

DRAFT ENVIRONMENTAL ASSESSMENT

**FISCAL YEARS 2012 THROUGH 2019 MAINTENANCE
DREDGING OF THE UPPER DUWAMISH WATERWAY**

Prepared by:



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Responsible Agency: The responsible agency for this navigation project is the U.S. Army Corps of Engineers, Seattle District.

Abstract:

This Environmental Assessment (EA) evaluates the environmental effects of the proposed maintenance dredging of the upper Duwamish Waterway. The upper Duwamish Waterway is located in the industrial district of Seattle, about six miles south of downtown Seattle in King County, Washington. The upper Duwamish Waterway is the southern end of the Duwamish Waterway which is about 5.5 miles long and empties into Elliott Bay. The Duwamish Waterway is an artificially dredged channel that was constructed by the U.S. Army Corps of Engineers (Corps). Construction deepening of the Duwamish Waterway straightened the original meandering channel of the Duwamish River allowing access by deep draft vessels. The Duwamish Waterway is important to commerce including shipping, boat building, vessel repair, and vessel storage. To maintain the entire 5.5 miles of the Duwamish Waterway the Corps must remove accumulated sediment from the upstream settling basin (known locally as the turning basin) every one to three years. An additional complication is that if the accumulated sediment were allowed to move downstream it could mix with known contaminated sediment which would drastically increase complexity and cost of sediment removal and disposal. Consequently, the most economically viable place to remove sediment is from the turning basin since the sediment that accumulates there is clean material from upstream. Maintenance dredging last occurred in 2010, but only a portion of the accumulated material was removed. The recommended plan consists of maintenance dredging up to 200,000 cubic yards during each dredge cycle within the approved Washington Department of Fish and Wildlife in-water construction window of November 1 to February 15 by mechanical dredge. Testing of the material to be dredged would occur and the material that meets Dredge Material Management Program (DMMP) criteria for open water disposal would be disposed of in the Elliott Bay DMMP open water disposal site; contaminated material would be disposed of in an authorized upland disposal site. The proposed project will not constitute a major federal action significantly affecting the quality of the human environment.

This document is available online at: <http://www.nws.usace.army.mil/ers/Index.cfm>

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ACRONYMS AND ABBREVIATIONS

BA	Biological Assessment
BiOp	Biological Opinion
CAA	Clean Air Act
cfs	cubic feet per second
cy	cubic yards
Corps	U.S. Army Corps of Engineers Seattle District
CWA	Clean Water Act
DMMO	Corps Dredged Material Management Office
DMMP	Dredged Material Management Program
DNR	Washington State Department of Natural Resources
DO	dissolved oxygen
EA	Environmental Assessment
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FY	Fiscal Year
MLLW	Mean Lower Low Water
NMFS	National Marine Fisheries Service
PCBs	polychlorinated biphenyls
PN	Public Notice
PSDDA	Puget Sound Dredge Disposal Analysis
PSR	Pacific Sound Resources
RM	River Mile
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Note: the PSDDA name was changed to Dredge Material Management Program (DMMP) in 1994 as a result of program expansion into coastal waters and the Columbia River. However, the underlying analysis of the original PSDDA disposal sites did not change as a result of the change in nomenclature. In this document, the early documents under PSDDA are referenced as PSDDA documents, while later documents are referenced as DMMP documents.

1 PROPOSAL FOR FEDERAL ACTION

1.1 Location of the Proposed Action

The proposed action (project area) is located in the upper Duwamish Waterway at approximately river mile (RM) 4.8 to RM 5.5 and is at the southern end of the industrial area which occurs along both sides of the Duwamish waterway (Figures 1 and 2). The area is located in the industrial area of Seattle at the southern end of Elliott Bay and about six miles south of the main Seattle downtown, King County, Washington, business area.

1.2 Authority

The Seattle Harbor Federal Navigation Project and maintenance dredging is authorized by the Rivers and Harbors Acts of March 2, 1925 and July 3, 1930. The authorized depth in the channel and settling basin is -15 feet Mean Lower Low Water (MLLW) with a 2-foot allowable over depth to -17 feet MLLW. The authorized dimension for the channel bottom width is 150 feet. The authorized dimensions for the settling basin (also known locally as the turning basin) are 250 feet wide by 500 feet long. Federal maintenance dredging is necessary within the lower 5.5 miles of the Duwamish River (also known as the Duwamish Waterway) every one to three years to remove accumulations of shoaling river sediment. The area typically dredged is the settling basin that extends from a natural bend in the river at River Mile (RM) 5.5 downriver approximately 2,100 feet. Additional dredging is proposed directly downstream of the settling basin and channel for a distance of about 1,200 feet. The total project area to be dredged is approximately eight acres. The overall distance to be dredged is about 3,300 feet. The Corps is authorized to remove up to 200,000 cubic yards of dredged material from the site during each dredge cycle. This EA addresses the proposed dredging activities beginning in fiscal year (FY) 2012 and continuing through 2019 from station 242+00 upstream to station 275+56 (upper end of the settling basin).





1.3 Purpose and Need

The purpose of the project is to maintain Congressionally-authorized project depths in order to provide safe navigation and a wide turning area for large ships in this industrial port area. This project is needed because without routine maintenance dredging, shoaling would lead to a shallower channel that would reduce the ability of large ships to enter and leave safely. This location has been dredged on a one to three year cycle since about 1931 in order to maintain this navigation channel. In addition, not conducting maintenance dredging in the settling basin would result in a buildup of sediment in the settling basin, which would eventually exceed the holding capacity of the settling basin. Once the capacity of the settling basin is exceeded, the sediment would continue to move downstream and settle in areas below the settling basin, where in some areas there is known sediment contamination. The clean sediment from the settling basin would become mixed with contaminated sediment. Eventually, as sediment accumulates in these downstream areas, dredging could be required in contaminated areas below the settling basin to maintain navigation depths.

Public Notice (PN) CENWS-OD-TS-NS-39 dated July ??, 2011, describes the maintenance dredging by clamshell dredge of up to 200,000 cubic yards (cy) of sand and silt from the navigation channel during each maintenance dredge event. The public notice covers upper Duwamish Waterway maintenance dredging beginning in FY 2012 through 2019. The Corps does not anticipate a future PN until 2019 unless there is a substantive change in maintenance dredge operations (e.g. change in the dimensions of the navigation channel, change in dredging location, change in dredge timing, or change in disposal location). The proposed dredging in FY 2012 through 2019 includes removing up to 200,000 cy of silt and sand in the upper Duwamish Waterway, during each dredge event, between stations 242+00 and 275+56 (Figure 1). The impacts of maintenance dredging in the upper Duwamish Waterway are described on a per event basis. The dredging is strictly for maintenance of an existing Federally authorized navigation channel. There would not be any changes in the underlying dimensions of the navigation channel or changes in impacts to the environment since the maintenance dredging is intended to maintain existing conditions.

Dredged materials would be disposed of at the Dredged Material Management Program (DMMP) open water site in Elliott Bay. The DMMP is managed by The Washington State Department of Natural Resources (DNR), Washington State Department of Ecology (Ecology), Environmental Protection Agency (EPA) and the Corps. This site is located north of Harbor Island between downtown Seattle and Duwamish Head (Figure 1). Disposal activities would be conducted in accordance with established criteria for the site. The DMMP agencies would conduct a suitability determination prior to dredging. If beneficial disposal uses can be identified, the material would be made available. Dredging and disposal activities are scheduled to be performed between November 1, 2011 and February 14, beginning in 2011 and each year thereafter when dredging is conducted. The actual dredging and disposal should take approximately 45 days to complete. However it could take as much as 75 days based on weather conditions.

1.4 Pertinent Documents

Since the proposed action is one for which previous environmental impact statements (EIS) and environmental assessments (EA) have been prepared, this EA is tiered from the parent documents in accordance with 40 CFR 1502.20. As a result, this EA does not repeat evaluations

presented in previous NEPA documents but rather incorporates discussions from previous NEPA documents by reference and concentrates on new issues specific to these subsequent actions.

Dredging practices and disposal options in the project area were evaluated in the following documents:

1973 Environmental Impact Statement (EIS) for the Seattle Harbor Federal Navigation Project (Corps 1973),
Environmental Impact Statement Supplement for the Seattle Harbor navigation project (Corps 1979),
Final EIS on the East, West, and Duwamish Waterways (Corps 1983),
Environmental Impact Statement for the Elliott Bay DMMP open-water disposal site - phase I (Corps 1988),
Maintenance dredging Environmental Assessments for 1992, 1996, 1999, 2002 and 2005 (Corps 1992, 1996, 1999, 2002, 2005), and
Biological Assessment for FY 2012 through 2027 Maintenance Dredging of the Settling Basin and Navigation Channel of the Upper Duwamish Waterway. (Corps 2011).

Copies of these documents are on file at the Seattle District office.

2 ALTERNATIVE ACTIONS

2.1 No Action

Under this alternative the Corps would not dredge the upper Duwamish Waterway. This alternative would cause no effects to the aquatic environment.. However, problems for marine traffic caused by the present shoaling rate would continue and worsen as sediments accumulate. The Duwamish navigation channel would continue to accumulate sediments which would reduce the depth of the channel below authorized project depths, greatly restricting use by larger vessels. This would have a significant negative effect on the local maritime economy. Shoaling would reduce the ability of ships to enter and leave safely under full load or during low tide conditions, and would likely cause at least one boat builder to move or go out of business.

In addition, the No Action Alternative would result in a buildup of sediment in the settling basin, which would eventually exceed the basin's holding capacity. Once the capacity of the settling basin is exceeded, the sediment would move downstream and settle in contaminated areas below the settling basin. The clean sediment from the settling basin would become mixed with contaminated sediment. Eventually, as sediment accumulates in these downstream areas, dredging could be required in the contaminated areas to maintain navigation depths. Dredging of contaminated sediment has considerably more environmental effect than dredging clean sediment, as it releases contaminants to the water column.

2.2 Clamshell Dredging with Disposal at an Upland Site

Under this alternative, all dredged material would be stockpiled at one or more upland sites and eventually used for construction or other development purposes. The costs and benefits of rehandling/reuse depend on transportation fees, rehandling expenses, and the demand for the use of the material on dry land. There are no upland disposal sites available near the project area and adjacent upland sites are fully occupied by commercial interests. Thus, transportation costs to a disposal site would be high. Rehandling of the material onto a barge for transport and then

pipng to the disposal site would increase costs compared to open water disposal. In addition, upland resource areas would also be effected by disposal activity; therefore, due to the non availability of local upland disposal sites, potential environmental effects, costs of rehandling, in conjunction with the area being highly industrialized, this option will not be considered further (Corps 2006).

2.3 Clamshell Dredging with Disposal at the Elliott Bay DMMP Open Water site and an Approved Upland Site

This is the proposed and preferred alternative. Under this alternative, the majority of the material would be disposed of at the DMMP open water site in Elliott Bay, and a small fraction would be disposed of in an approved upland disposal site (the amount of each would be determined based on sediment characterization (results will be available in August 2011). Based on previous test results the majority of the material is expected to meet DMMP guidelines for open water disposal and consequently would be disposed of at the Elliott Bay DMMP site; however, because some contaminated material is likely to be encountered in the 1,200 feet downstream of the turning basin, (DMMP 2009), it is expected that some upland disposal will be required. If beneficial use of the non-contaminated material could be identified, the material would be made available for that purpose. A possible beneficial use for drift cell nourishment in drift cell KI-5-1 (near Burien and Des Moines) is currently being evaluated. Contaminated material would be disposed of in an approved upland disposal site that meets DMMP guidelines. Approved upland sites are located many miles away, thus transportation costs to a disposal site would be high. However, there is no practical alternative location in the Duwamish River area that can take contaminated materials.

Dredging and disposal activities would be performed between November 1 and February 14 of each year that dredging is performed. The actual dredging and disposal (unless inclement weather causes a delay) should take approximately 45 days to complete.

This is the preferred alternative because it meets the purpose and needs stated above. This alternative would restore the project to Congressionally-authorized depths, ensuring that safe navigation could continue. Additionally, this alternative would prevent clean sediment from overflowing the settling basin and mixing with contaminated sediment downstream. This alternative minimizes environmental effects through compliance with DMMP guidelines for sediment disposal, and by reducing the future need for dredging in contaminated areas. The other alternatives either partially meet the purpose and needs or do not meet the purpose and needs. Although this alternative is more costly than the No Action alternative and the alternative below (Clamshell Dredging and Disposal at the Elliott Bay DMMP Open-Water Site), it conforms most closely to the requirements of the purpose and need statement (section 1.4).

2.4 Clamshell Dredging with Disposal at the Elliott Bay DMMP Open-Water Site

Under this alternative, only material suitable for open water disposal under the DMMP guidelines would be dredged; contaminated material would be left in place. Mechanical (clamshell) dredged material would be disposed of at the Elliott Bay DMMP disposal site.. This alternative would avoid affecting upland resource areas and would remove most of the material from the system, but would allow continued shoaling in locations where shoals currently occur. This option is less costly than the combination of open water disposal and upland disposal, or all upland disposal, because of closer proximity to the disposal site, and because dredged material would not be rehandled (Corps 1988). This option, however, would leave some material in the

navigation channel that could pose a safety hazard to maritime traffic. Disposal activities would be conducted in accordance with established criteria for the DMMP site. Dredging and disposal activities would be performed between November 1 and February 14 of each year that dredging is performed. If beneficial disposal uses could be identified, the material would be made available for that purpose. The actual dredging and disposal (unless inclement weather causes a delay) should take approximately 45 days to complete.

2.5 Description of the Environment

For more information on the local environment the reader is referred to the pertinent environmental documents mentioned in Section 1.4.

3 ISSUES FOR COMPARISON OF THE ALTERNATIVES

This section provides information on issues relevant to the decision process for selecting the preferred alternative. Comparative assessment of each alternative's effects to the environment is discussed in section 6 (below). Factors for selecting the recommended alternative include finding the plan that is the most cost effective and the least environmentally damaging.

3.1 Geomorphology

The Duwamish River is the lower portion of the Green River which originates in the Cascade Mountain Range of western Washington. The Green River flows northwesterly through heavily wooded conifer forests from the Cascade Crest to Eagle Gorge, where it is impounded by the Corps of Engineers' Howard A. Hanson Dam. The Howard A. Hanson Dam has controlled floods in the lower Green River valley, including Seattle's industrial district along the Duwamish Waterway, since November 1961.

After passing through the dam, the river flows northwesterly through the Green River valley to Seattle, where it becomes the Duwamish River. The Duwamish/Green River drains about 483 square miles with high and low flows of 12,000 cubic feet per second (cfs.) to 300 cfs.

The prehistoric Duwamish River channels have been straightened and altered by people over at least the last 100 years, with only limited indication of its original meandering course remaining today. The Duwamish Waterway branches to form the East and West Waterways before entering Elliott Bay. Elliott Bay is located on the east side of Puget Sound bounded by the Duwamish Head to the south, Magnolia Bluff to the north, and downtown Seattle to the east.

3.2 Aquatic Vegetation

There is little aquatic vegetation in the upper Duwamish Waterway, likely due to the industrial nature of the waterway. The waterway substrate is regularly disturbed by passing vessels and most of the shoreline is armored with riprap. Aquatic vegetation is also discouraged by property owners. There are a few areas where aquatic vegetation is encouraged, but these areas are generally off of the main channel with the exception of the shoreline in much of the turning Basin (at the southern end of the Federally authorized navigation channel).

3.3 Invertebrates, Fish and Wildlife

The benthic ecosystem in the lower Duwamish River is stressed by the sediment load that collects in the lower Duwamish River, by commercial and industrial activity, and by repeated dredging of the navigation channel, resulting in reduced diversity, with greater numbers of stress-tolerant invertebrates. The Duwamish/Green River system supports many different fish

species. Salmonids that migrate through the lower Duwamish River include coho (), chum (O.), fall Puget Sound Chinook (), sockeye (), pink salmon (), and summer and winter Puget Sound Steelhead (). Abundant marine fishes in the area include Pacific staghorn sculpin (), starry flounder (), English sole (), shiner perch (), and Pacific herring (). This area provides important rearing habitat for herring, perch, sculpins and other fishes. A variety of water birds typical of western Washington are found within the project area. Mostly small mammals inhabit the uplands surrounding the lower Duwamish.

No dredging would occur during the in-water work closure period for the upper Duwamish waterway, February 15 to October 31. Benthic communities in the areas to be dredged have been altered by previous dredging operations. These communities would be altered each time dredging occurs in the proposed dredging cycles, but are expected to rapidly return to their present condition after completion of each maintenance dredge operation. Demersal fish are expected to be temporarily displaced by dredging, but few or no mortalities are expected to occur. Waterbirds would be temporarily displaced, but effects would be negligible as they could move to other areas within Elliot Bay and Puget Sound and return after completion of maintenance dredging.

Placement of dredged material at the disposal site would also result in a physical effect that would reduce populations of sessile benthic infauna, thereby reducing, temporarily, contributions of this community to the aquatic food web. Numbers of these infaunal organisms are relatively low at the disposal site; however, and recolonization is expected to begin soon after disposal operations are complete. Certain species of mobile epibenthic organisms would escape the immediate impact area of the disposal. Individual and cumulative physical effects on benthic infauna are not believed to be significant (Corps 1988).

3.4 Threatened and Endangered Species

Several Endangered Species Act (ESA) endangered, threatened, and candidate species may be found in the project area. These include the following:

- Puget Sound Chinook salmon () - Threatened;
- Puget Sound steelhead () - Threatened;
- Bull trout () – Threatened;
- Steller sea lion () - Threatened;
- Humpback whale () - Endangered;
- Leatherback sea turtle () - Endangered;
- Southern Resident killer whale () – Endangered;

Of these species, only Chinook salmon, steelhead, and bull trout use the upper Duwamish Waterway. The Puget Sound/Strait of Georgia evolutionarily significant unit (ESU) of coho salmon () is a species of concern due to specific risk factors. The Puget Sound coastal cutthroat trout () ESU is also a candidate species. These species occur in the Duwamish/Green River system. The sea lion, sea turtle, killer whale and humpback whale have not been observed in the Duwamish Waterway or near the Elliott Bay disposal site.

The possible effects to threatened and endangered species are addressed in the Biological Evaluation dated July, 2011 (Corps 2011). The 2011 BE and supplemental documents for the proposed dredging and disposal operations concluded that for each of the threatened and endangered species the effects determination is “may affect, not likely to adversely affect” for the species and their designated critical habitats. An email concurrence letter for bull trout and their critical habitat for the FY 2010 dredging was received from USFWS on September 18, 2009. The Corps received a Biological Opinion (BiOp) for Puget Sound Chinook Salmon and their critical habitat from National Marine Fisheries Service (NMFS) dated September 21, 2006 for the period 2007 through 2011. The NMFS BiOp recommended a conservation measure that caused the Corps to establish a work group to examine if the conservation value of the transition zone in the upper Duwamish Waterway is being impaired by continued maintenance dredging in this area. The reasonable and prudent measures in the incidental take statement are as follows:

1. Improve prey base resources within the action area.
2. Ensure completion of a monitoring and reporting program to confirm that the terms and conditions in the take statement are effective in avoiding and minimizing incidental take from permitted activities.

The terms and conditions are as follows:

1. To implement measure #1 the COE shall ensure that:
 - a. Native vegetation is planted along the shoreline of the action area;
 - b. A planting plan would be provided to NMFS prior to revegetation.
2. To implement measure #2 the COE shall ensure that:
 - a. A report documenting the implementation of and compliance with the terms and conditions indicated above, and the level of incidental take that has occurred, shall be submitted to NMFS Washington Habitat every two years.

On September 18, 2009 the Corps received email correspondence from NMFS concerning the addition of steelhead to the list of threatened species that occur in the Duwamish River for maintenance dredging of the upper Duwamish Waterway and settling basin in 2009/2010. The NMFS indicated the conditions analyzed in the 2006 BiOp had not changed and therefore the project would not jeopardize the continued existence of listed species.

In general, dredging and disposal operations could disrupt feeding or migration behavior; however, these disruptions would only occur during dredge operations and those operations are scheduled to minimize effects to ESA listed species. In addition, the dredge operation is limited to a small segment of the navigation channel (~3,350 feet long by ~250 wide at the widest location) and dredged material disposal to an approved disposal site. Conservation measures will be implemented to protect Chinook salmon and bull trout, including use of a clamshell dredge and avoiding operations between February 15 and October 31. In addition, dredging and disposal operations are to be in conformance with DMMP management standards and water quality standards.

3.5 Historic and Cultural Resources

A review of the Washington State Department of Archaeology and Historic Preservation (DAHP) online database WISSARD indicates that there are no National Register-eligible cultural resources located neither within the project area nor within the vicinity of the project area. The closest archaeological sites are located approximately one-mile northwest of the proposed dredging and will not be affected by the dredging. All proposed dredging sites have

been dredged previously. The Puget Sound Dredge Disposal Analysis (PSDDA) Phase I EIS (Corps 1988) evaluated submerged historic shipwrecks for the Elliott Bay disposal site; significant cultural resources were mitigated under a Memorandum of Agreement with the Advisory Council on Historic Preservation in 1988. Dredging Guidance Letter No. 89-01 (March 13, 1989) states that it is the policy of the Corps that cultural resources surveys should not be conducted for maintenance dredging and disposal activities proposed within the boundaries of previously constructed navigation channels or previously used disposal areas. Accordingly, no new cultural resources surveys were conducted for this proposed project.

The proposed maintenance dredging lengthens the channel to be dredged compared to previous year's maintenance dredging, but it does not change in any fashion the configuration or location of the authorized upper Duwamish Waterway. Based on previous research by a Corps archaeologist and review of the dredging and disposal locations by the Muckleshoot Tribe, there do not appear to be any cultural resources associated with the proposed project area, the navigation channel, or the potential disposal sites. Similarly, there are no cultural resources listed for the project area that are eligible for the National Register. This information was previously coordinated with the State Historic Preservation Office in March 1988.

3.6 Water Quality

Ecology is responsible for setting water quality standards based on water use and the water quality criteria for designated uses. The waters of the Duwamish River (RM 11 to 0) are designated as category 1 to 5 depending on the contaminant. For example: category 1 and 4A for Ammonia-N, category 2 for dissolved oxygen (DO), and Category 5 for pH. Other contaminants include PCBs and Bis(2-ethylhexyl) phthalate. Water temperature is also of concern. Water quality within the lower Duwamish River can influence water quality conditions in the Duwamish River estuary. Elliott Bay and the Duwamish Waterway remain on Ecology's 303(d) list of threatened and impaired waters. The enforcement of total maximum daily load limitations for a number of parameters is expected to result in additional improvements in water quality. The trend for water quality in the action area is one of overall improvement.

Overall, water quality in the estuary was probably poorest in the early 1960s. Since then, enforcement of the Clean Water Act (CWA) and subsequent State water quality standards and implementation of the National Pollutant Discharge Elimination System have spurred substantial improvement in water quality conditions in the Duwamish estuary.

Diversion of Renton Treatment Plant wastewater effluent discharges from the river to Puget Sound has significantly reduced the biological oxygen demand in the estuary. Of the parameters for which historic data are available, all contaminants have been controlled to the point where few exceedances of state chronic water quality criteria, or thresholds for effects on salmonids, have been reported in recent years. Since the mid-1980s, there have been no reports of direct mortality of salmon or other fish in the estuary; problems previously associated with delayed Chinook salmon upstream migrations due to low DO barriers likewise have not been reported since the diversion of the Renton Treatment Plant outfall.

The Duwamish Waterway is characterized by occasional high levels of suspended sediment occurring during the late spring and even well into the driest portions of the year (274 mg/L on March 19, 1997, 264 mg/L on August 7, 1997, and 101 mg/L on March 22, 1998), which are likely due to intense precipitation from seasonal storm events. Water quality sampling data from the U.S. Geological Survey (USGS) gauge located at the Foster Golf Links golf course in

Tukwila Washington (Station No. 12113390) were reviewed for the years 1995 through 2004. No further data, with sufficient consistency, were available after 2004 at this station or other nearby stations. Data in Soos Creek above the hatchery were sporadically available in 2005 and 2007, but observations were so few that meaningful analysis was not possible. Thus the results from the 1995 through 2004 Foster Golf Links golf course station were used for analysis for this EA. These data indicated that the Duwamish River reaches its maximum suspended sediment levels generally between December and March. Average suspended sediment levels recorded during the previously used window for dredging (October 1 through February 15) have been 72 mg/L, including the highest readings of 787 mg/L on February 9, 1996, 361 mg/L on February 12, 1996, and 196 mg/L recorded on January 3, 1997. Lowest readings during the proposed dredging period have been 4 mg/L in December 2000.

Maintenance dredging in the upper Duwamish Waterway would result in the release of some sediment to the water column as the dredge bucket contacts the bottom, closes, and is raised through the water column and the dredge material loaded into the barges. Dredging results in pulsed and localized increases in suspended solids to the water column. Ecology sets limitations on the amount of sediment that is allowed to be re-suspended during dredging operations (and other in-water activities). There would be short-term re-suspension of sediments into the water column during the dredge operations. Ecology allows a 600 foot dilution zone downcurrent of the dredge operation such that suspended sediment in the water column would return to background conditions after 600 feet. Most mobile organisms would avoid the area of increased suspended sediment, although fish that enter the area of increase are unlikely to be harmed. Historical testing indicates that release of contaminants to the water column would be insignificant and any contaminated sediment that was released into the water column would quickly settle out within the Ecology-defined dilution zone. Therefore, suspended sediment effects will be negligible and are not expected to degrade the existing water quality conditions within the action area or have adverse effects on listed species or their prey.

Dissolved oxygen levels in the lower Duwamish do not always meet Ecology's standards. Excursions occur in middle and late summer (Herrera Environmental Consultants 2005). The proposed maintenance dredging would occur in the winter months (November 1 through February 14) when DO ranges from 9.6 to 12.1 mg/L (USGS data for 1999 to 2004 collected at Station 12113390 at Foster Golf Links golf course in Tukwila, WA). The state DO criterion for category 2 freshwater is 6.5 mg/L (WAC 173-201A).

Dissolved oxygen tends to decline in the vicinity of dredging operations when the suspension of anoxic sediments creates high chemical oxygen demand. Temporary decreases in DO associated with increased suspended sediments are possible in the immediate dredging plume area. Ecology in its 401 water quality certificate sets a lower limit on DO concentrations of 4 mg/L. Below this level the dredging must stop and cannot resume for a specified time. However, DO in the Duwamish River during the winter months (when dredging would occur) is not expected to fall below 4 mg/L due to the cooler conditions and consequent higher DO concentrations expected in these waters (based on USGS data cited in Section 4.3, mean concentrations of DO between October and February are 9.4–12.1 mg/L). Further, it is unlikely that the sediments to be dredged are strongly anoxic because the bulk of the sediment is expected to have a low percentage of fine materials (ranging from 8.7 and 6.4 percent fines).

Short term (during the time the dredge operations is occurring) effects of decreases in DO could include avoidance of the dredging area by mobile aquatic organisms and reduced foraging

opportunity during and immediately after dredging as fish avoid areas of depressed DO. The majority of juvenile salmonids would not be exposed to reduced DO conditions due to the timing of dredging between November 1 and February 14. However, some early emigrating Chinook salmon juveniles, as well as some returning adult winter run steelhead passing through the area on their way to their spawning grounds, could be exposed to effects of the dredge plume if dredging were to extend beyond January 15.

In the lower Duwamish Waterway, the primary influences on water temperature are the relative temperatures of the freshwater inflow and the saltwater intruding from Elliott Bay (Warner and Fritz 1995). This saltwater intrusion profoundly influences water temperature at various depths in the settling basin (Muckleshoot Indian Tribe Fisheries Department, unpublished data). For example, in January, water temperatures measured at 1-meter depths (46.8° F) can be 10° F warmer than water at a depth of 8 meters (36.5° F). In May, temperatures measured at 1 meter were 11° F warmer (63.9° F) than at a depth of 4 meters (52.9° F). In September, temperatures are more uniform with difference in the 5° F range (61.9 to 56.8° F). The range of temperatures over depth is influenced by the tidal stage. The variation in water temperature with depth provides adult and juvenile salmonids some refuge from the higher temperatures, however, in late summer and early fall, the general range of temperatures offers no refuge from temperatures above 57°F, which is considered the upper end of the preferred range for salmonid species.

Lack of large vegetation (trees and large shrubs) in the riparian zone has been cited as a significant cause of elevated temperature. Due to heavy industrialization, there is a near complete lack of riparian trees along the shoreline of the lower Duwamish River. Thus, the contribution of vegetation as an effective buffer against increasing water temperature from direct sun exposure is probably minimal for the action area and the lower Duwamish River.

The dredging operation will not change the overall water temperature in the project area, since there would be nothing in the dredging operation that could affect overall water temperature. However, in the process of the mechanical dredge bucket passing through the water column it may cause a mixing of the upper and lower water layers, thus disturbing the stratification and perhaps mixing cool and warmer water. This would have limited or no effect to aquatic organisms in the area due to the restricted area of impact and transitory nature of the mixing.

3.7 Sediment Quality

Most of the area proposed for maintenance dredging is in an area ranked by DMMO as low likelihood of contamination (a DMMP low-ranked area). The upstream portion of the area proposed for dredging, the turning basin, was last dredged January - February of 2010. Historically the material dredged from the turning basin was low-ranked (low likelihood of contamination).

Starting 16 January 2010, 59,935 cubic yards (cy) were removed from the turning basin and were sent to the Elliott Bay open water disposal site having met the DMMP criteria for open water disposal. Dredge operations ended 7 February 2010.

Starting 11 January 2010 and taking two days, 436 cy were removed from an area called the Speed Bump, so named because it resulted in a shallow area of the navigation channel. The speed bump was located downstream of the turning basin adjacent to Delta Marine Industries. This material was contaminated and thus was disposed of at the Rabanco Landfill in Eastern Washington.

The Duwamish River sediment was last sampled for contaminants in November 2008 and March 2009 (all areas including speed bump) and again in August 2009 (speed bump only).

The laboratory that did the chemical analyses misidentified the Aroclors (stated there was Aroclor 1232 where there wasn't any) and misquantified them as well, leading to rejection of the Polychlorinated biphenyls (PCB) data by an independent data validator. Reanalysis of the sediment samples by a more experienced lab resulted in findings of much lower Aroclor concentrations, similar to what had been found in this part of the Duwamish River navigation channel in previous studies. Spurious exceedances of the DMMP screening levels for PCBs caused the Corps to send many of the samples for bioassays. Bioassay results identified some of the material outside and downstream of the turning basin as unsuitable for open water disposal, even though there were no actual chemistry results above screening levels.

Sampling and testing were conducted and results will be available in August of 2011. There were a few bioassay modifications suggested at the last Sediment Management Annual Review Meeting (SMARM). The suggested bioassay modifications would be employed in the forthcoming round of testing. All sediment samples would be subjected to bioassays, regardless of whether or not screening levels are exceeded.

If sediment sampling in 2011 meets DMMP standards for open water disposal, the dredged sediment would be disposed of at the Elliott Bay DMMP site, unless a beneficial use for the material becomes available. If testing shows sediment samples from any individual dredge area are unsuitable for unconfined open water disposal at the DMMP site, the unsuitable material would be disposed of in an approved upland disposal site. Although the settling basin has historically had clean sediments, the lower Duwamish River downstream of the settling basin and located outside the Federal Navigation Channel is proposed for listing as a Superfund site.

The effects of the transport and disposal actions at open water sites were analyzed in a previous Biological Assessment prepared by the Corps (Corps 2010). The document (Corps 2010) assessed the effects of open water disposal of dredged material on ESA listed species and essential fish habitat (EFH). Table 1 summarizes the effect determinations for the ESA listed species and designated critical habitat in the area of the disposal sites. The conclusion was reached that open water disposal would not adversely affect ESA listed species or designated critical habitat. In contrast EFH would be affected through the accumulation of sediment in specific locations (non-dispersive sites). Therefore the Corps proposed eight conservation measures to minimize the impact.

Table 1. Summary of affect determinations for ESA listed species and designated critical habitat that might be encountered in open water disposal site (Corps 2010).

Species	Effect Determination	Designated critical Habitat/Proposed Critical Habitat
Puget Sound Chinook	Not likely to adversely affect	Not likely to adversely affect
Hood Canal Summer-Run Chum	Not likely to adversely affect	Not likely to adversely affect
Steller Sea Lion	Not likely to adversely affect	No effect
Bocaccio	Not likely to adversely affect	NA
Canary Rockfish	Not likely to adversely affect	NA
Yelloweye Rockfish	Not likely to adversely affect	NA
Eulachon	Not likely to adversely affect	NA
Coastal/Puget Sound Bull Trout	Not likely to adversely affect	Not likely to adversely affect
Marbled Murrelet	Not likely to adversely affect	No effect
Bald Eagle	Not likely to adversely affect	NA
Southern Resident Killer Whale	Not likely to adversely affect	Not likely to adversely affect
Humpback Whale	Not likely to adversely affect	NA
Leatherback Sea Turtle	Not likely to adversely affect	No effect
Green Sturgeon	Not likely to adversely affect	Not likely to adversely affect

3.8 Air Quality, Noise, and Artificial Lighting

The upper Duwamish Waterway lies within the industrial area of Seattle and is near the commercial shipping facilities. Ocean-going ships that carry freight typically use lower grade fuels compared to dredge machinery and tugs that operate in the Puget Sound basin. The dredging machine and tugs necessary for moving the dredge and barges are diesel powered and thus contribute to air pollution; however, the amount of air pollution generated by the dredge operation would not be higher than that produced by large ships that use the area. During the dredge operations large ship traffic would be reduced or eliminated to minimize interactions with the dredge operation. As a result the total amount of air pollution would likely undergo minimal or no increase over times when normal ship traffic is using the upper Duwamish Waterway.

Maintenance dredging at the settling basin would temporarily increase ambient noise levels as the dredge is working. Noise and activity during dredging operations could temporarily disturb some species from the adjacent shoreline areas and from the immediate area of the working dredge, but this effect is expected to be temporary. Lights operating on the dredge would temporarily increase ambient lighting levels at night in the immediate vicinity of the dredge, but are not expected to adversely affect neighboring properties or adjacent habitats due to the short duration of their presence. Once the dredge ceases to operate, there would be no long-term effects from the temporary increase in noise or light. The temporary duration would only be during the dredge operation, beginning and ending with the dredge operation.

The temporary increases in disturbance during dredging would be insignificant and discountable and are not expected to significantly degrade existing conditions within the action area or to have adverse effects on ESA listed species, as the dredging would be conducted during approved work windows.

The dredge operation would likely cause minimal or no net elevation of air pollution, noise, and artificial night lighting because the normal ship traffic in the upper Duwamish Waterway would be restricted during the dredge operation for safety reasons; increases in these parameters caused by the dredge operation would be mostly or entirely cancelled by decreases in the same parameters due to the lack of ship traffic.

3.9 Land Use and Aesthetics

During maintenance dredging the dredge, barges and tugs would be visible to observers from the shore and from the water. This would constitute a temporary change in the visual appearance to the waterway surface traffic during the time the maintenance dredging is occurring. However, the land use surrounding the dredge site is industrial, and the appearance of the dredge will not significantly contrast with the visual appearance of the area. There would be no effect to land use in terms of changes (temporary or permanent) to the terrestrial areas adjacent to the maintenance dredge area. No other effects to land use and aesthetics would occur.

3.10 Recreation

During the time when maintenance dredging is occurring there would be temporary effects to recreation since the area where dredging is occurring would be off limits to boating and fishing for safety reasons.

3.11 Hazardous, Toxic, and Radioactive Waste

There are no known radioactive wastes in the project area. Hazardous and toxic sediment may be located in the proposed dredge area. These sediments, if removed, would be disposed of in authorized upland hazardous waste sites.

3.12 Greenhouse Gas Emissions

The dredge and tugs will emit greenhouse gasses; however, the emissions would not constitute a new source since maintenance dredging has regularly occurred many times in the past. Simultaneously it is likely the amount of greenhouse gasses generated by the dredging may decrease slightly compared to previous years since diesel engine technology and fuel quality is currently undergoing substantial improvements in efficiency. Finally, large ocean going ships are notorious for using low grade heavy fuels that generate considerably more carbon than lighter fuels. Therefore, net greenhouse gas emissions would likely decrease during the dredge operation as large ocean going ships would not be able to use the upper Duwamish Waterway for safety reasons.

3.13 Local Economy

The removal of shoaled sediments is essential to maintaining the navigation channel as a deep draft vessel channel which is a necessity to most water oriented businesses in the Duwamish waterway. A considerable percentage of employees in the area are dependent on navigation oriented or related activities. Disruption to navigation traffic is anticipated, but work would be coordinated with the maritime community to allow affected parties to plan for the temporary closure of the upper Duwamish Waterway. Water dependent businesses can reduce the negative effects of temporary restrictions during dredge operations through advance planning. In addition to working directly with area maritime businesses, the Corps would ask the U.S. Coast Guard to issue a notice to mariners. Overall the maintenance dredging would benefit the economy in that normal commercial activities would continue as usual after the channel maintenance is completed.

3.14 Indian Treaty Rights

The Muckleshoot Indian Tribe has treaty fishing rights along the Duwamish River and Elliott Bay under the Point Elliott Treaty of 1855. Interference with treaty fishing rights would be avoided by performing dredging operations at times that do not conflict with either treaty Indian fishing activities or major fish runs on the Duwamish River. The Corps would work closely with the Muckleshoot Tribe to ensure that all concerns regarding the maintenance dredging in the navigation channel and upper Duwamish Waterway would be resolved through coordination.

3.15 Disposal Area Environment

The proposed disposal site is the DMMP designated Elliott Bay unconfined, open-water disposal site managed by the DMMP agencies (Figure 1). The center of the Elliott Bay disposal site is located about 3/4 mile north of Harbor Island in water 265 feet deep (Corps 1988).

Effects from disposal of dredged material at the approved Elliott Bay disposal site have been evaluated in detail in the PSDDA Phase I EIS. No significant effects on the disposal area benthos or water quality are anticipated.

4 MITIGATION

The combination of mitigation measures to reduce negative effects reduces the cumulative, short-term effects of this project to an insignificant level. These measures include: (1) project timing to reduce effects to salmonids and associated food web effects, (2) use of BMPs during dredging and disposal to minimize water quality effects, and (3) monitoring water quality conditions during dredging.

5 COORDINATION

The Public Notice covering the proposed project would be issued on July ??, 2011. The Seattle District Corps would continue to coordinate with Federal and state agencies and tribes regarding maintenance dredging in the Duwamish River. Coordination activities would continue during this FY 2012 through 2019 dredging operations. Based on the accompanying Section 404(b)(1) evaluation, dredging and disposal would be in accordance with Section 404 of the CWA as administered by the state of Washington. All comments on this draft EA received by the deadline would be addressed in the Final EA.

Coordination was conducted with the following entities and agencies:

- Muckleshoot Indian Tribe
- National Marine Fisheries Service
- United States Fish and Wildlife Service
- Dredge Materials Management Program Agencies
 - U.S Army Corps of Engineers
 - U.S. Environmental Protection Agency
 - Washington State Department of Ecology
 - Washington Department of Natural Resources

6 COMPARISON OF ALTERNATIVES AND SELECTION OF THE PREFERRED ALTERNATIVE

This section provides information on issues relevant to the decision process for selecting the preferred alternative and provides a comparative assessment of each alternative's effects to the environment, costs, and achievement of the project purpose, i.e. to return the channel to Congressionally-authorized depths to ensure safe navigation and support local economic activity. Factors for selecting the recommended alternative include finding the alternative that is the most cost effective and the least environmentally damaging. Major factors considered in choosing one alternative over the others include: (1) achievement of the project purpose; (2) environmental effects; and (3) cost.

6.1 Comparison of No Action Alternative and Action Alternatives

Effect to the environment, including aquatic, and terrestrial, would be least under the no action alternative assuming there was no future dredging. The other three alternatives including the preferred alternative would result in larger environmental effects. The local terrestrial environment would not be directly affected by any of the alternatives. The atmospheric environment would continue be affected under the preferred alternative due to dredging allowing continued large vessel access to the upper Duwamish Waterway. These vessels would continue to add pollutants to the atmosphere. Under the no action alternative, there would be less and

less use of the area by large vessels and eventually none resulting in lowered air pollution in the upper Duwamish Waterway. Changes in effects to the aquatic environment would perhaps be the most dramatic. The no action alternative would allow recovery of many aquatic functions that are now depressed. These would include recovery to a climax demersal fauna in the center of the waterway and increased shallow water habitat which would be beneficial for juvenile fishes including salmonids. Overall this would be beneficial to the aquatic environment and ESA listed species in the Duwamish Waterway. However, the no action alternative would allow contaminated sediments, which would be removed by two of the three action alternatives, to remain in the waterway.

In addition the no action alternative would not achieve the project purpose to maintain Congressionally-authorized depths, resulting in a significant negative effect to the local economy of Seattle. Continued shoaling caused by the transport of sediment from the upper reaches of the Green River would result in filling of the navigation channel. Eventually the entire Duwamish Waterway would become too shallow for large vessel traffic and cause water oriented businesses, such as Delta Marine Industries (a ship builder) to either close or move elsewhere, likely out of the Seattle area, eliminating several hundred jobs. The result would be fewer jobs in the local area. Finally cost; the no action alternative, would be the least costly.

In summary, the no action alternative is the lowest in cost, has more positive than negative environmental effects, but has significant negative economic effects and does not achieve the project purpose.

6.2 Comparison of the Three Action Alternatives

The factors in the comparison of the action alternatives are:

- Achievement of the project purpose (return the channel to Congressionally-authorized depths to ensure safe navigation and support local economic activity);
- Environmental effects;
- Cost

The alternative would be prohibitively costly. The high cost would likely preclude removing enough sediment to meet the project purpose. This alternative would result in continued release of atmospheric pollutants at the current level, and would disrupt the benthic community at the dredge site, but would remove contaminated sediment from the waterway. The

alternative would preclude the removal of contaminated sediment and result in leaving contaminated sediment in the upper Duwamish Waterway. This alternative would be less costly than the other two action alternatives, but would result in only partial achievement the project purpose. This alternative would cause continued release of atmospheric pollutants at the current level and disruption of the benthic community, without the environmental benefit of contaminant removal. The preferred alternative,

, would achieve the project purpose by completely returning the channel to authorized depths. It would be more costly than open-water disposal only, but less costly than all upland disposal. This alternative would result in continued release of atmospheric pollutants at the current level, and would disrupt the benthic community at the dredge site, but would remove contaminated sediment from the waterway.

In summary, Alternative 1 is the most costly, has some negative and some positive environmental effects, and only partially achieves the project purpose. Alternative 2 is low in cost, has some negative and no positive environmental effects, and only partially achieves the project purpose. The preferred alternative, Alternative 3, is moderate in cost, has some negative and some positive environmental effects, and fully achieves the project purpose.

6.3 Selection and Justification of the Preferred Alternative

The preferred alternative was selected because it fully achieved the project purpose, has less negative environmental effect than the other action alternatives, is moderate in cost, and prevents negative effects to the local economy. The preferred alternative would have greater negative effect on the environment than the no action alternative, but less effect than the other action alternatives. The preferred alternative would be moderate in cost compared to the other action alternatives and more costly than the no action alternative. And finally the no action alternative would have the greatest negative effect to the local economy while the preferred alternative would be the least disruptive.

7 CUMULATIVE EFFECTS

Cumulative effects result from the “individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). NEPA requires the evaluation of cumulative effects of the proposed dredging and disposal operations in light of past, current, and reasonably foreseeable future actions within the upper Duwamish Waterway. Actions with the highest potential for cumulative effects in this area would be continuation of commercial and recreational vessels utilizing the lower Duwamish River via the navigation channel, coupled with repeated dredging of the upper Duwamish Waterway and settling basin, and disposal of dredged material generated by dredging operations.

7.1 Historic landscape Conditions

Regarding the river’s natural environmental conditions, the repetition of dredging actions has contributed to degradation of the biological function of the upper Duwamish Waterway from its prehistoric condition. Prior to turning the Duwamish River into an industrial waterway, the river meandered across a wide floodplain that covered in excess of 4000 acres. The present river channel has been straightened, reduced in length by over a mile, and the shoreline armored. The combination of extensive diking, draining of adjacent lands within the floodplain, and the deepening of the main channel of the river has resulted in the disconnection of the river from its floodplain. This has limited the formation of habitats associated with intertidal salt marshes and large woody debris, and has supported urban land uses along the river’s edge by increasing the conveyance of floodwaters and sediment downstream and off of adjacent lands.

7.2 Existing Conditions

The existing Duwamish Waterway is an industrial waterway that supports a multitude of water dependent industries and facilities. The main channel is straight and artificially deepened to accommodate large vessels. Water-oriented facilities include boat building, manufacturing, loading and offloading of freight and many other industrial interests. There are a number of slips which are remnants of old channel meanders that were mostly filled when the river channel was

straightened. The shoreline is almost totally devoid of vegetation and is armored with riprap. Much of the shoreline embankment has overwater structure in the form of wharfs so ships can be docked alongside the wharfs allowing easy land access to the ships. The terrestrial area adjacent to the Duwamish Waterway is highly industrialized with the occasional pocket of vegetation on publically owned land. There is also some residential housing on the area to the west of the Duwamish River.

7.3 Reasonably Foreseeable Future Actions

The human community is positively affected by past, present, and future dredging actions through the safeguarding of navigation within the Duwamish River and the continuation of commercial and recreational vessel use of the Duwamish Waterway. Dredging in the upper Duwamish Waterway removes shoaling sediments that would otherwise hinder safe navigation especially at adjacent industrial, commercial, and recreational piers. By removing potentially hazardous areas of shoaling and by maintaining the authorized depth of the navigation channel, the cumulative effects of dredging supports the present and future economic and recreational use of the area. These cumulative effects are not expected to increase due to the proposed maintenance dredging; rather they are a continuation of the current type and intensity of human use of the lower Duwamish River and its adjacent uplands.

The cumulative effects of maintenance dredging projects on ESA listed species as a measure of the capability of the river system to support imperiled species are expected to be minimal. Minimal effects on bull trout, Chinook salmon, steelhead, Steller sea lions, and marbled murrelet are expected because dredging and disposal would occur within the work window of November 1 to February 14, and so would largely avoid effects on juvenile salmonids. Cumulative effects would be minimized on marbled murrelet, and Steller sea lions by avoiding disturbance in and around local nests or haul out areas and by avoiding disruptions of the local prey base through appropriate timing of work windows.

7.4 Incremental Effects of the Proposed Action

In the context of past dredging activities and the general degree of industrialization of the floodplain lands along the Duwamish Waterway, the proposed maintenance dredging would cause only a small effect to biological functions and floodplain connectivity. The effects would likely only occur during dredge operations and be geographically limited to 3,350 linear feet of the upper Duwamish Waterway. The entire area to be dredged would be 3,350 linear feet, however the amount of area actually affected at any given time is much smaller because the dredge can operate in only one small area at a time. Therefore the effects of dredging would be on each small area as the dredge proceeded from one location to another, rather than continuous over the entire project area. Based on the analysis above, the additional incremental effect of the preferred alternative beyond the already accumulated effects of maintaining an industrial waterway is believed to be insignificant.

8 ENVIRONMENTAL COMPLIANCE

The Corps has analyzed the environmental effect of all alternatives. The following sections describe how the preferred alternative complies with all pertinent environmental laws and executive orders

8.1 National Environmental Policy Act

This EA, along with the documents listed in Section 3, satisfies the documentation requirements of NEPA. A Finding of No Significant Impact (FONSI) is provided in Appendix A.

8.2 Marine Mammal Protection Act

The Marine Mammal Protection Act of 1972, as amended, prohibits the taking of marine mammals by citizens of the United States except under certain conditions (16 U.S.C. 1361). Several species of marine mammals can be found in Elliott Bay, and harbor seals and sea lions may occasionally be found in the lower Duwamish Waterway, but are not frequently observed in the project area. The project will not affect a significant portion of the forage range of marine mammals in Elliott Bay. Considering the infrequent occurrence of marine mammals in the project area, it is unlikely that seals or sea lions would encounter the project. If a seal or sea lion entered the waterway while dredging was occurring, the noise and lights of the dredge and tugs would likely cause the animal to avoid the area of dredging.

The project is not expected to significantly contribute to underwater sound levels outside the immediate project area. Information on underwater sound levels in the Duwamish Waterway is not available, therefore underwater sound levels of operating dredges measured in the lower Snohomish River were used as a substitute (Pentec, 2010, and SAIC, 2011). The ambient sound level in the lower Snohomish River is about 135 to 140 dB (re: 1 micro Pascal, root mean square (1 uPa, rms)) (SAIC and RPS/EH, 2011). Measurements of sound levels generated by dredging were as high as 177 dB 1 uPa, rms for a hydraulic dredge, and 170 dB 1 uPa, rms for a clamshell dredge (Pentec 2010, SAIC and RPS/EH, 2011). However this sound was subsumed into background within 150 meters. The Duwamish Waterway has soft substrate and likely absorbs underwater sound rapidly. Due to the infrequent occurrence of marine mammals in the Duwamish Waterway, and the small area of effect in comparison to the animals' forage range, it is unlikely that an increase of sound in a 150 meter radius area would change the behavior of or otherwise negatively affect marine mammals.

8.3 Endangered Species Act

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded projects must take into consideration effects to ESA listed or proposed threatened or endangered species. Since maintenance dredging would affect some listed species, a Section 7 consultation is required. The Corps prepared a BE for submission to USFWS and NMFS. The Corps' effect determinations (which can be found in Section 3.4 of the BE) are that no species or critical habitat would be adversely affected. The Corps has submitted the BE and is currently in consultation with the Services.

8.4 Clean Water Act

Section 404 of the Clean Water Act authorized a permit program for the disposal of dredged or fill material into waters of the United States, and defined conditions which must be met by Federal projects before they may make such discharges. The Corps of Engineers retains primary responsibility for this permit program. The Corps does not issue itself a permit under the program it administers, but rather demonstrates compliance with the substantive requirements of the Act through preparation of a 404(b)(1) evaluation.

The Corps has prepared and distributed for public comment a Section 404 public notice. The Corps also prepared a 404(b)(1) evaluation to document findings regarding this project pursuant to Section 404 of the Act as well as Section 10 of the Rivers and Harbors Act of 1899. Based on the analyses of the 404(b)(1) Evaluation, the Corps finds that the preferred alternative of this project complies with the substantive elements of Section 404 of the Clean Water Act.. These documents can be found in Appendix B.

Section 401 of the Act requires federal agencies to comply with state water quality standards. On 8 February 2011, the Corps submitted a letter and documentation to Ecology requesting issuance of a Water Quality Certificate. The Corps will abide by the conditions of the Water Quality Certificate to ensure compliance with State water quality standards.

8.5 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972, as amended, requires Federal agencies to carry out their activities in a manner which is consistent to the maximum extent practicable with the enforceable policies of the approved Washington Coastal Zone Management Program. The Corps has prepared a CZMA Consistency Determination for the navigation channel maintenance program. This evaluation established that the proposed work complies with the policies, general conditions, and general activities specified in the approved Grays Harbor County Shoreline Management Master Plan, the City of Westport Shoreline Management Master Plan, and the Grays Harbor Estuary Management Plan. The proposed action is thus considered consistent to the maximum extent practicable with the State of Washington Shoreline Management Program. These documents can be found in Appendix C.

8.6 Marine Protection, Research, and Sanctuaries Act

Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA) authorizes the EPA to promulgate ocean dumping criteria and designate recommended ocean disposal sites. The Southwest (3.9) site has been designated as an ocean disposal site under Section 102 of the MPRSA.

8.7 National Historic Preservation Act

The National Historic Preservation Act requires that the effects of proposed actions on sites, buildings, structures, or objects included or eligible for the National Register of Historic Places must be identified and evaluated. It is the policy of the Corps that historic resources surveys should not be conducted for maintenance dredging and disposal activities proposed within the boundaries of previously constructed navigation channels or previously used disposal areas [33 CFR 336.1(c)(6)]. Since the proposed dredging is confined to the removal of recently deposited sediments within the previously dredged channel width and depth boundaries, no submerged cultural resources would be affected by the project.

8.8 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires Federal agencies to consult with the NMFS regarding actions that may adversely affect EFH for Pacific coast groundfish, coastal pelagic species, and Pacific salmon. An EFH determination was included in the 2011 BE submitted to NMFS for review. The Corps is currently in consultation with NMFS on EFH.

8.9 Clean Air Act

Section 176 of the Clean Air Act (CAA), 42 USC 7506(c), prohibits Federal agencies from approving any action that does not conform to an approved state of Federal implementation plan. Maintenance dredging and disposal activities are specifically excluded from CAA conformity determination requirements [40 CFR 51.853 (c)(1)(ix)].

8.10 Executive Order 12898, Environmental Justice

Executive Order 12898 requires Federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations. The surrounding area is an industrial and commercial district, which would benefit from the action, with no significant proportion of minority or low income population.

The project does not involve siting of a facility that would discharge pollutants or contaminants. Dredged material is thoroughly tested for a wide variety of contaminants prior to disposal to ensure that the material is suitable for unconfined, open-water disposal. Therefore, no human health effects would occur. Maintenance of the existing navigation project would not negatively affect property values in the area, or socially stigmatize local residents or businesses in any way.

8.11 Executive Order 11988, Floodplain Management

Executive Order 11988 requires Federal agencies to consider how their activities may encourage future development in floodplains. No new or additional dredging would be provided that would encourage additional development.

9 REFERENCES

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APPENDIX A. Finding of No Significant Impact (FONSI)

DEPARTMENT OF THE ARMY
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CENWS-PM-ER

**Fiscal Years 2011 and into Future Years Maintenance Dredging, Duwamish River
Navigation Channel and Turning Basin, Seattle, Washington**

DRAFT FINDING OF NO SIGNIFICANT IMPACT

Background.

The project described in the Environmental Assessment (EA) is a component of the Seattle Harbor Federal Navigation Project, providing maintenance of a navigation channel in the upper Duwamish Waterway. The upper Duwamish Waterway is located approximately five miles upstream of the outlet of the Duwamish River into Elliott Bay and approximately six miles south of downtown Seattle. The upper Duwamish Waterway is part of the Seattle Harbor Federal Navigation Project and maintenance dredging, authorized by the Rivers and Harbors Acts of March 2, 1925 and July 3, 1930. The authorized dimension for the channel bottom width is 150 feet expanding to 250 feet by 500 feet long at the upstream end (locally called the turning basin). The upper Duwamish Waterway is important to local water oriented businesses as a transportation route and the turning basin is used as a location where ships can safely turn around. Without annual maintenance dredging, shoaling would lead to a shallower channel and turning basin that would reduce the ability of large ships to enter and leave safely. Dredging is accomplished using mechanical (clamshell) equipment, loading the dredged materials onto bottom dump barges. Maintenance dredging is required on a one to three year frequency in the upper Duwamish Waterway to remove shoaling river sediments.

Proposed Action.

The U.S. Army Corps of Engineers (Corps) proposes to dredge up to 200,000 cubic yards between stations 242+00 and 275+56 during each dredging cycle beginning in FY 2011/12 through 2019 every one to three years. The proposed dredging in FY 2011/2012 (November 2011 through January 2012) includes up to 200,000 cy of silt and sand in the upper turning basin and navigation channel between stations 242+00 and 275+56.

Disposal of dredged materials is proposed at the Washington State Department of Natural Resources (DNR) managed Dredged Material Management Program (DMMP) open water site in Elliott Bay. A suitability determination will be conducted by the Dredged Material Management Program agencies (Corps, Environmental Protection Agency, Washington Department of Ecology and DNR) prior to dredge operations. Disposal activities at the DMMP open water site will be conducted in accordance with established criteria for these sites, as detailed in their respective Biological Assessments, concurrence letters, and Biological Opinions. Dredging and disposal activities are scheduled to be performed between November 1 and February 15, of any year dredging occurs. Usually it takes 45 days to complete the dredging, but can take longer depending on weather conditions. Some dredged material may be used for beneficial uses such as capping toxic sediments and/or beach nourishment in selected locations. If beneficial uses can be identified, the material will be made available for that purpose.

If any of the dredge material is unsuitable for open water disposal it will be disposed of in an approved upland disposal site. Some material is likely to be unsuitable because dredging will occur farther downstream than past maintenance dredging in an area where known contamination is located. Upland disposal in a certified disposal site of some of the material may be required.

Summary of Environmental Effects.

While there will be a loss of subtidal habitats for benthic invertebrates and demersal fish species, this loss is expected to endure for only a few months as these areas continuously reshore, and benthic populations are expected to recolonize the dredged areas quickly. There would likely be small-scale, temporary increases in turbidity and decreases in dissolved oxygen within the river channel during dredging activities. Increases in turbidity and decreases in dissolved oxygen will be localized and only occur during active dredging. In order to reduce these effects and potential related effects on juvenile salmonids in the river, all 'in-water' construction work will take place between November 1 and February 15 of each year. Effects to turbidity and temperature are minimized by scheduling the action in the winter when background turbidity is typically higher and river temperature is lower, thereby reducing the small increment of effect from dredging. Therefore, the Corps concludes the proposed action will not have a significant effect on benthic invertebrates or water quality.

The in-water construction of this project will occur when Endangered Species Act (ESA) listed threatened juvenile and adult Puget Sound Chinook salmon and Coastal/Puget Sound bull trout are least likely to be present in the Duwamish River. The Corps has written a Biological Evaluation and determined that the dredge project 'may effect, but is not likely to adversely affect' ESA-listed species present in the project area. The Corps has consulted with the National Marine Fisheries Service and U.S. Fish and Wildlife Service as required by the ESA (50 CFR 402.16), and has received letters of concurrence with the Corps' findings. Avoiding 'in-water' work during peak salmonid out migration periods (generally between February 15 and July 15) will minimize the short-term effects of the project on juvenile salmonids and allow for maximum recovery of the benthic, epibenthic, and forage fish communities prior to the subsequent year's juvenile salmonid out migration period. By starting the project in November, a month earlier than in the past dredge maintenance cycles with the objective of finishing before mid January, the Corps will add a further time buffer to avoid the critical out migration periods of juvenile salmon. Therefore, the Corps finds that the proposed action will not have a significant effect on juvenile salmonids or ESA-listed species.

There will be no effect on known historic and cultural resource sites because maintenance dredging does not deepen, widen, or otherwise change the location or configuration of the established navigation channel, turning basin, or disposal sites. Navigation channel maintenance was coordinated with the State Historic Preservation Office in March 1988, and received concurrence with the finding of “no potential to adversely affect historic properties”. There will be no adverse effects to fishing rights of Native American Tribes. The Muckleshoot Tribe is supportive of the project as the maintenance dredging of the channel and turning basin allows the Tribe to fish in their native and customary fishing grounds.

Effects to the human environment will be temporary and localized. Dredging and disposal vessels may temporarily disrupt local boat traffic, increase air emissions and noise in the vicinity of the dredging and disposal sites, and decrease the aesthetic attractiveness of the general area during the approximately 45 days of dredging. The Duwamish River is highly industrialized and is constantly affected by noise, traffic, and air quality issues; therefore the additional effects in those areas will be managed through implementation of appropriate control plans. Because the effects will only add a small increment of marine traffic disruption, air emissions, and noise in an already highly industrialized area, the Corps finds that effects of the proposed action are not significant.

Section 401 of the Clean Water Act requires Federal agencies to comply with state water quality standards for any action that constitutes a fill under Section 404 of the Act. There will be no loss of intertidal mudflat or marsh habitats; however, the disposal of dredged material at the DMMP site in Elliott Bay is governed by Section 404. On 8 February 2011, the Corps submitted a letter and documentation to the Washington Department of Ecology requesting issuance of a Water Quality Certification. The Corps will abide by the conditions of the Water Quality Certification to ensure compliance with State water quality standards; therefore, the Corps has concluded that effects to water quality will be insignificant.

Effects from the dredging and disposal activities will generally be highly localized in nature, short in duration, and minor in scope. The Corps has determined that effects of this navigation project will not be significant, either individually or cumulatively.

Finding.

Based on the analysis detailed in the EA (attached) and summarized above, I have determined that the proposed project will not result in significant adverse environmental effects, does not constitute a major Federal action significantly affecting the quality of the human environment and, therefore, does not require preparation of an environmental impact statement.

Date

Anthony O. Wright
Colonel, Corps of Engineers
District Commander

APPENDIX B. 404(b)(1) Evaluation

**Fiscal Year 2011 and into Future Years Maintenance Disposal
Upper Duwamish Waterway Maintenance Dredge Operation
Seattle, King County, Washington**

**Substantive Compliance for
Clean Water Act Section 404**

1. Introduction. The purpose of this document is to record the Corps' evaluation and findings regarding this project pursuant to Section 404 of the Clean Water Act (CWA).

The following action is covered by this document: disposal of the dredged material at the Elliott Bay Open Water disposal Site.

The information contained in this document reflects the findings of the project record. Specific sources of information included the following:

- a. U.S. Army Corps of Engineers. 1988. Final environmental impact statement – unconfined, open-water disposal sites for dredged material, Phase I (Central Puget Sound). Puget Sound Dredge Disposal Analysis. Cooperatively prepared by (in alphabetical order) U.S. Army Corps of Engineers, Seattle District; U.S. Environmental Protection Agency, Region 10; Washington State Department of Ecology; and Washington State Department of Natural Resources. 285pp+ Appendices.
- b. Duwamish River Navigation Project, Fiscal Years 2007-2011 Maintenance Dredging and Disposal Programmatic Biological Evaluation, dated August 2006.
- c. U.S. Army Corps of Engineers. 2010. Biological Evaluation. Continued use of Puget Sound Dredge Disposal Analysis Program (PSDDA) Dredged Material Disposal Sites. 99pp+Appendices.
- d. Duwamish River Navigation Project, Fiscal Years 2011 and into Future Years Maintenance Dredging and Disposal Environmental Assessment, dated May 2011.
- e. Duwamish River Navigation Project, Fiscal Years 2011 and into Future Years Maintenance Dredging and Disposal Programmatic Biological Evaluation, dated April 2011.
- f. 404(b)(1) Evaluation (see below).
- g. Public Interest Review (see below).

This document addresses the substantive compliance issues of the Clean Water Act 404(b)(1) Guidelines [40 CFR §230.12(a)] and the Regulatory Programs of the Corps of Engineers [33 CFR §320.4(a)].

2. Project Background. The proposed action is routine upper Duwamish Waterway Federal maintenance dredging with disposal of dredged material at the Elliott Bay Open Water Disposal Site and an approved upland disposal site if needed for disposal of unsuitable material. The Duwamish Waterway navigation channel was originally

authorized by the Rivers and Harbors Acts of 1925 and 1930. The area typically dredged is a settling basin (also known locally as the turning basin) that extends from a natural bend in the Duwamish River at River Mile 5.5 downstream approximately 2,100 feet. Additional dredging is proposed directly downstream of the settling basin for a distance of about 1,200 feet. The overall distance to be dredged is about 3,300 feet. To return the upper Duwamish Waterway to its authorized depth the Corps typically removes up to 100,000 cubic yards of dredged material from the settling basin (Turning basin) and another 100,000 cubic yards will likely be dredged from the channel below the settling basin for a total of about 200,000 cubic yards during each dredge cycle.

3. **Project Need.** This project is needed because shoaling reduces the ability of ships to enter and leave safely under full load or during low tide conditions.
4. **Project Purpose.** The purpose of dredging and disposal operations in the upper Duwamish Waterway is to maintain the deep draft navigation channel to facilitate the commercial shipping traffic that is important for supporting the local and regional economy.
5. **AVAILABILITY OF LESS ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVES TO MEET THE PROJECT PURPOSE. THE ALTERNATIVES EVALUATED FOR THIS PROJECT WERE AS FOLLOWS:**

- a. **No Action Alternative.** Under this alternative, the Corps would not dredge the upper Duwamish Waterway. This would have a significant negative effect on the local maritime economy. The Duwamish navigation channel would accumulate sediments, which would greatly restrict use by larger vessels. Shoaling would reduce the ability of ships to enter and leave safely under full load or during low tide conditions, and would likely cause at least one boat builder to move or go out of business. This alternative would avoid negative effects to the aquatic environment caused by disposal; however, problems for marine traffic caused by the present shoaling rate would continue and worsen as sediments accumulate. Additionally, the No Action Alternative could cause increased harm to the aquatic environment if a prolonged emergency dredge operation was required, and the probability of at least some unsuitable material entering the water column during dredging.
- b. **Upland Disposal Alternative.** Under this alternative, all dredged material would be stockpiled at one or more upland sites and eventually used for construction or other development purposes. The costs and benefits of rehandling/reuse depend on transportation fees, rehandling expenses, and the demand for the use of the material on dry land. There are no upland disposal sites available near the project area and adjacent upland sites are fully occupied by commercial interests. Thus, transportation costs to a disposal site would be high. Rehandling of the material onto a barge for transport and then piping to the disposal site would increase costs compared to open water disposal. In addition, upland resource areas would be affected by disposal activity; therefore, due to no availability of local upland disposal sites, potential environmental effects, costs of rehandling, this option was not considered further (Corps 2011).
- c. **Proposed Alternative.** This is the proposed and preferred alternative. Under this alternative, the

majority of the material will be disposed of at the DMMP open water site in Elliott Bay, and a small fraction will be disposed of in an approved upland disposal site (the amount of each will be determined based on sediment characterization, scheduled for May 2011). Based on previous test results, the majority of the material is expected to meet DMMP guidelines for open water disposal and consequently will be disposed of at the Elliott Bay DMMP site; however, given the expanded footprint of the project (compared to previous years), there may be some unsuitable material that cannot be disposed of in an open water disposal site. This option is being considered because of the need to dredge the additional 1,200 feet downstream of the turning basin, which is likely to contain some unsuitable material. The unsuitable material would be disposed of in an approved upland disposal site likely at far greater cost than material that meets DMMP guidelines. Approved upland sites for unsuitable material are located many miles away, thus transportation costs to a disposal site may be high; however, there is no practical alternative location in the Duwamish River area that can take unsuitable materials. Dredging and disposal activities will be performed between November 1 and February 14 of each year that dredging is performed. If beneficial use of the suitable material is identified, the material will be made available for that purpose (a beneficial use for drift cell nourishment in drift cell KI-5-1 [near Burien and Des Moines] is being evaluated). The actual dredging and disposal (unless inclement weather causes a delay) should take approximately 45 days to complete.

- d. Mechanically
(clamshell) dredged material would be disposed of at the Elliott Bay DMMP disposal site only, and unsuitable material would be left in place. This alternative would avoid affecting upland resource areas and would remove most of the material from the system, but would allow continued shoaling in the channel. This option is less costly than the combination of open water disposal and upland disposal, or all upland disposal, because of closer proximity to the disposal site, and because dredged material would not be rehandled (Corps 1988). This option, however, would leave some material in the navigation channel that could pose a safety hazard to maritime traffic. Disposal activities would be conducted in accordance with established criteria for the DMMP site. Dredging and disposal activities would be performed between November 1 and February 14 of each year that dredging is performed. If beneficial disposal uses are identified, the suitable material would be made available for that purpose. The actual dredging and disposal (unless inclement weather causes a delay) should take approximately 45 days to complete.

. The Corps rejected Alternatives 1, 2, and 4 because they were not practicable, nor would they meet the project purpose and need. Alternative 3 is the least environmentally damaging practical alternative that meets the purpose and need.

6. **SIGNIFICANT DEGRADATION, EITHER INDIVIDUALLY OR CUMULATIVELY, TO THE AQUATIC ENVIRONMENT**

- a. . Habitat in the Elliott Bay dredge material management program open water disposal site will be disturbed by the disposal of dredge material. The Corps has assessed potential effects from open water disposal and determined that they will generally be localized to previously-disturbed areas, short in duration (occur

when disposal occurs and since disposal takes only minutes the disposal site will sustain a short duration effect), and minor in scope. Effects of disposal operations on salmonids will be reduced and/or avoided through implementation of timing restrictions. Due to these measures, negative effects to the Endangered Species Act listed species should not be significant either individually or cumulatively.

- b. . No significant adverse effects on recreation, aesthetics, or the economy are anticipated.

. The Corps has determined that there would be no significant adverse effects to aquatic ecosystem functions and values.

7. **Appropriate and Practicable Measures to Minimize Potential Harm to the Aquatic Ecosystem**

- a. . Potential effects of disposal operations on juvenile salmonids will be avoided through implementation of timing restrictions. No disposal of dredged material will occur during the outmigration period, February 15 through June 14, for the protection of Chinook salmon (), a species listed as threatened under the Endangered Species Act. This timing restriction, designated by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS), is protective of bull trout () foraging in the lower portion of the Duwamish River watershed (subadults and adults moving into and out of the estuary) and migrating juvenile Chinook salmon and steelhead ().

- b. . The Elliott Bay open water site was initially chosen because deposition of dredge material in that location would have minimal impacts to the aquatic environment. In addition the dredge material is generally disposed of at a time when Endangered Species Act listed species are not likely to be present.

[NOTE: Dissolved oxygen (DO) levels will be temporarily reduced during dredging, generally on the order of 1 to 2 milligrams per liter (mg/L) from ambient levels. The Corps monitors DO levels as the dredge operates. If DO levels drop below 4 mg/l, operations are suspended until conditions improve. Dredge operations will be conducted in winter when DO levels are typically high partially due to low temperatures. Thus the dredge operation may depress DO levels but will have little effect on the aquatic ecosystem.]

- c. . There will be no mitigation measures because the work will not change significantly any habitat.

. The Corps has determined that all appropriate and practicable measures have been taken to minimize potential harm.

8. **Other Factors in the Public Interest.**

- a. . The Corps is coordinating with State and Federal agencies, as well as Tribes, to assure careful consideration of fish and wildlife resources. The Corps has prepared a Biological Evaluation in accordance with the Endangered Species Act. The

Corps will assure full compliance with the Endangered Species Act prior to and during project implementation.

- b. . The Corps will obtain a Department of Ecology Water Quality Certification. The Corps will abide by the conditions in the Water Quality Certification to ensure compliance with State water quality standards.
- c. . Since the proposed dredging is confined to the removal of recently deposited sediments within the previously dredged channel width and depth boundaries, no submerged cultural resources will be affected by the project.
- d. . The Corps has determined that this maintenance work is consistent to the maximum extent practicable with the approved State of Washington Shoreline Management Program.
- e. . Not applicable
- f. . A minor, temporary disruption of navigation traffic may result from dredging and disposal operations. A Notice to Mariners will be issued before dredging and disposal operations are initiated. The action will maintain the channel for use by deep draft vessels.
 . The Corps has determined that this project is within the public interest.

9. **Conclusions.** Based on the analyses presented in regulatory project NEPA documents, as well as the following 404(b)(1) Evaluation and General Policies analysis, the Corps finds that this project complies with the substantive elements of Section 404 of the Clean Water Act.

404(B)(1) Evaluation [40 CFR §230] and General Regulatory Policies Analysis [33 CFR §320.4]

404(b)(1) Evaluation [40 CFR§230]

Potential Impacts on Physical and Chemical Characteristics (Subpart C)

1. **Substrate [230.20]** The surface substrate at the Elliott Bay open water disposal site consists of fine grain materials of marine and freshwater origin. Materials disposed of at the Elliott Bay open water disposal site are of similar particle size and larger. The Elliott Bay open water disposal site is a non-dispersive site and therefore bathymetric surveys are conducted to monitor the accumulation of dredge material.
2. **Suspended Particulate/Turbidity [230.21]** The discharge of dredged material at the Elliott Bay open water disposal site will result in a temporary increase in turbidity and suspended particulate levels in the water column, particularly in near-bottom waters. The material will rapidly sink to the bottom, while a small percentage of finer material is expected to remain in suspension. Increases in turbidity associated with disposal operations will be minimal (confined to the areas in the immediate vicinity of the disposal sites) and of short duration (currents will disperse any suspended material within hours of disposal).
3. **Water Quality [230.22]** No significant water quality effects are anticipated. During disposal operations, a localized turbidity plume may persist for a short period during the descent of dredged material through the water column. A minor reduction in dissolved oxygen may be associated with this plume, primarily during disposal of silty sediments. Since disposal operations consist of a series of instantaneous, discrete discharges over the dredging schedule, any water quality effects should be short lived (hours) and localized (immediate vicinity). All of the sediments will have been tested and approved for open water disposal under the guidelines of the Dredged Material Management Program (DMMP) administered by the Corps, Environmental Protection Agency (EPA), Washington Department of Ecology (Ecology), and Washington Department of Natural Resources (DNR). Additional sediment sampling and analysis will occur in advance of each dredging event. Material that does not meet DMMP guidelines will be disposed of in an approved upland disposal site and thus will not impact water quality.
4. **Current Patterns and Water Circulation [230.23]** The disposal of material dredged from the upper Duwamish Waterway will not obstruct flow, change the direction or velocity of water flow/circulation, or otherwise change the dimensions of the receiving water body. Most dredged material placed at the disposal site will remain in the disposal site and not re-enter the water column.
5. **Normal Water Fluctuations [230.24]** The disposal of material dredged from the upper Duwamish Waterway navigation channel will not impede normal tidal fluctuations. The

Elliott Bay open water disposal site is located in water deeper than 200 feet. This site is in deep enough water (> 200 feet) that currents and tidal flows will not be affected.

6. **Salinity Gradients [230.25]** The disposal of material dredged from the upper Duwamish Waterway navigation channel will not divert or restrict tidal flows and thus will not affect salinity gradients.

Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D)

1. **Threatened and Endangered Species [230.30]** Pursuant with Section 7 of the Endangered Species Act, the Corps prepared a Programmatic Biological Evaluation to assess potential effects of the proposed work on species protected under the Endangered Species Act. This document concluded that upper Duwamish Waterway maintenance dredging is not likely to adversely affect bull trout, Chinook salmon, or steelhead.
2. **Aquatic Food Web [230.31]** Turbidity associated with disposal operations may interfere with feeding and respiratory mechanisms of benthic, epibenthic, and planktonic invertebrates. Some sessile invertebrates in the navigation channel will suffer mortality from dredge operations. Species characteristic of these sites are opportunistic species, often small, tube-dwelling, surface-deposit feeders that exhibit patchy distribution patterns in space and time. Several studies have found that benthic infauna recolonize disposal sites quickly (several months), but that they may never reach mature equilibrium because of the frequent dredging. More mobile epibenthic organisms are expected to escape the immediate area without significant injury. Potential effects of dredging and disposal operations on salmonids will be reduced and/or avoided through implementation of timing restrictions and dredge type restrictions.
3. **Wildlife [230.32]** Noise associated with disposal operations may have an effect on bird and marine mammals in the project vicinity. The effects of any sound disturbance would likely result in displacement of animals rather than injury. Increases in turbidity associated with dredged material disposal could reduce visibility in the immediate vicinity of disposal activities, thereby reducing foraging success for any animals in the area. Any reduction in availability of food would be highly localized and would subside rapidly upon completion of the dredging and disposal operations. Disposal operations are not expected to result in a long-term reduction in the abundance and distribution of prey items. No breeding or nesting areas will be directly affected.

Potential Impacts to Special Aquatic Sites (Subpart E)

1. **Sanctuaries and Refuges [230.40]** Not applicable
2. **Wetlands [230.41]** Dredged material will not be discharged in wetland areas. Use of the designated disposal sites will not alter the inundation patterns of wetlands in the project vicinity.
3. **Mudflats [230.42]** Dredged material will not be discharged onto mudflats. Use of the designated disposal sites will not alter the inundation patterns of nearby mudflats.

4. **Vegetated Shallows [230.43]** Dredged material will not be discharged onto or directly adjacent to vegetated shallows. Under some tidal and weather conditions, a disposal plume of fine sediment fractions may travel over vegetated shallows. Such a minor increase in fine sediment is likely not measurable compared to the relative contribution of suspended sediments that normally move downstream with the river current.
5. **Coral Reefs [230.44]** Not applicable.
6. **Riffle and Pool Complexes [230.45]** Not applicable.

Potential Effects on Human Use Characteristics (Subpart F)

1. **Municipal and Private Water Supplies [230.50]** Not applicable.
2. **Recreational and Commercial Fisheries [230.51]** Some sport fishing grounds are located near the dredging and disposal site. Channel maintenance work is timed and located to minimize effects to fishing seasons in the dredging and disposal areas, as well as critical migration periods for salmonids.
3. **Water-related Recreation [230.52]** Not applicable.
4. **Aesthetics [230.53]** Disposal operations will not change the appearance of the project area. Localized, temporary increases in noise, lighting, and turbidity will occur while equipment is operating, but are not expected to be significant.
5. **Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves [230.54]** Not applicable.

Evaluation and Testing (Subpart G)

1. **General Evaluation of Dredged or Fill Material [230.60]** The material to be dredged is predominantly sand and silty sand. The areas to be dredged have been tested in accordance with DMMP guidelines and only material that is within those guidelines would be disposed of in water. Those materials that do not meet DMMP guidelines will be disposed of in an approved upland disposal site.
2. **Chemical, Biological, and Physical Evaluation and Testing [230.61]** The results of past testing conducted in accordance with DMMP procedures has demonstrated that the majority of material in the dredge area met DMMP guidelines. Those results supported the finding that most of the dredged material was suitable for open-water disposal. Testing of the material to be dredged is underway. Any material not suitable for open water disposal will be disposed of in an approved upland site. Only material that meets DMMP guidelines will be disposed of in the Elliott Bay open water disposal site.

Action to Minimize Adverse Effects (Subpart H)

1. **Actions Concerning the Location of the Discharge [230.70]** The effects of the discharge would be minimized by the choice of disposal sites. The disposal site has been

used for dredged material discharge. The discharge will not disrupt tidal flows. The location and timing of the proposed discharge has been planned to minimize smothering of organisms.

2. **Actions Concerning the Material to be Discharged [230.71]** Since concentrations of chemicals of concern in the materials to be discharged at the Elliott Bay open water disposal site are low, no treatment substances nor chemical flocculates will be added before disposal. The potency and availability of any pollutants present in the dredged material should be maintained.
3. **Actions Controlling the Material after Discharge [230.72]** Since the dredged materials have been approved for non-confined open water disposal by the inter-agency DMMP, no containment levees or capping is necessary.
4. **Actions Affecting the Method of Dispersion [230.73]** The disposal site has been selected by taking into account currents and circulation patterns to minimize dispersion of the discharge.
5. **Actions Related to Technology [270.74]** Appropriate machinery and methods of transport of the material for discharge will be employed. All machinery will be properly maintained and operated.
6. **Actions Affecting Plant and Animal Populations [270.75]** The Corps has coordinated dredging and disposal activities with the local Native American Tribes and the State and Federal resource agencies to assure minimal effects to fishery and wildlife resources.
7. **Actions Affecting Human Use [230.76]** The discharge will not result in damage to aesthetically pleasing features of the aquatic landscape. The discharge will not increase incompatible human activity in remote fish and wildlife areas.
8. **Other actions [230.77]** Not applicable.

General Policies for the Evaluation of Permit Applications [33 CFR §320.4]

1. **Public Interest Review [320.4(a)]** The Corps finds these actions to be in compliance with the 404(b)(1) guidelines and not contrary to the public interest.
2. **Effects on Wetlands [320.4(b)]** No wetlands will be altered by the disposal of material from dredging operations.
3. **Fish and Wildlife [320.4(c)]** The USFWS and the NMFS are being consulted to ensure that direct or indirect loss and damage to fish and wildlife resources attributable to dredging and disposal operations will be minimized.
4. **Water Quality [320.4(d)]** The Corps will abide by the conditions of the Section 401 Water Quality Certification issued by the Department of Ecology to ensure compliance with Washington water quality standards. Dissolved oxygen (DO) concentrations will be

monitored during dredging; work will temporarily cease if DO falls below the level defined by Ecology in the Water Quality Certification.

5. **Historic, Cultural, Scenic, and Recreational Values [320.4(e)]** The U.S. Army Corps of Engineers has consulted with representatives of interested Tribes, the State Historic Preservation Office, and other parties and has determined that the planned undertaking will have no effect on historic properties. No wild and scenic rivers, historic properties, National Landmarks, National Rivers, National Wilderness Areas, National Seashores, National Recreation Areas, National Lakeshores, National Parks, National Monuments, estuarine and marine sanctuaries, or archeological resources will be adversely affected by the proposed work.
6. **Effects on Limits of the Territorial Sea [320.4(f)]** Not applicable.
7. **Consideration of Property Ownership [320.4(g)]** Not applicable.
8. **Activities Affecting Coastal Zones [320.4(h)]** The proposed work complies with the policies, general conditions, and general activities specified in the King County Shoreline Management Master Plan.
9. **Activities in Marine Sanctuaries [320.4(i)]** Not applicable.
10. **Other Federal, State, or Local Requirements [320.4(J)]**
 - a. . An Environmental Assessment (EA), tiered from past Environmental Impact Statements, has been prepared to satisfy the documentation requirements of NEPA.
 - b. . In accordance with Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration effects to federally listed or proposed threatened or endangered species. A Programmatic Biological Evaluation (PBE) was submitted to USFWS and NMFS on May 24, 2011. The Corps anticipates receiving letters from NMFS and USFWS concurring with the determinations made in the PBE in June, 2011.
 - c. . The Corps must demonstrate compliance with the substantive requirements of the Clean Water Act. The Corps has requested a new Water Quality Certificate from Ecology. The Corps will abide by the conditions of the new Water Quality Certificate and future Water Quality Certifications to ensure compliance with State water quality standards.
 - d. . The Coastal Zone Management Act of 1972, as amended, requires Federal agencies to carry out their activities in a manner which is consistent to the maximum extent practicable with the enforceable policies of the approved Washington Coastal Zone Management Program. The Corps has prepared a Coastal Zone Management Act Consistency Determination for the Duwamish Waterway navigation channel maintenance program. This evaluation established that

the proposed work complies with the policies, general conditions, and general activities specified in the King County Shoreline Management Master Plan. The proposed action is thus considered consistent to the maximum extent practicable with the State of Washington Shoreline Management Program.

e

Not applicable

f

. The National Historic Preservation Act (16 USC 470) requires that the effects of proposed actions on sites, buildings, structures, or objects included or eligible for the National Register of Historic Places must be identified and evaluated. It is the policy of the Corps (33 CFR 336.1[c][6]) that historic resources surveys should not be conducted for maintenance dredging and disposal activities proposed within the boundaries of previously constructed navigation channels or previously used disposal areas. Since the proposed dredging is confined to the removal of recently deposited sediments within the previously dredged channel width and depth boundaries, and disposal will occur in a previously used disposal site, no submerged cultural resources will be affected by the project.

g

. The Fish and Wildlife Coordination Act (16 USC 470) requires that wildlife conservation receive equal consideration and be coordinated with other features of water resource development projects. A report is not required for maintenance work.

11. Safety of Impoundment Structures [320.4(k)] Not applicable.

12. Floodplain Management [320.4(l)] Disposal operations will not alter any floodplain areas.

13. Water Supply and Conservation [320.4(m)] Not applicable.

14. Energy Conservation and Development [320.4(n)] Not applicable.

15. Navigation [320.4(o)] Disposal operations will maintain the channel for use by deep draft navigation vessels.

16. Environmental Benefits [320.4(p)] Not applicable.

17. Economics [320.4(q)] The economic benefits of the upper Duwamish Waterway Navigation Project are important to the local community.

18. Mitigation [320.49(r)] Potential effects of disposal operations on salmonids will be avoided through implementation of timing restrictions. The number of organisms injured and killed due to disposal of dredged material will be minimized through timing restrictions. [NOTE: The Corps will monitor DO levels as the dredges operate in the upper Duwamish Waterway. If DO levels drop below 4 mg/l, operations are suspended until conditions improve.]

APPENDIX C. CZMA

COASTAL ZONE MANAGEMENT ACT CONSISTENCY DETERMINATION

Fiscal Year 2011 and Beyond Maintenance Dredging and Disposal

Stations 242+00 to 275+56

Upper Duwamish Waterway Federal Navigation Channel, Seattle, Washington

1. Introduction. Pursuant to the Coastal Zone Management Act (CZMA) 16 USC 1456 (c), Federal agency activities are required to be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State Management Programs. The Shoreline Management Act (SMA) of 1972 (RCW 90.58) is the core of authority of Washington's CZM Program. Primary responsibility for the implementation of the SMA is assigned to local government. The proposed Federal action applicable to this consistency determination is the dredging of about 200,000 cubic yards of sediment on a one to three year cycle from between Stations 242+00 and 275+56 of the Upper Duwamish Waterway Federal navigation channel, which is a continuation of established maintenance dredging. This determination of consistency with the Washington Coastal Zone Management Act is based on review of applicable sections of the State of Washington Shoreline Management Program and policies and standards of the King County Shoreline Management Master Program.

2. State Of Washington Shoreline Management Program. Primary responsibility for implementation of the State of Washington Shoreline Management Act of 1971 has been assigned to local governments. The applicable local government office responsible for the King County Shoreline Master Program as defined in RCW 90.58 is the King County Department of Development and Environmental Services.

3. Description of King County Plan. King County's Shoreline Master Program was adopted in 1978. In August 2009, King County released a new recommended Shoreline Master Program which has not yet been formally adopted. The Master Program of King County guides permit review for all relevant shoreline activities and in-water work activities in the project area.¹ The following outlines pertinent sections of the King County program. The Corps of Engineers consistency determination is indicated in .

The shoreline of the Duwamish River in the vicinity and downstream of the Turning Basin is designated as "Urban." The portions of the King County Code that apply to dredging in the Urban Environment and implement the Shoreline Management Act and the King County Shoreline Management Master Program follow below.

¹ The eastern portion of the dredging area is within the current city limits of the city of Tukwila. Tukwila's current Shoreline Master Program was adopted in 1974. The portion of the project within Tukwila is part of areas annexed by Tukwila since 1974. The City of Tukwila has submitted a Shoreline Master Program to Ecology for approval. Simultaneously, King County has submitted an updated Shoreline Master Program (the two jurisdictions are cooperating) to Ecology. Neither plan has been approved by Ecology. Therefore dredging remains subject to the standards and policies contained in the approved King County Shoreline Master Program from 1978.

KCC 25.16.190 Excavation, dredging and filling. Excavation, dredging and filling may be permitted in the urban environment, only as part of an approved overall development plan not as an independent activity, but only in accordance with the following:

A. Any fill or excavation regardless of size, shall be subject to the provisions of KCC 16.82.100;

B. Landfill may be permitted below the ordinary high water mark only when necessary for the operation of a water dependent or water related use, or when necessary to mitigate conditions which endanger public safety;

C. Landfill or excavations shall be permitted only when technical information demonstrates water circulation, littoral drift, aquatic life and water quality will not be substantially impaired;

D. Wetlands such as marshes, swamps and bogs shall not be disturbed or altered through excavation, filling, dredging or disposal of dredged material unless the manager determines that either:

1. The wetland does not serve any of the valuable functions of wetlands identified in K.C.C. 20.12.080 and United States Army Corps of Engineers 33 CFR 320.4(b), including, but not limited to, wildlife habitat and natural drainage functions; or

2. The proposed development would preserve or enhance any or all of the wildlife habitat, natural drainage and other valuable functions of wetlands as discussed in K.C.C. 20.12.080 or United States Army Corps of Engineers 33 CFR 320.4(b) and would be consistent with the purposes of this title;

E. Class I beaches shall not be covered by landfill except for approved beach feeding programs;

F. Excavations on beaches shall include precautions to prevent the migration of fine grain sediments, disturbed by the excavation, onto adjacent beach areas and excavations on beaches shall be backfilled promptly using material of similar composition and similar or more coarse grain size;

G. No refuse disposal sites, solid waste disposal sites or sanitary fills of putrescible or nonputrescible material shall be permitted within the shorelines of the state;

H. Excavation or dredging below the ordinary high water mark shall be permitted only:

1. When necessary for the operation of a water dependent or water related use;
2. When necessary to mitigate conditions which endanger public safety or fisheries resources;
3. As part of and necessary to roadside or agricultural ditch maintenance that is performed consistent with best management practices promulgated through administrative rules pursuant to the sensitive areas provisions of K.C.C. chapter 21A.24 and if:
 - a. the maintenance does not involve any expansion of the ditch beyond its previously excavated size. This limitation shall not restrict the county's ability to require mitigation, pursuant to K.C.C. chapter 21A.24, or other applicable laws;
 - b. the ditch was not constructed or created in violation of law;
 - c. the maintenance is accomplished with the least amount of disturbance to the stream or ditch as possible;
 - d. the maintenance occurs during the summer low flow period and is timed to avoid disturbance to the stream or ditch during periods critical to salmonids; and
 - e. the maintenance complies with standards designed to protect salmonids and salmonid habitat, consistent with K.C.C. chapter 21A.24; provided, that this paragraph shall not be construed to permit the mining or quarrying of any substance below the ordinary high water mark;

I. Disposal of dredged material shall be done only in approved deep water disposal sites or approved contain upland disposal sites;

J. Stockpiling of dredged material in or under water is prohibited;

K. Maintenance dredging not requiring a shoreline permit(s) shall conform to the requirements of this section;

L. Dredging shall be timed so that it does not interfere with aquatic life;

M. The county may impose reasonable conditions on dredging or disposal operations including but not limited to working seasons and provisions of buffer strips, including retention or replacement of existing vegetation, dikes and settling basins to protect the public safety and shore users' lawful interests from unnecessary adverse impact;

N. In order to insure that operations involving dredged material disposal and maintenance dredging are consistent with this program as required by RCW 90.58.140(1), no dredging may commence on shorelines without the responsible person having first obtained either a substantial development permit or a statement of exemption, though no statement of exemption or shoreline permit is required for emergency dredging needed to protect property from imminent damage by the elements;

O. Operation and maintenance of any existing system of ditches, canals or drains, or construction of irrigation reservoirs, for agricultural purposes are exempt from the shoreline permit requirement. (Ord. 16172 § 7, 2008: Ord. 13247 § 3, 1998: Ord. 5734 § 6, 1981: Ord. 3688 § 414, 1978).

In addition to King County Code, the King County Shoreline Master Program provides general policies for application to Urban Environments, as describe below.

1. Emphasis should be given to development within already developed areas.

2. Priority should be given to shoreline dependent and water oriented uses over other uses. Uses which are neither shoreline dependent or water oriented should be discouraged except for residential.

3. Emphasis should be given to developing visual and physical access to the shoreline in the Urban Environment.

4. To enhance the waterfront and insure maximum public use, industrial and commercial facilities should be designed to permit pedestrian waterfront activities consistent with public safety and security.

5. Multiple use of the shoreline should be encouraged.

6. Redevelopment and renewal of substandard areas should be encouraged in order to accommodate future users and make maximum use of the shoreline.

7. Aesthetic considerations should be actively promoted by means of sign control regulations, architectural design standards, planned unit development standards, landscaping requirements and other such means.

8. Development should not significantly degrade the quality of the environment, including water quality and air quality, nor create conditions which would accentuate erosion, drainage problems or other adverse impacts on adjacent Environments.

Finally, the King County Shoreline Master Program provides general policies for dredging activities, as discussed below.

1. Dredging and excavation in unique and fragile areas should not be allowed.

2. In all cases, dredging and excavation operations should be conducted to minimize adverse effects on the shoreline development.

3. Dredging operations should be scheduled so as to not materially interfere with the movements of fish.

4. When dredge spoil has suitable organic and physical properties, dredging operators should be encouraged to recycle dredged material into areas of the County suitable for agricultural practices.

5. Local and regional planning for development of long-term disposal sites for dredging spoils should be initiated by King County.

6. Shoreline areas where dredging and excavation and the disposal of dredge and excavation spoil are prohibited should be defined and designated.

4. Conclusion. Based on the above evaluation, The Corps has determined that the proposed dredging and disposal activities comply with the policies, general conditions, and activities as specified in the King County Shoreline Master Program. The Corps accordingly considers the proposed action consistent to the maximum extent practicable with the approved State of Washington Shoreline Management Program.