US Army Corps of Engineers ®
Portland District

DRAFT Environmental Assessment

Wahkiakum Ferry Federal Navigation Channel Realignment and Widening, Wahkiakum County, Washington

Contractor Clamshell Dredge Seahorse at Baker Bay Side Channel

20 June 2014

Executive Summary

The U.S. Army Corps of Engineers, Portland District (Corps), proposes to realign, widen, and continue operations and maintenance (O&M) of the Wahkiakum Ferry (WF) Federal Navigation Channel (FNC). This draft Environmental Assessment (EA), prepared by the Corps will be submitted for public review per the National Environmental Policy Act (NEPA). The purpose of this draft EA is to inform members of the public about the proposed realignment, widening, and continued operations and maintenance (O&M) program for the Wahkiakum Ferry (WF) Federal Navigation Channel (FNC) located at approximate River Mile (RM) 43.5 of the Columbia River, and to disclose new information about the environment and the effects to it by the alternatives listed in the draft EA. This draft EA also serves to solicit comments on the alternatives listed in the draft EA.

The purpose of realignment, widening, and O&M program of the WF FNC is to provide a wider turning radius leading into the Puget Island ferry terminal berth for the new ferry and to provide a continuous, safe, reliable ferry channel by periodically removing unsafe and restricting shoals. In order to widen the WF FNC, river sediments need to be dredged from the realigned and widened channel prism and placed in-water within the Columbia River FNC flowlane. Specific project actions include:

1) Improve ferry access to the Puget Island ferry terminal by realigning and widening the ferry channel in order to allow for a wider turning radius into the terminal berth.
2) Continue O&M dredging in order to provide a safe, reliable ferry channel.

The WF FNC would be realigned and widened after the Corps has received all required environmental clearances.

Table of Contents

1. Introduction 1
1.1. Purpose and Need 2
1.2. Project Description 2
1.2.1. Vicinity of the Proposed Project 2
1.2.2. Adjacent Projects 2
1.2.3. Wahkiakum Ferry Channel Project History and Configuration 3
1.2.4. Authority and Funding 3
1.3. Alternatives 4
1.3.1. No Action Alternative 4
1.3.2. Proposed Action Alternative 4
1.4. Approvals and Permits 6
2. Affected Environment and Environmental Consequences 7
2.1. Biologic Environment 7
2.1.1. Aquatic and Terrestrial Communities 7
2.1.2. Vegetation 8
2.1.3. Aquatic and Terrestrial Wildlife Species 8
2.1.4. Endangered Species Act Listed Species 9
2.1.5. Invasive Species 16
2.2. Physical Environment 18
2.2.1. Air Quality 18
2.2.2. Hydrology, Geology, and Morphology 19
2.2.3. Water Quality 22
2.3. Human Environment 24
2.3.1. Socio-Economic 24
2.3.2. Archaeological and Historic Resources 26
2.3.3. Visual Quality 28
2.4. Climate Change 29
2.4.1. Affected Environment 29
2.4.2. Environmental Consequences 30
2.5. Cumulative Impacts 30
2.5.1. Past, Present and Reasonably Foreseeable Actions 31
2.5.2. Effects 33
3. Compliance with Environmental laws 36
3.1. National Environmental Policy Act 36
3.2. Bald and Golden Eagle Protection Act 36
3.3. Clean Air Act 36
3.4. Clean Water Act 36
3.5. Coastal Zone Management Act 37
3.6. Comprehensive Environmental Response, Compensation, and Liability Act and Resource Conservation and Recovery Act 37
3.7. Endangered Species Act 37
3.8. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments 38
3.9. Executive Order 12898, Environmental Justice 38

3.10. Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance 38
3.11. Executive Order 11988, Floodplain Management 39
3.12. Executive Order 13112, Invasive Species 39
3.13. Executive Order 13186, Migratory Birds 39
3.14. Executive Order 11990, Protection of Wetlands 39
3.15. Farmland Protection Policy Act 39
3.16. Fish and Wildlife Coordination Act 40
3.17. Magnuson-Stevens Fishery Conservation and Management Act 40
3.18. Marine Mammal Protection Act 40
3.19. Marine Protection, Research, and Sanctuaries Act 41
3.20. Migratory Bird Treaty Act 41
3.21. Wild and Scenic Rivers Act 41
3.22. National Historic Preservation Act 41
4. Coordination and Distribution 43
5. Literature Cited 44
Appendix One 1
5.1.1. Terms and Conditions of NMFS 2012 BiOp 1

LIST OF FIGURES

Figure 1. Map of the current and proposed realignment and widening of the WF FNC. 5

LIST OF TABLES

Table 1. List of Approvals and Permits needed. 6
Table 2. ESA-listed Anadromous Salmonids under NMFS Jurisdiction. 10
Table 3. ESA-listed Fish and Marine Wildlife Species under NMFS Jurisdiction. 11
Table 4. EFH in the Action Area. 11
Table 5. ESA-listed Wildlife Species under USFWS Jurisdiction. 14
Table 6. Most common Invasive Species likely to be found or invade the Columbia River system. 16

ABBREVIATIONS AND ACRONYMS

ACHP	Advisory Council on Historic Preservation
AMD	Advanced Maintenance Dredging
APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
BA	Biological Assessment
BiOp	Biological Opinion
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CR	Columbia River
Corps	US Army Corps of Engineers, Portland District
CRD	Columbia River Datum
CWA	Clean Water Act
cy	cubic yard(s)
CZMA	Coastal Zone Management Act
DAHP	Department of Historic Preservation
DEQ	Oregon Department of Environmental Quality
DMEF	Dredged Material Evaluation Framework
DOE	Washington Department of Ecology
DPS	Distinct Population Segment
EA	Environmental Assessment
EFH	Essential Fish Habitat
EPA	U. S. Environmental Protection Agency
ER	Engineering Regulation
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FNC	Federal Navigation Channel
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	foot or feet
FWCA	Fish and Wildlife Coordination Act
MBTA	Migratory Bird Treaty Act
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSA	Magnusson-Stevens Fishery Management and Conservation Act
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

O&M	operation and maintenance
OHW	ordinary high water
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RHA	Rivers and Harbors Act
RM	river mile
RPM	reasonable and prudent measures
SEF	Sediment Evaluation Framework for the Pacific Northwest
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
TMDL	Total Maximum Daily Load
USC	US Code
USGCRP	US Global Change Research Program
USFWS	US Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WF	Wahkiakum Ferry
WQC	Water Quality Certification
WRDA	Water Resources Development Act

1. INTRODUCTION

The US Army Corps of Engineers, Portland District (Corps) is the lead agency under the National Environmental Policy Act (NEPA) for this document. This document has been prepared by the Corps for compliance with NEPA. The Corps proposes to realign and widen a section of the Wahkiakum Ferry (WF) Federal Navigation Channel (FNC). The WF FNC is located at Columbia River mile (RM) 43.5 and is currently authorized to a width of 200 feet (ft), a length of 1,900 ft, and depth of 9 ft, Columbia River Datum (CRD). Wahkiakum County purchased a new ferry and requested the Corps to realign and widen the WF FNC to accommodate the new, larger ferry named *M/V Oscar B.* The new ferry will use the existing ferry route between Puget Island, Wahkiakum County, Washington and Westport, Clatsop County, Oregon. Previous documents prepared by the Corps for the authorization and operation and maintenance (O&M) (dredging and placement) of the WF FNC include (but are not limited to):

a. *Westport, Oregon – Puget Island, Washington Wahkiakum County Ferry Channel Detailed Project Report, Section 107 Study* (Corps, 1993) (1993 Section 107 Study), which discussed the authorization, construction, and maintenance of the WF FNC.
b. *Environmental Assessment (EA), Westport, Or – Puget Island, WA Channel Dredging, Wahkiakum County, Washington.* Finding of No Significant Impact (FONSI), signed by Colonel, Corps of Engineers, Charles Hines. 29 April 1993.
c. *EA, Columbia River Federal Navigation Channel Operations and Maintenance Dredging and Dredged Material Placement Network Update, River Miles 3 to 106.5, Washington and Oregon*. 10 June 2014. (Columbia River O&M EA)

This draft Environmental Assessment (EA) addresses two alternatives for the WF FNC; the No Action and the Proposed Action alternative. The No Action alternative would continue to implement O&M within the existing alignment and width of the WF FNC as described and analyzed in the NEPA documents above and approved in the FONSI. The Proposed Action would realign and widen the existing WF FNC and provide subsequent O&M dredging and dredged material placement of the realigned and widened channel. For this project area, five species have been delisted and sixteen (16) species have become listed under the Endangered Species Act (ESA) since the 1993 Section 107 Study. The four species that have been delisted by the US Fish and Wildlife Service (USFWS) are the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrines*), brown pelican (*Pelecanus occidentalis*), and the Aleutian Canada goose (*Branta canadensis leucopareia*). The species that has been delisted by the National Marine Fisheries Service (NMFS) is the Steller sea lion (*Eumetopias jubatus*). This draft EA analyzes the effects of both alternatives to the listing of 16 new species under the ESA since the 1993 FONSI. Fifteen (15) species have been listed by the NMFS: Snake River spring/summer run Evolutionary Significant Unit (ESU), Snake River fall run ESU, Lower Columbia River ESU, Upper Columbia River spring run, and Upper Willamette River Chinook Salmon (*Oncorhynchus tshawytscha*); Snake River sockeye salmon (*O. nerka*); Lower Columbia River coho Salmon *(O. kisutch);* Columbia River Chum Salmon (*O. keta*); Snake River Basin, Lower Columbia River, Middle Columbia River, Upper Columbia River, and Upper Willamette River steelhead (*O. mykiss*); Southern Distinct Population Segment (DPS) of green sturgeon (*Acipenser medirostris*); and Southern DPS of Pacific eulachon (*Thaleichthys pacificus*). The USFWS listed one species: Columbia River DPS of bull trout (*Salvelinus confluentus*).

1.1. Purpose and Need

The Proposed Action is two-fold: the first action is to realign and widen the existing WF FNC and the second action is to provide continued O&M dredging of the widened and realigned channel. The purpose of the Proposed Action is to provide a realigned and widened channel for the continuous, safe, and reliable use of the navigation channel by removing restricting shoals. The purpose of widening the WF FNC is to accommodate the *M/V Oscar B*. The *M/V Oscar B* is wider and longer but drafts shallower than the currently operating ferry, *Wahkiakum*. Since *M/V Oscar B* is longer and wider, a wider turning radius to and from the WF FNC to the Puget Island ferry berth is needed. The WF FNC needs to be realigned and widened in order provide the new, larger ferry safe egress to and from the Puget Island ferry berth.

1.2. Project Description

1.2.1. Vicinity of the Proposed Project

The Columbia River runs for 1,240 miles. The head of Columbia River starts high in the Rocky Mountain Range of British Columbia, Canada, winding its way northwest before turning south into Washington State, of the United States. The Columbia River forms a portion of the border between Washington and Oregon before flowing into the Pacific Ocean. The Wahkiakum Ferry crosses the Columbia River between two ferry terminals; the Puget Island ferry terminal on Puget Island, Washington and Westport ferry terminal at Westport, Oregon. The WF FNC provides access to the Puget Island ferry terminal. The WF FNC is at approximately RM 43.5 of Columbia River, completely within Wahkiakum County of Washington State. Material dredged from the WF FNC is placed in the Columbia River (CR) FNC flowlane.

1.2.2. Adjacent Projects

The Columbia River FNC is immediately adjacent to the WF FNC. The CR FNC Project is located between RM +3.0 of the Columbia River and RM 106.5 at Vancouver, WA. The Columbia River is authorized to a depth of 43 ft, CRD, from RM 3 to RM 106.5. Advanced maintenance dredging (AMD) is practiced up to five ft below the authorized channel depth (48 ft CRD) and up to 100 ft outside the authorized channel width. This AMD approach enhances navigational safety by maintaining the authorized channel depth (which is necessary to ensure adequate under-keel clearance) during periods of channel shoaling that occur between maintenance dredging events and is conducted at the same time as routine maintenance dredging. Dredged material is primarily placed in-water in or adjacent to the CR FNC, along the shoreline, and at upland sites, but can also be placed at designated ocean and nearshore sites.

The Westport FNC serves the Westport ferry terminal, located in Clatsop County, Oregon. The Westport FNC meets the Columbia River at RM 43 and extends south from the CR FNC into Westport Slough approximately 3,500 ft. The Westport FNC is authorized to a length of 3,500 ft, width of 200 ft, and depth of 28 ft, CRD. The most recent dredging events maintain the channel to a depth of 9 ft, CRD. Material dredged from this channel is placed in-water in or adjacent to the CR FNC.

1.2.3. Wahkiakum Ferry Channel Project History and Configuration

A privately owned ferry has been operated on the Columbia River between Puget Island, Washington and Westport, Oregon as early as 1925. Due to service inconsistency provided by the privately-owned ferry service, Wahkiakum County assumed ferry operation in 1962. In 1988, Wahkiakum County requested assistance for navigation improvement from the Corps. The Corps conducted a Section 107 Rivers and Harbors Act (RHA) study and authorized the Wahkiakum Ferry Channel as a FNC in 1993. In 2010, Wahkiakum County completed an upgrade to the Puget Island ferry terminal. The ferry landing was redesigned with a much longer loading platform to handle buses and trucks. The loading platform increased in length from 69 ft to 163 ft. The current ferry has been in operation since 1962 and is capable of transporting 12 cars and 78 passengers; however, the current ferry is nearing the end of its operational lifecycle. Wahkiakum County recently purchased a new ferry to replace the current ferry. The *M/V Oscar B* is longer and wider, but drafts shallower than the *Wahkiakum* ferry. The *M/V Oscar B* is capable of transporting 23 cars and 100 passengers, as well as tour buses and large recreational vehicles.

The authorized WF FNC is currently maintained to a width of 200 ft and a depth of 9 ft plus 2 ft of advanced maintenance depth (AMD) The WF FNC starts approximately 50 ft south of the Puget Island ferry terminal and extends 1,900 ft towards the CR FNC. The first 900 ft of the channel contains shoals shallower than 9 ft and the remaining length (1,000 ft) of the channel is naturally deeper than 9 ft as it extends towards the CR FNC. Material dredged from the WF FNC is placed in-water in or adjacent to the CR FNC.

1.2.4. Authority and Funding

The Corps has been the federal governmental agency responsible for maintaining US navigable waters since 1824. Congress authorized projects such as CR FNC through various RHAs, the earliest one being enacted in 1878. Section 107 of the RHA of 1960, as amended, provides authority for the Corps of Engineers to plan and construct small FNC projects that have not already been specifically authorized by Congress. The RHAs gave way to the Water Resources Development Acts (WRDA) starting in 1973. Congress provides appropriations for maintenance of FNCs. Placement of dredged material is not formally designated within these authorizations. In-water placement of dredged material is governed by Section 404 of the Clean Water Act (CWA). The Corps does not issue itself a Section 404 CWA permit for authorization of dredged material placement in-water; however, the Corps conducts the 404(b)(1) analysis and implements the guidelines put forth by the CWA.

In 1988, Wahkiakum County requested the Corps' assistance for navigation improvements pursuant to Section 107 of the 1960 RHA. In 1993, the WF FNC was authorized as a FNC under Section 107 of the RHA of 1960. Maintenance dredging and in-water placement of dredged sediments to maintain this authorized FNC is conducted under the provisions of Sections 401 and 404 of the CWA of 1977, and in accordance with Regulations 33 Code of Federal Regulations (CFR) parts 335 through 338 ("Operation and Maintenance of Army Corps of Engineers Civil Works Projects Involving Discharge of Dredged or Fill Material into Waters of the US or Ocean Waters" and affiliated procedures, etc).

1.3. Alternatives

1.3.1. No Action Alternative

The No Action alternative entails continuing the existing O&M program within the existing alignment and configuration of the WF FNC. The No Action alternative provides the baseline for estimating direct and indirect impacts associated with the Proposed Action. The No Action alternative assumes that the WF FNC would continue to be maintained with dredging to its existing dimensions within its current channel alignment.

The *Wahkiakum* ferry is at the end of its lifecycle. Ferry boats have an average operational life expectancy of 25 to 30 years. The *Wahkiakum* is now in its 51st year of operation and is not expected to endure many more years of repair and rehabilitation before being retired from service. Wahkiakum County expects that the *M/V Oscar B* will not be safely operational within the current WF FNC configuration and will not use the new ferry without a channel revision. Once the *Wahkiakum* is retired, the need to conduct O&M of WF FNC would cease. Typical O&M for the WF FNC occurs every three to five years. An estimated 15,000 to 25,000 cubic yards (cy) of material is removed during each O&M dredging cycle. Dredged material is placed in-water in or adjacent to the CR FNC. Each dredging cycle takes approximately one week to conduct. It is anticipated that O&M of WF FNC would only require one more dredging cycle before the *Wahkiakum* ceases operation.

1.3.2. Proposed Action Alternative

The Proposed Action entails realigning and widening the WF FNC and continuing the existing O&M program for the realigned and widened WF FNC. The Proposed Action was developed in response to a request received from Wahkiakum County in 2012. Wahkiakum County states that the existing WF FNC does not meet the needs of the new ferry landing and that the current alignment of the WF FNC will not adequately serve *M/V Oscar B*. The Proposed Action addresses Wahkiakum County's concerns.

The proposed channel will widen to 300 ft wide, from the existing 200 ft width and it will shift upstream 170 ft so that it overlaps 130 ft of the existing channel width. The proposed channel will extend parallel to the existing channel length from the Puget Island ferry berth toward the CR FNC for approximately 650 ft. At that point, the revised channel will merge with the existing channel over the course of 500 ft and then continue in deep water to the CR FNC. For consistency with other side channels, the WFC stationing begins at the centerline of the CR FNC. The authorized depth of the channel would remain unchanged, at 9 ft CRD. It is anticipated that 20,000 cy of material will be dredged and placed during the initial widening, realignment, and maintenance of the existing channel. Dredged material will be placed in the CR FNC flowlane. It is expected the realigned and widened channel will remain within the same O&M dredging cycle of approximately 15,000 to 25,000 cy every three to five years. Each dredging cycle takes approximately one week to conduct. The revised WF FNC is expected to continue to operate as a navigational corridor for at least the next 20 years.

1.3.2.1. Project Area and Action for both the No Action and Proposed Action alternative

Puget Island, which is located in the lower Columbia River, is approximately 4,785 acres and it is oriented southeast to northwest within the Columbia River. Cathlamet Channel is north of the island. It separates Puget Island from the Washington shoreline; a bridge spans this channel providing access from the Washington mainland to Puget Island. Puget Island has multiple sloughs and several smaller islands along its perimeter. The majority of Puget Island is protected by levees that sever direct hydrologic surface connections for the interior sloughs. Puget Island is entirely within the State of Washington. The Puget Island ferry terminal is located at the terminus of State Route 409. The WF FNC is to the south of Puget Island in waters ranging from depths of 5 ft CRD to deeper than 20 ft CRD. See Figure 1 for a map of the current and proposed realignment and widening of the WF FNC.

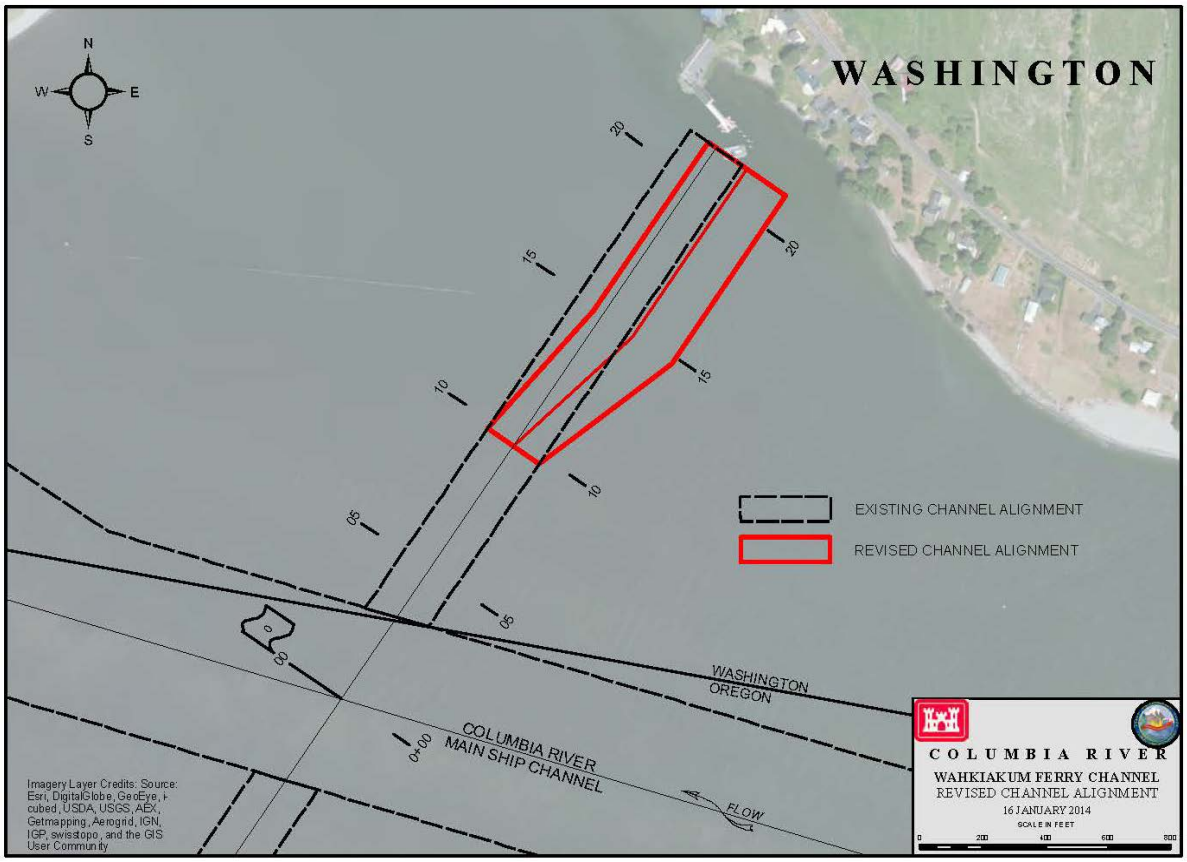

Figure 1. Map of the current and proposed realignment and widening of the WF FNC.

Both the No Action and Proposed Action entail the use of a crane fitted with a clamshell bucket or excavator mounted on a barge to conduct the O&M dredging work. The bucket will be maneuvered vertically through the water column to the shoal. When the bucket is full and closed, the bucket will be pulled vertically through the water column and maneuvered to a bottom-dump scow situated

nearby. The bed material to be dredged from the channel is over 96% coarse-grained sand and 3.5% fines (USACE 2014).

The Corps will place the dredged material via a bottom-dumping scow in-water in or adjacent to the CR FNC approximately 14,000 ft downstream of the dredging area. When the bottom-dump scow reaches carrying capacity or the WF FNC has been excavated to the desired prism, the scow will be towed to the in-water dredged material placement area. When over the placement area, the material will be released through the bottom of the scow, through either a split-hull or a series of doors. The Corps will distribute the dredged material evenly throughout the placement site. The Corps estimates that the dredging and placement actions will take approximately one week. It is expected that the mechanical dredge barge and scow will be floated to the project site from another project site or moorage. No upland mobilization of equipment is required.

In-water dredged material placement is conducted throughout the CR flowlane in or adjacent to the CR FNC. Placement of materials depends on the condition/depths of the river bottom each year as deeper flowlane areas are filled with dredged material, new deep areas are formed elsewhere in the river system as a result of natural hydrologic processes. In-water placement typically occurs at depths between 35 to 65 ft, with occasional exceptions. Where geologic features situated throughout the Columbia River constrain the channel, in-water placement may be required in waters as shallow as 20 ft or deeper than 65 ft.

1.4. Approvals and Permits

Table 1 outlines the permits and approvals that would be required prior to updating the project:

Table 1. List of Approvals and Permits needed.

Agency	Permit/Approval	Status
Washington Department of Ecology (DOE)	CZMA Consistency Determination Concurrence	Received April 29, 2014; no further action needed
Washington Department of Ecology (DOE)	401 Water Quality Certificate (WQC)	Amendment to WQC #9765; received April 29, 2014; no further action needed
National Marine Fisheries Service (NMFS)	Concurrence to “no change to effect determination” from the 2012 BiOp	Received 18 April, 2014; no further action needed
US Fish and Wildlife Service (USFWS)	BiOp to update 2010 Letter of Concurrence	Received BiOp 6 June, 2014; no further action needed

2. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

2.1. Biologic Environment

2.1.1. Aquatic and Terrestrial Communities

The focus of this section is on biological communities, not individual plant or animal species. The Columbia River serves as a wildlife and fish corridor. These corridors are areas of habitat used by wildlife for seasonal or daily migration. There are a wide range of regulations and laws that dictate and provide protection for components of the biologic environment. The applicable laws and compliance with the laws is detailed in Chapter 3. Species and habitat areas that have been designated under the ESA are reviewed in Section 2.1.4.

2.1.1.1. Affected Environment

The WF FNC is approximately 10 acres and is comprised of sandy shallow-water and deep-water habitats. During the September 2013 sediment characterization sampling, corbicula (*Corbicula fluminea*) clams were documented in the sandy substrates of the WF FNC (Corps, 2014).

2.1.1.2. Environmental Consequences

Dredging may temporarily disrupt or alter aquatic biotic communities. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value. Aquatic biotic communities are present within the project area. There will be no disruption of terrestrial communities on or adjacent to the project. Disturbance of aquatic habitats would range from a few hours for the water column during dredging, to a few days after dredging for the riverbed. The water column will return to background turbidity conditions once the dredging action ceases. The aquatic biotic communities are expected to re-colonize within the project area within one month to a year (Wilber and Clarke, 1999).

2.1.1.2.1. No Action

The No Action includes the continued O&M dredging of the WF FNC within the current dredging prism. It is likely that O&M dredging of the WF FNC will cease should the *Wahkiakum* ferry be taken out of service. Due to the composition of the riverbed and high-energy hydraulics within this reach, it is unlikely that the aquatic communities will change in absence of the WF FNC O&M dredging. Fish migrating through this corridor may be less likely to temporarily avoid this area due to the decrease in boat traffic should the *Wahkiakum* ferry be retired. When compared against the amount of other boat and vessel traffic moving along this reach, this indirect effect is discountable.

2.1.1.2.2. Proposed Action

Due to the composition of the riverbed and high-energy hydraulics within this reach, it is unlikely that the aquatic communities will change from the Proposed Action and subsequent O&M of the

realigned and widened channel. If fish are present in the project area they will likely temporarily disperse during the widening and O&M dredging actions. Fish are least likely to be entrained by a clamshell dredge (Larson and Moehl, 1990; Nightingale and Simenstad, 2001). Fish moving through the project area may temporarily avoid this area during the operation of the *Wahkiakum* ferry or the new *M/V Oscar B* ferry.

2.1.2. Vegetation

2.1.2.1. Affected Environment

There is no terrestrial vegetation present in the WF FNC and are not further considered in this evaluation. The WF FNC is situated in shallow (<20 ft) and deep (>20 ft) water aquatic habitat communities. It is unlikely that aquatic vegetation is established in the sections of the WF FNC shallower than 9 ft. A ferry traverses along this channel a minimum of two times an hour, 18 hours a day, and 365 days a year. It is likely that continual propeller wash does not allow for aquatic vegetation to establish in the shallower parts of the WF FNC (Eriksson et. al., 2004). Due to the composition of the riverbed, rate of sediment transport, and high hydraulic energy along this reach, it is unlikely that aquatic vegetation is present or could become established in the deeper (<9 ft) sections of the WF FNC. No aquatic vegetation survey has been performed. No submerged vegetation was documented during the September 2013 characterization of the WF FNC sediments (USACE 2014).

2.1.2.2. Environmental Consequences

It is unlikely that vegetation is present within the project area due to water depths greater than 9 ft and high flows in the channel. Dredging is unlikely to impact aquatic vegetation present within the WF FNC. If there is vegetation present within the project area, dredging will remove it.

2.1.2.2.1. No Action

Due to the composition of the riverbed and high-energy hydraulics within this reach, it is unlikely that aquatic vegetation community will change in absence of the WF FNC O&M dredging.

2.1.2.2.2. Proposed Action

Due to the composition of the riverbed and high-energy hydraulics within this reach, it is unlikely that the aquatic vegetation communities are present, and will not change as a result of the Proposed Action and subsequent O&M of the realigned and widened channel.

2.1.3. Aquatic and Terrestrial Wildlife Species

The Columbia River system supports a wide variety of aquatic and terrestrial wildlife species. Species information was obtained from the USFWS, NMFS, and Washington Department of Fish and Wildlife (WDFW).

2.1.3.1. Affected Environment

A variety of species inhabit or periodically utilize the WF FNC and adjacent waters. Aquatic species likely to be found in the project area include: corbicula clams, largemouth bass, smallmouth bass, bullhead, carp, catfish, channel crappie, crawfish, eulachon, yellow perch, northern pike minnow, Chinook salmon, coho salmon, chum salmon, sockeye salmon, American shad, steelhead, green and white sturgeon, suckerfish, coastal cutthroat trout and walleye. Water-based avian species that may utilize the area are: terns, cormorants, gulls, pelicans, eagles, osprey, and waterfowl.

2.1.3.2. Environmental Consequences

The widening and continued O&M dredging would temporarily disrupt wildlife. Disturbances would occur during dredging and placement. The disturbance will stop once the dredging action is concluded for that season. Level of habitat disturbance would continue at its current rate.

2.1.3.2.1. No Action

Temporary disturbances to wildlife during O&M dredging are expected to dissipate quickly once work is completed. The dredging and placement actions will not permanently alter which wildlife species may utilize the WF FNC reach because the channel would retain its deepwater and shallow-water habitat characteristics. The lack of aquatic vegetation does not provide good forage or rearing habitat for aquatic or terrestrial species and it is unlikely that this reach would become a highly valued habitat for use by wildlife.

2.1.3.2.1. Proposed Action

The dredging and placement actions will not permanently alter which wildlife species may utilize the WF FNC reach because it would maintain its deepwater and shallow-water habitat characteristics. Temporary disturbances to wildlife during dredging and placement are expected to dissipate quickly once work is completed. The lack of aquatic vegetation does not provide good forage or rearing habitat for aquatic species.

2.1.4. Endangered Species Act Listed Species

The primary federal law protecting threatened and endangered species is the ESA, 16 United States Code (USC), Section 1531, et seq., as well as 50 CFR Part 402. The ESA and its subsequent amendments provide for the conservation and recovery of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of the ESA, federal agencies are required to consult with USFWS and/or NMFS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations essential for the conservation of threatened or endangered species. The outcome of consultation under Section 7 may include a Biological Opinion (BiOp) with an Incidental Take statement, a Letter of Concurrence and/or documentation of a no effect finding. Section 3 of the ESA defines “Take” as

"harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct."

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976, was established to conserve and manage fishery resources found off the coast, as well as anadromous species and Continental Shelf fishery resources of the United States. This act is implemented by exercising (a) sovereign rights for the purposes of exploring, exploiting, conserving and managing all fish within the exclusive economic zone established by Presidential Proclamation 5030, dated 10 March 1983, and (b) exclusive fishery management authority beyond the exclusive economic zone over such anadromous species, Continental Shelf fishery resources and fishery resources in special areas. Essential Fish Habitat (EFH) is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH." (50 CFR 600.810)

Since the 1993 EA, additional species have been listed under the ESA. The NMFS listed 15 species: Snake River spring/summer run ESU, Snake River fall run ESU, Lower Columbia River ESU, Upper Columbia River spring run ESU, and Upper Willamette River ESU of Chinook salmon; Lower Columbia River ESU of coho salmon; Columbia River ESU of Chum Salmon; Snake River sockeye salmon; Snake River Basin ESU, Lower Columbia River ESU, Middle Columbia River ESU, Upper Columbia River ESU, and Upper Willamette River ESU of steelhead; Southern DPS of green sturgeon; and Southern DPS of Pacific eulachon. The USFWS listed one species, the Columbia River DPS of bull trout.

The range of critical habitat in the Columbia River overlaps for NMFS ESA-listed salmon and steelhead (with exception for sockeye), eulachon, and green sturgeon (the WF FNC is located at the extreme upper extent of Lower Columbia River Estuary), as well as USFWS ESA-listed bull trout.

2.1.4.1. ESA-Listed Species Under NMFS Jurisdiction

2.1.4.1.1. Affected Environment

The federally listed threatened and endangered species or managed fisheries under the jurisdiction of the NMFS that may occur in the proposed project area are shown in Tables 3, 4, and 5.

Table 2. ESA-listed Anadromous Salmonids under NMFS Jurisdiction.

Evolutionarily Significant Unit	Status	Critical Habitat	Federal Register (FR) Citation
Chinook Salmon (*Oncorhynchus tshawytscha*)			
Snake River spring/summer run	Threatened	Yes	70 FR 37160; 28 June 2005
Snake River fall run	Threatened	Yes	70 FR 37160; 28 June 2005
Lower Columbia River	Threatened	Yes	70 FR 37160; 28 June 2005
Upper Columbia River spring run	Endangered	Yes	70 FR 37160; 28 June 2005
Upper Willamette River	Threatened	Yes	70 FR 37160; 28 June 2005
Coho Salmon *(Oncorhynchus kisutch)*			

Lower Columbia River	Threatened	Yes	70 FR 37160; 28 June 2005 78 FR 2725; 14 January 2013
Chum Salmon (*Oncorhynchus keta*)			
Columbia River	Threatened	Yes	70 FR 37160; 28 June 2005
Sockeye Salmon (*Oncorhynchus nerka*)			
Snake River	Endangered	Yes	70 FR 37160; 28 June 2005
Steelhead (*Oncorhynchus mykiss*)			
Snake River Basin	Threatened	Yes	71 FR 834; 1 January 2006
Lower Columbia River	Threatened	Yes	71 FR 834; 1 January 2006
Middle Columbia River	Threatened	Yes	71 FR 834; 1 January 2006
Upper Columbia River	Threatened	Yes	71 FR 834;1 January 2006
Upper Willamette River	Threatened	Yes	71 FR 834; 1 January 2006

Table 3. ESA-listed Fish and Marine Wildlife Species under NMFS Jurisdiction.

Species	Status	Critical Habitat	Federal Register (FR) Citation
Southern DPS* Green Sturgeon (*Acipenser medirostris)*	Threatened	Yes	71 FR 17757; 7 April 2006
Southern DPS Pacific Eulachon (*Thaleichthys pacificus*)	Threatened	Yes	75 FR 13012; 18 March 2010

*DPS = Distinct Population Segment

Table 4. EFH in the Action Area.

Fishery Management Plan with EFH	EFH affected	EFH conservation plan
Pacific Coast Salmon	Yes	Yes

2.1.4.1.2. Consultation History

The Corps has previously consulted with NMFS on the CR FNC O&M (which includes the WF FNC) program addressing effects to the ESA-listed species and EFH stated above.

> National Marine Fisheries Service. 2012. *Reinitiation of Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Columbia River Navigation Channel and operations and maintenance, Mouth of the Columbia River to Bonneville Dam, Oregon and Washington (HUCs 1708000605, 1708000307, 1708000108).* NMFS No. 2011/02095. Northwest Region. Seattle, Washington, 11 July 2012. (2012 BiOp)

The NMFS 2012 BiOp outlines Reasonable and Prudent Measures (RPMs) that, if followed, would avoid jeopardizing the continued existence of ESA-listed species or adverse modifications to their critical habitats within the jurisdiction of the NMFS. The RPMs includes measures for timing of work conducted, water quality monitoring sampling and monitoring, operational constraints, and construction requirements for in-water, upland, and shoreline dredged material placement sites. The NMFS 2012 BiOp concluded that the CR FNC O&M (the WF FNC was included in the assessment provided to NMFS) program is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of their designated critical habitats. The 2012 BiOp included Terms and Conditions to carry out RPMs to avoid and minimize the extent of take (see appendix one for the Terms and Conditions). The 2012 BiOp included two conservation

recommendations to offset potential adverse effects on EFH. The Corps provided the revised WF FNC Proposed Action information to NMFS on 2 April 2014. NMFS determined that there are no new effects of the action identified by this modification and no alteration in the estimation of take for this action (J. Fisher, email correspondence, 18 April 2014). Therefore, reinitiation of section 7 consultation is not required.

2.1.4.1.3. Environmental Consequences

The continued O&M dredging work and subsequent upland and aquatic placement of dredged materials may affect ESA-listed species and their habitats. The ESA-listed species affected by the project include 15 species and their critical habitat, if designated, that have been listed by NMFS since the 1993 EA, as listed in Tables 3 and 4. The duration of effects may range from a few hours during dredging and placement, to a few months on benthic communities to become re-established within the subsurface. The level of disturbance would continue at its current rate.

In-water placement of dredged materials may have adverse and beneficial effects to NMFS ESA-listed species and their habitats. The NMFS 2012 BiOp on the CR FNC O&M dredging program effects to NMFS ESA-listed species provides detailed effects analysis of the dredging and placement actions and concluded that the program is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of their designated critical habitats.

Salmonid species: Adult fish are generally migrating mid-channel and may be found throughout the water column, usually within the upper 25 ft. Adult salmon and steelhead are strong swimmers however and should be able to avoid dredges, discharge plumes and burial, NMFS is confident any potential for adult fish to be entrained or buried by the dredges is discountable.

Subyearling salmonids are most susceptible to potential entrainment in the side channels. Subyearling salmon tend to inhabit shallow-waters such as tidal wetlands side channels, mud and sand flats and beaches until they attain sufficient size to exploit deeper channels and open water habitat. The subyearling fish are commonly found near the shoreline in low velocity currents at depths from 3 to 6 ft but have been observed to depths of 20 ft. The potential for directly killing or injuring subyearling occurs only during active dredging and placement. The analysis conducted in the NMS 2012 BiOp shows that the based on the in-water work window, potential impacts that may result in killed or injured subyearling due to dredging and disposal is very small, if any.

Designated critical habitat for salmonids on the mainstem Columbia River is affected by a variety of industrial and commercial industry, hydropower operations, and private and public developments. Habitat and food-web changes within the river, and other factors affecting salmon population structure and life histories have altered the Columbia River's capacity to support juvenile salmon. The adult and juvenile migration corridors pass through the WF FNC. The WF FNC is within the range of habitat used by rearing juveniles but is dredged at a time when there are less fish present within the Columbia River system.

Eulachon: The potential for directly killing or injuring eulachon occurs only during active dredging and placement. The analysis conducted in the NMFS 2012 BiOp shows that the potential impacts that may result in killed or injured eulachon due to dredging (.0003% to .0158%) and placement

(.003% to .0334%) is very small compared to the amount of time and area eulachon may be present in the Columbia River system.

The WF FNC is within the lower Columbia River mainstem designated critical habitat for eulachon. The mainstem provides spawning and incubation sites, as well as large migratory corridor to tributary spawning areas and back to the Pacific Ocean.

Green sturgeon: Green sturgeon make non-spawning marine to estuarine forays into the Columbia River mainstem. The potential impacts that may result in killed or injured green sturgeon due to dredging is very small (.08%) compared to the amount of time and area where green sturgeon may be present during dredging and in-water placement of dredged material in the Columbia River system. The WF FNC (~RM 44) is located at the extreme upper extent of the green sturgeon's designated critical habitat within the Columbia River estuary (~ RM 46).

Essential Fish Habitat: Defined EFH within the project area consists of habitat for coho salmon and Chinook salmon. The primary adverse effects of dredging and placement operations necessary to complete the Proposed Action is the potential for entrainment that might grab, injure, or kill juvenile salmon or their prey. Additional temporary adverse effects are reasonably likely to occur due to modification of channel substrate and impairment of prey resources and reduced water quality conditions caused by periodic maintenance of the side channel.

2.1.4.1.3.1. No Action

Temporary disturbances to fish during dredging and placement are expected to dissipate quickly once work is completed. It is likely that dredging and placement of the WF FNC will cease once the *Wahkiakum* ferry is taken out of service. The dredging and placement will not permanently alter which species may utilize the WF FNC reach because the channel would retain its deep-water and shallow-water habitat characteristics. The lack of aquatic vegetation does not provide good forage or rearing habitat for aquatic species and it is unlikely that this reach would become a highly valued habitat for use by aquatic species.

The impact to NMFS ESA-listed species was calculated by assessing the magnitude, timing, duration and severity of effects during dredging and in-water placement actions. The effects to NMFS ESA-listed species did not reach the level of jeopardy. NMFS issued terms and conditions to be followed when conducting the CR FNC O&M program. The Corps will follow these terms and conditions.

The No Action alternative at the WF FNC would not have additional effects to NMFS ESA-listed species, their critical habitat, or EFH beyond the range of effects covered in the 2012 BiOp. The No Action alternative would maintain the existing site capacities and it would not differ in effects consulted upon in 2012 BiOp for NMFS ESA-listed species.

2.1.4.1.3.2. Proposed Action

The dredging and placement of the realigned and widened FNC will not permanently alter which species may utilize the WF FNC reach because it would maintain its deepwater and shallow-water habitat characteristics. Temporary disturbances to aquatic species during dredging and placement are

expected to dissipate quickly once work is completed. The lack of aquatic vegetation does not provide good forage or rearing habitat for aquatic species.

There is no change in overall cy volume disclosed in-water placement. The direct effects from dredging and in-water placement are within the range of effects considered in the NMFS 2012 BiOp. NMFS issued terms and conditions to be followed when conducting the CR FNC O&M. The Corps will follow these terms and conditions. The Proposed Action alternative at the WF FNC would not have additional effects to NMFS ESA-listed species, their critical habitat, or EFH beyond the range of effects covered in the 2012 BiOp. The Proposed Action alternative remains within the range of action disclosed in the 2012 BiOp and it would not differ in effects consulted upon for NMFS ESA-listed species.

2.1.4.2. ESA-Listed Species Under USFWS Jurisdiction

2.1.4.2.1. Affected Environment

The federally listed threatened and endangered species under the jurisdiction of USFWS that may occur in the proposed project area are shown in Table 6.

Table 5. ESA-listed Wildlife Species under USFWS Jurisdiction.

Species	Status	Critical Habitat	Federal Register
Marbled Murrelet (*Brachyramphus marmoratus*)	Threatened	Designated	57 FR 45328 45337; 1 October 1992
Columbian White-tailed Deer (*Odocoileus virginianus leucurus)*	Endangered	(none)	32 FR 4001; 11 March 1967
Bull Trout (*Salvelinus confluentus*)	Threatened	Designated	63 FR 31693 31710; 10 June 1998

2.1.4.2.2. Consultation History

The Corps has previously consulted with USFWS on the O&M dredging program of the CR FNC (the existing WF FNC was included in this consultation) to address effects to many ESA-listed species in their jurisdiction. Several species have been delisted and no longer require ESA consultation, which include the bald eagle, peregrine falcon, brown pelican, and the Aleutian Canada goose.

United States Fish and Wildlife Service. 2002. *Biological and Conference Opinions for the Columbia River Channel Improvement Project.* Tracking number 02-1743, 02-4943. Oregon State Office. Portland, Oregon. 20 May 2002.

United States Fish and Wildlife Service. 2010. *Letter of Concurrence for operations and maintenance of the Columbia River Federal Navigation Project.* Reference number 13420-2010-I-0165. Oregon State Office. Portland, Oregon. 29 September 2010.

United States Fish and Wildlife Service. 2014. *Biological Opinion for Continued Operations and Maintenance Dredging Program for the Columbia River Federal Navigation Channel in Oregon and Washington (2014 – 2018).* Reference

number 01EOFW00-2014-F-0112. Oregon Fish and Wildlife Office. Portland Oregon. 6 June 2014.

On 29 September 2010, the Corps received concurrence from the USFWS (USFWS reference #13420-2010-I-0165) that continued O&M dredging was "Not Likely to Adversely Affect" for the ESA-listed species addressed above. The potential effects of the WF FNC Proposed Action alternative to bull trout is consistent with the proposed action and no new or unforeseen effects beyond these addressed in the previous consultation are anticipated. In addition, the Corps determined the WF FNC Proposed Action would have "no effect" to marbled murrelet, Columbian white-tailed deer, western snowy plover (*Charadrius nivosus nivosus*), northern spotted owl (*Strix occidentalis caurina*), short-tailed albatross (*Phoebastria albatrus*), Oregon silverspot butterfly (*Speyeria zerene*), and water howellia (*Howellia aquatilis*). Therefore, these species do not require ESA consultation.

The Corps completed reinitiation of Section 7 consultation with the USFWS for the CR O&M program (which includes the WF FNC Proposed Action) since the streaked horned lark (*Eremophila alpestris strigata*) was listed in the 2013. In their Biological Opinion dated 6 June 2014, the USFWS concurred that the proposed action was "Not Likely to Adversely Affect" for bull trout and its designated critical habitat.

2.1.4.3. Environmental Consequences

The continued WF FNC O&M dredging work and in-water placement of dredged materials may affect but is "Not Likely to Adversely Affect" ESA-listed bull trout and its critical habitat. The duration of effects may range from a few hours during dredging and in-water placement. Based on Section 7 consultation with the USFWS, this level of habitat disturbance would continue at its current rate.

2.1.4.3.1. No Action

The No Action alternative would affect ESA-listed bull trout within the jurisdiction of the USFWS during dredging and in-water placement. The effects to bull trout were addressed in the USFWS 2010 Letter of Concurrence. The update to the overall CR O&M (which included the proposed realignment and widening of the WF FNC) program was described in a BA and submitted to USFWS February 2014. Potential adverse and beneficial effects to bull trout and its designated critical habitat are not expected to change from the USFWS 2010 Letter of Concurrence.

2.1.4.3.2. Proposed Action

The Proposed Action alternative would affect ESA-listed bull trout through O&M dredging of the revised WF FNC and subsequent aquatic placement of dredged materials. The effects to bull trout were addressed in the USFWS 2010 Letter of Concurrence and those effects are ongoing. The Proposed Action alternative would utilize the flowlane placement.

2.1.5. Invasive Species

Executive Order 13112 requires federal agencies to "prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause." The order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to the human health." WDFW along with regional invasive species management groups have identified the top priority invasive species for prevention from establishment or eradication efforts. Invasive species once established have the potential for widespread native ecological disruption by displacement of native plants and animals, reduction in habitat and species biodiversity, competition with native organisms for limited resources, and degradation of habitats. Once an introduced species becomes established, the species becomes increasingly difficult and expensive to control; invasive species has the potential to negatively affect the environmental and economic viability of a region.

2.1.5.1. Affected Environment

High priority invasive species have been identified as the species most likely to generate ecological and economic losses within the Lower Columbia River system, consequently causing relatively high impacts to the human and ecological environment. Some species are already established within the system; other species have been discovered but are yet established, while other species are not within the system. Table 7 outlines which species are established or if established, likely to disrupt the Lower Columbia River system. The Corps may come across these species during dredging and placement operations for the WF FNC.

Table 6. Most common Invasive Species likely to be found or invade the Columbia River system.

Species		Status
Aquatic plants		
	Caulerpa seaweed (*Caulerpa taxifolia*)	Eradicated
	Common reed (*Phragmites australis*)	Present
	Eurasian water milfoil (*Myriophyllum spicatum*)	Present
	Parrot's feather (*Myriophyllum aquaticum*)	Present
	Purple loosestrife (*Lythrum salicaria*)	Present
	Water chestnut (*Trapa natans*)	Not present
Aquatic animals		
	American Bullfrog (*Lithobates catesbeianus*)	Present
	Chinese Mitten Crab (*Eriocheir sinensis*)	Reported sightings, not confirmed
	Common Snapping turtle (*Chelydra serpentina serpentina*)	Present
	Crayfish (*Orconectes neglectus, O. rusticus, Procambarus clarkii*)	Present
	Green crab (*Carcinus maenas*)	Present
	New Zealand mud snail (*Potamopyrgus antipodarum*)	Present
	Nutria (*Myocastor coypus*)	Present
	Red-Eared Slider (*Trachemys scripta elegans*)	Present
	Zebra/quagga mussel (*Dreissena polymorpha, D. rostriformis bugensis*)	Not present
Fish		

	Asian carp (*Hypophthalmichthys nobilis, H. molitrix, Mylopharyngodon piceus*)	Present
	Atlantic salmon (*Salmo salar*)	Present: not established
	Northern snakehead (*Channa* spp.)	Not present
	Oriental Weatherfish (*Misgurnus anguillicaudatus*)	Present

None of the species on the list are used by the Corps for erosion control or pest management. Prior to moving into and leaving the project area, all equipment and materials would be inspected for the presence of invasive species. If an invasive species is found present, the equipment would be cleaned and eradication strategies would be implemented. Different management strategies are implemented depending on the type of invasive species found, the Corps refers to the National Invasive Species Council and the 100th meridian initiative for invasive species management information. In compliance with the Executive Order 13112, the Corps would exercise applicable precaution if invasive species are found in or adjacent to the project area.

2.1.5.2. Environmental Consequences

The dredging and subsequent aquatic placement of dredged materials may provide avenues for invasive aquatic species to be re-distributed in the lower Columbia River. Dredging may inadvertently pick up and move aquatic vegetation invasive or invasive veliger species from one place to another through direct entrainment or through species attachment onto the vessel.

2.1.5.2.1. No Action

The No Action alternative would not change the project ability to minimize spread of invasive species. The Corps implements strategies that minimize the likelihood of invasive species movement from project to project. The Corps conducts inspections and decontamination of equipment when moving from one project to the next. The rate or intensity of invasive dispersal is not expected to increase from the re-distribution of dredged material from the WF FNC to the existing in-water placement sites. The in-water placement of materials dredged from the WF FNC back into the Columbia River is not expected to create a net increase or decrease invasive species

2.1.5.2.2. Proposed Action

Similar to the No Action alternative, the Proposed Action alternative would not change the project ability to minimize spread of invasive species. The Corps implements strategies that minimize the likelihood of invasive species movement from project to project. The Corps conducts inspections and decontamination of equipment when moving from one project to the next. The rate or intensity of invasive dispersal is not expected to increase from the re-distribution of dredged material from the WF FNC to the existing in-water placement sites. The in-water placement of materials dredged from the WF FNC back into the Columbia River is not expected to create a net increase or decrease invasive species

2.2. Physical Environment

2.2.1. Air Quality

The Clean Air Act (CAA) established a comprehensive program for improving and maintaining air quality throughout the United States. The focus of the CAA is to reduce ambient concentrations of air pollutants and toxins that degrade air quality; the reduction of air pollution in turn improves the human and biologic environment. The intent of the act is achieved through permitting of stationary sources, restriction of toxic substance emissions from stationary and mobile sources, and the establishment of National Ambient Air Quality Standards (NAAQS) as set by US Environmental Protection Agency (EPA). The CAA prohibits federal agencies from funding, authorizing, or approving plans, programs, or projects that do not meet or conform to the NAAQS requirements.

The EPA sets the national air quality standards for six common pollutants as emitted by any stationary and mobile (marine and/or terrestrially based) source (as referred to as “criteria” pollutants). These standards consist of threshold levels for carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter 2.5 and 10, and sulfur dioxide.

The EPA transferred primary implementation and enforcement of the CAA authority for federal air quality standards to state, local, or tribal regulatory agencies. The delegated agency is responsible for establishing State Implementation Plan (SIP) specific to their region. The contents of a typical SIP fall into several categories: (1) State-adopted control measures which consists of either rules/regulations or source-specific requirements (e.g., orders and consent decrees); (2) State-submitted comprehensive air quality plans, such as attainment plans, maintenance plans rate of progress plans, and transportation control plans demonstrating how these state regulatory and source-specific controls, in conjunction with federal programs, will bring and/or keep air quality in compliance with federal air quality standards; (3) State-submitted "non-regulatory" requirements, such as emission inventories, small business compliance assistance programs; statutes demonstrating legal authority, monitoring networks, etc.); and (4) additional requirements promulgated by EPA (in the absence of a commensurate State provision) to satisfy a mandatory requirement. If the NAASQ is exceeded, the region is designated as a nonattainment area and mandated to implement measures to improve the region air quality through the implementation of a stricter SIP.

2.2.1.1. Affected Environment

The WF FNC is located in an area removed from direct sources of air pollution. For this region, the CAA, as delegated by EPA, is regulated by the Washington Department of Ecology (DOE) for the majority of air pollution contributors.

Air quality is affected by changes in weather patterns and vice versa. The lower Columbia River climate is characterized by wet winters, relatively dry summers, and mild temperatures throughout the year. Along the lower elevations of the immediate coast, normal annual precipitation is between 65 to 90 inches. Occasional strong winds strike the Oregon and Washington Coast, usually in advance of winter storms. Wind speeds can exceed hurricane force, and in rare cases have caused damage to structures or vegetation. Damage is most likely at exposed coastal locations, but it may extend into inland valleys as well. Such events are typically short-lived, lasting less than one day.

The prevailing winds along the Lower Columbia River comes from the east out of the Columbia Gorge during the fall and winter months (from about October to March), and from the west off of the ocean during the spring and summer months (April to September). The lower Columbia River currently meets the NAAQS.[1]

2.2.1.2. Environmental Consequences

2.2.1.2.1. No Action

The No Action alternative would not change the project's ability to meet air quality standards. There would be slight decrease of project-based air emissions once the WF FNC no longer needs O&M dredging. Once *Wahkiakum* ferry ceases operations, it is likely that traffic-based emissions will increase along State Route 4 on the Washington side, and Highway 30 on the Oregon side. Commuters that use the ferry from Cathlamet to Westport would need to drive to Westport via the Longview Bridge or the Astoria-Megler Bridge. The Longview Bridge is approximately 26 miles from Cathlamet. The Astoria-Megler Bridge is approximately 45 miles from Cathlamet. For the past three years, approximately 48,000 cars have used the ferry crossing annually.

2.2.1.2.2. Proposed Action

The Proposed Action alternative would not change the project's ability to meet air quality standards. There would be a temporary and localized reduction in air quality during placement due to emissions from dredging and aquatic placement of dredged materials. These impacts would be minor and temporary in nature, and would cease once dredging and placement is completed.

2.2.2. Hydrology, Geology, and Morphology

2.2.2.1. Affected Environment

Columbia River discharges are dependent on weather, reservoir operations, and ocean tides. The highest flows generally occur in May or June as a result of snowmelt in the upper watershed. Upstream reservoirs store water during this high flow period, which has reduced the 2-year flood peak at the Dalles, Oregon (RM 192) from 580,000 cubic ft per second (cfs) under natural conditions to 360 thousand cfs with regulation. Low flows, typically in the 100,000 cfs range, occur in September and October, after the snowmelt but before the winter rains. Water stored during the spring freshet is released during low flow periods to increase hydropower generation.

Puget Island has been highly modified by anthropogenic sources since the early 1900s.
Since the 1900s the river running past Puget Island has been highly modified by dredging operations and the installation of pile dikes and other structures that altered the movement of sediment. Areas of pile dike placement have accumulated migrated sand that may have otherwise not accumulated in absence of pile dikes. The dams provide flood protection measures, and as a result, natural scour and depositional processes have decreased in the lower Columbia River.

[1] http://www.deq.state.or.us/aq/forms/annrpt.htm

Several different types of shoaling occur within the CR FNC. Sediment transport processes and types of shoaling along the existing WF FNC vary based on water depth (which also correlates with offshore distance from the adjacent shoreline of Puget Island). At water depths greater than 35 ft (or further than 1,500 ft from the shoreline of Puget Island), large scale sand waves form the dominant shoaling feature within the WF FNC. These types of riverbed features are driven by spatially coherent bedload sediment transport processes and are typically aligned with the prevailing river current and thalweg. Within water depth range of 35 to 15 ft (or 1,000 to 1,500 ft from shore), riverbed shoaling features transition from large sand waves to smaller-scale bedforms, as the prevailing river current can be affected by local processes which contribute to cross-shore sediment transport which diminishes thalweg-aligned shoaling features.

At riverbed elevations at depths shallower than 15 ft CRD (inshore of 1,000 ft from the Puget Island shore line, along the WF FNC) shoaling effects become incoherent indicating that sediment transport is affected by spatially variable processes along the shore-river margin. These shallow-water sediment transport processes may be affected by ambient bed-load processes interacting with wave action, shore-edge eddies, tidal fluctuations, and other shore-edge background effects. Sediment transport processes within these shallow-water area can be affected by “down slope” effects, as sediment can be mobilized offshore due to cross-shore variations in riverbed slope. It is within this incoherent “close to shore” zone where sediment transport is affecting the shoaling within the present WF FNC, and driving the need for periodic maintenance dredging (when shoaled water depths become shallower than depths of 9 ft CRD within the FNC). In summary, the dredging requirement for the existing WF FNC is typically confined within the northern (shoreward) 300 ft of the 2,125-ft long channel. Within this shallow-water zone, the shoaling sediment may originate from upstream riverbed areas or from areas upslope (via down-slope sediment transport), which are closer to shore (even along the shoreline area).

2.2.2.2. Environmental Consequences

The present WF FNC begins at approximate Columbia RM 43 on the Washington side of the Columbia River thalweg, where riverbed elevation varies from depths of 55 to 48 ft CRD. At this point, the WF FN proceeds 2,125 ft to the north-north east and terminates just before the WF berth area, where riverbed elevation varies from depths of 4 to 9 ft CRD. At these shallow-water areas within the WF FNC, riverbed elevation is dependent on seasonal shoaling patterns and the cycle of O&M dredging. The present shoreward terminus of the WF FNC is approximately 80 ft south-southwest from the ferry terminal dock (or 230 ft offshore from the shoreline of Puget Island). An existing ferry berthing area, which is periodically maintained by Wahkiakum County, extends 40 to 70 ft shoreward from the present WF FNC to water depth corresponding to depths of 4 to 7 ft CRD (depending on seasonal shoaling patterns and cycle of O&M dredging). Wahkiakum County is responsible for establishment and maintenance of the present ferry berthing area, which extends to within 150 ft from the shore line of Puget Island. Because the ferry berthing area is closer to shore than the WF FNC, the berthing area can sometimes experience high rates of shoaling due to enhanced shore-edge and down-slope transport processes.

2.3.3.2.1. No Action

Dredging would periodically remove sand shoals that impair navigation within the WF FNC and place the dredged sand at existing in-water placement sites. O&M dredging for the existing WF FNC currently ranges between 15,000 to 25,000 cy, which is removed every 2 to 3 years. O&M dredging for the present ferry berthing area has typically been performed concurrently with WF FNC dredging activity. The vertical extent of the O&M dredge cut typically extends 2 to 5 ft below grade, as needed to attain project depth of 9 ft CRD with up to 2 ft of advance maintenance. In-water placement of the dredged sand is intended to redistribute the sediment within the aquatic ecosystem and maintain sediment availability to riverine transport and depositional functions. There are no direct impacts to the hydrologic regime resulting from the No Action alternative.

The No Action alternative at WF FNC would result in continuation of existing sediment transport and morphology trends that are presently affecting the WF FNC and riverbed areas adjacent to the FNC. These sediment transport trends consist of incoherent background effects induced by shore-river interactions and down-slope sediment transport, affecting shoaling within present WF FNC and ferry berthing area within 1,000 ft (offshore) from the Puget Island shoreline.

The shoreline of Puget Island immediately upstream of the WF FNC (and ferry berthing area) has been experiencing bank erosion. Causes of the erosion are likely associated with background effects of spatially-variable shallow-water sediment transport and the natural variability within a river system affected by tidal action. This erosional trend may continue or it could stabilize based on localized shoreline equilibrium. The shoreline morphology within sand-based riverine systems is inherently dynamic due to the variable nature of the fluvial and sediment transport regimes. In such systems, natural variation of the river shoreline is a rule, rather than an exception. There are no indirect impacts to the hydrologic regime resulting from the No Action alternative.

2.3.3.2.2. Proposed Action

Only the northern 300 ft of the existing WF FNC requires O&M dredging, and this is assumed to be nominally the case for the realigned channel. The modified WF FNC will not be dredged to a deeper elevation than the existing project (a depth of 9 ft CRD). However, due to the varying orientation of Puget Island shoreline, the terminal point of the realigned WF FNC will be positioned 40 ft closer to the shoreline than the present channel condition. In an aerial consideration, the proposed WF FNC modification increases the extent of dredging by 50% (due to the 100 ft increase in channel width) and translates the shoreward extent of dredging by 15% (40 ft) closer to shore, as compared to the existing condition. In summary, the net increase of dredging area associated with the realigned WF FNC as compared to the existing condition is approximately (300 ft x 100 ft) 0.68 acres, of which 0.13 acres will be positioned closer to shore than the existing configuration.

While the proposed WF FNC realignment has the same bottom elevation as the existing channel (a depth of 9 ft CRD), there will be a deeper initial dredge cut needed to establish the depth at 9 ft CRD for the realigned WF FNC within the new work area, to where the modified project would be extended. The realigned WF FNC will be widened 100 ft upriver (parallel to shore) and positioned 40 ft closer to shore. Within the realigned channel, the present riverbed is 2 to 4 ft shallower than the shoal areas within the present WF FNC (which are typically at depths of 4 to 7 ft CRD). This means

that the new work areas associated with the realigned WF FNC will require a dredge cut of 4 to 7 ft to attain a depth of 9 ft CRD, instead of the normal 2 to 5 ft dredge cut associated with existing condition O&M.

Construction of the revised WF FNC alignment will require some dredging within the existing channel footprint (approximately 8,000 cy) and some new work dredging associated with the realigned WF FNC (approximately 12,000 cy) as described above. These volume estimates are based on a January 2014 hydrosurvey. The total dredging estimate of 20,000 cy to implement the proposed WF FNC modification is reasonably close to the range of previous O&M dredging events for the existing WF FNC (15,000 CY – 25,000 cy). Initially, the O&M dredging volume associated with the realigned WF FNC is expected to be higher than the existing project, perhaps by 20-50%, due to the larger areal configuration of the realigned channel and closer proximity to the shoreline of Puget Island. The O&M dredging frequency is expected to remain similar to the existing condition (2-3 year O&M cycle). After conducting the first or second O&M dredging cycles for the realigned WF FNC, the associated O&M dredging for the realigned project is expected to reduce over time and equilibrate to the O&M dredge-cut depth and volume similar to that of the existing condition WF FNC alignment.

Indirect effects could occur along the realigned WF FNC. Within 50-70 ft of the WF FNC terminus, the proposed increase in channel width (widening by 100 ft) would deepen the riverbed by 1-3 ft in areas where the riverbed elevation is at depths between 5 to 8 ft CRD and where the riverbed slope is uniform and not steep. Within this area, project-related effects are considered to be nominal with respect to the hydraulics and sediment transport and changes to existing patterns of erosion, deposition and flow are not expected as a result of the widening.

Realignment of the WF FNC, along the northern-most area of the project, does move the federal project closer to the southern shore of Puget Island. Within the northern-most 50-100 ft of the realigned WF FNC, deepening of the WF FNC relative to present riverbed elevation (by a 4 to 7 ft dredge cut) has the potential to induce riverbed erosion adjacent to and upstream of the realigned WF FNC. This erosional effect could entail lowering of the riverbed by 1 to 7 ft along areas adjacent to the realigned WF FNC, within the northern-most 50-100 ft of the project. The erosional effect could extend 30 to 70 ft beyond the realigned WF FNC where it would diminish to zero effect. The WF FNC realignment, while no deeper than the existing project, is a deeper cut relative to riverbed elevations, as the riverbed rapidly increases in elevation as it approaches the shore. Because of the locally steeper riverbed slope along the northern-most margin of the proposed WF FNC realignment, the realigned WF FNC has the chance to locally induce down-slope sediment transport

The deeper dredge cut along the northern-most 50-100 ft of the realigned WF FNC, may increase the potential of eroding the areas upstream including the shoreline. Should the riverbed adjust (erode) in response to the realigned WF FNC, the effect should equilibrate within 1-3 years after initial project implementation (channel realignment); meaning that the erosional effect would cease.

2.2.3. Water Quality

The CWA governs the release of pollutants into waterways. There are four applicable sections to the No Action and Proposed Action: Sections 401, 402, 404, and 303(d). Section 401 requires Water

Quality Certificates from the state where the discharge to waters of the US will occur. The certification is granted by the state certifying that the discharge will not violate the states' water quality standards. EPA retains jurisdiction in limited cases. A WQC will be required from Washington.

Section 402 authorizes the EPA, or states to which the EPA has delegated authority, to permit the discharge of pollutants under the National Pollutant Discharge Elimination System (NPDES) program. The navigation program is not required to obtain a NPDES permit because dredged material is exempt from NPDES program requirements (40 CFR 122.3(b)).

Section 404 authorizes the Secretary of the Army to permit the discharge of dredged or fill material into waters of the US at specified placement sites. Placement sites are evaluated and authorized through the application of the Section 404(b)(1) guidelines, further described in 40 CFR 230. However, the Corps does not issue itself a 404 permit to authorize Corps discharges of dredged or fill material but does apply the 404(b)(1) guidelines when determining project impacts. Only when there is no practicable alternative would any discharge of fill material occur. A 404(b)(1) analysis is conducted prior to initiation of any new dredging and placement actions.

Section 303(d) of the CWA establishes that states are to list waters which are not meeting applicable water quality standards. The list includes priority rankings set by the states for the listed waters. Once the impaired waters are identified, Section 303(d) requires that the states establish total maximum daily loads (TMDLs) that would meet water quality standards for each listed waterbody.

Sediments from the FNCs are evaluated to determine if they are acceptable for in-water unconfined placement according to the requirements of the CWA and the MPRSA. The Corps has characterized sediments to be dredged in accordance with the regional and national dredge material testing manual protocols, Ocean Testing Manual, Inland Testing Manual, 2009 Sediment Evaluation Framework for the Pacific Northwest (SEF), and previously under the 1998 Dredge Material Evaluation Framework (DMEF).

2.2.3.1. Affected Environment

Under Section 303(d) the Columbia River around and within the project area has been inventoried by the Washington DOE and the Oregon Department of Environmental Quality (DEQ) as having impaired water quality and is listed on the 303(d) list. This reach of the river is 303(d) listed for temperature and toxins (dieldrin and polychlorinated biphenyl).

The CR FNC sediment testing is typically performed on the mainstem Columbia River on a 10-year rotational cycle unless an event occurs that would warrant more frequent sampling. The 10-year rotation allows for the continued, even management of both budget and labor while providing sediment quality information to allow dredging to proceed unobstructed. Projects dredged less frequently, such as the auxiliary side channel projects, are evaluated, sampled, and tested as required by the SEF. A brief description of recent sediment quality sampling results is provided below for the WF FNC area:

The WF FNC project was sampled 26 September 2013 (USACE 2014). The Wahkiakum Ferry shoal is composed of 96.2% sand and 3.5% fines (silt + clay); the total organic carbon content of the shoal is 0.7%. The chemical analyses indicated only very low levels of contamination in the samples, with all levels well below their respective SEF screening levels. The Wahkiakum Ferry project has a "very low" management area rank and the material is suitable for unconfined aquatic placement per the 2009 SEF guidance.

The detailed results of the characterizations highlighted above are available upon request. Based on these results, the dredged materials have been determined suitable for unconfined aquatic placement without further testing.

Per compliance under Section 401 of the CWA, the WF FNC program is currently covered by Washington DOE WQC Order #9765, as amended 29 April 2014.

2.2.3.2. Environmental Consequences

2.2.3.2.1. No Action

There would be no changes in impacts to water quality for the No Action alternative that has not already been assessed. The direct impacts of using the existing WF FNC is not different than what was evaluated in prior Water Quality Certifications and EAs. It is expected that the decrease in dredging will impart discountable change to the impact on water quality.

2.2.3.2.2. Proposed Action

There may be a temporary and localized reduction in water quality during the initial widening of the WF FNC and subsequent O&M of the widened, realigned channel. These impacts would be minor and temporary in nature, and would cease once dredging/placement is completed. Although there is some evidence that disposal of fine sediments can create a situation that decreases dissolved oxygen in the water column, that situation does not occur in the mainstem Columbia River. The sediment dredged is primarily sand (<4% fines) and therefore, it is unlikely that dissolved oxygen would be impacted by dredging and placement of this sandy material. It is also true that toxins found in the sediment adhere to fine-grained material, not sand (EPA 1991). Because toxins have not been detected during sediment testing under the SEF, there is no expectation of water quality being impacted by re-suspension of toxins during placement. It is expected that dredging will impart discountable change to the impact on water quality.

2.3. Human Environment

2.3.1. Socio-Economic

The Wahkiakum County ferry is the most energy efficient and economical means to cross the Columbia River for local commuters. Interstate transportation cost savings are realized by having commuters avoid commuting 45 miles downstream to the Astoria-Megler Bridge in Astoria, Oregon or 26 miles upstream to the Lewis and Clark Bridge in Longview, Washington to take advantage of

employment opportunities and/or the convenience of additional shopping, entertainment and cultural activities available in larger communities.

According to data provided by U.S. Department of Commerce, Bureau of Economic Analysis, Wahkiakum County had a population of 3,991 in 2011. Of this total population, approximately 1,518 individuals live within the county and are part of the labor force. The majority of the county's residents (1,116 individuals) live within the county but are employed outside the county (that is over 73%); another 402 individuals live and are employed within the county; while another 285 individuals are employed within the county but reside outside the county. This data indicates that the majority of the residents constituting a majority of the labor force commute to other counties, whether in Oregon or Washington to pursue employment opportunities.

This data is further supported by comparing the mean time to work in minutes for commuters in Clatsop County (Oregon) vs. commuters in Wahkiakum County (Washington). According to the U.S. Census Bureau data derived from population estimates, American Community Survey, the labor force in Clatsop County commute 18.5 minutes to work, compared to 22.4 minutes on average for the State of Oregon. Wahkiakum County residents' mean travel time to work is 36.4 minutes vs. 25.5 minutes for the state of Washington. This indicates that Wahkiakum County labor force tend to travel further to commute to work than Clatsop County residents. Because larger communities exist within Oregon, namely Astoria and Clatskanie, the data supports the accounts from ferry operators that the Wahkiakum ferry tends to transport more commuters from Washington to Oregon in the morning hours and from Oregon to Washington during the late afternoon hours than vice-versa.

2.3.1.1. Environmental Consequences

2.3.1.1.1. No Action

The No Action alternative would not allow for the WF FNC to be realigned and widened. O&M of the existing WF FNC is likely to cease once the *Wahkiakum* ferry stops operating. It would be unsafe to operate *M/V Oscar B* within the current WF FNC alignment and would represent a direct loss in upfront investment costs.

The region would be at risk of losing important investments both in the State of Washington and in the State of Oregon. A new expanded boat launch in Washington has already been completed. Wahkiakum County has spent 2.8 million dollars to upgrade a redesigned terminal on Puget Island to accommodate the loading of buses and longer trucks. *M/V Oscar B*, will double the capacity for vehicles, and is keeping with the design criteria established for the new terminal. Clatsop County, in Oregon, has received 1.88 million in Federal transportation dollars to upgrade the landing in Westport, Oregon. Should the channel not be realigned and widened, these investments would be negated. The new ferry under construction is not safe to operate within the existing channel configuration and the old ferry currently being operated is near the end of its economic useful life. Beyond the risk of losing millions in investment dollars, the effect to the community demographics, employment and income could be noticeable.

The vulnerable segment of human population at risk of being effected as a result of the channel not being widened are the commuters residing in Wahkiakum County, Washington, commuting to either

Clatsop County or Columbia County, Oregon for employment purposes. It is expected residents who are part of the labor force that commute to Oregon for employment would have their real incomes decline as their expenditures increase resulting from having to travel further to get to work. With a decline in real incomes for a large portion of the labor force, an adverse effect is expected to be felt on housing, retail and services available within the state of Washington, especially within Wahkiakum County. With a decline in real incomes, constraints would be placed on the ability for the public sector to impose any tax increases to support public services. Because educational services, health care and social assistance constitutes the largest industry for Wahkiakum County, it is expected the County would be adversely affected should the channel not be modified to accommodate the new larger ferry.

With less services available and less income coming into the Wahkiakum County, it is expected vacancy levels for the retail sector would increase, store turnovers would increase, employment would decrease, tax revenues would stall and eventually decrease, new business incubations would decline, property values would stagnate and eventually decline, the availability of goods and services demanded by the community's residents would stagnate and possibly decline, and the demographics would initially be stable but would be at risk of declining.

2.3.1.1.2. Proposed Action

The Proposed Action alternative would allow for the WF FNC to be realigned and widened in order to accommodate the new *M/V Oscar B* ferry. The upfront investment costs would be fully recognized.

The proposed realignment and widening of the WF FNC would allow for continued transportation access between Puget Island and Westport. The eventual operation of *M/V Oscar B* would allow for increased Columbia River use opportunities as a result of the Proposed Action alternative. The region would able to recognize the benefits of investments provided by the State of Washington and the State of Oregon. With the increased capacity of *M/V Oscar B*, there is potential for increased economic benefits within the region and it is likely that the demographics would remain stable.

2.3.2. Archaeological and Historic Resources

The National Historic Preservation Act of 1966 (NHPA), as amended, sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places (NRHP). Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on those undertakings, following regulations issued by the ACHP (36 CFR 800). The Archaeological Resources Protection Act (ARPA) applies when a project may involve archaeological resources located on federal or tribal land. ARPA requires that a permit be obtained before excavation of an archaeological resource on such land can take place.

2.3.2.1. Affected Environment

The area of potential effect (APE) for this project has been identified as the area that will be dredged and the location where the dredged material will be placed. The Washington Department of Archaeology and Historic Preservation (DAHP) concurred with the APE. In checking Corps project files, DAHP files, and the Oregon State Historic Preservation Office (SHPO) cultural resources databases, most of the APE was surveyed during a hydrographic survey done by David Evans and Associates, Inc. (2009) for the National Oceanic and Atmospheric Administration, National Ocean Service (NOAA). This survey utilized multi-beam coverage in order to map the riverbed and identify wrecks and/or obstructions. This survey did not identify any wrecks or obstructions within or near the APE for dredging or placement. The only other cultural resources survey done in the vicinity of the project was done for the replacement of the Wahkiakum Ferry Ramp. The report resulting from this project, "Cultural Resources Survey, Washington State Department of Transportation, Wahkiakum Ferry Ramp Replacement, Puget Island, Wahkiakum County, Washington" (Report Number 1349778) did not identify any historic properties within that project area. That project did identify structures over 50 years of age, but they are located outside of the APE. There are no known archeological sites within, or in close proximity to the APE.

2.3.2.1.1. Environmental Consequences

Based on the background research that was done for the APE, and given there are no known shipwrecks or other archeological sites within or near the APE, the Corps has determined the Proposed Action will have no effect on historic properties on. This determination was coordinated with DAHP and Tribes, dated 1 April 2014. DAHP concurred with that determination and no response was received from Tribes.

2.3.2.1.1.1.No Action

If this project was not carried out there would be no direct effects to historic properties given that there are no known archeological sites within, or in close proximity to the proposed project area. The ferry operations would remain static with the use of the current ferry and maintenance dredging within the existing dredge prism.

There would be no indirect effects to historic properties given that there are no known archeological sites within, or in close proximity to the proposed project area. As is noted above, ferry operations would not change from their current status and thus there would be no new impacts if the project was not carried out.

2.3.2.1.1.2.Proposed Action

Based on the results of the NOAA survey there are no known obstructions within the project area. In addition there are no other archeological sites within or near the APE and thus the expansion of the dredge prism, and the placement of the dredged material will have no direct impacts on known cultural resources. Therefore the Corps has determined the Proposed Action will have no direct effects on historic properties. There are structures over 50 years of age near the APE, but given that all the work associated with this undertaking will be in-water, these structures will not be affected.

2.3.3. Visual Quality

The NEPA of 1969 establishes that the federal government use all practicable means to ensure all Americans access to safe, healthful, productive, and *aesthetically* and culturally pleasing surroundings (42 USC 4331[b][2]).

2.3.3.1. Affected Environment

The physiographic setting of WF FNC is that of a rural, riverine setting. Several dwellings line the bank adjacent to the WF FNC. A combination of natural and anthropogenic features comprises the reach along which the WF FNC is situated. From the WF FNC, there are natural elements of the viewshed interspersed with agricultural fields (fences), human settlement (houses, docks, dike fields), transportation corridors (roads, railways), and human created sandy shorelines. These elements are surrounded by or partially blocked from view by riparian vegetation.

2.3.3.2. Environmental Consequences

There is one primary action that may impart visual changes to the overall landscape, the dredging action. Dredging and placement of dredged material involve the use of mechanical clamshell or buckets mounted on a barge. This equipment would be a visual detractor from the natural riverine environment.

2.3.3.2.1. No Action

Direct: The No Action is only expected to occur for one week for the one week every three to five years. Dredging would cease once the *Wahkiakum* is taken out of service. The No Action is considered a temporary visual disturbance on the landscape. The use of a dredge and scow within the project area is considered a temporary detractor from the viewshed and does not permanently affect the aesthetic properties of the project area. There are no additional unique visual resources that would be impacted by the Proposed Action alternative.

Once the *Wahkiakum* is removed from service, the visual viewshed for the No Action alternative would change. When compared against the amount of marine traffic moving along this reach, the loss of the dredging vessel and the *Wahkiakum* ferry provides minimal change to the viewshed.

2.3.3.2.2. Proposed Action

The Proposed Action is only expected to occur for one week for the initial realignment, widening, and maintenance. Subsequent O&M is expected to occur for one week every three to five years. The Proposed Action is considered a temporary visual disturbance on the landscape. The use of a dredge and barge within the project area is considered a temporary detractor from the viewshed and does not permanently affect the aesthetic properties of the project area. There are no additional unique visual resources that would be impacted by the Proposed Action alternative.

2.4. Climate Change

Climate is governed by incoming solar radiation and greenhouse effects that influence short-term, seasonal, and long-term weather patterns. The greenhouse effect is the result of certain naturally occurring atmospheric gases absorbing long-wave radiation emitted from the Earth. Absorption of this long-wave radiation in the atmosphere, as opposed to allowing it to be emitted back into space, warms the earth. Greenhouse gases include (in the order of importance to the greenhouse effect): water vapor, carbon dioxide, methane, nitrous oxide and ozone. Anthropogenic activities such as the burning of fossil fuels (adding more greenhouse gases to the atmosphere) and clearing of forests (removing a natural sink for carbon dioxide), have intensified the natural greenhouse effect, causing climate change. Carbon dioxide emissions from the burning of fossil fuels are the most substantial source of anthropogenic greenhouse gases. Global atmospheric concentrations of carbon dioxide have risen almost 100 parts per million (ppm) since pre-industrial value of 280 ppm (OCCRI 2010). Natural factors, which include solar variation and volcanic activity, also contribute to climate change. However, scientific evidence suggests that these factors alone do not fully explain the observed accelerated climate change within the past few decades.

2.4.1. Affected Environment

Climate change is likely to play an increasingly important role in determining the fate for wildlife species and the conservation value of habitats in the Columbia River. It is expected that climate change would exacerbate long-term problems related to temperature, stream flow, habitat access, predation, and marine productivity (CIG 2004, ISAB 2007). According to the US Global Change Research Program (USCGRP), the average regional air temperatures have increased by an average of 1.5°F over the last century (up to 4°F in some areas), with warming trends expected to continue into the next century (USGCP 2009). Warming is likely to continue during the next century as average temperatures increase another 3 to 10°F (USGCRP 2009).

These changes would not be spatially homogeneous across the Columbia River. Areas with elevations high enough to maintain temperatures well below freezing for most of the winter and early spring would be less affected. Low-lying areas that historically have received scant precipitation contribute little to total stream flow and are likely to be more affected. Overall, about one-third of the current cold-water fish habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (USGCRP 2009). Precipitation trends during the next century are less certain than for temperature but more precipitation is likely to occur during October through March and less during summer months, and more of the winter precipitation is likely to fall as rain rather than snow (ISAB 2007, USGCRP 2009). Where snow occurs, a warmer climate would cause earlier runoff so stream flows in late spring, summer, and fall would be lower and water temperatures would be warmer (ISAB 2007, USGCRP 2009).

Higher winter stream flows increase the risk that winter floods in sensitive watersheds would damage spawning habitat and wash away incubating eggs (USGCRP 2009). Earlier peak stream flows would also flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and the risk of predation (USGCRP 2009). Lower stream flows and warmer water temperatures during summer would degrade summer rearing conditions, in part by increasing the prevalence and virulence of fish diseases and parasites (USGCRP 2009). Other

adverse effects are likely to include altered migration patterns, accelerated embryo development, premature emergence of fry, variation in quality and quantity of tributary rearing habitat, and increased competition and predation risk from warm-water, non-native species (ISAB 2007).

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

The effects of climate change to the No Action and Proposed Action could lead to a change in the timing of shoal formation from current changes due to precipitation, the extent of snowpack, and rain-on-snow events. These changes in weather patterns could influence seasonal river flows, influencing the presence of size of shoaling in the lower Columbia River, thereby influencing the timing of dredging and placement of materials. Subsequently, dredging operations would be modified to address changes in shoaling patterns. It is assumed that any effects climate change might have across the project area during this timeframe would be negligible and effects to any aquatic or terrestrial habitat would be immeasurable.

2.4.2. Environmental Consequences

2.4.2.1. No Action

The No Action alternative would not change the project's direct effects on climate change. It is assumed that any effects climate change might have across the project area during the next 20 years would be negligible and effects to the Corps' operation of the WF FNC, aquatic or terrestrial habitat would be immeasurable.

2.4.2.2. Proposed Action

The Proposed Action alternative would not change the project's direct effects on climate change. It is assumed that any effects climate change might have across the project area during the duration of the WF FNC operating lifecycle would be negligible and effects to any aquatic would be immeasurable.

2.5. Cumulative Impacts

Cumulative effects are defined as, "the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor, but can collectively become a measureable impact actions taking place over a period of time. Resources determined not to have the potential to result in measurable cumulative effects were not addressed in this analysis. These resources include: geology, riparian processes, hydrology, sediment quality, cultural / historic and recreation. In general, effects of a particular action or group of actions would be considered to have a measureable cumulative impact if one of the following conditions is met:

- Effects of several actions occur in a common location;
- Effects are not localized (i.e., can contribute to effects of an action in a different location);
- Effects on a particular resource are similar in nature (i.e., affects the same specific element of a resource); and
- Effects are long-term (short-term impacts tend to dissipate over time and cease to contribute to cumulative impacts).

Noting that environmental impacts may result from many diverse sources and processes, Council on Environmental Quality (CEQ) guidance observes that "no universally accepted framework for cumulative effects analysis exists," while noting that certain principles have gained acceptance and "the list of environmental effects must focus on those that are truly meaningful." Assessing cumulative impacts may involve assumptions and uncertainties because data on the environmental effects of other past, present, and reasonably foreseeable actions are often incomplete or unavailable. As a result, impacts on resources often must be expressed in qualitative terms or as a relative change. For this section cumulative impacts were assessed using guidance from CEQ.

Geographic boundaries for the analyses of cumulative effects vary for each resource. The proposed temporal boundary for analyses of cumulative impacts is the late 1880s, when the original authorization of the federal channels and the North and South Jetties first occurred and to the extent that they have had lasting effects contributing to cumulative impacts. The reasonably foreseeable nature of potential future actions helps define the forward-looking temporal boundary. While ongoing maintenance and placement activities could continue for many more years and could contribute to cumulative impacts during that timeframe, it would be speculative to consider actions beyond what is reasonably foreseeable. Given this limitation, the forward-looking temporal boundary has been established at about 10 years, which is a reasonable timeframe by which the reasonably foreseeable future actions identified below would likely be completed. Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the proposed project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

Cumulative impacts on resources in the project area may result from the impacts of operating and maintaining the Columbia River projects together with other past, present, and reasonably foreseeable projects such as residential, commercial, industrial, and other development, as well as from agricultural activities and the conversion to more intensive types of agricultural cultivation. Such land use activities may result in cumulative effects on a variety of natural resources such as species and their habitats, water resources, and air quality. Additionally, they can also contribute to cumulative impacts on the urban environments such as changes in community character, traffic volume and patterns, housing availability, and employment. A definition of cumulative impacts under NEPA can be found in 40 CFR 1508.7 of the CEQ Regulations.

2.5.1. Past, Present and Reasonably Foreseeable Actions

This section identifies past, present, and reasonably foreseeable actions that could incrementally contribute to resources affected by the No Action or the Proposed Action for the WF FNC.

Past actions relevant to the cumulative analysis in this EA are those that have previously taken place and are largely complete, but that have lasting effects on one or more resources that would also be affected by the actions. For these past actions, CEQ guidance states that consideration of past actions is only necessary to better inform agency decision-making. Typically the only types of past actions considered are those that continue to have present effects on affected resources. Past actions are summarized below and their effects, which have resulted in the existing conditions, as described in this document.

- Early settlement of the Columbia River Basin during the late 1800s and early 1900s.
- Authorization of Federal Navigation Channels and associated navigation projects (side channels, basins, anchorage areas) in the lower Columbia River by the RHAs of 1878, 1884, 1892, 1902, 1910, 1912, 1919, 1930, 1933, 1935, 1937, 1938, 1945, 1946, 1954, and 1960.
- Construction, maintenance and periodic reconstruction of pile dikes, levees, and bridges in, over, or adjacent to the Columbia River.
- Continued human use and modification of the lower Columbia River, the surrounding area, and tributaries feeding into the river up until the passing of the CWA. This included clearing for timber harvest and agricultural development, urban development of towns and cities near the shoreline, highways and railroads, and power and utility lines.
- Navigation facilities (including both commercial and recreational docks and marinas) constructed and maintained by various ports along the lower Columbia River.
- Corps' annual maintenance dredging and placement activities for FNC.
- Recreational facilities established by federal, state, and local agencies.
- Federal permits for aquatic and wetland impacts within the lower Columbia River.
- Commercial and residential development that has occurred in the area.
- Private, recreational, commercial, and industrial vessel navigation in the lower Columbia River.

The lower Columbia River has been substantially altered from the 1800s by early settlement, timber harvest and fishing, agriculture, population growth and the commercial/industrial and residential developments and that has resulted in the following: introduction of non-native species; rivers, streams, and landscapes have been physically altered; and fish and wildlife resources have been impacted by habitat alteration or loss.

Present actions are those that are currently occurring and also result in impacts to the same resources as would be affected by either action. Present actions generally include on-going use activities (waterfront activities) and recently completed development (new or replaced docks, dredging, and waterfront development). It also includes the operation of the facilities built from the past; navigation, dam operations, levee operations, the use of roads and transportation facilities, etc. Similar to past actions, relevant present actions have largely been captured in the bulleted items listed above.

Reasonably foreseeable future actions are those actions that are likely to occur and affect the same resources the Proposed Action. For a future action to be considered reasonably foreseeable there must be a level of certainty that it would occur. This level of certainty is considered met with the submission of a formal project proposal or application to the appropriate jurisdiction, approval of such a proposal or application, inclusion of the future action in a formal planning document, or other

similar evidence. For future actions in the proposal stage, the action also must be sufficiently defined in terms of location, size, design, and other relevant features to allow for meaningful consideration in the cumulative analysis. Present and reasonably foreseeable actions include many of the same operational and maintenance activities described in the above list. To determine whether there are other present and/or future actions reasonably certain to occur in the Project Area, Corps studies of the area were reviewed, outstanding Corps regulatory permits were reviewed for proposed large-scale actions and county planning offices queried. The following actions were identified as being reasonably certain to occur over the next ten years in the vicinity of the WF FNC:

Corps actions:

- Columbia River and auxiliary side channels Federal Navigation Channel projects: Continued annual maintenance dredging and placement activities associated with Columbia River are expected.
- General Investigation studies.
- Maintenance of Columbia River pile dike system.

County actions:

- Wahkiakum County
    - Puget Island ferry terminal upgrades and ferry berth dredging

2.5.2. Effects

This section analyzes the potential cumulative impacts for each of the environmental resource categories in which the implementation either action might contribute to cumulative impacts when considered with other past, present, and reasonably foreseeable actions. Resources determined not to have the potential to result in cumulative effects were not addressed in this analysis. These resources include: geology, sediment quality, and cultural/historic. Since environmental analyses for some of the listed activities are not complete or do not include quantitative data, cumulative impacts are addressed qualitatively. This analysis uses the same thresholds of measureable impacts used to assess the environmental impacts of the WF FNC for the No Action and the Proposed Action.

Water Quality: The geographical boundary for this resource is confined to the Puget Island reach, between RM 40 and 50.

The identified past, present and future reasonably foreseeable actions, when combined with the effects of the No Action or the Proposed Action, could incrementally increase water turbidity and suspended sediments and increase the risk of petroleum spills during dredging and placement activities within waters around Puget Island. New development projects would also result in long-term increases in impervious surfaces and associated runoff into these waters. However, the identified present and future actions are required to adhere to local, state, and federal surface and stormwater control regulations and best management practices, which are designed to limit negative impacts to surface waters from both construction and ongoing operations. Compliance of present and future projects with these regulations, which are subject to change based on regional assessments, would minimize adverse cumulative impacts.

Air Quality: The geographical boundary for this resource includes the Project Area along with the waterfront communities from RM +14 to RM 66 of the Columbia River. Astoria-Megler Bridge is located at RM 14. Lewis and Clark Bridge is located at RM 66. These two bridges are the two closest river crossings from the WF FNC.

The identified past, present and future reasonably foreseeable actions, when combined with the effects of the No or Proposed Action, could incrementally increase air pollution levels within lower Columbia River. However, these impacts would be temporary in nature (reaching highest levels during dredging). While ongoing maintenance dredging takes place throughout the Columbia River basin, additive increases in air pollution are unlikely to impact nearby residents as most of the reasonably foreseeable future projects are not located immediately adjacent to residential areas. Therefore, cumulative air quality impacts from the No or Proposed Action, in combination with past, present and reasonably foreseeable actions are less than what would be considered a measureable impact.

Other actions, as well as the WF FNC activities, would have to comply with EPA standards and the Air Quality Program. The Air Quality Program protects the region's air through program planning development and guidance, industrial source control, major new source review, coordination of permit and plan review programs, data analysis and reporting, and regulation. Compliance with these regulatory agencies would minimize cumulative impacts from the Project.

Biological: The geographical boundary for this resource is the Puget Island and habitat adjacent to Puget Island. Past development within the Columbia River basin has resulted in losses of aquatic and riparian habitats, which caused adverse impacts to fish and wildlife resources. Most of the losses were due to filling such as levee construction and other encroachments in the water, hydrologic alterations (including channelization, diking and draining of wetlands), and upland forestry practices to support development, industry and agriculture uses. In-water biological resources have been impacted by commercial and recreational fishing activities. These actions occurred in a regulatory landscape very different from what exists today.

Completion of present reasonably foreseeable projects has the potential for cumulative impacts to biological resources in the lower Columbia River for the No Action and Proposed Action alternatives. Impacts include the physical removal of aquatic habitat through dredging and covering of aquatic habitat during in-water placement and temporary increases in turbidity. Dredging could temporarily fragment shallow-water habitat used for feeding, shelter and migration by ESA-listed salmon and other aquatic species. However, many of the present and foreseeable projects are already working with federal, state and local resource agencies to adhere to conservation measures and BMPs (in-water work windows to avoid key migration times for salmonids, etc.); and, developing mitigation plans to offset adverse impacts on biological resources. Future land uses are also required to comply with shoreline plans and even more specific local use area plans (i.e. the local comprehensive land use plans for counties in Washington and Oregon; these plans provide policies to guide management and planning of land activities that may affect the lower Columbia River). Therefore cumulative impacts would be adverse for both the No Action and Proposed Actions, although currently minimized through regulations as would be the case in the future. Compliance of future development with these plans and applicable BMPs and conservation measures would minimize direct and indirect cumulative impacts to biological resources.

Socioeconomic: The geographical boundary for this resource extends to towns situated along the Columbia River from Astoria, Oregon, to Longview, Washington. The No Action alternative could adversely impact socioeconomic resources in the region by removing a reliable and safe navigation channel for the *M/C Oscar* ferry. The Proposed Action for the WF FNC project would incrementally benefit socioeconomic resources in the region by providing a reliable and safe navigation channel for the *M/V Oscar* ferry. The current regulatory framework ensures compliance of future development with applicable laws. Implemented conservation measures would minimize direct and indirect cumulative impacts to natural and cultural resources while supporting tourism and access to industry.

Hydrology: The geographical boundary for this resource extends along the southern shoreline of Puget Island. The No Action alternative would have no change to the hydraulics along this reach as the WF FNC remains within a stable channel configuration. The Proposed Action for the WF FNC has the potential for cumulative impact the hydraulics along the southern shoreline of the Puget Island.

Wahkiakum County will be expanding the ferry berthing area for an alongshore distance of 150 ft upriver (east) beyond the present berthing area, and along an average cross-shore distance of 60 ft (or approximately 150 ft x 60 ft). As the ferry berthing area is expanded upriver, the eastern area of the berthing area will be positioned about 50 ft closer to the shoreline than the present ferry berthing area. Within the expanded berthing area (0.25 acres), the present riverbed is 4 to 6 ft shallower than the shoal areas within the present berthing area (which are typically at depths of 4 to 7 ft CRD). This means that expanded berthing area will require a dredge cut of 4 to 8 ft to attain a depth of 9 ft CRD project elevation, instead of the normal 2 to 5 ft dredge cut that Wahkiakum County implements for the present berthing area.

Because of the close proximity that the new berthing area will be to the shoreline of Puget Island, a steep dredge-cut needed to implement the berthing area to depths of 9 ft CRD. The anticipated future operations and maintenance volume for the expanded berthing area may be equivalent to its initial dredged cut volume (estimated at 7,000 cy), and may remain at the volume for multiple dredging cycles before the adjacent shallow-water areas equilibrate to the expanded berthing area configuration. Implementation of the expanded berthing area has the chance to locally induce down-slope sediment transport, since the riverbed rapidly increases in elevation as it approaches the shore. These deeper dredge cuts undertaken by the county may increase the potential of eroding adjacent areas upstream including the shoreline.

3. COMPLIANCE WITH ENVIRONMENTAL LAWS

The following laws provide environmental standards for operation and maintenance activities at Corps civil works projects. The No Action and Proposed Action must also comply with these environmental laws and executive orders.

3.1. National Environmental Policy Act

This EA was prepared in order to help fulfill and complete the requirements of the NEPA of 1969, as amended (42 U.S.C. 4321 et seq.). From this draft EA, the Corps will either; (a) select one of the alternatives and prepare a finding of no significant impact or (b) determine that the impacts rise to the level of significance. With (b), if the Corps should pursue the action, it will begin preparation of an environmental impact statement.

3.2. Bald and Golden Eagle Protection Act

This Act provides for the protection of bald and golden eagles by prohibiting the taking, possession, and commerce of such birds, except under certain specified conditions. The Corps uses best management practices (BMPs) to avoid effects to bald eagles. The No and Proposed Action does not involve forestry practices, use of aircraft or other motorized equipment, blasting, or other work that can result in loud or intermittent noises within 660-ft of an active or alternate eagle nest between 1 January and 15 August. The actions would not disturb bald or golden eagles and therefore *complies with* the Bald and Golden Eagle Protection Act.

3.3. Clean Air Act

The CAA of 1970, as amended, established a comprehensive program for improving and maintaining air quality throughout the United States. The intent of the Act is achieved through permitting of stationary sources, restriction of toxic substance emissions from stationary and mobile sources, and the establishment of NAAQS. Noise pollution is addressed through Title IV of the Act. The actions would have short-term intermittent reduction in air quality during dredging and placement. Noise impacts would be minor and temporary in nature and would immediately return back to background levels at the completion of the actions. The No and Proposed Actions would be *in compliance* with the CAA.

3.4. Clean Water Act

The CWA governs the release of pollutants into waterways.

Section 401 **–** Requires certification from the state that a discharge to waters of the US in that state would not violate the states' water quality standards. The EPA retains jurisdiction in limited cases. Under Section 401 of the CWA, the realignment, widening, and O&M of the WF FNC is currently covered by DOE WQC Order #9765, as amended 29 April 2014.

Section 402 **–** Authorizes the EPA, or states to which the EPA has delegated authority, to permit the discharge of pollutants under the NPDES program. The navigation program is not required to obtain a NPDES permit because dredged material is exempt from NPDES program requirements (40 CFR 122.3(b)).

Section 404 **–** Regulates the discharge of dredged or fill material into waters of the US. The EPA has delegated permitting under Section 404 of the CWA to the Corps. However, the Corps does not issue itself a 404 permit for discharges of dredged or fill material, but the Corps does apply the 404(b)(1) guidelines (40 CFR Part 230). Only when there is no practicable alternative would any discharge of fill material occur in waters of the US, including wetlands. The discharge of dredged materials from the Columbia River into the Columbia River during in-water placement has no net loss of aquatic functions and values and the temporary effects of in-water placement comply with the guidelines. There would be no wetlands impacted by this project. Therefore, the Proposed Action complies with the 404(b)(1) guidelines.

3.5. Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) encourages coastal states to develop and implement coastal zone management plans that are consistent with national policies to preserve, protect, develop, and where possible, restore or enhance, coastal zone resources. Section 307 of the CZMA requires that any federal action occurring in or outside of the coastal zone which affects coastal land or water uses or natural resources must be consistent with the state's Coastal Management Program. The Corps provided a consistency determination to the DOE for the realignment, widening, and O&M of the WF FNC. The WF FNC CZMA remains within the CZM concurrence provided by DOE 23 June 2014 as confirmed by DOE with the issuance of the amendment to WQC# 9765. The Corps would ensure the No and Proposed Actions within this EA are *in compliance* with CZMA to the maximum extent practicable.

3.6. Comprehensive Environmental Response, Compensation, and Liability Act and Resource Conservation and Recovery Act

The CERCLA established a method to assign liability to parties responsible for the release of hazardous wastes, and established a trust fund to pay for their cleanup to reduce associated dangers to public health and the environment.

The Proposed Action is not within the boundaries of a designated Superfund site as identified by the EPA or the states of Oregon or Washington for a response action under CERCLA, nor is the project area on the National Priority List (http://www.epa.gov/superfund/sites/npl/index.htm); therefore, this Act is *not applicable* to the Proposed Action. There is no indication that any hazardous, toxic, and radioactive wastes are in the vicinity of the Network. Any presence of these types of wastes would be responded to within the requirements of the law and Corps' regulations and guidelines.

3.7. Endangered Species Act

In accordance with Section 7(a)(2) of the ESA of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed

species within NMFS and USFWS jurisdiction. Any incidental take as a result of the realignment, widening, and O&M of the WF FNC has been coordinated between NMFS, USFWS, and the Corps.

In accordance with Section 7(a)(2) of this Act, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species. Information on federally listed species and designated critical habitat is presented in this EA. The NMFS issued a BiOp with an incidental take statement on 11 July 2012, as reviewed in Section 2.2.4. The Corps received a Letter of Concurrence from the USFWS on 29 September 2010, as reviewed in Section 2.2.4. Consultation with USFWS concluded with the receipt of a Biological Opinion received 6 June 2014; the Biological Opinion states that the WF FNC actions are consistent with the activities previously consulted on. The Corps would ensure the dredging and placement actions proposed within this EA are *in compliance* with ESA prior to initiating this project.

3.8. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments

Federal agencies shall establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, and strengthen the United States government-to-government relationships with Indian tribes. The Corps sent letters to seek input on potential cultural and natural resources of concern on 30 April 2014 to the Cowlitz Indian Tribe, the Confederated Tribes of Grand Ronde, and the Confederated Tribes of Siletz Indians. No responses were received from the Indian tribes.

3.9. Executive Order 12898, Environmental Justice

This order requires federal agencies to minimize health impacts on subsistence, low-income or minority communities, ensuring no persons or group of people bear a disproportionate burden of negative environmental impacts resulting from the execution of this country's domestic and foreign policies. No subsistence, low-income or minority communities would be affected by the No or Proposed Actions because while the WF FNC provides a convenient transportation corridor between Puget Island and Westport, there are alternative routes for travel. Therefore, there would be no change in population, economics or other indicator of social well-being. Consequently, the Proposed Action is *in compliance* with this Order because no environmental justice implications exist for the No and Proposed actions.

3.10. Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance

Federal agencies shall increase energy efficiency; measure, report, and reduce their greenhouse gas emissions from direct and indirect activities; conserve and protect water resources through efficiency, reuse, and stormwater management; eliminate waste, recycle, and prevent pollution; leverage agency acquisitions to foster markets for sustainable technologies and environmentally preferable materials, products, and services; design, construct, maintain, and operate high performance sustainable buildings in sustainable locations; strengthen the vitality and livability of

the communities in which federal facilities are located; and inform federal employees about and involve them in the achievement of these goals. The No and Proposed actions are *in compliance* with this Order because all actions would be conducted in a manner as to prevent pollution and chemical spills by following BMPs.

3.11. Executive Order 11988, Floodplain Management

Executive Order 11988, Floodplain Management requires federal agencies to consider how their actions may encourage future development in floodplains, and to minimize such development. The No and Proposed Action would not affect development of floodplains or the management of floodplains as all aspects of the actions are in-water. The proposed activities are *in compliance* with this Order because the actions are not within the floodplain.

3.12. Executive Order 13112, Invasive Species

Federal agencies are required to combat the introduction or spread of invasive species in the United States. This order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, this is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." The Corps would follow BMPs to minimize the spread of invasive species. The No and Proposed Action is *in compliance* with this Order because the action will not intentionally spread invasive species.

3.13. Executive Order 13186, Migratory Birds

This order further strengthens the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act, the Fish and Wildlife Coordination Act (FWCA), the ESA and the NEPA. Federal actions resulting in any "take" (intentional or otherwise) of a migratory bird are required to develop Memorandum of Understanding with USFWS to promote the conservation of migratory bird populations and resources. There would be no intended impact to any migratory birds resulting from the No or Proposed Action; therefore, the action is *in compliance* with this Order.

3.14. Executive Order 11990, Protection of Wetlands

The purpose of this executive order is to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. In planning their actions, federal agencies are required to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. Only when there is no practicable alternative would any discharge of fill material occur. There are no wetlands within the No Action or Proposed Action project area. There would be no intended impact to any wetland resulting from the proposed activities; therefore, the actions are *in compliance* with this Order.

3.15. Farmland Protection Policy Act

This Act, without authorizing federal agencies to regulate the use of private or non-federal lands, encourages federal agencies to minimize the impact of federal programs on the unnecessary and irreversible conversion of farmland (prime or unique) to nonagricultural uses. It follows that federal programs shall be administered in a manner that, as practicable, would be compatible with state and local government and private programs and policies to protect farmland. The No and Proposed Action is *in compliance* with this Act because the activities would not occur on lands utilized for agricultural purposes, nor would the landscape be converted to alternative land uses.

3.16. Fish and Wildlife Coordination Act

The FWCA (16 U.S.C. 661 *et seq*.) directs federal agencies to prevent the loss and damage to fish and wildlife resources in; specifically, wildlife resources shall be given equal consideration in light of water-resource development programs. Consultation with the USFWS is required when activities result in the control of, diversion or modification to any natural habitat or associated water body, altering habitat quality and/or quantity for fish and wildlife. For the Corps, all coordination under this Act is in accordance with the 1993 Section 107 Study; included within is a FWCA analysis developed by federal and state resource agencies. The USFWS FWCA Report was finalized by USFWS. All actions related to the proposed project within the project area are included in this Coordination Agreement and because the Proposed Action will not substantively modify any new natural habitats or water bodies, there will be *no negative effect* to fish and wildlife habitat. This activity was consistent with the act, therefore no further action or coordination was necessary.

3.17. Magnuson-Stevens Fishery Conservation and Management Act

Also known as the MSA, this is designed to actively conserve and manage fishery resources found off the coasts of the United States, to support international fishery agreements for the conservation and management of highly migratory species. The MSA established procedures designed to identify, conserve, and enhance EFH for fisheries regulated under a federal fisheries management plan. Federal agencies must consult with the NMFS on all federal actions authorized, funded, or carried out by the agency that may adversely affect EFH. The NMFS 2012 BiOp provided two conservation recommendations to avoid and reduce adverse effects to EFH, as reviewed in Section 2.1.4, the Corps will continue to follow the conservation recommendations. Therefore, the project is *in compliance* with the MSA.

3.18. Marine Mammal Protection Act

This Act established a federal responsibility to conserve marine mammals within waters of the United States. With certain specified exceptions, the Act establishes a moratorium on the taking and importation of marine mammals, as well as products taken from them, and establishes procedures for waiving the moratorium and transferring management responsibility to the states. Marine mammals (or their parts) could potentially occur in the project area. It is possible that the Proposed Action could disturb the Steller sea lion and other pinnipeds with the movement of dredges through the WF FNC, but it is unlikely that the effects would rise to the level of harm or harassment. No adverse impacts are expected to Steller sea lions from the No Action or Proposed Action. In its 2012 BiOp for the CR FNC O&M program, the NMFS set forth terms and conditions in order to minimize impacts of the actions on marine mammals in the project area.

3.19. Marine Protection, Research, and Sanctuaries Act

The MPRSA is also known as the Ocean Dumping Act and it prohibits the dumping of materials into the ocean that would degrade or endanger human health or the marine environment. The No Action and Proposed Action is *in compliance* with this Act because no materials from this project will be placed in the ocean.

3.20. Migratory Bird Treaty Act

The MBTA makes it unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Provisions are in place for the protection of migratory bird, part, nest, egg or product. Under the MBTA, "migratory birds" essentially include all birds native to the US and the Act pertains to any time of the year, not just during migration. The No and Proposed Action could displace birds by altering flight patterns, or cause other behavioral changes; however, it is not expected that effects would rise to the level of prohibited conduct under the MBTA.

3.21. Wild and Scenic Rivers Act

This Act applies only to rivers designated by Congress as "wild and scenic" in order to safeguard the special character of these rivers. Under this Act, federal agencies may not assist the construction of a water resources project that would have a direct and adverse effect on the free-flowing, scenic, and natural values of a federally designated wild or scenic river. The Columbia River along this reach is not designated as a Wild and Scenic River[2]; as a result, this Act is *not applicable* to the No and Proposed Action.

3.22. National Historic Preservation Act

Section 106 of the NHPA requires agencies to consider the potential effects of their projects and undertakings on historic properties eligible for, or listed on, the NRHP. Historic properties include archaeological sites or historic structures or the remnants of sites or structures. To determine the potential effect of the project on known or unknown historic properties, the following items are analyzed: the nature of the proposed activity and its effect on the landscape; the likelihood that historic properties are present within a project area; whether the ground is disturbed by previous land use activities and the extent of the disturbance; reviewing listings of known archeological or historic site locations, including site data bases and areas previously surveyed or listings of sites on the NRHP.

The Corps professional cultural resources staff has made a determination of no effect for the Proposed Action based on the analysis that there are no known historic properties within or near the area of potential effects identified for this action. The Washington DAHP has concurred with the

[2]As verified through this link: http://www.rivers.gov/wildriverslist.html

APE and the no effect determination. The Corps did not receive any comments from Tribes who were contacted as part of this action.

4. COORDINATION AND DISTRIBUTION

Early and continuing coordination with the general public and appropriate public agencies is an essential part of the environmental process to determine the scope of environmental documentation, the level of analysis, potential impacts and avoidance, minimization, and/or related environmental requirements. Agency consultation for this project has been accomplished through a variety of formal and informal methods

This draft EA is being issued for a 30-day public review period. Review comments are requested from federal and state agencies, as well as various interested parties. Responses to public comments would be prepared. Public concerns identified in comments would aid in determination of whether or not an environmental impact statement (EIS) is necessary for the Proposed Action. If it is determined that an EIS is not required, a FONSI would be signed, concluding the NEPA process.

In addition to the posting of the EA on the Corps website, a notice requesting comments regarding this EA was sent to the following agencies and groups:

National Marine Fisheries Service
US Coast Guard
US Environmental Protection Agency
US Fish and Wildlife Service

Confederated Tribes of Siletz
Confederated Tribes of the Grand Ronde
Cowlitz Indian Tribe

Cowlitz County, Washington
Wahkiakum County, Washington

Washington Department of Archaeology and Historic Preservation
Washington Department of Ecology
Washington Department of Fish and Wildlife
Washington Department of Natural Resources
State of Washington Governor's Office

American Rivers
Columbia River Estuary Study Taskforce
Columbia River Inter-Tribal Fish Commission
Northwest Environmental Advocates
Pacific States Marine Fish Commission
Pacific Northwest Waterways
Port of Longview
Portland Audubon Society
Salmon for All
Wahkiakum Port District #1 and #2

5. LITERATURE CITED

CIG (Climate Impacts Group). 2004. Overview of climate change impacts in the US Pacific Northwest (July 29, 2004, updated August 17, 2004). Climate Impacts Group, University of Washington, Seattle.

EPA. 1991. *Methods for Collection, Storage and Manipulation of Sediments and Toxicological Analyses: Technical Manual.* Office of Science and Technology. Washington DC.

Eriksson, B.K., Sandstrom, A., Isausc, M., Schreiberd, H., and P. Kara. Effects of boating activities on aquatic vegetation in the Stockholm archipelago, Baltic Sea Department of Plant Ecology, Evolutionary Biology Centre of Coastal Research, National Board of Fisheries, Gamla Slipvagen. Sweden 27 May 2004. Estuarine, Coastal and Shelf Science 61 (2004) 339–349

ISAB (Independent Scientific Advisory Board). 2007. Climate change impacts on Columbia River Basin fish and wildlife. ISAB Climate Change Report, ISAB 2007-2, Northwest Power and Conservation Council, Portland, OR.

Larson, K.W. and C.E. Moehl, 1990. Entrainment of anadromous fish by hopper dredge at the mouth of the Columbia River. p. 102-112. In C.A. Simenstad (ed.) Effects of dredging on anadromous Pacific coast fishes. Workshop Proceedings, Seattle, September 8-9, 1988, Washington, U.S.A.

Nightingale, B. and C.A. Simenstad. Dredging activities: Marine issues. Washington State Transportation Center, University of Washington, Seattle, WA (2001).

Oregon Climate Change Research Institute (OCCRI). 2010. Climate Change Service. Available at: http://occri.net/climate-science. Oregon State University, College of Earth, Ocean, and Atmospheric Sciences. Copyright 2010. Last viewed on February 13, 2013.

US Army Corps of Engineers. 2014 unpub. Wahkiakum Ferry Channel Realignment – Westport Slough Dredging Project: Sediment Quality Evaluation Report. February 3, 2014. Portland District, Portland, OR.

USGCRP (US Global Climate Chance Research Program). 2009. Global Climate Change Impacts in the United States. Washington DC. Global Change Research Program. 2009.

US Department of Transportation, Maritime Transportation. 2011. US Water Transportation Statistical Snapshot. Washington, DC.

Wilber, D., and D., Clarke. 1999. Defining and assessing benthic recovery following dredging and dredged material disposal. US Army Corps of Engineers Research and Development Center. Vicksburg, MS.

APPENDIX ONE

5.1.1. Terms and Conditions of NMFS 2012 BiOp

The terms and conditions described below are non-discretionary, and the Corps or any applicant must comply with them in order to implement the reasonable and prudent measures (50 CFR 402.14). The Corps or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this incidental take statement (50 CFR 402.14). If the following terms and conditions are not complied with, the protective coverage of Section 7(o)(2) will likely lapse.

1. To implement Reasonable and Prudent Measure #1 (dredging and dredge material disposal), the Corps shall:
    a. Apply these terms and conditions to its own actions when carrying out FNC O&M work, to the actions of any contractor hired by the Corps for that purpose, and to the actions of any party licensed by the Corps to dredge sand from the FNC for commercial purposes.
    b. Complete all dredging and in-water placement during the following times (the "routine" or "preferred" O&M season):
        i. The mouth of the Columbia River at RM -3.0 to the Interstate 5 Bridge at RM 106.5 from June 1 through December 15.
        ii. I-5 Bridge at 106.5 to the Bonneville Dam at RM 145 from August 1 through September 30.
        iii. All side channels except the Old Mouth Cowlitz River from August 1 through December 15 (i.e., Baker Bay/West Channel, Chinook Channel, Hammond Boat Basin, Skipanon Channel, Skamokawa Creek, Wahkiakum Ferry Channel, Westport Slough, and Upstream Entrance to Oregon Slough and Portland-Vancouver Anchorage.
        iv. Old Mouth Cowlitz River from September 1 through December 1
    c. Dredging and in-water placement may be completed outside the preferred O&M season as necessary to resolve shoaling conditions that cause, or are likely to cause, significant draft restrictions for commercial vessels if left unmanaged until the next preferred O&M season.
        i. Whenever possible, limit dredging outside the preferred O&M season to April 1 through May 31.
        ii. No in-water disposal is allowed between December 1 and May 31Cowlitz River at RM 63 to 70,
        iii. When alternative sites are available, there will be no in-water placement near the mouths of the Kalama River at RM 71 to 75, or the Lewis River at RM 85-89 December 1 and May 31.
        iv. Testing and calibration of dredge equipment outside the preferred O&M season must occur upstream the Lewis River at RM 89.
    d. Prior to any dredging taking place, the Corps must develop and implement a Water Quality Sampling and Monitoring Plan for dredging and disposal that has been reviewed and approved by NMFS. The plan must include the following minimum

requirements for turbidity monitoring during periods of active dredging, disposal, and dewatering of upland facilities.

i. A properly and regularly calibrated turbidimeter is recommended, however visual gauging is acceptable

ii. Locations of turbidity samples or observations must be identified and described in the plan. At a minimum, monitoring must take place at the following distance, and within any visible plumes:
    1. Dredging and in-water disposal activities (flowlane and beach placement) – Upcurrent (background) and 900 feet down current from the point of discharge (bucket, cutterhead, draghead, or pipeline) and no more than 150 feet laterally from the vessel or shoreline.
    2. Other disposal activities (upland) – Upcurrent (background) and 300 feet downcurrent from the discharge point.
    3. If a meter is used the Corps must identify a depth between 10 and 20 feet, or at mid-depth if in shallow areas (less than 20 feet in depth), to collect all samples.

iii. Monitoring must occur when dredging and disposal is being conducted and must meet the following requirements;
    1. Active Dredging – once a day during a flood tide and once a day during an ebb tide.
    2. In-Water Disposal (Flowlane and Beach Placement) – once a day during a flood tide and once a day during an ebb tide during a disposal activity.
    3. Background turbidity NTU or observation, location, tidal stage, and time must be recorded prior to monitoring downcurrent

iv. Compliance:
    1. Turbidity must be measured or observed and recorded as described above during periods of active dredging, disposal, and dewatering of upland facilities. Results must be compared to the background sample or observation taken during that monitoring event.
    2. If an exceedance over the background level (as defined below Table 1) occurs at the second monitoring interval the activity must stop until the turbidity levels return to background. At that time, activity may resume with the minimum frequency of monitoring while maintaining compliance

Table 1 Turbidity Exceedance and Actions Required

TURBIDITY CAUSING ACTION	ALLOWABLE EXCEEDANCE TURBIDITY LEVEL			ACTION REQUIRED AT 1ST MONITORING INTERVAL	ACTION REQUIRED AT 2ND MONITORING INTERVAL
	TURBIDIMETER		VISUAL		
	Background < 50 NTU	Background ≥ 50 NTU			
DREDGING & IN-WATER DISPOSAL	0 to 5 NTU above background	10% over background	Visible plume	Modify activity and continue to monitor at ebb or flood tide	Stop activity until levels return to background and continue to monitor at ebb or flood tide
UPLAND DISPOSAL				Modify activity and continue to monitor every 4 hours	Stop activity until levels return to background and continue to monitor every 4 hours

a. Water quality limits on side channel and Portland-Vancouver Anchorage dredging:
   i. DO will be sampled at the mid-point of the water column 300 feet down current from the dredge and in the turbidity plume if visible.
   ii. Samples will be collected during daylight hours during active dredging at the following frequency; once a day during a flood tide and once a day during an ebb tide.
   iii. DO concentrations must be sampled with a dissolved oxygen meter properly and regularly calibrated according to the owner's manual.
   iv. Dredging may not begin if DO concentrations at the dredge site are less than 6.5 mg/l
   v. If the level of DO measured is below 8 mg/l, the monitoring frequency must increase to every four hours until the level returns above 8 mg/l.
   vi. If the level of DO is measured below 6.5 mg/l, or if distressed or dead fish are observed in or beside the dredge, the activity must be stopped until the level returns to above 6.5 mg/l.
   vii. Restricted visibility: During periods of restricted visibility that could cause an unsafe condition, the Corps may postpone required compliance monitoring until conditions improve if confirmation is made by a third party, such as the Coast Guard Watch Stander or the National Weather Service, that the visibility in the area to be monitored is considered to be restricted and is unsafe to conduct the required monitoring. If monitoring is postponed due to restricted visibility and unsafe conditions, the weather condition, time of determination, and verification route must be recorded. Regular monitoring must resume once the visibility returns to safe levels.

b. Keep dragheads and cutterheads at or buried in the substrate when suction dredges are working, and no more than 3.0 feet above the substrate for the minimum time necessary to clean or purge the dragheads.

c. Discharge material from a pipeline dredge at depths of 20.0 feet or more below the water surface.
d. Require use of an enclosed-bucket whenever a clamshell dredge or back-hoe will be used to dredge materials that are not approved for in-water disposal due to contaminant concerns.
e. Use the SEF (2009; or the most recent version) to determine the suitability of sediment for in-water disposal or beneficial use.
f. Grade all shoreline disposal or beach nourishment sites to between 10 to 15% with no swales to reduce the potential to strand juvenile salmonids.
g. Monitor upland disposal sites during the nesting season. Discourage any avian predators that are found nesting at an upland disposal site, consistent with the Migratory Bird Act.
h. Construct any new upland disposal site at least 300 feet from the shoreline, and include a berm designed to minimize sediment in return flow.
i. Provide this notice to all Corps project managers or contractors engaged in FNC maintenance, and to all private vendors licensed to remove sand from the FNC for commercial purposes:

> NOTICE. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NMFS Law Enforcement at 360.418.4246. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by law enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

2. To Implement Reasonable and Prudent Measure #2 (monitoring), the Corps shall:
   a. Prepare a monitoring report for NMFS by February 15 each year that describes the Corps' efforts in carrying out these terms and conditions. The report must include
      i. An assessment of overall channel maintenance activity.
      ii. An assessment of dredging and disposal activities by river segment, including the dredged area in acres, dredging time in minutes, date, dredge type, disposal site.
      iii. DO and turbidity observations before and during side channel dredging.
      iv. A summary of all observations of upland disposal sites that may be used for nesting use by avian predators, especially Caspian terns and double-crested cormorants.
      v. The finished beach gradient at any beach nourishment site used during the year.
      vi. The location, time and amount of any reported spills, the cleanup response time and actions as well as effectiveness.
      vii. A copy of any warning, notice of noncompliance, penalty notice, violation, or other enforcement action taken by a Federal, state or local agency.
   b. Submit the annual monitoring report to:

State Director
Oregon State Habitat Office
Attn: 2011/02095
1202 NE Lloyd Boulevard, Suite 1100
Portland, Oregon 97232-2778

c. The Corps must attend an annual coordination meeting with NMFS by Mar 1 each year to discuss the annual report and any actions that can improve conservation under this opinion, or make the maintenance program more efficient or accountable. The Corps is also encouraged to invite representatives from the Oregon Department of Environmental Quality, the Washington Department of Ecology, the Oregon Department of Fish and Wildlife, the Washington Department of Fish and Wildlife and the US Environmental Protection Agency to attend.