1.** Federal Register notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation. Listing status: ‘T’ means listed as threatened under the ESA.

Species	Listing Status	Critical Habitat	Protective Regulations
<b>Chinook salmon (<i>Oncorhynchus tshawytscha</i>)</b>			
Lower Columbia River	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Willamette River	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
<b>Coho salmon (<i>O. kisutch</i>)</b>			
Lower Columbia River	T 6/28/05; 70 FR 37160	Not applicable	6/28/05; 70 FR 37160
<b>Steelhead (<i>O. mykiss</i>)</b>			
Lower Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Willamette River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

## ENDANGERED SPECIES ACT BIOLOGICAL OPINION

Section 7(a)(2) of the ESA requires Federal agencies to consult with NMFS to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The Opinion that follows records the results of the interagency consultation for this proposed action.

To complete the jeopardy analysis presented in this draft Opinion, NMFS reviewed the status of each listed species<sup>2</sup> considered in this consultation, the environmental baseline in the action area, the effects of the action, and cumulative effects (50 CFR 402.14(g)). From this analysis, NMFS determined whether effects of the action were likely, in view of existing risks, to appreciably reduce the likelihood of both the survival and recovery of the affected listed species.

For the critical habitat adverse modification analysis, NMFS considered the status of the entire designated area of the critical habitat considered in this consultation, the environmental baseline in the action area, the likely effects of the action on the function and conservation role of the affected critical habitat, and cumulative effects. NMFS used this assessment to determine whether, with implementation of the proposed action, critical habitat would remain functional, or retain the current ability for the primary constituent elements (PCEs) to become functionally established, to serve the intended conservation role for the species.<sup>3</sup>

If the action under consultation is likely to jeopardize the continued existence of an ESA-listed species, or destroy or adversely modify critical habitat, NMFS must identify any reasonable and prudent alternatives for the action that avoid jeopardy or destruction or adverse modification of critical habitat and meet other regulatory requirements (50 CFR 402.02).

### **Status of the Species and Critical Habitat**

The summaries that follow describe the status of the ESA-listed species, and their designated critical habitats, that occur within the geographic area of this proposed action and are considered in this Opinion. More detailed information on the status and trends of these listed resources, and their biology and ecology, can be found in the listing regulations and critical habitat designations published in the Federal Register (Table 1).

It is also likely that climate change will play an increasingly important role in determining the abundance of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. During the last century, average regional air temperatures increased by 1.5°F, and increased up to 4°F in some areas (USGCRP 2009). Warming is likely to continue during the next century as average temperatures increase another 3 to 10°F (USGCRP 2009). Overall, about one-third of the current cold-water fish habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (USGCRP 2009).

Precipitation trends during the next century are less certain than for temperature but more precipitation is likely to occur during October through March and less during the summer, and more of the winter precipitation is likely to fall as rain rather than snow (ISAB 2007, USGCRP 2009). Where snow occurs, a warmer climate will cause earlier runoff so stream flows in late

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<sup>2</sup> An “evolutionarily significant unit” (ESU) of Pacific salmon (Waples 1991) and a “distinct population segment” (DPS) (Policy Regarding the Recognition of Distinct Vertebrate Population; 61 FR 4721, Feb 7, 1996) are both “species” as defined in section 3 of the ESA.

<sup>3</sup> Memorandum from William T. Hogarth to Regional Administrators, Office of Protected Resources, NMFS (November 7, 2005) (Application of the “Destruction or Adverse Modification” Standard Under Section 7(a)(2) of the Endangered Species Act).

spring, summer, and fall will be lower and water temperatures will be warmer (ISAB 2007, USGCRP 2009).

Higher winter stream flows increase the risk that winter floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (USGCRP 2009). Earlier peak stream flows will also flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and the risk of predation (USGCRP 2009). Lower stream flows and warmer water temperatures during summer will degrade summer rearing conditions, in part by increasing the prevalence and virulence of fish diseases and parasites (USGCRP 2009). Other adverse effects are likely to include altered migration patterns, accelerated embryo development, premature emergence of fry, and increased competition and predation risk from warm-water, non-native species (ISAB 2007).

The earth's oceans are also warming, with considerable interannual and inter-decadal variability superimposed on the longer-term trend (Bindoff *et al.* 2007). Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances (Scheuerell and Williams 2005, Zabel *et al.* 2006, USGCRP 2009). Ocean conditions adverse to salmon and steelhead may be more likely under a warming climate (Zabel *et al.* 2006).

**Status of the Species.** Over the past few decades, the sizes and distributions of the populations considered in this Opinion generally have declined due to natural phenomena and human activity, including the operation of hydropower systems, over-harvest, hatcheries, and habitat degradation. Enlarged populations of terns, seals, sea lions, and other aquatic predators in the Pacific Northwest have been identified as factors that may be limiting the productivity of some Pacific salmon and steelhead populations (Bottom *et al.* 2005, Fresh *et al.* 2005).

**LCR Chinook salmon.** The range of this species includes all naturally-spawned populations of Chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon, east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run Chinook salmon in the Clackamas River. Historical records of Chinook salmon abundance are sparse, but cannery records suggest a peak run of 4.6 million fish in 1883. Although fall-run Chinook salmon are still present throughout much of their historical range, they are still subject to large-scale hatchery production, relatively high harvest, and extensive habitat degradation. The spring-run populations are largely extirpated as a result of dams that block access to their higher-elevation habitat. Abundances largely declined during 1998-2000 and trend indicators for most populations are negative, especially if hatchery fish are assumed to have a reproductive success equivalent to that of natural-origin fish. However, 2001 and 2002 abundance estimates increased for most LCR Chinook salmon populations over the previous few years (Good *et al.* 2005).

Factors limiting recovery for LCR Chinook salmon are reduced access to spawning/rearing habitat in tributaries, hatchery impacts, loss of habitat diversity and channel stability in tributaries, excessive sediment in spawning gravel, elevated water temperature in tributaries, and harvest impacts on fall Chinook (NMFS 2005, NMFS 2006). The NMFS (2007) identified

degraded estuarine and nearshore habitat; floodplain connectivity, and function; channel structure and complexity; riparian areas and large wood; stream substrate, streamflow; fish passage; and harvest and hatchery impacts as the major factors limiting the recovery of this species.

LCR Chinook salmon in the action area are part of the Clackamas fall-run population. Based on a recent viability status report (McElhany *et al.* 2007), there are no reliable abundance data for this population, but estimates put the population in the “extirpated or nearly so” persistence category based on the minimum abundance threshold. There is no abundance or productivity evidence supporting the existence of a viable, natural-origin population in the Clackamas. This population is at significant risk based on the criteria for diversity, spatial structure, and abundance and productivity<sup>4</sup>. From the perspective of all viability criteria, LCR Chinook in Oregon are at high risk (McElhany *et al.* 2007). Habitat degradation in the basin has reduced the spatial distribution of suitable habitats for fall Chinook.

***UWR Chinook salmon.*** The UWR Chinook salmon includes seven populations of native spring-run populations above Willamette Falls and in the Clackamas River. All the populations are in a single stratum since they share a similar life history pattern (spring run) and a single ecozone (McElhany *et al.* 2003, Myers *et al.* 2006). All populations are present in the action area during some portion of the year.

Numbers of spring Chinook salmon in the Willamette River basin are extremely depressed (McElhany *et al.* 2007). Historically, the spring run of Chinook may have exceeded 300,000 fish (Myers *et al.* 2003). The current abundance of wild fish is less than 10,000 fish, and only two populations (McKenzie and Clackamas) have significant natural production. The UWR Chinook have been adversely affected by the degradation and loss of spawning and rearing habitat (loss of 30 to 40%) associated with hydropower development, and interaction with a large number of natural-spawning hatchery fish. Other limiting factors include altered water quality and temperature, lost and degraded floodplain connectivity and lowland stream habitat, and altered streamflow in the tributaries (NMFS 2005, NMFS 2006). The NMFS (2007) identified degraded floodplain connectivity and function, channel structure and complexity, riparian areas and large wood recruitment, water quality, fish passage, and hatchery impacts as the major factors limiting recovery of this species.

McElhany *et al.* (2007) analyzed the population criteria (diversity, spatial structure, and abundance and productivity) for UWR Chinook salmon and found that the risk of extinction is high. The Clackamas population exhibited the lowest extinction risk. However, five of the seven populations were clearly in the high risk category, and thus the ESU can be characterized as having a high risk of extinction.

Chinook salmon generally spawn and rear in mainstem reaches of large rivers such as the Willamette River and the Clackamas River. Juvenile Chinook salmon that have emerged from

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<sup>4</sup> McElhany *et al.* 2007 (Table 1) defines population risk as the following percentage probability of extinction in 100 years: “extinct or very high risk” has a 60-100% probability; “high risk” has a 25-60% probability; “moderate risk” has a 5-25% probability; “low or negligible risk” has a 1-5% probability; and “very low risk” has a >1% probability. At the ESU level, risk is described more generally from the perspective of all populations and viability criteria.

spawning sites in the Upper Willamette River watershed use the lower mainstem Willamette River and Columbia Slough through Portland for temporary rearing as they migrate to the ocean.

**LCR coho salmon.** This ESU includes 25 populations that historically existed in the Columbia River basin from the Hood River downstream (McElhany *et al.* 2007). The boundaries do not extend into the upper Willamette portion of the basin because Willamette Falls is a natural barrier to fall-migrating salmon and steelhead. In general, wild coho in the Columbia River basin have been in decline for the last 75 years. The number of wild coho returning historically was at least 600,000 fish (Chapman 1986). As recently as 1996, the total return of wild fish may have been as few as 400 fish (Chilcote 1999). Of the 25 historical populations, only the Clackamas and Sandy populations show direct evidence that coho production is not reproductively dependent on the spawning of stray hatchery fish (McElhany *et al.* 2007). However, in the last 5 years there has been an increase in the abundance of wild coho in the Clackamas and Sandy rivers, plus a reappearance of moderate numbers of wild coho in the Scappoose and Clatskanie rivers after a 10-year period in the 1990s when they were largely absent (McElhany *et al.* 2007).

The NMFS (2007) identified floodplain connectivity and function, degraded channel structure and complexity, degraded riparian areas and large wood recruitment, degraded stream substrate, degraded streamflows, degraded water quality, and harvest and hatchery impacts as the major factors limiting recovery of LCR coho salmon.

The Clackamas population would be the most likely population found in the action area. Based on a recent analysis, this population is most likely in the low risk category for abundance and productivity, although all the other populations are in the high or very high risk category (McElhany *et al.* 2007). Spatial structure scores are reduced because of significant habitat degradation in lower basin tributaries such as Johnson and Kellogg creeks, and other urbanized portions of the lower Willamette River, Multnomah Channel, and Sauvie Island. This habitat loss has reduced the population's diversity score. Despite this, the Clackamas population is the only population in Oregon's portion of the species that is most likely in the viable category, and the risk of extinction for LCR coho in Oregon remains high (McElhany *et al.* 2007).

**LCR steelhead.** This species includes all naturally spawning populations of steelhead in streams and tributaries of the Columbia River between, and including, the Cowlitz and Wind rivers in Washington, along with, and including, the Willamette River and Hood River in Oregon. Excluded are steelhead from the Upper Willamette River basin above Willamette Falls and steelhead from the Little and Big White Salmon rivers in Washington (NMFS 2004).

Five populations of winter steelhead and one population of summer steelhead exist in Oregon (McElhany *et al.* 2007). The population most likely to be present in the action area is the Clackamas River population, which is part of the Cascade winter stratum.

In general, wild steelhead numbers are depressed from historical levels but probably exist in most of their historical range, and all historical populations are believed to be extant. However, up until recent years, the presence of naturally spawning hatchery fish in most populations has been high (McElhany *et al.* 2007).

The Clackamas population is at low risk for abundance and productivity, although the future impacts of human population growth and climate change add a degree of uncertainty (McElhany *et al.* 2007). The Upper Clackamas River basin contains most of the historically-productive habitat, and most of that habitat is of high quality today. For the species, the overall risk classification for Oregon LCR steelhead is moderate, with the Clackamas population at the lowest risk.

Factors limiting recovery for LCR steelhead are degraded floodplain and stream channel structure and function, reduced access to spawning/rearing habitat, altered streamflow in tributaries, excessive sediment and elevated water temperatures in tributaries, and hatchery impacts (NMFS 2005, NMFS 2006). The NMFS (2007) identified degraded floodplain connectivity and function, channel structure and complexity, riparian areas and large wood recruitment, stream substrate, streamflow, water quality, fish passage and predation/competition as the major factors limiting recovery of this species.

***UWR steelhead.*** This species consists of four populations: the Molalla, North Santiam, South Santiam, and Calapooia. All populations of UWR steelhead migrate through and rear in the action area. These populations are depressed from historical levels, with adverse impacts from the alteration and loss of spawning and rearing habitat associated with hydropower development. Based on recent analyses of the population criteria, McElhany *et al.* (2007) concluded that the species risk of extinction is moderate, with the highest risk category being genetic diversity.

Habitat loss, hatchery steelhead introgression, and harvest are the major contributors to the decline of this species. Willamette Falls (RM 26.5) is a known migration barrier. Winter-run steelhead and spring-run Chinook salmon historically occurred above the falls, whereas summer-run steelhead, fall-run Chinook, and coho salmon did not. Detroit and Big Cliff dams have cut off access to 335 miles of spawning and rearing habitat in the North Santiam River. In general, habitat in this species has become substantially simplified since the 1800s by removal of large wood to increase the river's navigability.

The NMFS (2007) identified degraded floodplain connectivity and function, channel structure and complexity, riparian areas and large wood recruitment, streamflow, fish passage, and predation/competition and disease as the major factors limiting recovery of this species.

**Status of Critical Habitat.** Climate change, as described in the introduction above, is likely to adversely affect the conservation value of designated critical habitats in the Pacific Northwest. These effects are likely to include, but are not limited to, depletion of cold water habitat and other variations in quality and quantity of tributary spawning, rearing and migration habitats and estuarine areas.

The NMFS has designated critical habitat for all species considered in this Opinion, except LCR coho salmon, for which critical habitat has not been proposed or designated. To assist in the designation of salmonid critical habitat in 2005, NMFS convened critical habitat review teams (CHARTs), organized by major geographic areas that roughly correspond to salmon recovery planning domains. Each CHART consisted of Federal biologists and habitat specialists from

NMFS, the Fish and Wildlife Service, the Forest Service, and the Bureau of Land Management, with demonstrated expertise regarding salmon and steelhead habitat and related protective efforts within that domain.

In designating these critical habitats, NMFS organized information at the scale of the watershed or 5<sup>th</sup> field hydrologic unit code (HUC5) because that scale largely corresponds to the spatial distribution and site fidelity of Pacific salmon and steelhead populations (WDF *et al.* 1992, McElhany *et al.* 2000). The NMFS reviews the status of designated critical habitat affected by the proposed action by examining the condition and trends of PCEs throughout the designated area. The action area was rated as high value due to its location in a rearing and migration corridor. PCEs consist of the physical and biological features identified as essential to the conservation of the listed species in the documents that designate critical habitat. The PCEs found at the project site are freshwater rearing and freshwater migration (Table 2).

The value of critical habitat for these species in the Lower Willamette River is limited by poor water quality, altered hydrology, lack of floodplain connectivity and shallow-water habitat, and lack of complex habitat to provide forage and cover. The action area is in an urban area where the habitat has been degraded due to past land use practices including stormwater runoff and industrial and urban development.

**Table 2.** PCEs of critical habitats designated for ESA-listed salmon and steelhead species considered in the Opinion and corresponding species life history events.

Primary Constituent Elements		Species Life History Event
Site Type	Site Attribute	
Freshwater rearing	Floodplain connectivity Forage Natural cover Water quality Water quantity	Fry emergence from gravel Fry/parr/smolt growth and development
Freshwater migration	Free of artificial obstruction Natural cover Water quality Water quantity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration

### Environmental Baseline

The environmental baseline includes 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). NMFS (2008) provides an example of one aspect of the environmental baseline for the Lower Willamette River. For more details about the environmental baseline in the action area refer to Section 4 of the BA.

Since 1850, both primary channel and side channels have been lost in the Lower Willamette River (Gregory 2002). Much of the off-channel and beach type habitat has been lost over the years due to development and channelization. With development comes clearing of riparian vegetation and direction of stormwater to the river. Much of the sediment trying to move downstream in the Willamette River is blocked by dams. These river changes contribute to the limiting factors identified for ESA-listed species using the action area.

The Willamette River is approximately 1,400 feet wide and approximately 45 feet deep in the action area. The banks in the action area are comprised of numerous commercial and industrial facilities. Remnant riparian vegetation communities on both banks are highly disturbed and dominated by invasive species. The portion of the Willamette River that the project is in is currently on Oregon's 303(d) list because it does not meet water quality standards for multiple contaminants, biological criteria and bacteria (DEQ 2009).

### **Species Within the Action Area**

The action area in the Willamette is downstream of the Clackamas River and Johnson Creek watersheds. The Clackamas River is the natal stream for populations of UWR Chinook, LCR Chinook, LCR steelhead and LCR coho. Johnson Creek is the natal stream for LCR Chinook and coho. NMFS expects that many fish rearing in the action area are likely to have been produced in these two Lower Willamette River tributaries.

Additionally, those fish produced in the upper river, above Willamette Falls, migrate through the action area. According to a 2005 study (Friesen 2005), Chinook in the action area are subyearlings from lower basin tributaries, such as the Clackamas River, and larger yearlings are from the upper basin tributaries, such as the Santiam River. Since the Willamette River is a migratory corridor, both adult and juvenile life history stages are expected to be in the action area. During the proposed in-water work window, it is likely that juveniles of all species will be present and Chinook adults will be migrating upstream.

Individuals in the action area are exposed to reduced water quality, lack of suitable habitat and restricted movement due to developed urban areas and land use practices. These stressors already exist and are in addition to any adverse effects produced by the proposed action.

### **Critical Habitat Within the Action Area**

The action area is in a developed urban area. The function and conservation value of PCEs in the action area are characterized by reduced water quality, a multitude of fish barriers, insufficient riparian areas and lack of floodplain and habitat complexity. The proposed project would be within and adjacent to a shallow water area that includes some areas with beach-type habitat. As reported in a Lower Willamette River study (Friesen 2005), beach areas provide important habitat for ESA-listed fish and seem to be the preferred nearshore habitat type for juvenile coho. A primary recommendation of this multi-year study is to protect existing beach habitat. Additional development in or loss of beach and shallow water areas in the action area will reduce the conservation value of PCEs in those areas for rearing and migration.

## **Effects of the Action**

Effects of the action refers to the direct and indirect effects of an action on the species or critical 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). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

The effects of the proposed project include adverse effects associated with construction activities (disturbance and entrainment of fish from dredging and excavation, increased contaminants and suspended sediments, removal of prey items, and the removal of riparian vegetation) and beneficial post-construction effects (reduction of contaminants due to their removal and isolation under the cap, reduction of shading due to removal of pilings and over-water structures, an improved riparian area from native plantings over time, and the potential adverse effect of reduction in quality of habitat due to additional armor placement below ordinary high water if that armor does not remain covered with gravel).

**Effects from Dredging and Excavation.** The proposed dredging and excavation will cause suspension of sediments and contaminants in the water column, and the removal of prey items and riparian vegetation. There is also a small risk of fuel or other contaminant leaks from equipment used for dredging and excavation. These effects are discussed in the paragraphs below.

**Effects from Suspended Sediments and Contaminants.** The proposed in-water work will increase turbidity and suspended sediment in the Willamette River. The increases in turbidity and suspended solids will be short term (weeks to months) during construction, localized, and minimized where possible by turbidity curtains.

Contaminants of ecological concern that are likely to be present in the sediments in the action area include PCBs, polycyclic aromatic hydrocarbons (PAHs), tributyltin (TBT), and metals (antimony, cadmium, chromium, copper, lead, mercury, nickel and zinc). Toxicological effects from these pollutants are dependent on their concentration, composition and environmental condition. The concentration of contaminants in the water column will increase along with the suspended sediment caused by dredging, excavation and capping, thus increasing the exposure of salmonids and their prey species to these toxins. In addition, the concentration of dissolved contaminants will increase due to disturbance of the substrate for those contaminants that have a dissolved fraction. Consequently, elevated concentrations of both dissolved and particulate contaminants are possible downstream or upstream from in-water work, depending on the tidal stage during the activity. The increases in suspended sediment and particulate and dissolved contaminants are likely to remain elevated within the proposed action area for up to 24 hours following in-water work. Therefore, suspended sediment and contaminant concentration may remain elevated throughout the dredging, excavation and capping activities. The pile removal is unlikely to cause additional suspended sediment and contaminants because the piles will be cut off at the mud line, not below it, to avoid mobilization of contaminants. In the unlikely event of a

fuel or contaminant leak, measures will be taken to immediately remove the equipment from the water, repair it, and clean up any contaminants according to the pollution control plan.

The long-term (years), contaminant-related effects of this action will be beneficial because of the removal of contaminated sediments and the isolation of sources of contamination to the river. If the cap is disturbed after construction is completed, the isolated contaminants may move into the surface of the sediment or into the water column. Institutional controls, such as conservation easements or vessel speed and approach restrictions, will help ensure the cap is not disturbed and maintains its integrity over the long term.

**Effects to the Prey Base.** Increased suspended sediment and contaminants during in-water work will disturb the planktonic prey organisms of salmonids in the dredging area, and this effect will last for up to 24 hours following the in-water activities. It is unlikely that numeric changes in the pelagic community will be measurable following in-water work because of the flow-induced movements of these animals, and their transient presence in the action area. Thus, prey items within the action area will be disturbed during in-water work, but the effects are not expected to be measurable afterwards. Despite the potential for increased contaminant exposure to the pelagic prey base of salmonids, it is unlikely that changes in contaminant loading in the pelagic community will be measurable as a consequence of the proposed action, again because of the flow-induced movements of these animals, and their transient presence in the action area.

The temporal extent of disruption to benthic prey in the action area during and following dredging, excavation and capping will be longer. The benthic invertebrate populations will be removed (dredging, excavation) or buried under the cap (fish are unlikely to be buried because they will swim away from the disturbance). The area will gradually be recolonized, but the effects to benthic productivity and availability of prey items will last at least several months after the cap is completed. In addition, the placement of large angular rock armor over the cap will likely change the availability, composition and productivity of the benthic community at the site over the long term. The placement of rounded gravel over much of the rock armor will minimize this effect.

**Effects from Removal and Replanting of Riparian Vegetation.** Streambank excavation is likely to result in the removal of all current riparian vegetation, much of which is invasive, but a small amount of which is native. Removal of riparian vegetation is reasonably certain to result in a temporary reduction of (poor quality) habitat for forage resources and foraging, resting, and high flow refuge until the riparian area is replanted and re-established. This will likely take several years. In addition, removal of riparian vegetation is reasonably certain to slightly degrade water quality by increasing water temperature within the action area; however, because of the size of the Lower Willamette River and the current degraded riparian conditions, water temperature effects will likely not change to a degree that will be detectable or measurable.

According to the BA, over the long term (years), the riparian portion of the action area will be improved by planting native vegetation, some of which will be seasonally submerged and create habitat complexity, shade and large wood recruitment potential.

**Effects from Removal of In-water and Over-water Structures.** The proposed action will result in the removal of in-water and over-water structures. An additional 0.05 acres of habitat will be uncovered due to the removal of 2,200 piles, and the removal of a moored crane barge, floating dock and gangway will reduce shading over an additional 0.41 acres. Shading from docks and other over-water structures may reduce juvenile salmonid prey organism abundance and the complexity of the habitat by reducing aquatic vegetation and phytoplankton abundance (Kahler *et al.* 2000, Carrasquero 2001), as well as increase the presence and success of salmonid predators.

**Effects of Aquatic Habitat Modification (Placement of Rock Armor).** Large, angular rock armor (riprap) will be permanently placed below ordinary high water in the action area to stabilize the cap, ensuring it remains in place over the long term. Riprap used in streambank stabilization projects has deleterious effects to the functioning stream environment. Negative impacts from riprap to the stream environment include hardening the streambank, resulting in halted channel migration; disconnecting the stream from the floodplain and adjacent wetlands; creating a smooth surface along the streambank thereby increasing water velocities (Sedell *et al.* 1990); changes in hydrology, morphology, and water quality of a stream (Bolton and Schellberg 2001); increased potential for downstream erosion and erosion at the revetment/streambank interface (USFWS 2004; Larsen and Greco 2002); decrease in large wood recruitment to the stream; altered riparian habitat succession (Fischenich 2003); disruption of invertebrate communities; and simplifying the stream and reducing fish habitat complexity. Placement of riprap bank protection may also cause an increase in the predators of ESA-listed salmonids such as smallmouth bass.

The shallow-water areas (defined as the areas between ordinary high water and -17 feet COP datum) affected by the riprap placement are important habitat for rearing and migration of the ESA-listed species considered in this Opinion, especially juveniles (Friesen 2005). However, the current habitat in the action area is mostly of low quality, and the placement of gravel over much of the riprap that will armor the cap will minimize the effects of the armor placement so that after construction of the cap there will be no net increase in riprap on the surface due to the proposed action. The gravel placed over the riprap armor, along with the entire cap, will be monitored over time so that if it does not stay in place, consultation will be reinitiated so that other measures to improve fish habitat can be taken.

### **Species Within the Action Area**

Rearing and migrating juveniles are likely to be in the action area year round. In the Willamette River, upstream migrating Chinook adults are likely to be present in July and upstream migrating coho adults are likely to be present in October. All in-water work will take place during the work window and the effects to species within in the action area have been evaluated based on the presence of ESA-listed species during the in-water work window.

1. Embryos and alevins
  - a. Incubation – no incubation occurs in the action area.
  - b. Emergence – no emergence occurs in the action area.

## 2. Juveniles

- a. Rearing – juveniles rearing in the action area during dredging, excavation or capping will likely experience entrainment or disturbance from the in-water work, increased exposure to suspended sediments and contaminants during construction, reduced feeding due to the removal and burial of prey items, and impacts from the removal of riparian vegetation and in-water and over-water structures. These effects are discussed below.

Entrainment of migrating and rearing fish by dredging equipment occurs when fish are trapped during the uptake of sediments and water by dredging machinery, which can cause injury or death. The probability of entrainment is largely dependent upon the likelihood of fish occurring within the dredging prism, fish densities, dredging depth, the entrainment zone, location of dredging within the river, equipment operations, time of year, and the species' life stage. Low densities of ESA-listed salmonids are likely to be present during dredging, although the species composition of the community will change depending on when during the work window the dredging takes place. Fish are likely to be transitory in the entrainment zone, and the limited area of dredging and excavation lowers the likelihood of fish entrainment, as does the deployment of localized turbidity curtains around areas to be dredged or excavated and the type of equipment selected for use. However, based on the near shore proximity of dredging operations, and previous evidence that dredging operations in the lower Columbia River will entrain juvenile salmon and steelhead (Larson and Moehl 1990, R2 Resources Consultants 1999 as cited in NMFS 2002), the proposed action is likely to harm some migrating and rearing juvenile salmon and steelhead. Additionally, during the placement of turbidity curtains, some fish may be trapped and unable to escape the conditions in the immediate work area; however, measures such as carefully moving the curtains out away from the shore should mitigate risk of entrapment.

Juvenile salmon and steelhead will be less able than adults to swim around the disturbances caused by in-water work and their movements may be delayed. If they are delayed in areas with suitable cover and forage opportunities, then the delay will likely be energetically neutral; however, if cover and forage are less available, then the delay will mean greater risk of predation, increased exposure to contaminants, and energetic costs associated with poor food availability and swimming in the current. These effects will likely lead to injury to a few individuals in the action area during in-water work.

ESA-listed salmonids in the action area during in-water work will be exposed to increased suspended sediment and turbidity downstream from the dredging, excavation and cap placement. The effects of suspended sediment and turbidity on fish, as reported in the literature, range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been hypothesized to enhance cover conditions, reduce predation on salmonids, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental

effects of TSS on fish are the frequency and the duration of the exposure, not just the TSS concentration. At concentrations of 53 to 92 parts per million (ppm) (24 hours) macroinvertebrate populations were reduced (Gammon 1970). Concentrations of 250 ppm (1 hour) caused a 95% reduction in feeding rates in juvenile coho salmon (Noggle 1978). Concentrations of 1,200 ppm (96 hours) killed juvenile coho salmon (Noggle 1978). Concentrations of 53.5 ppm (12 hours) caused physiological stress and changes in behavior in coho salmon (Berg and Northcote 1985). It is not known what levels of suspended sediment and turbidity will be present in the action area during construction, but any effects on ESA-listed salmonids in the action area during construction will likely trigger similar effects to those described above. Some of these effects are likely to lead to injury.

Of the pollutants that the ESA-listed salmonids will be exposed to along with the suspended sediment during in-water work, PCBs appear to have the most ecological risk to benthic organisms, fish, and other aquatic life. PCBs are present in the sediment at varying concentrations, exceeding 6,760 µg/kg in some “hot spots” within the action area. PCBs have been identified as a carcinogen, bioaccumulate through the food chain, and are linked to liver, stomach and thyroid damage, and immune disorders in fish (Meador *et al.* 2001). Working during the summer when the fewest ESA-listed species are present and use of turbidity curtains around hot spots will reduce the exposure of these species to contaminants. Still, some individuals may be harmed by exposure to contaminants during in-water work.

The removal or burial of salmonid prey items during in-water work may have effects such as reduced growth on juvenile salmonids rearing or migrating through the action area during and following in-water work. The disturbance to the benthic community at the site likely will not alter feeding opportunities for salmonids in the lower river as a whole, so very few ESA-listed salmonids will likely be injured from lack of prey in the action area.

Removal of riparian vegetation is reasonably certain to result in a temporary reduction of (poor quality) habitat for forage resources and foraging, resting, and high flow refuge for juvenile ESA-listed salmonids until the riparian area is replanted and re-established. This will likely take several years. According to the BA, over the long term (years), the riparian portion of the action area will be improved by planting native vegetation, some of which will be seasonally submerged and create habitat complexity, shade and large wood recruitment potential. This will improve the ability for juvenile ESA-listed salmonids to forage, rest and seek refuge from stronger currents in the action area.

The removal of in-water and over-water structures will likely have a beneficial effect on ESA-listed salmonids by reducing shading from in-stream and over-water structures. This shade plays an important role in predation success on ESA-listed salmonids. Shadows of in-water and over-water structures allow ambush

predators to remain in darkened areas, barely visible to prey, and watch for prey to swim by against a bright background (high visibility). Prey species moving around structures are unable to see predators in dark areas under or beside structures and thus are more susceptible to predation. In studies on smallmouth bass, ambush cover and low light intensities increased foraging efficiency for predators (Bevelhimer 1996). In-water and over-water structures are known to benefit fish species that prey on juvenile salmon and steelhead. Juvenile fish abundance has been found to be reduced under piers and overwater structures when compared to open water or areas with piles but no overwater structures (Able *et al.* 1998), likely due to limitations in prey abundance and increased prey capture under structures.

The adverse effects described above will be short term (weeks to months, except for the effects of riparian vegetation removal) and most individuals will likely be able to avoid the area. Over the long term (years), juveniles rearing in the action area will likely benefit from the removal of structures in the water (such as the pilings) that can delay migration and over the water that can increase predation, and the improvement in water quality due to the removal and isolation of contaminants. Over time, increased native riparian plantings will likely improve refuge habitat for rearing juveniles by increasing large wood recruitment and habitat complexity in the riparian area.

- b. Migration –juveniles migrating through the action area during dredging, excavation or capping activities will likely experience entrainment, harassment and migration delays from the in-water work, increased exposure to suspended sediments and contaminants during construction, and impacts from the removal of riparian vegetation and in-water and over-water structures. These effects are described more fully in the juvenile rearing section above. The effects will be short term (weeks to months) and most individuals will likely be able to avoid the area. Over the long term, juveniles migrating through the action area will benefit from the removal of structures in the water (such as the pilings) that can delay migration and over the water that can increase predation, and the long-term improvement in water quality due to the removal and isolation of contaminants.
- c. Smoltification – no smoltification occurs in the action area.

### 3. Adults

- a. Sub-adult growth and development – this life stage is not present in the action area.
- b. Upstream migration and holding –adults migrating or holding in the action area during dredging, excavation or capping activities may experience entrainment, harassment or migration delays from the in-water work, increased exposure to suspended sediments and contaminants during construction, and impacts from the removal of riparian vegetation. These effects are described more fully in the juvenile rearing section above. The effects will be short term (weeks to months)

and any adults migrating through will likely be able to avoid the area. Over the long term, adults will benefit from the removal of structures in the water (such as the pilings) that can delay migration and the long-term improvement in water quality due to the removal and isolation of contaminants.

- c. Spawning – no spawning occurs in the action area.
- d. Seaward migration (steelhead) – steelhead kelts migrating or holding in the action area during dredging, excavation or capping activities may experience harassment or migration delays from the in-water work, increased exposure to suspended sediments and contaminants during construction, and impacts from the removal of riparian vegetation. These effects are described more fully in the juvenile rearing section above. The effects will be short term (weeks to months) and any kelts migrating through will likely be able to avoid the area. Over the long term, they will benefit from the removal of structures in the water (such as the pilings) that can delay migration and the long-term improvement in water quality due to the removal and isolation of contaminants.

As stated above, when they are present adult fish will likely avoid the dredging, excavation and capping areas. Juvenile salmon are more likely to be affected because they are less able to swim away from in-water disturbances. Therefore, some juvenile salmonids will likely suffer increased physiological stress, reduced feeding, or other changes in behavior such as avoidance or delayed migration, which are likely to impair growth, reduce lipid stores, and increase the likelihood of mortality.

### **Critical Habitat Within the Action Area**

Designated critical habitat within the action area for the ESA-listed salmon and steelhead considered in this Opinion consists of a freshwater rearing site and freshwater migration corridor and their essential physical and biological features, also known as primary constituent elements (PCEs), as listed below. The effects of the proposed action on these features are summarized below. The action area is not in a freshwater spawning area, nearshore marine area or offshore marine area. Therefore, only freshwater rearing and migration PCEs will be discussed.

- 1. Freshwater rearing
  - a. Floodplain connectivity –The current limited connection to floodplain will be maintained.
  - b. Forage– increased suspended sediment and dredging, excavation and capping will temporarily reduce food resources for juvenile salmonids in the action area, but impacts to the forage base from construction will only occur during and immediately following dredging, excavation and capping. Impacts to benthic forage organisms from the placement of large rock to armor the cap will be long term and will likely change the availability, composition and productivity of the benthic community at the site. Effects to forage and foraging habitat are also likely to occur from riparian vegetation removal. Currently, the riparian zone in

the action area is in poor condition; however it still functions to provide habitat for salmonid forage species. Removing riparian habitat is reasonably certain to reduce the species diversity and abundance of forage species within the action area until newly planted riparian species are established. Pelagic feeding opportunities for juvenile listed salmonids are not limiting at the watershed scale, and should improve in the action area once the newly planted riparian area becomes established.

- c. Natural cover –there will be a temporary increase in cover due to suspended sediments in the water column during in-water work and temporary decrease in cover due to the removal of riparian vegetation until newly planted vegetation becomes established. The establishment of newly planted vegetation could take anywhere from months to decades after the completion of the proposed action, depending on the type of vegetation. The loss of functioning natural cover until new plantings are established means the loss of foraging, resting, and refuge habitats that salmonids use to maximize growth and avoid predators. Eventually, the new native riparian plantings will likely increase the conservation value of this PCE, although the increase in value may be limited in some areas by the rock armor layer, even if it is buried under gravel.
- d. Water quality –elevated concentrations of both dissolved and particulate contaminants are likely downstream or upstream from the action area, depending on the tidal stage, and the increases in suspended sediment and particulate and dissolved contaminants are likely to remain elevated within the action area throughout the period of dredging, excavation and capping. These short-term (weeks to months), localized effects will only temporarily reduce the conservation value of this PCE. Over the long term (years), water quality in the action area should be improved because of the removal of the contaminated sediments from the river and the isolation of contaminant sources.
- e. Water quantity –no effect.

## 2. Freshwater migration

- a. Free of artificial obstruction –migration will likely be delayed during in-water activities. Removal of in-water structures may decrease migration delays over the long term (years).
- b. Natural cover – there will be a temporary increase in cover due to suspended sediments in the water column during in-water work and a temporary decrease in cover due to the removal of riparian vegetation until newly planted vegetation becomes established. The establishment of newly planted vegetation could take anywhere from months to decades after the completion of the proposed action, depending on the type of vegetation. The loss of functioning natural cover until new plantings are established means the loss of foraging, resting, and refuge habitats that salmonids use to maximize growth and avoid predators. Eventually, the new native riparian plantings will likely increase the conservation value of this

PCE, although the increase in value may be limited in some areas by the rock armor layer, even if it is buried under gravel.

- c. Water quality –elevated concentrations of both dissolved and particulate contaminants are likely downstream or upstream from the action area, depending on the tidal stage, and the increases in suspended sediment and particulate and dissolved contaminants are likely to remain elevated within the action area throughout the period of dredging, excavation and capping. These short term (weeks to months), localized effects will only temporarily reduce the conservation value of this PCE. Over the long term (years), water quality in the action area should be improved because of the removal of the contaminated sediments from the river and the isolation of contaminant sources.
- d. Water quantity –no effect.

The proposed action is likely to cause minor, localized and temporary degradation of critical habitat PCEs for water quality, forage, natural cover and freedom from artificial obstruction due to in-water work. Long-term effects to PCEs include improvements to water quality and freedom from artificial obstruction. Based on the most recent study of the Lower Willamette River (Friesen 2005), shallow-water, beach-type habitat was preferentially selected by juvenile salmon. This type of habitat is limiting at the reach and watershed scales. The proposed project would affect this type of habitat by placing angular rock armor below ordinary high water. However, the current habitat in the action area is mostly of low quality, and the placement of gravel over much of the angular rock that will armor the cap will minimized the effects of the armor placement so that after construction of the cap there will be no net increase in riprap on the surface due to the proposed action.

### **Cumulative Effects**

Cumulative effects are 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). NMFS expects development to continue as the population in the action area continues to grow.

Future land use consistent with the South Waterfront Plan is a category of actions that are reasonably certain to occur within the action area: NMFS is aware that the property adjacent to the Willamette River action area on the west side is planned for development of large residences, office buildings, road expansions, waterfront trails and recreation areas. These developments are likely to result in additional stormwater runoff, floodplain fill and reduced riparian vegetation due to trails and infrastructure.

## **Synthesis and Integration of Effects**

### **Species at the Population Scale**

All adult UWR Chinook salmon and UWR steelhead must migrate through the action area to the Upper Willamette River basin and all juvenile UWR Chinook salmon and UWR steelhead must migrate from the Upper Willamette River basin to the ocean through the action area. The LCR Chinook, LCR steelhead and LCR coho individuals in the action area are likely to be from the Clackamas River populations and must also pass through the action area as juveniles and adults.

The current extinction risk for UWR Chinook salmon is very high and the recovery goal for the extinction risk is very low. The current extinction risk for UWR steelhead is low and the recovery goal for the extinction risk is very low. The current extinction risk for the Clackamas River population of LCR Chinook salmon is very high and the recovery goal for the extinction risk is medium. The current extinction risk for the Clackamas River population of LCR coho salmon is medium and the recovery goal for the extinction risk is very low. The current extinction risk for the Clackamas River population of LCR steelhead is medium and the recovery goal for the extinction risk is low. The Clackamas River population is identified as a “core” population. In order to meet the ESU-viability criteria, representative populations, such as the Clackamas River population, need to achieve viability criteria or be maintained (ODFW 2010).

The environmental baseline is such that individual ESA-listed salmonids in the action area are exposed to reduced water quality, lack of suitable riparian and aquatic habitat and restricted movement due to developed urban areas and land use practices. These stressors already exist and are in addition to any adverse effects produced by the proposed action. Major factors limiting recovery of the ESA-listed salmonids considered in this Opinion include degraded estuarine and nearshore habitat; degraded floodplain connectivity and function; channel structure and complexity; riparian areas and large wood recruitment; stream substrate, streamflow; fish passage; water quality; harvest and hatchery impacts; predation/competition; and disease (NMFS 2007).

The effects of the proposed action on the factors limiting recovery for the ESA-listed salmonids considered in this Opinion include a temporary reduction in water quality in the action area from the increase in contaminants and suspended sediment during construction. The reduction in water quality will be short term (weeks to months) during dredging, excavation and construction of the cap. Because these effects are relatively brief and small in scale, survival and recovery of ESA-listed salmonids will not be affected by these short-term effects. Over the long term (years to decades), water quality will improve because of the removal and containment of contaminants due to the proposed action.

Another limiting factor affected by the proposed action is riparian areas and large wood recruitment. Removal of the mostly invasive riparian vegetation at the site to construct the cap will result in a temporary reduction of (poor quality) habitat for forage resources and foraging, resting, and high flow refuge for juvenile ESA-listed salmonids until the riparian area is replanted and re-established. This will likely take several years. Over the long term (years to decades), the riparian portion of the action area will be somewhat improved by the proposed planting and maintaining of native vegetation (including trees) in the riparian area, some of

which will be seasonally submerged and create habitat complexity, shade and large wood recruitment potential. This will somewhat improve the ability for juvenile ESA-listed salmonids to forage, rest and seek refuge in the action area.

Two other major factors limiting recovery that will be affected by the proposed action are stream substrate and predation/competition. The removal of in-water and over-water structures will likely have a beneficial effect on ESA-listed salmonids by reducing shading. Shade plays an important role in predation success on ESA-listed salmonids. In-water and over-water structures are known to benefit fish species that prey on juvenile salmon and steelhead. Stream substrate will be affected by the armoring of the cap, which will involve the placement of large angular rock over areas below ordinary high water that previously had smaller substrates, such as sand and gravel, that provide important habitat for rearing and migration of the ESA-listed species considered in this Opinion, especially juveniles. Riprap used in streambank stabilization projects has deleterious effects to the functioning stream environment and reduces fish habitat complexity. Placement of riprap bank protection may also cause an increase in the predators of ESA-listed salmonids such as smallmouth bass. However, the current habitat in the action area is mostly of low quality, and the placement of a gravel cover over much of the riprap that will armor the cap will minimize the adverse effects of the armor so that after construction of the cap there will be no net increase in riprap on the surface due to the proposed action. The gravel placed over the riprap armor will be monitored over time so that if it does not stay in place, consultation will be reinitiated so that other measures to improve fish habitat can be taken.

Cumulative effects, such as land use consistent with the South Waterfront Plan, are likely to negatively affect some of the same limiting factors affected by the proposed action. However, as long as the gravel stays in place over the additional rock being placed to armor the cap, the long-term effects of the proposed action (reduced exposure to contaminants, increased quality of riparian areas, reduced predation from the removal of in-water and over-water structures) will be beneficial to the ESA-listed salmonids that use the action area. In addition, the applicant has proposed to complete all in-water work during the preferred summer in-water work window which will reduce the short-term adverse effects from construction to adult and juvenile ESA-listed salmonids that migrate and rear in the action area by scheduling work when salmon presence is low. However, the excavation, dredging, capping and pile removal are still likely to result in stress, injury or death of some individuals in the action area. Most of the fish will incur short-term stress due to construction of the cap and associated in-water work. Any non-lethal stress experienced by individual fish is likely to be brief (weeks). A few fish may be injured or killed by the culmination of joint causes, such as a previous wound acquired from exposure to the environmental baseline and genetic weakness.

The few adults and juveniles that are likely to be injured or killed due to the action are too few to affect the abundance or productivity of any affected population or to appreciably reduce the likelihood of survival and recovery of any listed species. Therefore, the proposed action will not reduce the productivity or survival of the affected populations of LCR Chinook salmon, UWR Chinook salmon, LCR steelhead, UWR steelhead or LCR coho salmon, even when combined with a degraded environmental baseline and additional pressure from cumulative effects.

## **Critical Habitat at the Watershed Scale**

The value of critical habitat for these species in the Lower Willamette River is limited by poor water quality, altered hydrology, lack of floodplain connectivity and shallow-water habitat, and lack of complex habitat to provide forage and cover. The action area is in an urban area where the habitat has been degraded due to past land use practices including stormwater runoff and industrial and urban development. Despite this, the PCEs in the action area provide a high and medium conservation role for LCR Chinook salmon, LCR steelhead, UWR Chinook salmon, and UWR steelhead.

The same effects of the proposed action that will have an effect on ESA-listed salmon and steelhead will also have an effect on critical habitat PCEs for salmon and steelhead. The proposed action is likely to result in the temporarily reduced conservation value of critical habitat in the action area during construction as well as beneficial, long-term effects from the removal and containment of contaminants, pilings and other debris, decreasing slopes and increased native riparian plantings. The permanent modification of shallow-water habitat through armoring of the cap will have an adverse effect on its conservation value, however this effect will be minimized by the placement of gravel over much of the armor, which will be monitored to make sure the gravel stays in place.

To offset the impacts of modifying shallow water habitat at the site, contaminants will be removed or contained, slopes decreased, a stormwater outfall will be decommissioned, the riparian area will be improved through plantings of native species some of which will be seasonally submerged, and shoreline debris will be removed. In addition, as part of the proposed action, 2,200 derelict piles, dock stringers, a gangway and a floating dock will be removed from shallow-water habitat in the Lower Willamette River to benefit migrating and rearing ESA-listed species.

The effects of this action will not lower the value of the necessary habitat attributes in the action area, and may actually increase the conservation value of the action area over the long term. At the watershed scale, the proposed action will not increase the extent of degraded habitat within the basin, add to the degradation of water quality, or further decrease limited rearing areas or limit access to rearing habitat. Even when cumulative effects are included, the proposed action will not reduce the conservation value of critical habitat at the watershed scale. Critical habitat for LCR Chinook salmon, LCR steelhead, UWR Chinook salmon, and UWR steelhead will remain functional, or retain the current ability for the PCEs to become functionally established, to serve the intended conservation role for the species.

## **Conclusion**

After reviewing the status of LCR Chinook salmon, UWR Chinook salmon, LCR steelhead, UWR steelhead, and LCR coho salmon and designated critical habitats, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of LCR Chinook salmon, UWR Chinook salmon, LCR steelhead, UWR steelhead or LCR coho salmon

or result in destruction or adverse modification of designated critical habitats for LCR Chinook salmon, UWR Chinook salmon, LCR steelhead or UWR steelhead.

### **Incidental Take Statement**

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. 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 by NMFS as significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by Fish and Wildlife Service as an intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not prohibited under the ESA, provided that such taking is in compliance with the terms and conditions of an incidental take statement.

### **Amount or Extent of Take**

Actions necessary to construct the proposed cap will occur during the summer in-water work window when juvenile LCR Chinook salmon, UWR Chinook salmon, LCR coho salmon, LCR steelhead and UWR steelhead and adult Chinook and coho are likely to be present. These species use the action area in the Willamette River as a migratory and rearing corridor.

Adverse effects of the proposed action will include degradation of habitat due to armoring, the temporary loss of prey items for rearing juveniles, harassment from dredging and capping activities, and an increase in turbidity and pollutants during one in-water work window. These effects are reasonably likely to result in incidental take/harassment of adults and juveniles, and harm of juveniles (avoidance behaviors, impaired feeding, reduced growth) that will likely lead to injury within the action area.

Take caused by the habitat-related effects of this action cannot be accurately quantified as a number of fish. This is because the precise distribution and abundance of juvenile fish within the action area, at the time of the action and for many years to follow, are not a simple function of the quantity, quality, or availability of predictable habitat resources within that area. Rather, the distribution and abundance of fish within this action area also show wide, random variations due to biological and environmental processes operating at much larger demographic and regional scales. In such circumstances, NMFS uses the causal link established between the activity and a change in habitat conditions affecting the listed species to describe the extent of take as a numerical level of habitat disturbance.

The best available indicators for the extent of take are the area of the river to be used by ESA-listed salmonids as habitat that will be armored, the manner in which dredging occurs, the total area of the cap after construction is completed, and the extent of suspended sediment plumes.

These features best integrate the likely take pathways associated with this action, are proportional to the anticipated amount of harm, and are the most practical and feasible indicators to measure. Thus, the extent of take indicators that will be used as reinitiation triggers for this consultation are: (1) 3.07 acres of rock armor surfaces below ordinary high water in the action area as a result of construction and during the 10 years following construction (this is identical to the acreage of rock armor surfaces in the action area in its pre-construction state); (2) use of a dredge or excavation method during one in-water work window that minimizes fish entrainment to the extent contemplated in the attached Opinion (3) 12.94 acres of undisturbed total bank and sediment cap footprint below ordinary high water; and (4) increased suspended sediment from dredging and constructing the cap with suspended sediment plumes measured 300 feet from the boundary of activities at 5 nephelometric turbidity units (NTUs) over the background level for two consecutive monitoring intervals. Total acreage of rock armor surfaces is an extent of take indicator due to the adverse effects of rock armor versus smaller substrates on the habitat of ESA-listed salmonids. Using a shore-based excavator along with turbidity curtains serves as an extent of take indicator because alternative methods (such as suction dredges) have a greater potential to entrain juvenile ESA-listed salmonids. The cap's total undisturbed area makes a suitable extent of take indicator because a disturbed or damaged cap can mobilize contaminants that have been isolated by the cap. Suspended sediment generated during the project is an extent of take indicator due to the direct relationship between suspended sediment and contaminant concentrations.

In the accompanying Opinion, NMFS determined that this level of anticipated take is not likely to result in jeopardy to the species. The area of rock armor surfaces below ordinary high water in the action area as a result of construction and during the 10 years following construction (3.07 acres), the net loss of gravel placed over the rock armor without replacement by an equal depth of gravel or finer substrates within a 6 month period, use of a dredge or excavation method during one in-water work window that minimizes fish entrainment to the extent contemplated in the attached Opinion, the undisturbed area of total bank and sediment cap footprint below ordinary high water (12.94 acres), and increased suspended sediment from dredging and constructing the cap with suspended sediment plumes measured 300 feet from the boundary of activities at 5 nephelometric turbidity units (NTUs) over the background level for two consecutive monitoring intervals are thresholds for reinitiating consultation. The net increase in rock armor surface habitat, net loss of gravel placed over the rock armor, dredging for more than one in-water work window or dredging in a manner that diverges from that considered in the Opinion (*e.g.*, use of a suction dredge), future disturbance of the cap, and increased suspended sediment beyond background measured 300 feet from the boundaries of activity for two consecutive monitoring intervals are thresholds for reinitiating consultation. Exceeding these indicators for extent of take will trigger the reinitiation provisions of this Opinion.

### **Reasonable and Prudent Measures**

The following measures are necessary and appropriate to minimize the impact of incidental take of listed species due to the proposed action:

The COE shall:

1. Minimize incidental take from construction and in-water work by avoiding and minimizing adverse effects to water quality, habitat and the ecology of aquatic systems.
2. Ensure completion of a monitoring and reporting program to confirm that the take exemption for the proposed action is not exceeded, and that the terms and conditions in this incidental take statement are effective in minimizing incidental take.

### **Terms and Conditions**

The measures described below are non-discretionary, and must be undertaken by the COE or, if an applicant is involved, must become binding conditions of any permit or grant issued to the applicant, for the exemption in section 7(o)(2) to apply. The COE has a continuing duty to regulate the activity covered by this incidental take statement. If the COE (1) fails to assume and implement the terms and conditions or (2) fails to require an applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the COE or applicant must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement.

1. To implement reasonable and prudent measure #1 (construction and in-water work), the COE shall ensure that:
  - a. In-water Work Window. To minimize effects of in-water work, all in-water work shall occur between July 1 and October 31.
  - b. Notice to Contractors. Before beginning work, all contractors working on site are provided with a complete list of reasonable and prudent measures, and terms and conditions intended to minimize the amount and extent of take resulting from general dredging activities, in-water work, and capping activities.
  - c. Best Management Practices and Conservation Measures. All relevant BMPs and conservation measures outlined in the BA shall be carried out as described.
  - d. Turbidity Curtains. Isolation measures appropriate for site conditions must be used. Measures other than fish salvage must be taken to prevent fish from being trapped inside any turbidity curtain deployed for the proposed action.
  - e. Minimize Impact Area. The applicant will confine dredging and capping impacts to the minimum area necessary to complete the project.
  - f. Dredging Equipment. No suction dredge shall be used.
  - g. No Fallback or Redistribution. All digging passes of the bucket during any dredging shall be completed without any material intentionally being returned to the wetted area. Dumping of partial or full buckets of dredged material back into the project area is not allowed. Dredging of holes or sumps below the maximum depth, and redistribution of sediment by dredging, dragging or other means is not allowed. Dredge cycling time shall be slowed, as necessary, to reduce turbidity and reduce sediment drift to adjacent areas.

- h. Debris. All large anthropogenic debris shall be removed from sediments and transported to an appropriate disposal site.
- i. Floating debris. The applicant will deploy an absorptive boom during all dredging activities to capture contaminants that may be floating on the water surface as a consequence of dredge activities.
- j. Cap.
  - i. Institutional controls (*e.g.*, covenants, easement, vessel restrictions, or some other long-term measures) that protect the integrity of the cap by limiting anthropogenic disturbance and development must be in place upon completion of cap construction.
  - ii. Contaminated soil or sediment shall be capped in place with a minimum of 10 inches of clean cover material.
  - iii. Cap material shall be clean sand from an approved location.
- k. Pile Removal. The removal of the treated wood piles on the project site will occur by cutting them off at the mudline and capping the stumps with at least 2 feet of clean material. Any debris that falls into the water during pile cutting or removal must be immediately removed.
- l. Pollution Control Plan. The applicant will implement a pollution control plan (PCP) to prevent pollution caused by project operations from entering the river. The PCP must have the following components:
  - i. The name and address of the party responsible for accomplishment of the PCP.
  - ii. Practices to prevent contaminant releases associated with equipment and material storage sites and fueling staging areas.
  - iii. A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.
  - iv. A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.
  - v. Practices to prevent debris from dropping into any stream or waterbody, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.
  - vi. During dredging activities, inspections will be done as often as necessary to ensure the controls discussed above are working properly. If an inspection shows that the controls are ineffective, work crews will be mobilized immediately to make repairs, install replacements, or install additional controls as necessary.
- m. Transport and Upland Disposal of Materials. Any soil, sediment, water or other materials removed from the site will be transported and disposed of at an upland disposal site such that no materials removed from the site will return to any waters containing ESA-listed species.

- n. Habitat Measures.
- i. Vegetation Cover. The applicant must achieve 80% aerial coverage by established (*i.e.*, not newly-planted) vegetation at year 5 for the areas where planting is planned (from +8 feet COP datum in the downstream reach and from +15 feet COP datum in other reaches to the top of the bank). Invasive plant species do not count toward the 80% cover. The native vegetation cover must be maintained for 25 years after the proposed action is completed.
  - ii. Large woody debris or trees removed from the site in order to place the cap should be salvaged and replaced as appropriate in the project area after construction is completed.
  - iii. Institutional controls (*e.g.*, covenant, easement, or some other long-term measure) must be placed on the cap area to prevent disturbance or development in the future.
  - iv. The portion of the project area where gravel will be placed over the rock armor in order to provide improved habitat for ESA-listed species must be monitored at 6 month intervals for a minimum of 5 years and annually for an additional 5 years (unless otherwise approved by NMFS) in order to establish whether the gravel is staying in place over the rock armor. The applicant and the COE should work with NMFS to develop an acceptable monitoring plan. NMFS must approve the monitoring plan before construction can begin. If it is found during the monitoring period that any of the gravel over the rock armor is eroding, and is not being replaced by an equal depth of gravel or finer substrates within a 6 month period, consultation should be reinitiated so that other measures to improve habitat for ESA-listed species can be taken.

2. To implement reasonable and prudent measure #2 (monitoring and reporting), the COE shall ensure that:

- a. Monitoring. The size of the dredge/cap prism and sediment/riparian disturbance area shall be monitored (dredged material volume and aerial extent). In addition, monitoring shall be conducted for turbidity, sheens or other visible contamination in the water or along the bankline.
  - i. Visual monitoring. If a turbidity plume or sheens are observed, then the applicant must modify the activity and continue to monitor every hour. Quantitative turbidity monitoring shall be conducted and recorded as described below. Monitoring shall occur each day during daylight hours when in-water work is being conducted. A properly and regularly calibrated turbidometer is required.
  - ii. Representative background point. A sample must be taken every hour at a relatively undisturbed area approximately 600 feet upcurrent from in-water disturbance to establish background turbidity levels for each monitoring cycle. Background turbidity, location, time, and tidal stage must be recorded prior to monitoring downcurrent.

- iii. Compliance point. Monitoring shall occur every hour approximately 300 feet downcurrent from the point of disturbance and be compared against the background measurement. The turbidity, location, time, and tidal stage must be recorded for each sample. At a minimum, a measurement must be taken within two feet of the river bottom, and at least one other depth.
- iv. Compliance. Results from the compliance points should be compared to the background levels taken during that monitoring interval. Turbidity may not exceed an increase of **5 NTUs** above background during the summer in-water work window.
- v. Exceedance. If an exceedance over the background level occurs, the applicant must modify the activity and continue to monitor every hour. If an exceedance over the background level continues after the second monitoring interval (2 hours), the activity must stop until the turbidity levels return to background. If the exceedances continue, then work must be stopped and NMFS notified so that revisions to the BMPs can be evaluated.
- vi. Weather. If the weather conditions are unsuitable to monitor the dredging operations (heavy fog, ice/snow, excessive winds, rough water, *etc.*), then dredging operations must cease until conditions are suitable for monitoring.
- vii. Reporting. Copies of daily logs for turbidity monitoring shall be available to NMFS upon request.
- b. Reporting. The applicant reports all monitoring items, including turbidity measurements, BMPs and conservation measures that require monitoring, gravel layer and vegetation cover observations, and dates of initiation and completion of work, to NMFS within 90 days of the close of any work window that had in-water work within it, and within 90 days of any monitoring actions. Any exceedance of take covered by this Opinion must be reported by the applicant to NMFS immediately. The reports will include a discussion of implementation of the relevant terms and conditions in #1, above.
- c. The applicant submits monitoring reports to:

National Marine Fisheries Service  
Oregon State Habitat Office  
Attn: 2010/00231  
1201 NE Lloyd Boulevard, Suite 1100  
Portland, OR 97232-2778

- d. The applicant posts the following notice prominently at the work site:

NOTICE: If a sick, injured or dead specimen of a threatened or endangered species is found in the project area, the finder must notify NMFS through the contact person identified in the transmittal letter for this Opinion, or through the NMFS Office of Law Enforcement at 1-800-853-1964, and follow any instructions. If the proposed action may worsen the fish's condition before NMFS can be contacted, the finder should

attempt to move the fish to a suitable location near the capture site while keeping the fish in the water and reducing its stress as much as possible. Do not disturb the fish after it has been moved. If the fish is dead, or dies while being captured or moved, report the following information: (1) NMFS consultation number; (2) the date, time, and location of discovery; (3) a brief description of circumstances and any information that may show the cause of death; and (4) photographs of the fish and where it was found. The NMFS also suggests that the finder coordinate with local biologists to recover any tags or other relevant research information. If the specimen is not needed by local biologists for tag recovery or by NMFS for analysis, the specimen should be returned to the water in which it was found, or otherwise discarded.

### **Conservation Recommendations**

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. The following recommendation is a discretionary measure that is consistent with this obligation and therefore should be carried out by the COE:

Identify and implement habitat enhancement or restoration activities in the Lower Willamette River that increase the amount of shallow-water habitat in the reach to benefit ESA-listed salmonids.

Please notify NMFS if the COE carries out this recommendation so that we will be kept informed of actions that are intended to improve the conservation of listed species or their designated critical habitats.

### **Reinitiation of Consultation**

Reinitiation of formal consultation is required and shall be requested by the Federal agency or by NMFS where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that has an effect to the listed species or designated critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat is designated that may be affected by the identified action (50 CFR 402.16).

To reinitiate consultation, contact the Oregon State Habitat Office of NMFS, and refer to the NMFS Number assigned to this consultation (2010/00231).

## MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirement of section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions, or proposed actions that may adversely affect EFH. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitats, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

The Pacific Fishery Management Council (PFMC) described and identified EFH for groundfish (PFMC 2005), coastal pelagic species (PFMC 1998), and Chinook salmon, coho salmon, and Puget Sound pink salmon (PFMC 1999). The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of Chinook and coho. Based on information provided by the action agency and the analysis of effects presented in the ESA portion of this document, NMFS concludes that proposed action will have the following adverse effects on EFH designated for Pacific Coast salmon:

Temporary reduction in water quality from increased turbidity and contaminants, effects to physical habitat (changing bottom topography) and the prey base (temporarily removing benthic populations), and harassment/displacement from disturbance caused by dredging and capping operations.

### Essential Fish Habitat Conservation Recommendations

The following two conservation measures are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH. These conservation recommendations are a subset of the ESA terms and conditions.

1. Construction and In-water Work: The COE should follow terms and conditions 1a – 1n as presented in the ESA portion of this document.
2. Monitoring and Reporting: The COE should follow term and condition 2a – 2c as presented in the ESA portion of this document.

### Statutory Response Requirement

Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations [16 U.S.C. 1855 (b)(4)(B)]. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse effects of the activity on EFH. If the response is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations. The reasons must include 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.

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

### **Supplemental Consultation**

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

## **DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW**

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section addresses these Data Quality Act (DQA) components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

**Utility:** Utility principally refers to ensuring that the information contained in this document is helpful, serviceable, and beneficial to the intended users.

The Opinion in this document concludes that the proposed project will not jeopardize the affected listed species. Therefore, the COE can authorize this action in accordance with its authority under section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. The intended users are the COE and ZRZ Realty Company.

Individual copies were provided to the above-listed entities. This consultation will be posted on the NMFS Northwest Region website (<http://www.nwr.noaa.gov>). The format and naming adheres to conventional standards for style.

**Integrity:** This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

**Objectivity:**

***Information Product Category:*** Natural Resource Plan.

***Standards:*** This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the ESA Consultation Handbook, ESA regulations (50 CFR 402.01, *et seq.*) and the MSA implementing regulations regarding EFH [50 CFR 600.920(j)].

***Best Available Information:*** This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this Opinion/EFH consultation contain more background on information sources and quality.

***Referencing:*** All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

***Review Process:*** This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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