



US Army Corps
of Engineers®
Portland District

Environmental Assessment

Proposed Nearshore Disposal Locations at the Mouth of the Columbia River Federal Navigation Project, Oregon and Washington



U.S. Army Corps of Engineers Mouth of the Columbia River (MCR) Federal Navigation Project

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**DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT**

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for
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at the
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Oregon and Washington**

This Environmental Assessment (EA), prepared by the U.S. Army Corps of Engineers, Portland District (Corps), is submitted for public review under applicable laws and regulations, including the National Environmental Policy Act, and Clean Water Act. This EA discloses the range of alternatives considered and the environmental consequences associated with the Corps' proposed use of one nearshore and one intertidal dredged material disposal sites for the Mouth of the Columbia River (MCR) federal navigation project. The use of these sites would improve the following aspects of the overall operation and maintenance of the MCR federal navigation project:

- Provide additional long-term dredged material disposal options for the MCR dredged material disposal site network;
- Increase efficiency of dredging operations by using sites closer to the federal navigation channel;
- Protect the existing jetties that are a part of the MCR navigation system;
- Beneficially use dredged material by keeping it in the Columbia River littoral cell

The sites would be used after the Corps has received all required environmental clearances, and assuming that the Corps makes a Finding of No Significant Impact (FONSI) for the proposed action. The Corps is the lead federal agency for this EA.

Comments concerning this EA have been received by the public and incorporated in Section 5 - Coordination.

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Acronyms and Abbreviations

AMT	Adaptive Management Team
AUP	Annual Use Plan
BA	Biological Assessment
C&LW	Columbia and Lower Willamette
CFR	Code of Federal Regulations
cm	centimeter(s)
Corps	U.S. Army Corps of Engineers
CRCIP	Columbia River Channel Improvement Project
CWA	Clean Water Act
cy	cubic yard(s)
DPS	Distinct Population Segment
DWS	Deep Water (disposal) Site
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	foot or feet
LCSG	Lower Columbia Solutions Group
MCR	Mouth of the Columbia River
mcy	million cubic yard(s)
MLLW	mean lower low water
NJS	North Jetty (disposal) Site
NMFS	National Marine Fisheries Service
O&M	operation and maintenance
ODEQ	Oregon Department of Environmental Quality
RM	river mile(s)
R&M	research and monitoring
RSMP	Regional Sediment Management Plan
SWLD	Southwest Washington Littoral Drift
SWS	Shallow Water (disposal) Site
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WRDA	Water Resources Development Act

1. PURPOSE AND NEED

1.1. INTRODUCTION

This draft Environmental Assessment (EA) evaluates the environmental effects for incorporating additional nearshore disposal sites for the beneficial use of dredged material at the mouth of Columbia River federal navigation project (MCR project). Every year, from 3 to 5 million cubic yards (mcy) of sand is dredged by the U.S. Army Corps of Engineers (Corps) from the MCR entrance channel to keep the Columbia River deep-draft federal navigation channel open. Currently, the sediment dredged is disposed of at three existing dredged material disposal sites. Two of these sites are within the nearshore littoral area – the Shallow Water Site (SWS) and the North Jetty Site (NJS). The third site is a Deep Water Ocean Disposal Site (DWS) that is used when the other two sites are at capacity or when the weather is too treacherous to use them. Over the past 5 years, approximately one-third of the sand dredged at the MCR has been taken to the DWS. This removes a large portion of this clean (uncontaminated) resource from the Columbia River littoral cell¹, where it would help sustain the jetties, beaches, and marine habitats in the MCR area.

1.2. PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to add additional, long-term dredged material disposal sites to the existing network of disposal sites for the MCR operations and maintenance project. Additional disposal sites are needed to supplement sediment within a naturally erosive environment, obtain needed information on nearshore processes, and divert a sand resource that is otherwise “lost” if it goes to deep-water disposal rather than to beneficial use in the littoral zone². The addition of nearshore disposal sites also would give the Corps’ flexibility for disposal options. The use of additional nearshore disposal sites would improve the following aspects of the overall operation and maintenance of the MCR project:

- Provide additional long-term dredged material disposal options for the MCR dredged material disposal site network;
- Increase efficiency of dredging operations by using sites closer to the federal navigation channel;
- Protect the existing jetties that are a part of the MCR navigation system;
- Reduce the need to place dredged material in the DWS;
- Beneficially use dredged material by keeping it in the Columbia River littoral cell; and

The existing SWS is the current disposal site utilized as a feeder of sediment back into the littoral system. Strategic placement of sediment in this disposal site has improved the movement of sediment into Peacock Spit (to the north of the North Jetty). However, the littoral cell is still experiencing depletion of sediment. Due to the variability of each dredging season, definitive actions cannot be predefined; sediment must be distributed among disposal sites in order to not overload one disposal zone. Although they are dispersive sites, disposal at the SWS and NJS has been limited because of bathymetric restrictions (i.e., potential for dredged material mounding). Therefore, the Corps is seeking to use other

¹ The Columbia River littoral cell extends from Tillamook Head, Oregon to Point Grenville, Washington. The cell is subdivided by three large estuaries: Grays Harbor, Willapa Bay, and the Columbia River estuary. More information can be found in the *Affected Environment* section of this EA.

² A littoral zone is a nearshore environment with naturally occurring erosive and depositional processes. A continual supplement of sediment input is needed in order to ensure a balanced sediment budget within each zone.

nearshore sites to aid in returning sand to the littoral cell and, in the process, reducing the need to place dredged material in the DWS.

1.3. CORPS REGIONAL SEDIMENT MANAGEMENT PROGRAM

1.3.1. Overview

The Corps initiated implementation of a national Regional Sediment Management (RSM) Program in 1999 with the objective of optimizing the utilization of sediments and management of projects through a systems-based approach. Section 204 of the Policy Guideline Language for RSM provides that the Secretary of the Army shall develop at federal expense, regional sediment management plans, in cooperation with appropriate federal, state, regional, and local agencies, for sediment obtained through construction, operation, or maintenance of an authorized federal water resource. The RSM plans identify projects for transportation and placement of sediment to reduce storm damages to property and protect, restore, and create aquatic and biologically related habitat. Portland District, through the National Policy Consensus Center at Portland State University, and along with EPA, and the states of Oregon and Washington has attempted to apply the national RSM objectives to maintenance dredging operations at MCR. The RSM program supports sustainable navigation and dredging, flood and storm damage reduction, and environmental practices in order to increase overall benefits and reduce lifecycle costs. RSM strives to enhance the planning, construction, and operation and maintenance of projects where the exchange of sediments would occur naturally. Central to the RSM program is the idea of ‘working with nature.’ RSM is also a means to involve stakeholders to share resources, share technology and data, identify needs and opportunities, and develop solutions to improve the utilization and management of sediments. The main focus is to better understand the regional sediment transport processes through integration of regional data and application of tools which improve our knowledge of the regional processes, understand and share demands for sediment, and identify and implement adaptive management strategies to optimize use of sediments and streamline projects. Benefits of this approach are improved partnerships with stakeholders, improved sediment utilization and project management on a regional scale, improved environmental stewardship, and reduced overall lifecycle costs.³

The Portland District’s proposal to add the disposal sites outlined in this EA represents the implementation of the RSM program. Small scale “pilot” projects have take place at the proposed South Jetty Nearshore Site and the proposed Benson Beach Site in the past. For the purposes of this EA the RSM program’s goal is to feed the inlet’s morphology using dredged material, and letting nature do the work of dispersing the placed dredged material to supplement the sediment budget of the inlet and adjacent nearshore coast, without compromising the reliability of the navigation channel or environmental resources.

1.4. CORPS NAVIGATION MISSION AT THE MCR

1.4.1. Overview

The features of the MCR project were authorized by Rivers and Harbors Acts of 1884, 1905, 1954, as well as Public Law 98-63. The MCR project consists of a 0.5-mile wide entrance channel extending for

³ As stated for memorandum: Implementation Guidance for Regional Sediment Management - Section 2037 of the Water Resources Development Act of 2007 (WRDA 2007).
<http://planning.usace.army.mil/toolbox/library/WRDA/wrda07sec2037.pdf>

about 6 miles through a jettied entrance between the Columbia River and the Pacific Ocean. The ocean entrance at the MCR is characterized by large waves and strong currents and is considered one of the world's most dangerous coastal inlets. From 1885 to 1917, the North and South jetties were constructed. Jetty construction realigned the ocean entrance to the Columbia River, established a consistent navigation channel that was 40-feet deep across the bar, and greatly improved navigation through the MCR. Improvements made from 1930 to 1942 (including adding Jetty A and the Sand Island pile dikes) produced the present entrance configuration. The Corps' Northwestern Division, Portland District, is responsible for the operation and maintenance of the MCR project.

1.4.2. Benefits of the MCR Project

The MCR is the ocean gateway for maritime navigation to and from the Columbia-Snake River navigation system. The federal deep-draft navigation channel is important to the regional and national economy. Approximately \$16 billion worth of U.S. products bound for world markets and 55 million tons of incoming cargo pass through the MCR project annually. More than 12,000 commercial vessels and 100,000 recreational/charter vessels navigate through the MCR annually. According to the Pacific Northwest Waterways Association, more than 40,000 jobs along the lower Columbia River are dependent on seaport activity.

1.4.3. Existing MCR Project Features

1.4.3.1. Entrance Channel

The MCR entrance channel lies between river miles (RM) -3 to +3. The authorized project provides for a 2,640-foot wide entrance channel extending across the inlet's offshore bar. The northerly 2,000 feet of the entrance channel is maintained at -55 feet mean lower low water (MLLW), plus an additional 5 feet for advanced maintenance; the southerly 640 feet of the entrance channel is maintained at -48 feet MLLW, plus an additional 5 feet for advanced maintenance.

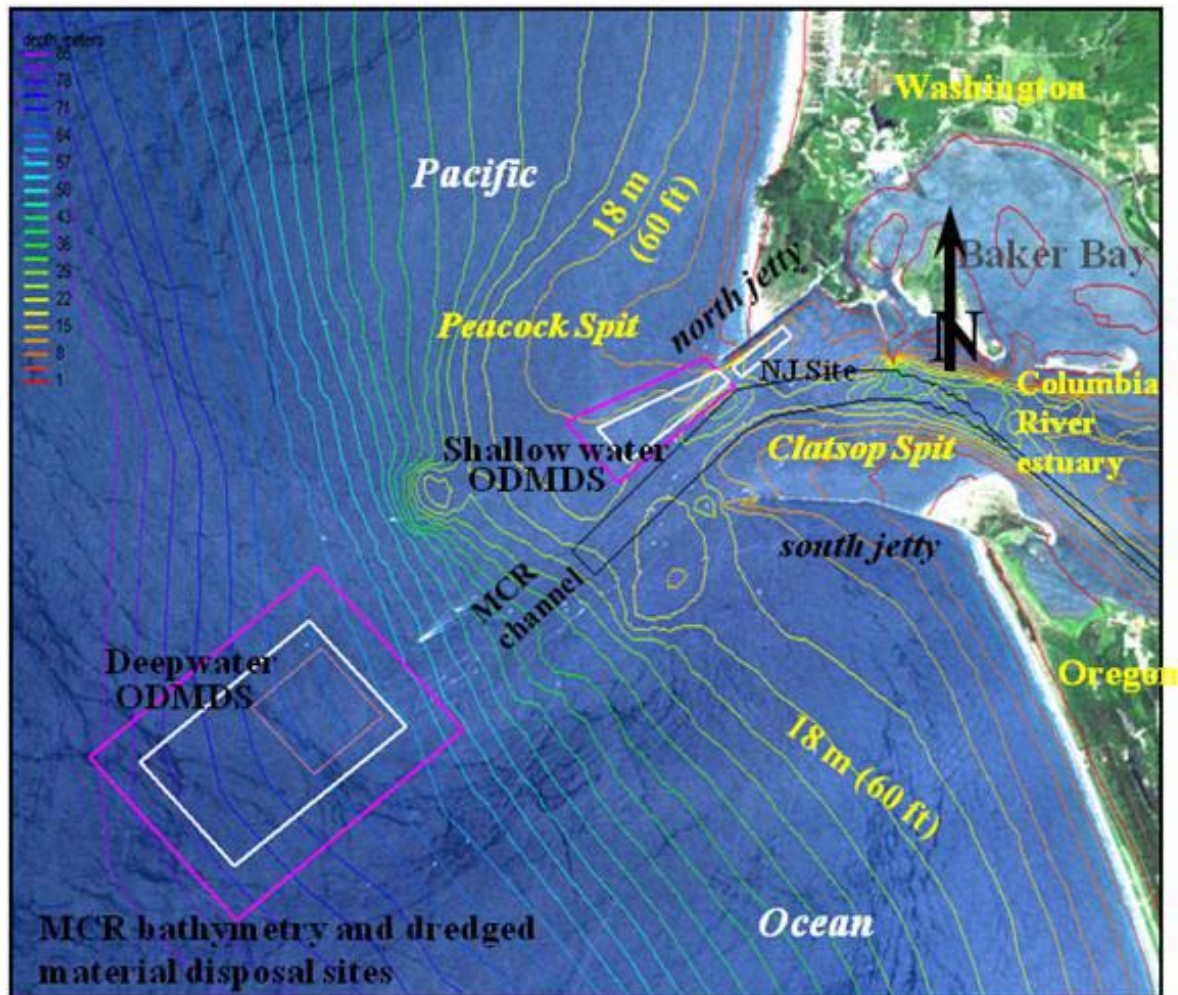
1.4.3.2. Jetties

The three MCR jetties are rock structures that help ocean-going vessels move between the Columbia River and Pacific Ocean. The North Jetty and Jetty A are located in Pacific County, Washington, near Ilwaco and Long Beach on the Long Beach Peninsula (see cover photo). The 2.3-mile long North Jetty was completed in 1917. Three repairs to the North Jetty have been made with the last one completed in 2005. Since initial construction, about 0.4 miles of the North Jetty head has eroded and is no longer functional. Jetty A, positioned on the south side of the North Jetty, was constructed in 1939 to a length of 1.1 miles and is located upstream of the North Jetty. Jetty A was constructed to direct river and tidal currents away from the North Jetty foundation. The South Jetty is located in Clatsop County, Oregon near Warrenton/Hammond and Astoria. The South Jetty is about 6.6 miles long. The initial 4.5-mile section of the South Jetty was completed in 1896, with a 2.4-mile extension completed in 1914. Currently, approximately 3 miles of jetty extends seaward of the shoreline. To stabilize the foundation, six groins perpendicular to the South Jetty were constructed from 1893 to 1913 with lengths varying from 100 to 1,000 feet. Over 6,100 feet of head loss has occurred at the South Jetty. Nine repairs to the jetty have been completed with the latest one in 2007.

1.4.3.3. Existing Disposal Sites

The SWS lies within 2 miles offshore from the MCR and was evaluated and designated in 2005 by the U.S. Environmental Protection Agency (EPA) under Section 102 of the Marine Protection, Research and Sanctuaries Act (Figure 1). The SWS occupies a trapezoidal area of 3,100 to 5,600 feet in width by 11,500 feet in length and lies in a water depth of 45 to 75 feet. The SWS is dispersive, which means that material placed there is transported away from the site by waves and currents.

Figure 1. Existing Dredged Material Disposal Sites at the MCR



Active monitoring and evaluation determined that 80% to 95% of the dredged sand annually placed at the SWS moves northward onto Peacock Spit. Approximately 33 mcy of dredged sand was placed within the SWS during 1997-2010 (Corps and EPA 2011). The SWS is of strategic importance to the region; its continual use has supplemented Peacock Spit with sand, has maintained the littoral sediment budget north of the MCR, has protected the North Jetty from scour and wave attack, and has stabilized the MCR inlet.

The NJS is located about 200 feet south of the North Jetty (see Figure 1). It occupies an area of 1,000 by 5,000 feet and has a range in water depth of 35 to 55 feet. This site was evaluated and established in 1999 under Section 404 of Clean Water Act (CWA) to allow the placement of dredged material along the toe of the North Jetty to protect it from excessive waves and current scour. Approximately 4.9 mcy of dredged material was placed in the NJS during 1999-2010 (Corps and EPA 2011).

The entire DWS occupies an area of 17,000 by 23,000 feet and lies 6 miles offshore from the MCR in a water depth of 190 to 300 feet. The DWS has a defined placement area, which is inscribed within the overall site boundary by a 3,000-foot buffer zone that separates the DWS boundary from the DWS placement area (see Figure 1). The DWS placement area is 11,000 by 17,000 feet. The DWS was designated in 2005 under Section 102 of the Marine Protection, Research and Sanctuaries Act to provide sufficient capacity for the placement of dredged materials to meet current and anticipated future ocean disposal needs at the MCR (EPA 2005). Use of the DWS occurs only when the SWS and NJS have been used to the maximum extent practicable, or when inclement weather conditions or operational constraints temporarily preclude their safe use. Approximately 647,000 cubic yards (cy) of dredged material was placed in the DWS in 2008, 2.9 mcy in 2009, and 290,400 cy in 2010 (Corps and EPA 2011).

These sites are currently monitored by comparing pre-, during, and post-dredging bathymetric surveys. The dredges also track daily dredged material placements. By tracking the changes in the bathymetric contours, the Corps ensures that their dredged material placements do not produce excessively high or large dredged material mounds.

All three of the active disposal sites at the MCR have undergone extensive evaluation and review regarding their potential effects prior to their designation. Additional information about these disposal sites can be found at http://www.nwp.usace.army.mil/docs/d_sediment/odmds/MCR_AUP_2011.pdf.

1.4.3.4. Dredging at the MCR

The Corps annually dredges 3 to 5 mcy of sediment from the MCR. Most of the dredging occurs between RM -2 to +2 and the dredged material is predominantly clean quartz sand in the fine-sand size range (particle diameters from 0.19 to 0.25 millimeters) with generally less than 3% fine-grained material (particle diameters less than 0.0625 millimeters, passing a 230-mesh sieve). Due to the exposed, high-energy ocean conditions at the MCR, only ocean-going hopper dredges are able to safely perform the required dredging and material placement activities. Dredging at the MCR is limited to June through November when wave conditions are favorable for working safely at the offshore bar. Two hopper dredges are normally required to perform maintenance dredging; a government-operated dredge and a contractor-operated dredge, each with different capacities and operating characteristics.

1.4.3.5. Dredging in the Columbia Federal Navigation Channel

The Corps is authorized to maintain the Columbia and Lower Willamette (C&LW) federal navigation channel (RM 3.0 to 106.5) to a depth of 43 feet and width of 600 feet. Maintenance dredging in the lower (estuarine) reach (RM 3-29) is predominantly clean quartz sand in the medium to fine-sand size range with generally less than 1% by weight of fines and organic content, which is considered suitable for placement in designated ocean disposal sites. Within the estuarine reach (RM 3-29), the long-term operation and maintenance (O&M) plan for the C&LW project is to place the maintenance material in the ocean only when existing estuarine disposal sites are unavailable. No dredged material from RM 3-29 has been placed in ocean disposal sites since 2008.

1.4.4. Related Documents

1.4.4.1. MCR Annual Use Plan

The year-to-year management of the EPA designated dredged material disposal sites located at the MCR is controlled and documented through the preparation and adherence to an Annual Use Plan (AUP). The AUP serves as the primary mechanism for the evaluation of disposal site capacity and the adaptive management of the dredged material placement. The AUP is revised for each dredging-placement season, as required by the EPA's 2005 MCR disposal site designation (EPA 2005). The MCR AUP is prepared each year by the Corps' Portland District, and it is reviewed and approved by EPA, Region 10. While only EPA designated disposal sites, i.e. DWS and SWS, are required to be in the AUP, the Corps will include all disposal sites in the AUP for efficient sediment management.

The objectives of the AUP are to: (1) provide a decision framework that allows MCR dredging operations managers to adaptively manage open water disposal sites on a day-to-day basis, and (2) define criteria with which to assess information (via monitoring and daily operational data) on a frequent basis that can be used to identify potential future problems and proactive steps to be taken to avoid them. The amount of dredged material that can be placed in an open water disposal site is limited by each site's capacity to accumulate and disperse the material without adversely affecting the environment or navigation. The principal site management constraint for the MCR is to avoid modification of a disposal site's bathymetry (i.e., dredged material mounding) that could potentially result in excessive wave amplification, due to wave shoaling over mounded dredged material. The 2011 AUP can be found at: http://www.nwp.usace.army.mil/docs/d_sediment/odmds/MCR_AUP_2011.pdf.

1.4.4.2. Regional Sediment Management Plan (RSMP)

The Lower Columbia Solutions Group (LCSG) is a bi-state group, convened by the Governors of Oregon and Washington, and the Chair of the Council on Environmental Quality. The intent of the LCSG is to develop a long-term strategy for regional sediment management within MCR, ensure sustainable management of natural and economic resources, continue to support navigational safety, and protect the jetty infrastructure already in place. The group utilizes the framework put forth by the AUP, an approach that allows for disposal sites to be managed in such a way that the use and monitoring of MCR's disposal site network can be adjusted as needs arise (adaptive management).

The Corps has worked with stakeholders, state agencies, and other federal agencies to develop regional sediment management objectives. These objectives support the beneficial use of dredged material in the greater MCR system and the retention of sediment in the Columbia River littoral cell. They also are captured in the *Mouth of the Columbia River Regional Sediment Management Plan* (LCSG 2011). The RSMP goals that are relevant to this EA include the following:

- Identify a range of available sites for disposal of dredged material that can be sustainably and adaptively managed, retain clean sand in the littoral system, and avoid or minimize impacts to benefit biological resources and navigation safety;
- Augment the present and future sediment budget at the MCR using dredged material to optimally sustain the inlet and related littoral system;
- Increase stability of the sand shoals that the North and South jetties are built upon and replenish sand in the nearshore, thus reducing wave damage to the jetties and erosion and associated property loss along the northern Oregon and southern Washington coasts;

- Address loss of biological habitat from ongoing erosion and sediment transport in the littoral zone, most notably in the area directly south of the South Jetty; and
- Ensure that disposal practices will not result in unacceptable adverse effects on the nearshore ocean ecosystem, including Endangered Species Act (ESA)-listed species and commercial and recreational fisheries (i.e., crab and razor clam).

In response to workshops held in 2009, the LCSG initiated the current regional sediment management planning effort in early 2010 with the goal to develop a program of potential new beneficial use activities, including a regional network of disposal sites, an adaptive management program for their use, and identification and prioritization of research and monitoring measures. As part of the RSMP effort, a policy workshop was conducted in August 2010, leading to a combined science/policy workshop in November 2010. In the fall of 2011, the RSMP was finalized by the LCSG. This document encompasses a decade of collaborative research and discussion and is expected to guide future efforts to streamline dredged material distribution in such a way that the materials placed in the system are continually contributing to the Columbia River littoral cell. Ultimately, the intent of the RSMP is to provide far-reaching positive benefits to the biological community, economic viability, and physical environment. The proposed action is consistent with the goals of the RSM program (reviewed in section 1.3).

1.4.5. Previous Studies and Workshops

The MCR has been the subject of multiple physical and biological studies over several decades by various federal, state, and local entities. Studies sponsored by the Corps have been summarized in the 2007 *Summary of Physical and Biological Studies at the MCR Sponsored by the U.S. Army Corps of Engineers*. Studies conducted since 2005 under LCSG auspices are available for review at <http://www.lowercolumbiasolutions.org>. These studies focus on better understanding sediment transport processes, wave and circulation patterns, and the potential impacts of dredge disposal on species and habitat within the MCR region. For example, since 2002, more than a dozen different research projects have collected *in situ* and remotely sensed data, performed various data analyses, applied and calibrated wave/circulation/sediment transport/morphology change models, and investigated species distribution, diversity, and burial impacts specifically within the MCR region (e.g., Vavrinc et al., 2007 a,b). In addition to these scientific studies, science/policy workshops have been convened by LCSG in 2005, 2007, 2009 and 2010 with scientists, technical specialists and policy-makers in order to discuss nearshore physical processes and their policy implications for sediment management.

In 2004, the Oregon Nearshore Beneficial Use Project was initiated by LCSG, and partially funded by the Port of Astoria, to collaboratively address the depletion of sand in the nearshore environment south of the South Jetty. To address scientific information needs and share this information with decision-makers, LCSG and the Oregon State University Institute for Natural Resources commissioned a series of scientific white papers and convened joint workshops. Among the conclusions were that a limited demonstration project should be conducted to determine the feasibility of “thin layer” disposal in the nearshore environment. Other conclusions from the workshop included:

- Mounding should be avoided that creates navigational hazards due to wave amplification.
- Crab information is lacking.
- No long-term impacts on the benthic community are expected with disposal.
- ESA-listed fish species are likely to be unaffected, but there are questions about such issues as avoidance behavior of juvenile salmon and other species and burial of flatfish and bottom fish.
- Concerns about impacts to bird populations focus on marbled murrelets.

- Impacts on marine mammals are negligible.
- A bi-state policy on sediment management is needed.

In September 2005, a pilot study for dredged material placement was completed at the proposed South Jetty Beneficial Use Site. The pilot study was sponsored by the Lower Columbia Solutions Group (LCSG), convened by the governors from the states of Oregon and Washington, which consists of stakeholders interested in and affected by dredged disposal activities in the Lower Columbia River. Stakeholders included commercial crabbers, fishing interests, environmental groups, development interests, the Port of Astoria, and local, state, and federal government agencies including the Corps. The funding for the project was provided by eleven different stakeholders involved in the collaborative effort. The Corps, Portland District provided the dredge Essayons, personnel, and financial support to conduct the pilot project. The Port of Astoria served as the project permittee and contractual agent (in conjunction with the Corps) for conducting the monitoring of the study area.

The objective of the pilot study was to evaluate the feasibility of the site-specific beneficial use of the MCR dredged material in the near shore environment. The beneficial uses include:

- Accretion of material in the littoral zone to prevent further erosion to the foundation of the MCR South Jetty. The addition of material to the substrate will help maintain and protect the structural integrity of the jetty by reducing wave energy on the jetty.
- Replenish littoral sands in a previously identified erosive area. Net erosion in the nearshore area has resulted in physical changes to the seafloor including exposed ancient laminate clay/mud substrates and increased bottom slope.
- Increase supply of sand substrate for benthic infauna and epibenthic infauna habitat in the near shore area.

The pilot study design involved the placement of approximately 30,000 cubic yards of dredged material at a new disposal location to the south of the MCR South Jetty. A total of six hopper dredge loads were supplied by the USACE dredge Essayons, placed along six disposal lanes of approximately 6,000 feet long by 500 feet wide. Water depths in the pilot study placement area ranged between -40 to -60 ft mean lower low water (MLLW). Data collection efforts included sediment profile imaging photography (SPI), sediment grain size distribution, and a multi-beam side-scan sonar survey. The SPI survey and sediment sampling were conducted by Science Applications International Corporation (SAIC). The study found that the depositional depth of the dredged material footprint was estimated to average from 2.03 to 2.69 inches based on the volume of material placed at each disposal lane. SAIC determined that this depositional estimate is within the targeted depth identified. The visual and physical similarities of the dredged material and native substrate, in conjunction with the prism penetration depth, inhibited the identification of an interface between the deposition and original surface in the SPI images. The bathymetric surveys were unable to discern any measurable bathymetric relief following placement, which would indicate that substantial mounding of dredged material did not occur. The study concluded that based on the data collected for the pilot study, enhanced disposal in a nearshore environment appears to be a feasible alternative for the beneficial use of dredged materials from the MCR navigational channel. (SAIC, 2006)

In August 2008, the Corps initiated a sand tracer study in the nearshore area south of the South Jetty to evaluate sediment dispersal in this area. Results showed dispersal toward the North and South jetties, with some dispersal to the west and noticeably more to the east and then south along Clatsop Plains and the beach. The pattern of deposition to the north suggests transport from the end of the South Jetty in a west-northwest direction across the channel to the north and around the ebb shoal to the north as far as the south end of Long Beach, WA. In general, it appears that dredged sand deposited in the nearshore area

south of the South Jetty will widely disperse; some of the material that moves north and west toward the navigation channel would be expected to be retained within the proximity of the South Jetty and lead to deposition both along the jetty and the Clatsop Plains shoreline.

In April and June 2009, two science-policy workshops were conducted in conjunction with the Southwest Washington Littoral Drift Restoration Project to address mound-induced wave amplification and safety implications for small boat navigation, as well as biological information needed to proceed with selection of nearshore beneficial use sites for sediment disposal. An overall goal identified by workshop participants was to eliminate deep water disposal through the identification of new nearshore beneficial use sites. To advance that goal, specific conclusions and recommendations included:

- Proceed with the planned Benson Beach and Oregon nearshore demonstration projects to assess the viability and effects of nearshore disposal.
- Consolidate previously identified potential disposal areas near North Head into a single new “North Head” site to be assessed as a permanent nearshore disposal site.
- Avoid navigation safety in areas of dredged material disposal by avoiding mounding altogether. Also address life safety issues generally by improving prediction and real-time information on waves and wind.
- For biological species, a key determinant is evidence of any greater effect than what occurs with current dredging practices.
- Primary species of concern are Dungeness crabs, ESA-listed fish species, and a species of gaper clam that is not well understood.
- The issue of thick versus thin layers of placement needs to be addressed.
- Limited resources should be used wisely, relying on currently available monitoring techniques and focusing on the most sensitive life stages.
- Adaptively manage disposal sites.

Also as a result of the 2009 workshops, a variety of cooperative activities and studies were undertaken, including enhancements to the existing Argus beach monitoring system at North Head, initiation of a detailed wave analysis for the area south of the South Jetty and other potential regional sediment management areas at the MCR, evaluation of nearshore circulation south of the South Jetty using remote sensed data, deployment of a Coastal Data Information Program wave-ride buoy at the approaches to MCR, and continuation of the sediment tracer study for the area south of the South Jetty.

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. DEVELOPMENT OF ALTERNATIVES

2.1.1. Project Area

The project area under consideration in this EA is defined as: (1) all aquatic and upland habitats ~~to~~ 0 to 10 miles offshore from the MCR and extending 6 miles north and 6 miles south of the MCR, and (2) extending upstream in the MCR entrance channel to RM +3.

2.1.2. Related Actions

2.1.2.1. Dredging at the MCR and in the Columbia River

This EA does not address dredging for the MCR project, as the impacts of dredging were previously addressed in the Columbia River Channel Operations and Maintenance (O&M) EA (Corps 1994; Corps 1994) and the Columbia River Channel Improvement Project Environmental Impact Statement (CRCIP EIS; Corps 1999, 2003), which are incorporated by reference, and all dredging parameters remain the same. In addition, this EA does not address the existing SWS, NJS and DWS, as the environmental impacts of these sites also were addressed in the O&M EA and the CRCIP EIS. The use of these sites is included in the assessment of cumulative effects, section 4.6 of this EA.

2.1.2.2. Littoral Drift Restoration

Section 111 of the Water Resources Development Act (WRDA) of 2000 authorized the Corps to conduct studies for a shore protection project at Benson Beach. This enabled the Corps to study the impacts of alternative dredged materials disposal methods within the MCR. Starting in 2002, Benson Beach (directly north of the North Jetty) was used as a pilot project to evaluate different disposal methods with the intent to return sand back into Columbia River littoral cell. The Southwest Washington Littoral Drift (SWLD) Restoration EA (Corps 2008a) and decision in a Finding of No Significant Impact (FONSI) on August 7, 2008 were issued to pump ashore of materials dredged from MCR onto Benson Beach. The 2008 SWLD EA evaluated 5 years of use with up to 1,000,000 cy of sand placed annually, and is incorporated by reference. By using the pump-ashore method, the material deposited would minimize erosion at Benson Beach and allow for beach accretion throughout the littoral cell. Consequently, Benson Beach is included in this EA as a component of the full network of MCR disposal locations.

2.1.3. Selection Criteria for Alternatives

Each potential disposal alternative was evaluated based on adherence to the following objectives:

- Meet the Corps' mission of maintaining the federal navigation channel;
- Comply with mandates of the National Environmental Policy Act and other pertinent laws and regulations;
- Allow ongoing conservation efforts to continue and promote protective efforts in the MCR project area; and
- Regulate dredged material disposal to maximize sediment management for the MCR project.

Potential disposal alternatives were further narrowed down to accommodate distance and depth thresholds for dredges, disposal location sensitivity to economic and environmental parameters, and disposal method parameters.

- **Distance and Depth Parameters.** Efficient disposal operations are contingent upon dredge travel time and method of disposal. Suitable disposal locations need to be at, or within, a distance that does not place undue cost increases for the Corps dredging program, and that provides a safe depth range for dredges to place sediment. The shallowest area that a loaded dredge could safely use is -25 feet MLLW (as waves and currents permit).
- **Economic and Environmental Parameters.** There is a limited pool of contractors and dredges that can physically work at the MCR. The Jones Act requires that only U.S.-flagged, built, and crewed vessels be used to conduct work in the United States. There are only four dredging companies with dredges that can work at the MCR, with six suitable dredges among them. Average dredging cycle costs (dredging, transit, and dispersal time) could be reduced by utilizing a nearshore or intertidal site over use of the existing DWS. Also, retaining sediment in the Columbia River littoral cell could reduce future costs associated with shoreline erosion.
- **Disposal Method Parameters.** The driving factors when selecting types of dredging equipment for use at MCR are: capability of dredges to navigate high energy wave environments, physical characteristics of sediments, production timing, and method of placement. The two disposal methods currently used at MCR are bottom placement using a hopper dredge and pump-ashore. The most common practice is bottom placement due to the hopper's ability to work in high energy wave environments. Material can be placed strategically utilizing a combination of operational and mechanical procedures. If weather conditions allow, a contract dredge can place material on an intertidal site via the pump-ashore method. This process involves hooking the dredge up to a floating pipe and pumping a slurry mixture of sediment onto the intertidal site. The use of the pump-ashore method is contingent on funding, navigability, and safety considerations. A disposal method that has yet to be utilized in the Portland District dredging program is "rainbowing", which utilizes an on-deck nozzle to disperse a slurry of dredged sediment via aerial spray. This method is typically used to fill in shallow intertidal environments or to place sediment directly onshore.

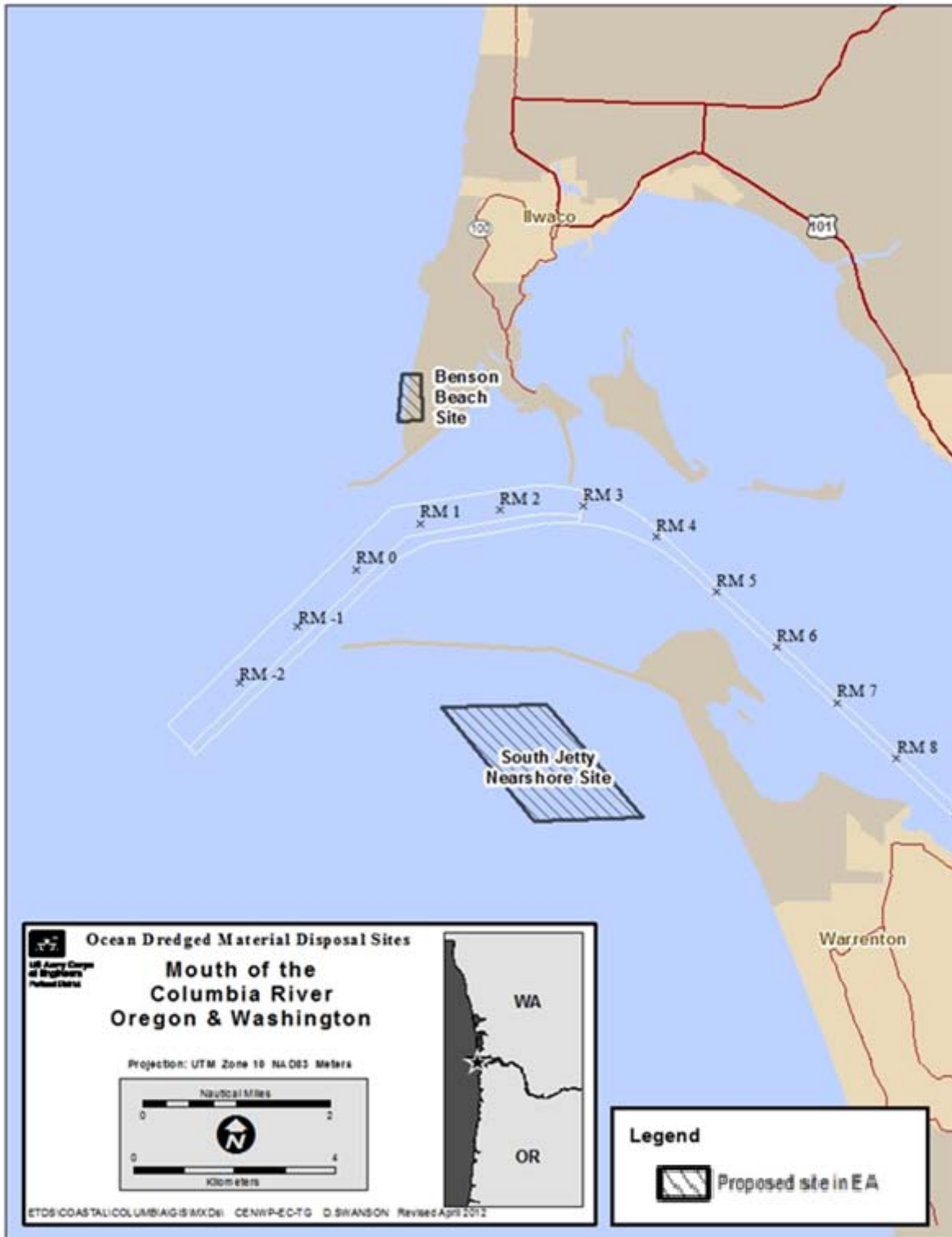
2.2. ALTERNATIVES SELECTED FOR EVALUATION

2.2.1. Preferred Alternative - South Jetty Nearshore and Benson Beach Intertidal Sites

South Jetty Nearshore Site

The South Jetty Nearshore site would be located nearshore, south of the South Jetty in waters -40 to -60 feet deep (Figure 2). The site is projected to have an annual capacity of between 300,000 and 500,000 cy. This subtidal site is intended to provide sand needed to mitigate recent erosion and supplement the sediment budget in the nearshore area adjacent to the South Jetty. Dredged material disposal at this location would be a beneficial use, as the intent would be for dredged material to enter the littoral drift system along the coastline, mimicking conditions that existed historically at the MCR. Based on previous bathymetric and vibrocore studies, this area is losing between 88,000 and 270,000 cy per year

Figure 2. Proposed Intertidal and Nearshore Material Placement Sites at the MCR

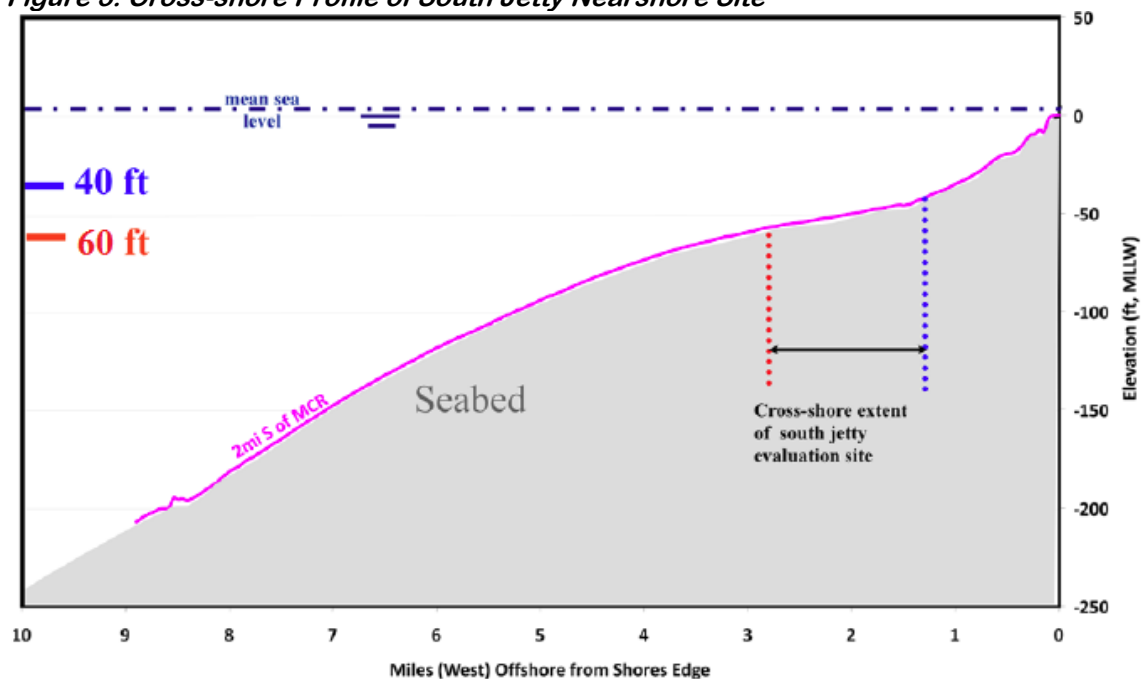


and pre-historic clay layers are being exposed. Use of this site is intended to reverse this trend and as the material gradually builds up at the new site, it would also serve to break waves at a distance from the South Jetty with the intent of decreasing wave damage to the jetty itself. Previous studies of the area determined this area to be the least productive area within the South Jetty vicinity in terms of benthic productivity. Data indicated that this area does not have an established, complex infaunal community (Hammermeister 2006).

The South Jetty Nearshore site has been identified as the area in the greatest need of dredged material, with scouring of the seabed expected to accelerate without the input of sand into the littoral zone. Erosion in this area increases the intensity of waves hitting the jetty; any catastrophic jetty failure or breach would create new ecosystem changes and result in dramatic impacts to the navigation channel and estuary. Modeling in conjunction with a November 2010 science/policy workshop indicates that this site is ideally located for circulation of sand to the South Jetty. Monitoring will be required after placement to ensure that material placed at the site effectively contributes material to the littoral system and stability to the South Jetty shoals. In order to address the concerns of the Columbia River Crab Fishermen's Association posed at the 4 January 2012 LCSG meeting, the use of the South Jetty Nearshore site would be limited by site management provisions that only allow material placement after August 15, when the crab season in Oregon ends and the crab pots are removed out of the water. Monitoring results will inform future use and management of the new sites. Like the NJS, SWS, and DWS, the proposed sites will be configured with a grid pattern and allocated a maximum load per cell. Bathymetric surveys would be conducted throughout the dredging season. The surveys will then be compared to the spring baseline conditions. The dredges will minimize the overlapping of disposal tracks in the sites.

A cross-shore profile of the proposed South Jetty Nearshore site is shown in Figure 3.

Figure 3. Cross-shore Profile of South Jetty Nearshore Site



The site has the following coordinates and dimensions:

Corner Coordinates:

46° 12' 11.90" N, 124° 01' 09.47" W
46° 13' 23.97" N, 124° 02' 36.89" W
46° 13' 20.90" N, 124° 04' 17.11" W
46° 12' 08.86" N, 124° 02' 49.65" W

Dimensions:

9,540 feet long by 7,040 feet wide
Depth -40 feet to -60 feet

Benson Beach Intertidal Site

The Benson Beach Intertidal site is directly adjacent to the north of the North Jetty (see Figure 2). This site was initially identified as a potential disposal area through a 2007 science/policy workshop in conjunction with the SWLD Restoration Project. Pump ashore of materials dredged from the MCR onto Benson Beach was assessed in the SWLD EA (Corps 2008a). By using the direct pump-ashore method, the material deposited would minimize erosion at Benson Beach and allow for beach accretion throughout the littoral cell. The SWLD EA evaluated 5 years of use with up to 1,000,000 cy placed annually; this EA analyzes a maximum of 500,000 cy annually.

Onshore placement of dredged sand would be via pump-ashore dispersal hopper dredge. Material placement would start 1,500 feet north of the North Jetty, in order to reduce the reintroduction of materials southward towards the jetty. The disposal typically entails 300,000 to 500,000 cy of sand within the intertidal zone (-2 to +7.5 feet MLLW) during a disposal season. The deposition of the placed sand is intended to occur naturally as the discharged sand is reworked by waves and currents. A "transient depositional feature" is intended to form a shore edge prominence (salient) that locally extends into the surf zone. The anticipated depositional thickness would be about 5 to 8 feet, with an alongshore extent of 900 to 1,300 feet and a cross-shore extent of 700 to 900 feet. The transient depositional feature would be dispersed by waves and currents through time; the rate of dispersion is unknown. As this feature is dispersed, the dispersed sand would augment the littoral sediment budget of the adjacent areas. Placement in this site is dependent on partner funding, to account for the incremental cost of pump-ashore disposal method.

The Benson Beach Intertidal site has the following coordinates and dimensions:

Corner Coordinates:

124° 4' 38.89" W, 46° 16' 55.24" N
124° 4' 37.68" W, 46° 16' 25.39" N
124° 5' 00.65" W, 46° 16' 24.72" N
124° 4' 58.63" W, 46° 16' 35.32" N

Dimensions (site is not an equilateral polygon):

2,860/3,945 feet long by 1,475/2,340 feet wide
Depth +7.5 feet to -2 feet

2.2.2. No Action Alternative

The No Action Alternative assumes that no beneficial placement of dredged material (sand) would occur within the Columbia River littoral cell. Dredged sediment would continue to be placed in existing, approved disposal sites (SWS, NJS, and DWS). Dredged material (sand) placed in the DWS, located 6 miles offshore, would result in a continual loss of material from the littoral cell, and does not help sustain the jetties, beaches, and marine habitats in the MCR area. Beaches to the north and south of the MCR would continue to degrade and could scour away. Any further loss of beaches would negatively affect the biologic, geomorphic, and economic communities.

2.3. ALTERNATIVES NOT SELECTED FOR FURTHER EVALUATION

2.3.1. Individual use of proposed disposal sites

Each disposal site addresses specific areas within MCR's overall littoral zone. Truncating the proposed sites from the overall disposal site network and managing them singularly does not allow for a balanced approach. The proposed sites are specifically designed to be used as a part of a network of disposal sites. It was determined that having the full range of nearshore and intertidal sites along with the current disposal network would allow maximum flexibility in placing sediment beneficially.

2.3.2. Pump-Off Disposal Method

A potential disposal method is dispersed spraying of liquefied sand (rainbowing). This practice mixes the sediment from a hopper dredge with water to create slurry that is sprayed into a disposal area, which can be done while a dredge is moving or anchored. The time necessary for placement via rainbowing is similar to the time required for pump-ashore which is considerably longer than for thin layer discharge through partially open hopper doors. Disposal by rainbow spray is almost exclusively used for island, beach, and berm building. If rainbow spray is used for intertidal sediment placement, any turbidity would quickly disperse and is not likely to create water quality issues. Rainbow spray has not been commonly used in deeper nearshore environments. The extent of turbidity generated from rainbowing in the nearshore environment is unknown. There is some potential for fish entrainment, and the effects to ESA-listed would need to be evaluated. This method would substantially increase the time required to dispose of a full hopper dredge, making it more costly. Also, the availability of dredge equipment capable of dispersed spray is limited. Although this method holds promise for minimizing effects on benthic species, the effects to ESA listed species are unknown, and increased duration of placement timing may create issues that limit its viability as a disposal method. Therefore, this method of disposal is not considered further in this EA.

2.3.3. Other Disposal Locations

During meetings with stakeholders, it was suggested the proposed North Head Nearshore site be moved north by 3 to 5 miles. Use of this new location would not be economically feasible and disposing of material in this location would not maintain sediment within the littoral zone. The North Head Nearshore Site was removed from further consideration in this EA. This site needs further evaluation and consideration prior to inclusion into the network of disposal sites. If a feasible approach is identified, a separate NEPA evaluation will be conducted at that time.

The South Jetty Intertidal site was removed from further consideration in this EA due to equipment limitations and site access constraints. This site needs further evaluation and consideration prior to inclusion into the network of disposal sites. If a feasible approach is identified, a separate National Environmental Policy Act (NEPA) evaluation will be conducted at that time.

2.4. PROPOSED ACTION

The proposed action combines the use of the three existing disposal sites (SJS, NJS, DWS) with the two proposed disposal sites described in Section 2.2. In keeping with the adaptive management approach described below, this regional network of disposal sites (Figure 5) for the MCR would provide options for disposal reflective of operational, navigational safety, biological and other management considerations.

Both nearshore and intertidal sites are included, reflecting improved opportunities for nearshore disposal through operational changes, and the strong potential for regional funding for further studies and design of a monitoring program.

2.4.1. Adaptive Management Approach

The Corps annually dredges 3 to 5 mcy of sediment from the MCR entrance channel. Most of the dredging occurs from RM -2 to +2; the dredged material is primarily clean quartz sand with less than 3% fine-grained materials (AUP 2011). Management of MCR's dredged materials is coordinated on an annual basis with the EPA through the AUP. This AUP drives the evaluation of disposal site capacity and the adaptive management of the dredged material placement. Due to the variability of each dredging season, definitive placement actions and amounts placed cannot be predefined. Sediment must be distributed among disposal sites in order to not overload one disposal zone. The network of sites would be managed to avoid or minimize adverse effects on endangered species and their critical habitat and other species of concern, to avoid mounding of sediment that creates navigation hazards due to wave amplification. Management considerations would utilize current industry standard best management practices for the placement of clean dredged materials. As monitoring and funding allows, information collected during the use of these sites would inform future design of disposal site use. Like the NJS, SWS, and DWS, the proposed sites would be configured with a grid pattern and allocated a maximum load per cell. It is expected that the annual accumulation of placed material would not create seasonal increases in bathymetric readings beyond one foot.

Determinations of locations for disposal each year will be made by the Corps in its AUP, recognizing that no single site has the capacity to take all of the dredged material available annually. The opportunity to utilize multiple sites on a rotating basis is expected to reduce the potential for mounding impacts and minimize effects on biological species of concern. Continued use of the existing SWS and NJS sites is assumed; the DWS will be used only on a contingency basis when funding, equipment, environmental, safety or other issues preclude use of the existing and proposed disposal sites. The SWS and NJS sites will remain the highest priority sites, with the new sites being used as needed to accommodate excess sediment.

Among the proposed disposal sites, priorities for disposal would be based on guidelines developed by the Corps, factoring in operational, funding and environmental considerations. Interim guidelines for prioritizing disposal among the proposed disposal sites are shown below.

1. If funding and equipment are available and in-water work periods allow, the South Jetty Nearshore site would be the first priority, as this area has been identified as having the greatest need of dredged material, with scouring of the seabed expected to accelerate without the input of sediment into the littoral zone.
2. If funding and suitable equipment are available, the next priority would be onshore beach nourishment along Benson Beach north of the North Jetty. Material deposited would minimize erosion at Benson Beach and Peacock Spit and allow for beach accretion. In order to provide dredged material as a beneficial use, an outside source has to provide the incremental increased cost incurred for using this site.¹

¹ Engineering Regulation 1165-2-30

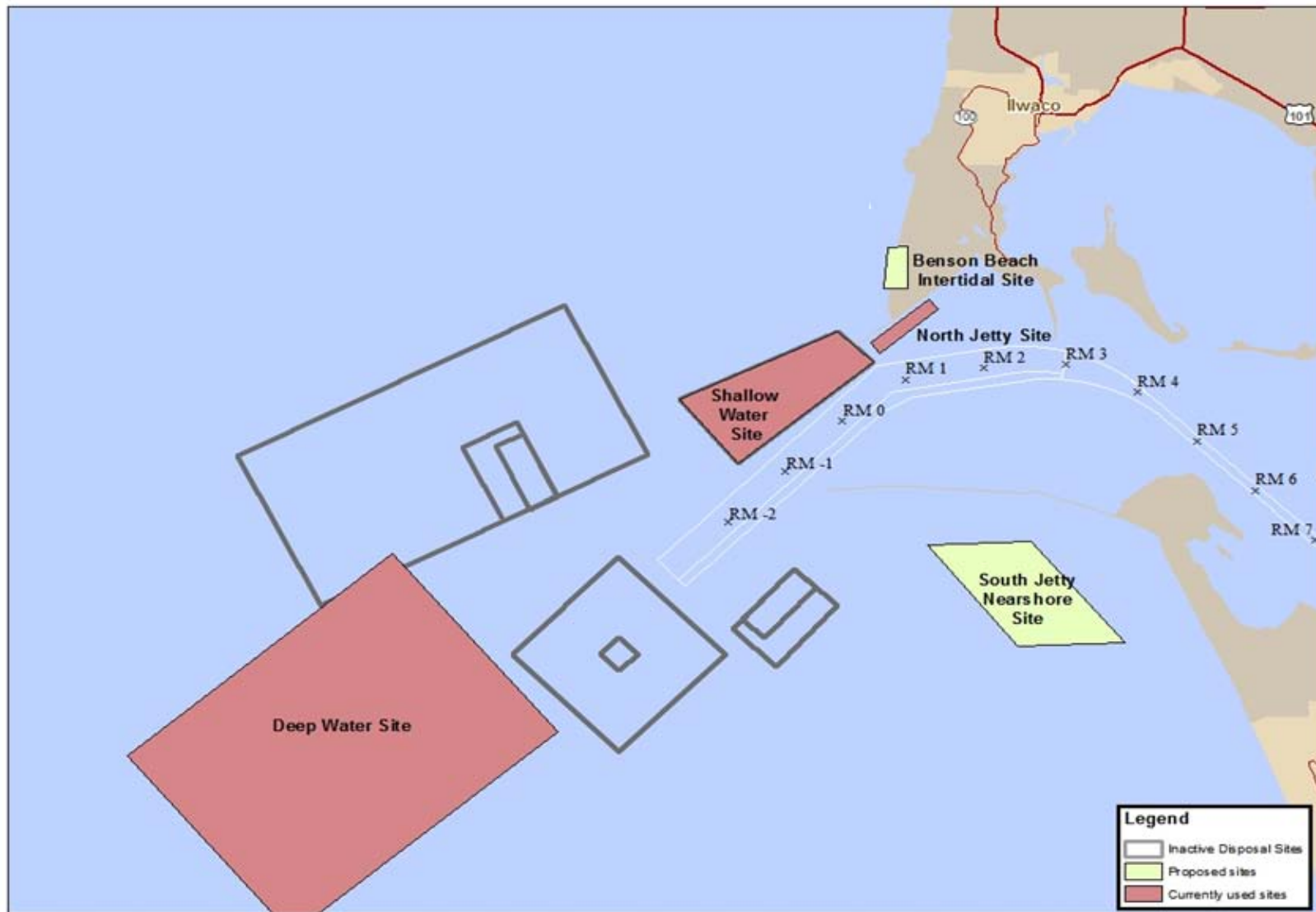


Figure 4. Regional Network of Current and Proposed Disposal Sites at the MCR

The adaptive management program would focus on monitoring the amount of material disposed of at each site to ensure an annual maximum mounding height is not exceeded (one foot increase in bathymetric contours). The Corps would also develop a recommended program of baseline studies and monitoring, focusing on species of concern. These studies would be undertaken as funding allows. At a minimum, monitoring for each active disposal site at MCR would include a pre- and post-disposal bathymetry survey as well as an annual informational bathymetric survey of a 2- by 2-mile area north of the North Jetty on Peacock Spit. Results of the monitoring will be used to inform future use of the network of disposal sites at the MCR.

For the 2012 dredging season, monitoring will include studies on the beneficial effects of the dredged material disposal, navigational safety, and biological resources. This monitoring program is not limited to the Corps but is a regional effort as outlined in the RSMP. This program is contingent upon funding, from federal and other sources. For the 2012 dredging season, monitoring will occur only if material is placed at the proposed nearshore disposal sites (only placement in the South Jetty Nearshore Site is proposed for the 2012 dredging season). Monitoring would include daily tracking of the placement of material within each disposal site and frequent bathymetry surveys at the disposal sites during the dredging season. Through cooperation with NMFS, a benthic video sled would be constructed and deployed at the proposed nearshore sites. The intent of the video sled is to survey benthic environments for macrofaunal distribution and density. Crab motility and mortality during disposal events would be assessed using surveys conducted via tagging and monitoring of movement using acoustic telemetry analysis. The intended goals of these monitoring actions are to assess benthic populations in response to disposal events. This monitoring program may be expanded to include baseline surveys of the potential but not currently proposed North Head Nearshore Site. Additional, yet to be identified, monitoring efforts may be undertaken as scope of work and funding allows. The Corps will use these monitoring actions to inform the future use of the disposal sites.

2.4.2. Dredging and Disposal Considerations

All standard best management practices for disposal operational safety would be applied to the proposed action. Weather conditions at the MCR, as well as wave and current intensity, limit dredge operations primarily to the months of June through mid-October, with some work conducted into November as weather permits. Typically, two hopper dredges are required to complete the work each year. Hopper dredges used at the MCR can operate 24 hours per day, 7 days per week. More than 1,000 annual load cycles are necessary to maintain navigation at the MCR.

A typical load cycle for one hopper dredge involves 0.75 to 1.5 hours to fill its hopper, 0.5 to 1.5 hours to transit to and return from the disposal site, and 3 to 12 minutes to place one load of dredged material into a given disposal site. This disposal sequence is difficult to modify, not only because of the time it takes to complete the MCR maintenance dredging, but also because the hopper dredges serve other locations and do not work continually at the MCR. When planning the dredging season, a variety of conditions are analyzed and captured in the AUP including shoaling conditions and dredging requirements, capacity of disposal sites, timing of site use, type and availability of dredges, and other factors.

One of the proposed disposal sites is located nearshore in waters 40 to 60 feet deep, while the other site would be located in intertidal waters along Benson Beach. A hopper dredge used in nearshore areas must be capable of safely navigating and maneuvering in relatively shallow areas and disposing of material in a measured and relatively thin layer, generally averaging less than about 12 centimeters ((cm) [or 4.7 inches]) in depth. Another operational constraint is that, under most conditions, a loaded hopper dredge cannot safely move parallel to the waves or shoreline while disposing of material; it needs to start at the

closest point to the shore and move out perpendicularly, heading directly into the waves. At a June 2011 West Coast dredging conference, it was announced that improved capabilities for disposal from retrofitted hopper dredges are expected, which may help facilitate both nearshore and onshore disposal in the MCR project area.

As dredged material is discharged directly from a dredge, the resulting mound height is influenced by factors such as vessel speed, water depth, and discharge technique (i.e., open-hull versus bottom door and whether the bottom doors are fully or partially open). The speed of the dredge during disposal has the greatest effect on the depth of discharged material. The slower the dredge moves while discharging, the higher the centerline mound will be. Based on Pearson et al. (2006), a maximum dredge thickness of 12 cm (4.7 inches) is reasonably expected at the centerline of the placement, decreasing to the outside edges. Using the Short-term Fate (STFATE) dredged material disposal model developed by the Corps' Engineer Research and Development Center (ERDC), a matrix of disposal conditions was developed for dredges used in the Columbia River. Results indicate that the mound from a single disposal event in waters 45 feet deep could have a maximum thickness of about 12.6 cm (5 inches) at the centerline of the disposal event. Results were reported for the Oregon Nearshore Beneficial Use Project, with findings estimated at a maximum layer of sediment about 9 cm (3.5 inches) deep from a disposal event in deeper water (60+ feet). It is important to note that the maximum material depth decreased dramatically with distance from the centerline of the disposal event.

Onshore or pump-ashore disposal at Benson Beach will involve pumping dredged material through a floating discharge pipe from the pipeline dredge to an existing shoreline. The dredge first pumps a landing on the shoreline to establish a point from which further material placement occurs. Dredged material is pumped in a blend of sand and water slurry (about 20% sand) and as it exits the shore pipe, the sand settles out on the shoreline. Typically, temporary sand berms are used in order to retain sand during pump-out; otherwise, much of the sand would immediately be lost. Berms are built gradually by earth-moving equipment as pump-out continues. Settling rates of MCR sands are very quick and turbidity from the operation is minimal. After sufficient sand has settled out, it is moved by bulldozers to match the elevation of the existing shoreline. The process continues by adding to the shore pipe and proceeding longitudinally along the shoreline.

3. AFFECTED ENVIRONMENT

3.1. PHYSICAL CHARACTERISTICS

3.1.1. Waves, Currents, and Morphology

The MCR is a high energy environment. The ocean entrance is characterized by large waves and strong currents interacting with spatially variable bathymetry. Approximately 70% of all waves approaching the MCR are from the west-northwest. During winter storm conditions, the ocean offshore of the jettied river entrance is characterized by high swells approaching from the northwest to southwest combined with locally generated wind waves from the south to southwest. From October to April, average offshore wave height is 9 feet. From May to September, average offshore wave height is 5 feet and waves approach mostly from the west-northwest. Occasional summer storms produce waves from the south-southwest with wave heights of 6.5 to 13 feet.

Tides at MCR are mixed semi-diurnal with a diurnal range of 7.5 feet. The instantaneous flow rate of estuarine water through the MCR inlet during ebb tide can reach 1.8 million cubic feet per second. Tidally dominated currents at the MCR can exceed 8.2 feet per second. A large, clockwise-rotating eddy current has been observed to form between the North Jetty, the navigation channel, and Jetty A during ebb tide. A less pronounced counter-clockwise eddy forms in response to flood tide. Horizontal circulation is generally clockwise (when viewed from above), with incoming ocean waters moving upstream in the northern portion of the estuary and river waters moving downstream in the southern portion. Vertical circulation is variable, reflecting the complex interaction of tides with river flows and bottom topography and roughness (Corps 1983). The North Jetty eddy has varying strength and direction (based on location and timing of tide) ranging from 0.3 to 3.3 feet per second.

As waves propagate shoreward toward the MCR, the waves are modified by the asymmetry (irregularity) of the MCR's underwater morphology (form). Nearshore currents and tidal currents are also modified by the jetties and the MCR morphology. These modified currents interact with the shoaling waves to produce a complex and agitated wave environment within the MCR. The asymmetric configuration of the MCR and its morphology is characterized by the protruding offshore extent of Peacock Spit on the north side of the North Jetty, southwesterly alignment of the North/South jetties and channel, and the absence of a large shoal on the south side of the MCR. This asymmetry causes incoming waves to be focused onto areas which would not otherwise be exposed to direct wave action.

An example of this wave-focusing effect is the area along the south side of the North Jetty. The area located between the North Jetty, navigation channel, and Jetty A is affected by wave action during conditions when the offshore wave direction is from the west-northwest, because of the refractive nature of Peacock Spit. Waves passing over Peacock Spit (approaching from the northwest) enter the MCR along the south side of the North Jetty. Conversely, large waves approaching from the southwest are refracted/diffracted around the South Jetty and over Clatsop Spit, protecting the south side of the North Jetty from large southerly waves.

3.1.2. South Jetty Nearshore Site

The cross-shore profile for the South Jetty Nearshore site is shown in Figure 3. The shore area along the South Jetty root has experienced profound changes since the time of jetty construction. Before South Jetty construction, the nearshore area immediately south of the jetty was dominated by a broad, shallow ebb

tidal shoal, exhibiting relatively shallow water depth. Construction of the jetty dissipated this shoal, resulting in a rapid trend of increasing water depth through time. As the water depth along the south side of the jetty increased, wave action along the jetty root and adjacent shore area increased. The increased wave environment motivated rapid deterioration of the entire south jetty and culminated with the breaching event along the South Jetty root in the late 1920s. During the 1930s, extensive efforts were undertaken to rebuild the South Jetty and re-establish the shore-land interface along the south-side root of the jetty. The effort was successful; however, the result has been subjected to an increasingly harsh environment of wave action and related circulation since the 1930s.

3.1.3. Benson Beach Intertidal Site

Benson Beach was naturally created as a result of constructing the North Jetty. Sediment initially aggraded onto Peacock Spit in the late 1890s, stretching more than 2,500 feet along the north side of the North Jetty, and continued until the 1930s when construction of the MCR jetties limited the sediment entering the littoral cells. The beach shore-face is constantly changing due to seasonal, climatic, and wave variations. Because of the reduction of sediment input into the littoral cell, Benson Beach has degraded over 2,000 feet. A prominent sand bar defines the initial onset to Benson Beach and is located in waters approximately 25 feet deep. This sandbar is a part of Peacock Spit and moves shoreward or oceanward depending on the season. The dry-beach and intertidal component of Benson Beach is affected by any changes into definition of the outer sandbar and vice versa. Without Benson Beach, more rapid scouring would occur along the toe of the North Jetty, ultimately setting the jetty up for greater potential to be breached in storm events.

3.2. COLUMBIA RIVER LITTORAL CELL

The Columbia River littoral cell extends from Tillamook Head, Oregon to Point Grenville, Washington (Gelfenbaum et al., 1999). The cell is subdivided by three large estuaries: Grays Harbor, Willapa Bay, and the Columbia River estuary. These bays and two headlands divide the littoral cell into four sub-cells denoted as Clatsop Plains, Long Beach Peninsula, Grayland Plains, and North Beach. The current loss of an estimated 1 mcy of material each year from the littoral zone is expected to not only exacerbate erosion along the north Oregon and south Washington coasts, but also poses a risk of breaching the MCR jetties. Additionally, adverse impacts to the biological environment are expected with the deterioration of the nearshore ecosystem.

Current erosion of the beach and offshore bar system threatens the viability of the jetty system, Long Beach Peninsula and Clatsop Spit. The nearshore bars that form and move based on seasonal storm activity are being depleted of the sediments required for protection of the beaches and jetty structures. Recent surveys indicate that the depth of marine sands in the nearshore areas between Clatsop Spit and the South Jetty is roughly 3 feet or less in depth. The sand that accreted south of the South Jetty following jetty construction has transported out of the southern Clatsop Plains littoral sub-cell (Moritz, Corps, personal communication; Buijsman et al., 2003).

Presently, new sediment flushed from the MCR is blocked from reaching the southern shoreline by the South Jetty. As a result, the shoreline $\frac{1}{2}$ to $1\frac{1}{2}$ miles south of the MCR is receding without the input of sediment into the littoral zone. The protective system of bars parallel to the shoreline is diminishing in size, reducing their wave breaking effect and resulting in increased erosion threats. The beach continues to erode, posing a risk to the South Jetty.

Similarly, in the decades since jetty completion, the accreted sand making up Benson Beach north of the North Jetty appears to be migrating north within the northern Long Beach littoral sub-cell (Kaminsky et al., 2000). The present volume of new sediment transported to the north from the MCR is much less from historic, pre-jetty volumes and is insufficient to offset erosion at Benson Beach.

Ongoing erosion is expected to continue or become more severe as climate change factors increase the frequency and duration of storm events. The impacts of long-term sea level rise and shorter-term ocean condition changes would increase risks of catastrophic erosion events near the Columbia River mouth. The December 2010, *Oregon Climate Change Adaptation Framework Report*, prepared by the State of Oregon, describes coastal climate change impacts:

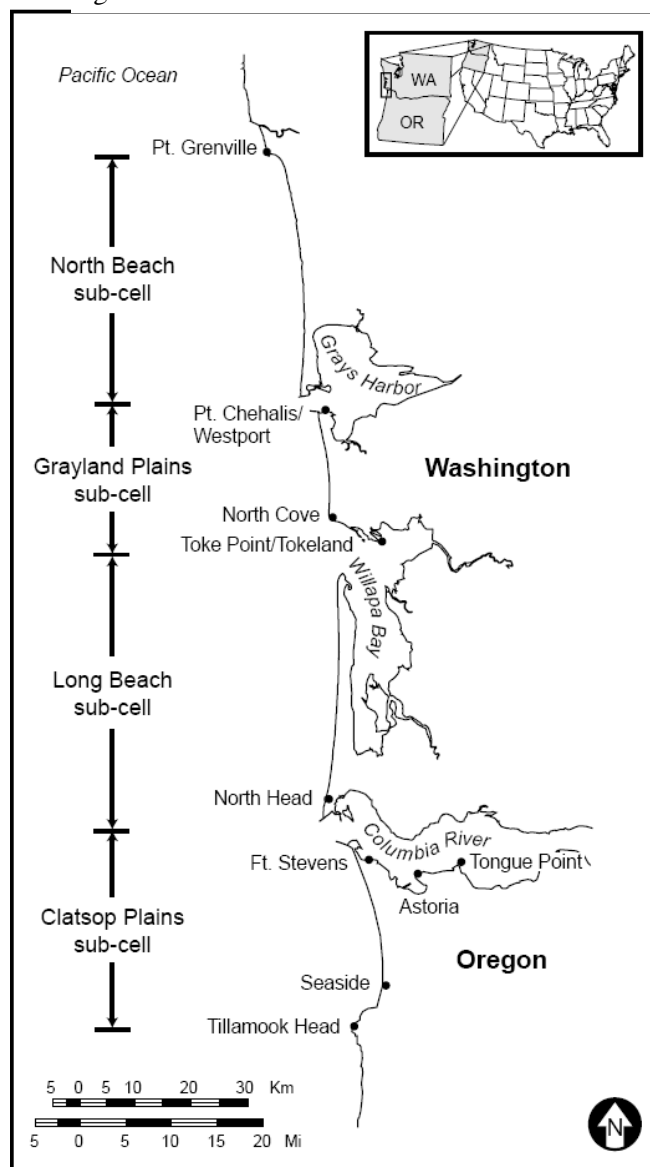
The coast is vulnerable to a number of climate-related impacts. Oregon's winter storms have been the primary factor for coastal erosion and flooding (Ruggiero 2008). Maximum wave heights have increased...from the period of the late 1970s to 2005, from 9 meters to about 12 meters. It is unclear if the increasing wave heights trend observed in the late 20th century will continue into the future, though the possibility of increasing storm-generated wave heights and the likely trend of rising sea levels may present a substantial threat to the Oregon Coast (Ruggiero et al., 2010).

Confining the currents within the active MCR inlet as a result of jetty construction has not only altered sediment transport processes, but has also modified waves and seafloor topography in the area. The interaction of waves and seafloor topography affects nearshore circulation patterns and, thus, shoreline accretion and erosion rates. As erosion patterns continue, a sediment-starved littoral cell would result in adverse ecosystem and physical effects. The prospect of a jetty breach at either the South or North jetties would create ecosystem changes and result in dramatic impacts to the navigation channel.

3.3. SEDIMENT QUALITY

The Corps regularly evaluates sediments from federal navigation channels to determine if they are acceptable for in-water disposal in accordance with the requirements of the Clean Water Act and the Marine Protection, Research, and Sanctuaries Act. Sampling and analysis is conducted in accordance with

Figure 5. Columbia River Littoral Cell



the guidance of the *Sediment Evaluation Framework for the Pacific Northwest* (2009). Project sediment sampling is typically performed on a 10-year rotational cycle, unless an event occurs that warrants more frequent sampling. The MCR navigation channel was sampled in 1990, 2000, and 2008 (see <http://www.nwp.usace.army.mil/environment/sediment.asp>). In 2008, ten surface grab sediment samples were collected from sites previously sampled in 2000. Percent sand averaged 98.45% with a range of 99.3% to 97.0%, and percent silt and clay averaged 1.59% ranging from 3.0% to 0.7%. Physical results for the 2000 and 2008 samples were compared. The mean percent sand for all samples in 2000 was 98.11%, and in 2008 was 98.45%. Within both data sets, sediment towards the outer portion of the MCR is finer than sediments towards the center (Corps 2008b).

In 2000, a sediment trend analysis was conducted at the MCR and surrounding offshore locations by GeoSea Consulting (McLaren and Hill 2000, Corps 2005). Over 1,200 samples were collected. Physical analyses of the samples surrounding the MCR area (six samples selected) indicate that the sediments consisted of greater than 99% sand. Ten samples in the MCR area were analyzed for physical and chemical contamination. No contaminants were detected at or near screening levels.

3.4. WATER QUALITY

Water quality in nearshore waters at the MCR is expected to be typical for seawater in the Pacific Ocean. For example, in 1980 the U.S. Geological Survey (USGS) collected seawater samples from 14 stations offshore of Yaquina Bay and conducted elutriate tests (see Fuhrer and Rinella 1983). All parameters measured were well within normal ranges expected for nearshore ocean waters and met the state's water quality standards. Currently, water column tests are rarely performed in nearshore ocean waters unless there is a "reason to believe" a water column release may occur.

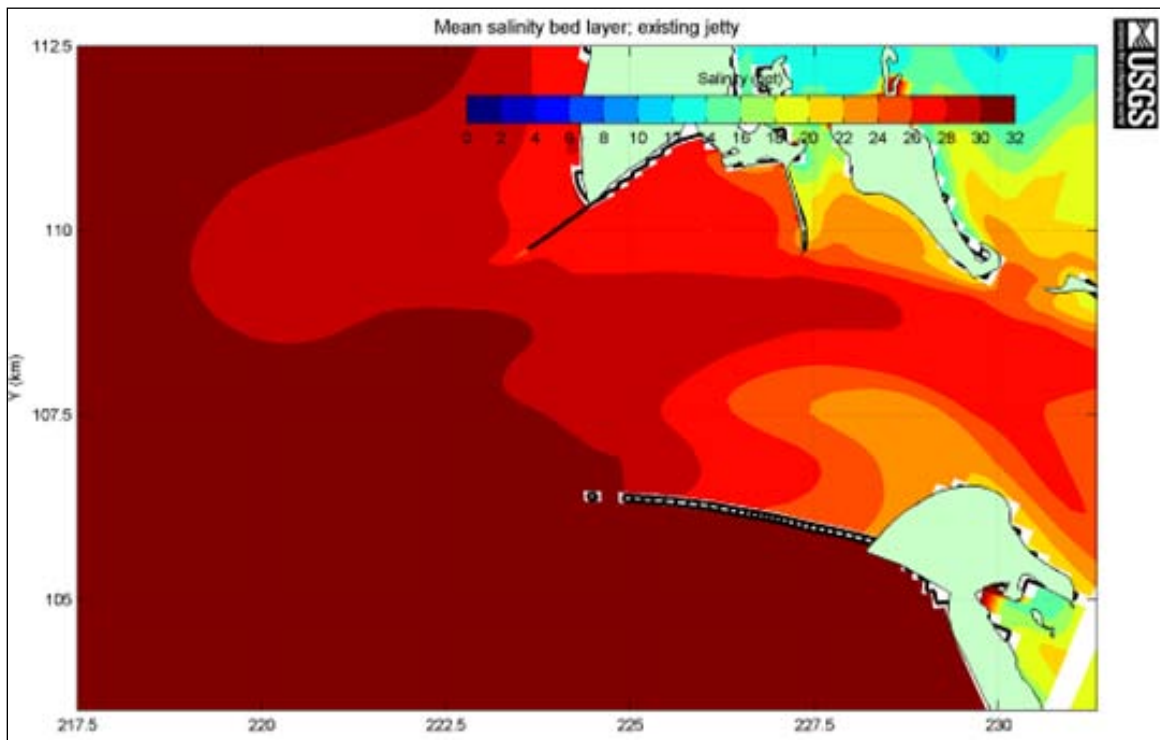
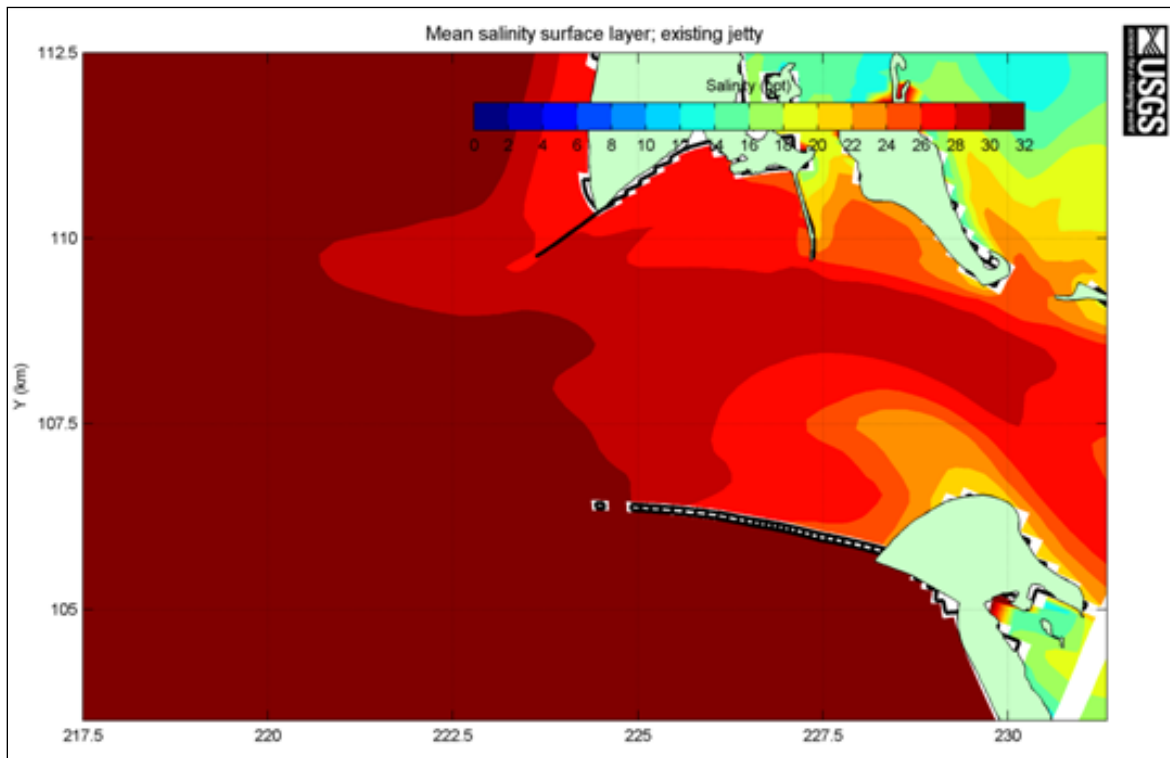
The Columbia River is listed under Section 303(d) of the CWA as water quality limited for temperature from the MCR to Bonneville Dam. The listings pertain to the summer months. Modeling work on a temperature total maximum daily load for the Columbia River and the Snake River, from its mouth at the Columbia to its confluence with the Salmon River, discloses that the major impacts to temperature occur as a result of impoundments behind dams, and with the confluence of the Snake River.

The Columbia River is also water quality limited under Section 303(d) for the toxics parameters of DDE (DDT metabolite), polychlorinated biphenyls, and arsenic. Other toxics parameters listed of potential concern include cadmium; copper; iron; lead; mercury; nickel; silver; tributlin; zinc; aldrin; alpha-BNC; benzo(a)anthracene; benzo(g, h, i)perylene; BHC; chlordane; chrysene; cyanide; DDD; DDT; dieldrin; endrin; hexavalent chromium; phenol; polynuclear aromatic hydrocarbons; pyrene; and radionuclides. The proposed disposal sites are located in the ocean environment or intertidal zone north of the MCR; therefore, these toxics parameters are not a concern at the proposed locations.

The Oregon Department of Environmental Quality (ODEQ) indicates that the Columbia River has naturally occurring turbidity levels at the river and ocean interface, rising to high levels during high flow events (ODEQ 2008).

Salinity distribution in the Columbia River plume is determined by the circulation patterns and the mixing process driven by tidal currents. The variability in river flow, tides, and currents also result in large variability in salinity. Modeling by USGS (Figure 6) showed that in near surface waters near the landward portions of the North Jetty, salinity naturally varied with tides to 20 parts per thousand during October-November (USGS 2007).

Figure 6. Mean Salinity for Surface Layer for August/September (top map) and October/November (bottom map) at the MCR



3.5. FISH AND WILDLIFE

A variety of anadromous and resident fish species occur within the MCR area, including several listed under the Endangered Species Act (ESA). The occurrence of adult anadromous salmonids in the MCR area is correlated primarily with their period of upstream migration. Juvenile salmonids are present following their migration out of the Columbia River estuary primarily in the spring and fall. The southern Distinct Population Segment (DPS) of green sturgeon also occurs in the estuary, which is also included as part of its designated critical habitat. Its specific distribution and habitat use in the estuary is not well known. However, Green sturgeon would be expected to occur in the more tranquil estuary proper to a greater extent than in the MCR vicinity. Anadromous Pacific lamprey (*Lampetra tridentate*) may be present in the vicinity of the MCR as they return to freshwater during spawning migration from July to October. Lampreys typically spend approximately 4 to 6 years rearing in freshwater, returning to the ocean during spring high flows. During their 2 to 3 years in the ocean, lampreys act as scavengers, parasites, or predators on larger prey such as salmon and marine mammals.

Resident fish species occur throughout the year with many using the estuary as a rearing and nursery area. Resident fish species that may be present in the area include various groundfish species, such as California skate (*Raja inornata*), soupfin shark (*Galeorhinus galeus*), spiny dogfish (*Squalus acanthias*), lingcod (*Ophiodon elongates*), Pacific cod (*Gadus macrocephalus*), butter sole (*Isopsetta isolepis*), English sole (*Parophrys vetulus*), Pacific sanddab (*Citharichthys sordidus*), rex sole (*Glyptocephalus zachirus*), rock sole (*Lepidopsetta bilineata*), sand sole (*Psettichthys melanostictus*), starry flounder (*Platichthys stellatus*), black rockfish (*Sebastes melanops*), brown rockfish (*Sebastes auriculatus*), and copper rockfish (*Sebastes caurinus*). Some of these species use the MCR as a migratory corridor when traveling to rearing areas in bays and intertidal areas where there are larger concentrations of food organisms, such as the amphipod *Corophium salmonis*.

Marine mammals known to occur in the MCR area include gray whales, orcas, dolphins, porpoises, sea lions, and harbor seals. Most cetacean species observed by Green and others (1991) occurred in Pacific slope or offshore waters (600 to 6,000 feet in depth). Harbor porpoises (*Phocoena phocoena*) and gray whales (*Eschrichtius robustus*) were prevalent in shelf waters less than 600 feet in depth. Pinniped species that may occur in the vicinity of the jetties include Pacific harbor seals (*Phoca vitulina richardsi*), California sea lions (*Zalophus californianus*), and Steller (northern) sea lions (*Eumetopias jubatus*). An important haul out area for Steller sea lions occurs on the South Jetty.

Pelagic birds are numerous off the Columbia River including gulls, auklets, common murrelets, fulmars, phalaropes, and kittiwakes. Briggs and others (1992) found that seabird populations were most densely concentrated over the continental shelf (< 600 feet in depth). Brown pelicans (*Pelecanus occidentalis*) typically occur from late spring to mid-fall along the Oregon and Washington coasts. Three species of cormorants occur in the Columbia River estuary and forage in nearshore Pacific Ocean waters, the estuary, or upriver. Three species of terns occur in the Columbia River or over nearshore waters. Caspian terns (*Hydroprogne caspia*) are present from April to September and have established large colonies on islands in the estuary. Shorebirds found on beaches include sanderlings and various species of sandpipers, dunlins, and plovers.

Four bald eagle (*Haliaeetus leucocephalus*) territories, two at Cape Disappointment, Washington (Cape Disappointment and Fort Canby pairs) and two on Clatsop Spit, Oregon (Fort Stevens and Tansy Point/Clear Lake pairs), occur in the general vicinity of the MCR (Isaacs and Anthony 2005). Bald eagles have multiple (alternate) nest sites; the Fort Canby nest site is approximately 1.6 miles northeast of Benson Beach, the Cape Disappointment nest site is about 2.2 miles northeast of Benson Beach. The Fort Stevens and Tansy Point/Clear Lake nest sites are more than 3 miles from the South Jetty. Bald eagles have been observed foraging along the shorelines. Foraging activities along the North Jetty and Benson Beach may occur infrequently. Bald eagles from territories on Clatsop Spit appear to forage in Trestle Bay. Other probable foraging locations include the various lakes scattered throughout Clatsop Spit and the shorelines and intertidal mudflats of the Columbia River estuary.

3.5.1. Benthic Species

Almost all of the MCR area experiences some type of commercial fishing activity. The major fisheries are for bottom fish, salmon, Dungeness crab (*Cancer magister*), and other shellfish species. Dungeness crabs utilize the MCR area as a primary habitat that is especially important for mating and egg development (McCabe et al., 1986). The MCR area is a major Dungeness crab fishing location with most crab fishing occurring north of the North Jetty and south of the South Jetty to Cannon Beach in water depths of generally less than 150 feet. Crab fishing occurs from December to September with the majority of the catch occurring early in the season. Dungeness crab population numbers are subject to large cyclic fluctuations in abundance. Catch records for the fishery are generally believed to represent actual population fluctuations. Modeling studies by Higgins and others (1997) have shown that small scale environmental changes, such as delay in the onshore currents in the spring by a short period of time, can dramatically impact survival of young-of-the-year crab but have no effect on adults and older juveniles inshore. Bottom fishing by trawl for flatfish, rockfish, and shrimp occurs year-round over the entire offshore area, primarily at depths offshore from the jetties. Commercial and recreational salmon fishing occurs over much of the offshore area.

The MCR is also a major Pacific razor clam (*Siliqua patula*) harvesting location. Most of the harvested razor clams occur on the intertidal beaches that are exposed during low tides. Razor clams found in subtidal waters deeper than 30 feet (9 meters) may serve as the broodstock for the intertidal populations. Figure 7 shows existing benthic sampling results in the MCR project area.

3.5.2. ESA-listed Species under NMFS Jurisdiction

Federally listed threatened and endangered species under the jurisdiction of the National Marine Fisheries Service (NMFS) that may occur in the MCR area include 13 salmonid stocks and other fish and marine wildlife species (Tables 1 and 2).

A Biological Assessment (BA) for *Anadromous Salmonids, Green Sturgeon, Pacific Eulachon, Marine Mammals & Marine Turtles for Columbia River Channel Operations and Maintenance* was submitted to NMFS in April 2011. An addendum to this BA covering the proposed disposal sites was prepared and submitted to NMFS in September 2011. The essential fish habitat (EFH) species present include five coastal pelagic species, numerous Pacific Coast groundfish species, and coho and Chinook salmon (Table 3). The NMFS is consulting on EFH in conjunction with the ESA consultation.

Figure 7. Benthic Sampling at the MCR

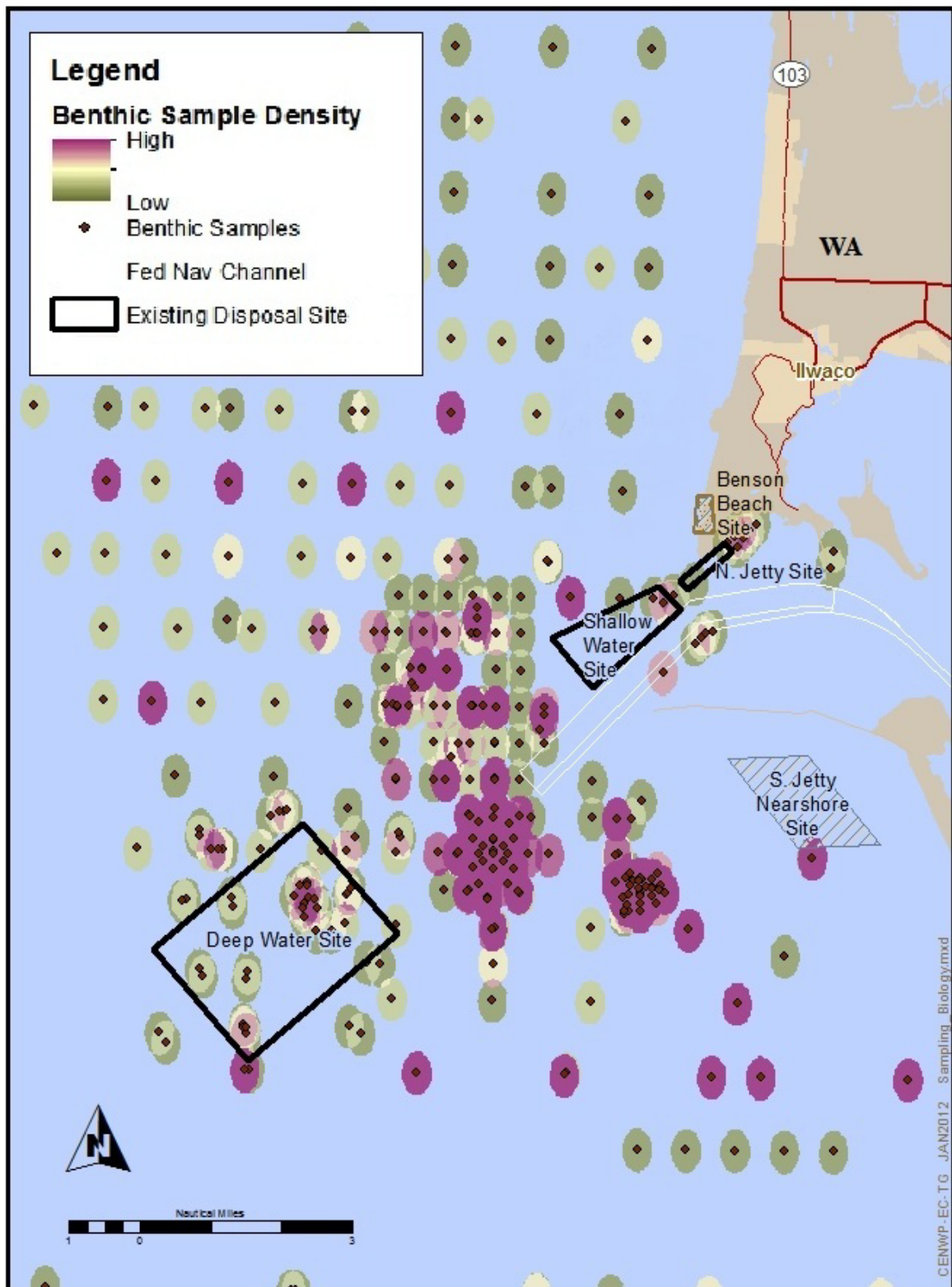


Table 1. ESA-listed Anadromous Salmonids under NMFS Jurisdiction

Evolutionarily Significant Unit	Status	Life History Type	Federal Register (FR) Citation
Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)			
Snake River spring/summer run	Threatened	Ocean	70 FR 37160; June 28, 2005
Snake River fall run	Threatened	Ocean	70 FR 37160; June 28, 2005
Lower Columbia River	Threatened	Stream	70 FR 37160; June 28, 2005
Upper Columbia River spring run	Endangered	Stream	70 FR 37160; June 28, 2005
Upper Willamette River	Threatened	Ocean	70 FR 37160; June 28, 2005
Coho Salmon (<i>Oncorhynchus kisutch</i>)			
Lower Columbia River	Threatened	Stream	70 FR 37160; June 28, 2005
Chum Salmon (<i>Oncorhynchus keta</i>)			
Columbia River	Threatened	Ocean	70 FR 37160; June 28, 2005
Sockeye Salmon (<i>Oncorhynchus nerka</i>)			
Snake River	Endangered	Stream	70 FR 37160; June 28, 2005
Steelhead (<i>Oncorhynchus mykiss</i>)			
Snake River Basin	Threatened	Stream	71 FR 834; January 1, 2006
Lower Columbia River	Threatened	Stream	71 FR 834; January 1, 2006
Middle Columbia River	Threatened	Stream	71 FR 834; January 1, 2006
Upper Columbia River	Threatened	Stream	71 FR 834; January 1, 2006
Upper Willamette River	Threatened	Stream	71 FR 834; January 1, 2006

Table 2. ESA-listed Fish and Marine Wildlife Species under NMFS Jurisdiction

Species	Status	Federal Register (FR) Citation
Southern DPS* Green Sturgeon (<i>Acipenser medirostris</i>)	Threatened	71 FR 17757; April 7, 2006
Southern DPS Pacific Eulachon (<i>Thaleichthys pacificus</i>)	Threatened	
Steller Sea Lion (<i>Eumetopias jubatus</i>)	Threatened	55 FR 49204; November 26, 1990
Blue Whale (<i>Balaenoptera musculus</i>)	Endangered	35 FR 18319; December 2, 1970
Fin Whale (<i>Balaenoptera physalus</i>)	Endangered	35 FR 18319; December 2, 1970
Sei Whale (<i>Balaenoptera borealis</i>)	Endangered	35 FR 18319; December 2, 1970
Sperm Whale (<i>Physeter macrocephalus</i>)	Endangered	35 FR 18319; December 2, 1970
Humpback Whale (<i>Megaptera novaeangliae</i>)	Endangered	35 FR 18319; December 2, 1970
North Pacific Right Whale (<i>Eubalaena glacialis</i>)	Endangered	73 FR 12024; March 6, 2008
Southern Resident Killer Whale (<i>Orcinus orca</i>)	Endangered	70 FR 69903; November 18, 2005
Loggerhead Turtle (<i>Caretta caretta</i>)	Threatened	43 FR 32800; July 28, 1978
Green Turtle (<i>Chelonia mydas</i>)	Threatened	43 FR 32800; July 28, 1978
Leatherback Turtle (<i>Dermochelys coriacea</i>)	Endangered	35 FR 18319; December 2, 1970
Olive Ridley Turtle (<i>Lepidochelys olivacea</i>)	Threatened	43 FR 32800; July 28, 1978

*DPS = Distinct Population Segment

Table 3. Possible EFH Species and Potential Life Stage Use

Species Type	Common Name	Egg	Larvae	Young Juvenile	Juvenile	Adult	Spawning
Groundfish Species							
<i>Raja inornata</i>	California Skate	X		X		X	X
<i>Galeorhinus galeus</i>	Soufin Shark	X		X		X	X
<i>Squalus acanthias</i>	Spiny Dogfish	X		X	X	X	
<i>Hydrolagus colliei</i>	Ratfish			X		X	X
<i>Ophiodon elongatus</i>	Lingcod	X	X	X	X	X	X
<i>Scorpaenichthys marmoratus</i>	Cabezon	X	X	X	X	X	X
<i>Hexagrammos decagrammus</i>	Kelp Greenling	X	X	X	X	X	X
<i>Gadus macrocephalus</i>	Pacific Cod	X	X	X		X	X
<i>Merluccius productus</i>	Pacific Whiting (Hake)	X	X	X		X	

Proposed Nearshore Disposal Locations at the MCR

Species Type	Common Name	Egg	Larvae	Young Juvenile	Juvenile	Adult	Spawning
<i>Anoplopoma fimbria</i>	Sablefish				X		
<i>Isopsetta isolepis</i>	Butter Sole					X	X
<i>Pleuronichthys decurrens</i>	Curlfin Sole					X	X
<i>Parophrys vetulus</i>	English Sole	X	X	X		X	X
<i>Hippoglossoides elassodon</i>	Flathead Sole			X			
<i>Citharichthys sordidus</i>	Pacific Sanddab	X	X	X		X	
<i>Eopsetta jordani</i>	Petrale Sole			X		X	
<i>Glyptocephalus zachirus</i>	Rex Sole			X		X	
<i>Lepidopsetta bilineata</i>	Rock Sole	X		X		X	X
<i>Psettichthys melanostictus</i>	Sand Sole			X		X	X
<i>Platyichthys stellatus</i>	Starry Flounder	X	X	X		X	X
<i>Sebastes melanops</i>	Black Rockfish			X		X	
<i>Sebastes auriculatus</i>	Brown Rockfish	X	X	X		X	X
<i>Sebastes caurinus</i>	Copper Rockfish	X	X	X	X	X	X
<i>Sebastes maliger</i>	Quillback Rockfish	X	X	X	X	X	X
<i>Sebastes miniatus</i>	Vermillion Rockfish			X			
Coastal Pelagic Species							
<i>Engraulis mordax</i>	Northern anchovy	X	X		X	X	
<i>Sardinops sagax</i>	Pacific sardine	X	X		X	X	
<i>Scomber japonicus</i>	Pacific mackerel	X	X		X	X	
<i>Trachurus symmetricus</i>	Jack mackerel					X	
<i>Loligo opalescens</i>	Market squid	?	?	?		X	?
Salmon Species							
<i>Oncorhynchus kisutch</i>	Coho salmon				X	X	
<i>Oncorhynchus tshawytscha</i>	Chinook salmon			X	X	X	

Source: Corps 2008

3.5.3. ESA-listed Species under USFWS Jurisdiction

The federally listed threatened and endangered species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) that may occur in the MCR area are shown in Table 4.

Table 4. ESA-listed Wildlife Species under USFWS Jurisdiction

Common Name	Scientific Name	Status
Short-tailed Albatross	<i>Phoebastria albatrus</i>	Endangered
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	Threatened
Western Snowy Plover	<i>Charadrius nivosus nivosus</i>	Threatened
Columbian White-tailed Deer	<i>Odocoileus virginianus leucurus</i>	Endangered
Oregon Silverspot Butterfly	<i>Speyeria zerene hippolyta</i>	Threatened
Bull Trout	<i>Salvelinus confluentus</i>	Threatened

There have been three confirmed sightings of short-tailed albatross off the Oregon Coast. The closest sighting to the project vicinity was 20 miles southwest of the MCR (Marshall et al., 2003).

Historical records and observations indicate that murrelets were common and regularly seen along Washington and Oregon coastlines (Helm 2009, Jewett 1953, and Gabrielson and Jewett 1940). The marbled murrelet is a near-shore marine bird that is most frequently observed within 1.5 miles of shore (Marshall 1988). Marbled murrelets forage just beyond the breaker-line and along the sides of river mouths where greater upwelling and less turbulence occurs. Murrelets forage within the water column; prey items include invertebrates and small fish such as anchovy, herring, and sand lance (Marshall 1988). Marbled murrelets are expected to occur in the general vicinity of the MCR. The Cape Disappointment

area is located about 1.6 miles northeast of the North Jetty at Benson Beach and contains suitable habitat for marbled murrelet nesting. While nesting has not been documented in this area, birds have frequently been noted in flight during the nesting season.

Columbian white-tailed deer occur on the Oregon and Washington mainland and instream islands primarily from Skamokawa, Washington upstream to Port Westward. Their closest location to the project vicinity is 34 miles upstream at the Julia Butler Hansen National Wildlife Refuge.

A small population of western snowy plovers occurs on beaches at Leadbetter Point, Washington, which is more than 20 miles north of the project vicinity. The closest Oregon nesting location is far south of the project vicinity at Bayocean Spit in Tillamook County. Although western snowy plovers historically occurred in the vicinity of Clatsop Spit, no breeding or over-wintering plovers have been reported from these beaches in recent years (USFWS 2001). Western snowy plovers have been observed on Clatsop Spit in 2008 and 2007, although it was uncertain if they were breeding or passing through the area (USFWS 2011)¹.

The Oregon State Parks and Recreation Department (OPRD) has identified the northern-most tip of Clatsop Spit in their 2008 Habitat Conservation Plan (HCP) for Western Snowy Plovers (HCP). This area is part of Fort Stevens State Park and may be managed for species recovery. The river side of Clatsop Spit is a proposed critical habitat for snowy plovers and is currently managed as an unoccupied Snowy Plover Management Area (SPMA), as defined by the HCP. If snowy plovers attempt to nest (one or more attempt in the previous two years) within the boundaries of the SPMA, the status will change to occupied SPMA.

The Oregon silverspot butterfly occupies coastal headlands or Coast Range peaks that provide specific habitat features, primarily because of the presence of its host plant, the early blue violet (*Viola adunca*). The closest populations of this butterfly to the project area occur at Camp Rilea in Clatsop County, Oregon to the south and at Long Beach, Washington to the north.

The Columbia River may have provided important historical rearing and overwintering habitat for bull trout (Buchanan et al., 1997). Currently, the occurrence of bull trout in the Columbia River downstream of Bonneville Dam appears to be incidental, and their occurrence upstream of Bonneville Dam appears to be limited.

3.6. CULTURAL AND HISTORIC RESOURCES

There are no recorded historic properties within the MCR disposal area. The pilings that remain from the South Jetty trestle structure are historic. The jetties are over 50 years old and may be eligible for listing under National Register criteria (a): “associated with events that have made a significant contribution to the broad patterns of our history.”

The MCR and nearshore areas to the north and south are littered with shipwrecks (Figure 8). Well over 200 major shipwrecks have occurred near the mouth – known for a century as “The Graveyard of the Pacific” (Astoria and Warrenton Chamber of Commerce, <http://www.olderogon.com/about/entry/about-the-astoria-warrenton-area/>). The Columbia River bar is one of the most difficult river crossings in the world. These shipwrecks date to the early 1800s, although there is circumstantial evidence of shipwrecks before that. Spanish ships may have wrecked in the early 1700s, probably driven ashore in storms.

¹ Kathy Roberts (USFWS), email message to Gretchen Smith, March 30, 2012.

Figure 8. Shipwrecks at the MCR



Source: National Oceanic and Atmospheric Administration

3.7. TRIBAL RESOURCES

The only known tribal resources located within the project area are fish and other aquatic species as described in Section 3.5 above.

3.8. SOCIO-ECONOMIC RESOURCES

The following socioeconomic information was taken from the draft community profiles prepared by the NMFS (2006) and U.S. Census data. The MCR area encompasses Pacific County, Washington, near the communities of Ilwaco and Long Beach on the Long Beach Peninsula and Clatsop County, Oregon, near the communities of Warrenton and Astoria.

3.8.1. Ilwaco, Washington

Ilwaco had a total population of 950 people in the 2000 Census and 936 people in the 2010 Census. In 2000, 81.5% of Ilwaco's population lived in family households. Health care and social assistance was the top occupational field for the employed population 16 years and over (12.5%), followed by retail trade with 11.8%, and educational services with 10.8%. The agriculture, forestry, fishing and hunting occupations represented 3.7% of the employed population. About 27.8% of the labor force was employed by local, state, or federal governments, and 3.8% was employed by the armed forces. Ilwaco's per capita income was \$16,138, compared to the national average of \$21,587. The median household income was \$29,632, lower than the national average of \$41,944. About 16.3% of the city's population was living below the poverty level, which was higher than the national average of 12.4%.

In 2000, Ilwaco residents owned 21 vessels that participated in commercial fisheries. Of the 338 commercial vessels that delivered landings in 2000 to Ilwaco, the landings were in the following fisheries (data shown represents landings in metric tons/value of said landings/number of vessels landing; NA = not available): coastal pelagic fish (NA/NA/2), crab (861.9 t/\$3,864,427/104), groundfish (2350.7 t/\$634,261/35), highly migratory fish species (1907.1 t/\$3,595,659/119), salmon (187.4 t/\$468,717/98), shrimp (NA/NA/2), and other species (47.5 t/\$183,071/81). In 2000, approximately 14 charter-fishing operators serviced sport anglers and tourists. In 2003, there were 1,580 sport fishing license transactions valuing \$24,978. In Catch Area 1 (Ilwaco-Ocean) and Area 1A (Ilwaco-Buoy 10), the 2000 sport salmon catch was 27,889 and 16,335 respectively. This data includes (1/1A): (1,630/2,972) Chinook and (26,259/13,363) coho, based on creel survey estimates. In 2000, there were approximately 16,243/42,061 (1/1A) marine angler trips in the sport salmon fishery for a total of 58,304 across both Ilwaco areas. In Area 1, Columbia River to Leadbetter Point, a total of 106 steelhead were caught by anglers. The coastal bottom fish catch for Area 1, Ilwaco/Ilwaco Jetty, was 8,388/631, respectively. The pacific halibut catch for Areas 1-2 (Ilwaco-Westport-Ocean Shores) was 2,341 fish.

Cape Disappointment State Park (formerly Fort Canby State Park) is situated just outside of Ilwaco. This 1,882-acre, year-round park is a popular recreation area and offers several miles of ocean beaches, a campground, a boat launch, two lighthouses (Cape Disappointment and North Head), and hiking trails.

3.8.2. Long Beach, Washington

Long Beach had a total population of 1,283 people in the 2000 Census and 1,392 people in the 2010 Census. In 2000, 66.6% of Long Beach's population lived in family households. Accommodations and food services were the top occupational field, employing 21.1% of the employed population 16 years and older. This was followed by health care and social assistance with 20.3% and retail trade with 9.5%. The agriculture, forestry, fishing and hunting occupations represented 4.8% of the employed population. About 17.7% of the labor force was employed by either local, state, or federal governments and 1.1% was employed by the armed forces. Long Beach's per capita income was \$21,266, compared to the national average of \$21,587. The median household income was \$23,611, about 44% lower than the national average of \$41,944. About 18.7% of the population was living below the poverty level, which was higher than the national average of 12.4%.

In 2000, no commercial vessels delivered landings to Long Beach. Long Beach residents owned 21 vessels that participated in West Coast fisheries. Most participated in the crab and salmon fisheries. In 2003, there were 5,044 sport fishing licenses issued, valued at \$70,171. In 2000, one salmon charter fishing operator serviced sport anglers and tourists in the area.

3.8.3. Warrenton, Oregon

Warrenton had a total population of 4,096 people in the 2000 Census and 4,989 people in the 2010 Census. A total of 82.4% of the population lived in family households in 2000. In 2000, the main occupational fields were education, health, and social services (19.3%) and retail (18.6%). The agriculture, forestry, fishing and hunting occupations represented 3.4% of the employed population, and 14.2% of the labor force was employed by local, state, or federal governments. Warrenton's per capita income was \$16,874, compared to the national average of \$21,587. The median household income was \$33,472, which was lower than the national average of \$41,944. About 14.2% of the population was living below the poverty level, which was higher than the national average of 12.4%.

In 2000, Warrenton residents owned 52 vessels that participated in commercial fisheries. A total of 334 commercial vessels delivered landings to the Astoria-Warrenton port complex in 2000. These fishery landings included (data shown represents landings in metric tons/value of said landings/number of vessels landing): coastal pelagic fish (5907 t/\$794,612/29), crab (1399 t/\$6,530,137/92), groundfish (45,284 t/\$12,980,569/151), highly migratory fish species (1682 t/\$3,273,354/112), other fish species (178 t/\$633,751/84), salmon (52 t/\$138,537/82), and shrimp (3947 t/\$3,816,430/48). In 2000, there were at least four seafood processors operating in Warrenton with about 168 employees. Approximately 39,523,763 pounds of fish were processed at a value of \$22,361,265. In 2000, the top three processed products in the community, in terms of pounds landed and revenue earned, were Dungeness crab, flounder, and shrimp. In 2003, at least two outfitter guide businesses and two licensed charter vessel businesses were based in Warrenton. For the Astoria-Warrenton port complex, the 2000 recreational salmonid catch in the Ocean Boat Fishery was 766 Chinook and 13,712 coho salmon. The recreational non-salmonid catch totaled 1,533 fish, with most being black rockfish (*Sebastes melanops*).

Fort Stevens State Park is situated just outside of Warrenton. This 3,700-acre, year-round park is a very popular recreation area and offers camping, beachcombing, freshwater lake swimming, 9 miles of bicycle trails, 6 miles of hiking trails, wildlife viewing, a historic shipwreck, and a historic military area. Fort Stevens is also known for providing quality recreational fishing and clamming access.

3.8.4. Astoria, Oregon

Astoria had a total population of 9,813 people in the 2000 Census and 9,477 people in the 2010 Census. While the fishing industry has long formed the economic foundation of Astoria, the largest employers in 2003 were the U.S. Coast Guard, the Astoria School District, the Columbia Memorial Hospital, Clatsop County, and the Clatsop Community College. Other main industries in Astoria in 2000 were education, health and social services, retail trade, recreation, and accommodation and food services. According to the 2000 Census 17.1% of the surveyed population worked for the local, state, or federal government and 2.5% were in the armed forces. Astoria's per capita income was \$18,759, compared to the national average of \$21,587. The median household income was \$33,011, which was lower than the national average of \$41,944. About 15.9% of the population was living below the poverty level, which was higher than the national average of 12.4%.

In 2000, Astoria residents owned 184 vessels that participated in commercial fisheries. For information about commercial fishery landings, see the Warrenton data reported above. There were at least four seafood processors operating in Astoria in 2000. About 154 employees were employed by these processors and about 10,119,325 pounds of fish were processed at an estimated value of \$16,870,071. The top three processed products were flounders, Dungeness crab, and shrimp. Astoria had at least six outfitter guide businesses in 2003, and six licensed charter vessel businesses.

4. ENVIRONMENTAL CONSEQUENCES

The effects of the proposed action are discussed in this section.

4.1. PHYSICAL CHARACTERISTICS

The disposal of dredged material (sand) in the nearshore and intertidal environment of the MCR is expected to provide the following positive effects:

- Augment the present and future sediment budget at the MCR using dredged material to optimally sustain the inlet and related littoral system;
- Increase stability of the sand shoals that the North and South jetties are built upon and replenish sand in the nearshore, thus reducing wave damage to the jetties and erosion and associated property loss along the northern Oregon and southern Washington coasts;
- Replenish littoral sands in the nearshore area. Net erosion in the nearshore area has resulted in physical changes to the seafloor including exposed ancient laminate clay/mud substrates.
- Increase supply of sand substrate for benthic infauna and epibenthic infauna habitat in the nearshore area.

4.1.1. Sediment Quality

More than two decades of sediment sampling indicates that dredged material from the MCR is primarily clean (uncontaminated) sand (typically >98% sand; no presence of chemicals of concern above accepted screening levels). It is expected that the sediment will remain uncontaminated during implementation of the proposed action.

4.1.2. Water Quality

Material placement at the proposed nearshore disposal sites would use a hopper dredge to dispose of material offshore in waters between 40 and 60 feet deep. The disposal of dredged material from the hopper dredge creates a diffusive plume near the bottom. When the material dropped is sand, the plume falls very quickly and the sand is not immediately dispersed away from the disposal site. Thus, the impact to water quality of each hopper discharge of sand would be highly localized and of a short duration. The cumulative impact to the nearshore disposal areas would be minimal, in that the water quality effects of each discharge would be dissipated before the hopper returns with its next load, at a different location, for discharge.

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 at the MCR. The sediment dredged is primarily sand (<2% fines) and therefore, it is unlikely that dissolved oxygen will be impacted by disposal of this sandy material in the proposed disposal sites. It is also true that toxins found in the sediment adhere to fine-grained material, not sand (EPA 1991). Because toxins should not be present in the first place, there is no expectation of a re-suspension of toxins during disposal.

Onshore disposal of dredged material at the Benson Beach site would only cause water quality impacts where the material is discharged onto the beach. This discharge would increase turbidity in the surf zone as sand is deposited both directly into the water and/or subsequently moved by earth-moving equipment into the water. The turbidity plume is not expected to extend outside of the immediate discharge area

because the material is sand with minimal fines, which settles to the bottom very quickly where it is subsequently moved with the waves and currents. All construction equipment will follow a spill management plan. It is expected that the use of construction equipment and materials will not impact water quality.

Any monitoring conducted and the use of associated equipment during the dredging season would not measurably affect water quality.

4.1.3. Air Quality and Noise

There would be a temporary and localized reduction in air quality during disposal due to emissions from the dredge and during monitoring and placement of monitoring equipment, and from any earth-moving equipment used at the Benson Beach site. There also would be temporary and localized increases in noise levels from this equipment. These impacts would be minor and temporary in nature, and would cease once disposal is completed.

4.2. FISH AND WILDLIFE

4.2.1. Aquatic Resources

4.2.1.1. Fish

The potential impacts from the proposed action on fish, including ESA-listed species, from use of the proposed nearshore disposal sites are discussed in Section 4.2.4. Onshore disposal of dredged material (sand) at the Benson Beach site would be expected to have little to no impact on fish as they are not typically found in the surf zone, and are mobile and expected to avoid the general vicinity during disposal.

4.2.1.2. Benthic Species

The benthic community at the MCR is characterized by species who have adapted to a high-energy environment. The members of this community are highly motile rapid burrowers, quick tube builders or rapid colonizers. Dredged material disposal at the South Jetty sites would likely cause some loss of benthic organisms due to hopper disposal and during monitoring. The Corps has developed disposal methodology that would maintain disposal accumulation from 4 to 12 cm (~1.5 to 5 inches). The thin-layer disposal method was tested at the South Jetty Nearshore Demonstration site in 2005. In addition, the conclusion of the 2005 and 2009 science-policy workshops is that distribution of benthic species at the MCR is inherently patchy and variable and effects on the benthic invertebrates would be inconsequential as long as the sediment being dispersed is similar in size to the native sediments (LCSG 2011). Consequently, the impacts of nearshore disposal on benthic invertebrates is expected to be minimal because the dredged material (sand) being disposed of is very similar to native bed material and the use of thin-layer dispersal methods. It is expected that the benthic infauna would recolonize the placement area after the disposal event (Wilson, Fredette, et al. 2008; Wilber, Clarke, and Rees 2006)

Additionally, monitoring serves as a tool for determining impact to benthic organisms during disposal events. Incidental placement or movement of monitoring equipment may disrupt benthic organism's movement, but this disruption would be minimal.

The STFATE model has been used to predict the mound thickness from hopper disposal using various vessel speeds, load capacities, and water depths (Pearson et al., 2006). The results of this study showed that the worst-case scenario (slow vessel speed, large hopper load, and shallow disposal depth of 45 feet) would create a mound of about 11 cm (about 4.7 inches) or less in thickness.

A study done by Vavrinec and others (2007a) specifically addressed the question of injury and/or mortality of Dungeness crab at the MCR during dredged material disposal. The laboratory-based study mimicked disposal operation conditions as closely as possible while taking into consideration limitation posed by equipment scale in relation to real-world disposal conditions with maximum disposal layer at 12 cm (~5 inches). The results of the study indicated that the survivability of adult crab (age 3+) was 100% at 12 centimeter burial, and about 47% for female crabs and 20% for male crabs, age 2+ and young-of-year crab. The survivability rate of the age 2+ and young-of-year crab improves with the decrease in depth of burial rate, with disposal operations placing dredged materials between 4 and 12 cm (~1.5 to 5 inches). The survivability percentage is further enhanced with the surge current caused by the dredged material disposal; the surge velocity pushes the crabs out from under the center of the impact point into zones with decreased burial depths (from 12 to 7 cm or ~5 to 2.7 inches). Furthermore, crabs exhibit a self-rescue mechanism that allows for almost immediate repositioning if turned upside down from the surge (Vavrinec et al., 2007a).

While the MCR is a major Pacific razor clam harvesting location, the specific intertidal zone (Benson Beach) being proposed is not understood to carry substantial populations of razor clams (LCSG 2011). Most of the harvested razor clams occur on the intertidal beaches that are exposed during low tides. Laboratory experiments (Vavrinec et al., 2007b) conducted on Pacific razor clams to predict survival rates of clams exposed to sediment burial of varying depths and frequencies indicate that survival of adult razor clams was 100% after burial to depths of 3.5 and 12 cm (~1.4 to 5 inches). Razor clam survival decreased to 89% after burial to a depth of 18 cm (~7 inches) and 70% after burial to a depth of 24 cm (~9.4 inches). An additional burial experiment was conducted with smaller razor clams and survival was 100% after burial to a depth of 12 cm (~5 inches).

Conclusions from a 2009 science/policy workshop included that the additional sand provided by onshore disposal could benefit intertidal razor clam stocks along beaches affected by erosion. Based on the workshop, some effect to the community would be expected following disposal; but the long-term impacts to razor clams are expected to be beneficial. The time frame for recovery would be variable depending on project-specific details such as thickness of material disposed, timing, and others.

Because the dredged material (sand) being disposed of is very similar to native bed material and thin-layer dispersal methods will be used by the hopper dredge, no adverse impacts to Dungeness crab and razor clams are anticipated from disposal of dredged sand in the proposed disposal sites. However, because of concerns by the Columbia River Crab Fishermen's Association, the use of the South Jetty Nearshore site would be limited by site management provisions that only allow for disposal after August 15, when the crab season in Oregon ends. The North Head Nearshore site would be limited by site management provisions that only allow for disposal after September 15, when the crab season in Washington ends.

4.2.2. Vegetation

At the Benson Beach disposal site, beach vegetation consists primarily of European beach grass and beach sagebrush. The dune line would not be impacted by beach disposal work as the pipeline would be placed seaward of the dune line and all beach vegetation. There would be no impact to vegetation from

use of the proposed nearshore disposal sites. There may be temporary impacts to the vegetation as construction equipment moves between the staging area and the disposal area. The staging area will be placed away from established vegetation. Construction equipment will follow BMPs to minimize their movement to and from the project area. It is expected that the monitoring actions undertaken would not impact any vegetation.

4.2.3. Wildlife

It is possible that the proposed action could disturb pinnipeds (sea lions, harbor seals) with the movement of dredges as they dispose of material, but it is unlikely that the effects would rise to the level of harm or harassment. The nearest haul out area for pinnipeds is on the South Jetty, removed from the proposed disposal area by a mile. Pinnipeds are highly mobile species and tend to avoid vessel traffic. No adverse impacts are expected to pinnipeds from the proposed action.

The proposed action would not adversely affect seabirds and other avian species such as grebes, cormorants, and terns because they can readily avoid the disposal areas and any short-term impacts from disposal to foraging habitat would be minimal relative to the availability of adjacent habitat. Brown pelicans could be disturbed during disposal; however, impacts are expected to be minimal because they can avoid the disposal areas. Similarly, it is unlikely that bald eagles would be impacted by the proposed action because they can readily avoid the disposal areas while foraging.

Shorebirds (sanderlings, sandpipers, dunlins, and plovers) are located on the shoreline and in the surf zone feeding on near-surface forage organisms or resting in and near the edge of the surf zone. Disposal at the Benson Beach onshore site would temporarily displace shorebirds, although they would not have to move far to avoid the active disposal zone. It is expected that shorebirds will be able to avoid construction equipment during movement; therefore disposal at the proposed nearshore sites would not impact shorebirds.

4.2.4. ESA-listed Species under NMFS Jurisdiction

4.2.4.1. Anadromous Salmonids

The proposed nearshore disposal sites are located in areas where adult and juvenile salmonids may occur. Disposal activities at the MCR typically occur from June through October. This coincides with juvenile out-migration for all of the listed salmonid species. This also coincides with adult upstream spawning migration for summer run Chinook, fall run Chinook, summer steelhead, and coho.

Maintenance activities at the MCR are likely to only have a minimal effect on the behavior of juvenile and adult listed salmonid stocks in the area where the dredges work, and this would be in areas not normally known for salmonid migration because salmonids are not commonly found in the deeper areas. Since the MCR is not an area where salmonids are known to spawn, there would be no impact to that portion of their life cycle. The MCR is a high-energy environment, subject to wave energy, tides, ocean currents and freshwater flows, which is not the preferred area for salmonid rearing.

Disposal of dredged material in the North Head and South Jetty nearshore sites will result in the burying of benthic organisms found below the hopper dispersal zone. Any reduction to potential salmonid food sources is minimal because it is expected that the benthic organisms will recolonize the area buried within the dispersal zone after the action occurs.

It is likely that the noise and activity associated with disposal at the nearshore sites will cause some avoidance and displacement of juvenile and adult salmonids in the immediate area where the dredge is working. That is, fish would likely avoid the area if the noise of the disposal activity was disturbing to them. However, the area of disturbance around the dredge is very small relative to the entire MCR area, and the impact to salmonids is expected to be minimal since most fish are able to avoid the impact area and can find ample area for migrating around the dredge.

As previously discussed, it is unlikely that dissolved oxygen will be impacted by disposal of this sandy material in the nearshore placement sites. There is also no expectation of a re-suspension of toxins by disposal. There is the potential for short-term and localized elevation of turbidity levels at the disposal locations. Because the dredged material is sand, these increases would be short term (less than 1 hour) and confined to areas where disposal occurs.

Increases in suspended solids concentrations are anticipated to be localized and short-term, and would occur near the disposal operation at the nearshore sites. The likely exposure of salmonids will be to the low concentrations (0 to 2 milligrams per liter increases; NMFS 2005) that will occur downstream from the disposal operation. In addition, less than 1% of dredged material consists of the fines that cause gill clogging (Sigler et al., 1984). Accordingly, the anticipated slight increases in suspended solids would not be of sufficient intensity or nature to cause gill clogging in salmonids.

Onshore disposal of dredged material at the Benson Beach disposal site would be expected to have little to no impact on listed salmonids as they are not typically found in the surf zone as adults or juveniles, and because they are mobile and would be expected to avoid the general vicinity during disposal.

Monitoring actions undertaken will likely have no impact on ESA listed species. It is expected that fish will avoid the video sled. The use of a single beam or multibeam sonar from a hydrosurvey vessel,¹ for obtaining bathymetric readings, is unlikely to impact fish.²

The Corps has determined that the proposed action of including the proposed nearshore and Benson Beach intertidal disposal sites into the MCR disposal network is not likely to jeopardize the ESA-listed anadromous salmonids. The Corps determined that the action is not likely to adversely affect their critical habitat. NMFS's 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 Operations and Maintenance, Mouth of the Columbia River to Bonneville Dam, Oregon and Washington – HUCS 1208000605, 1708000307, 1708000108* (hereon referred to as 2012 BiOp)(NMFS 2011/02095) concludes that the proposed action is not likely to jeopardize the continued existence of LCR Chinook salmon, UWR spring-run Chinook salmon, SR fall-run Chinook salmon, CR chum salmon, LCR coho salmon, SR sockeye salmon, LCR steelhead, UWR steelhead, MCR steelhead, UCR steelhead, SRB steelhead, southern green sturgeon, or eulachon, or result in the destruction or adverse modification of designated critical habitats of any of those species, except for LCR coho salmon, for which critical habitat has not been proposed or designated.

¹ <http://www.navsea.navy.mil/nuwc/keyport/Environmental%20Documentation/Appendix%20B.pdf>

² http://www.wsdot.wa.gov/NR/rdonlyres/0B027B4A-F9FF-4C88-8DE0-39B165E4CD94/61426/BA_HumanSoundonFish.pdf

4.2.4.2. Other Listed Species

Green sturgeon would be expected to occur in the more tranquil estuary proper to a greater extent than in the MCR vicinity. Green sturgeon may use the area as habitat for adult and subadult migration and feeding, as well as growth and development to adulthood by subadults. Nearshore disposal at the South Jetty and North Head sites could result in flushing of green sturgeon from the area being used at time of disposal. However, green sturgeon are highly mobile and this type of disturbance is considered minimal and would not be expected to adversely affect green sturgeon populations in the Columbia River. Primary constituent elements of critical habitat that could be affected include food resources and water quality. Effects to critical habitat from disposal could affect green sturgeon critical habitat, albeit not greatly. Disposal of sand would not produce large amounts of turbidity or total suspended solids. The impact to water quality from hopper discharge of sand would be highly localized and of short duration. Steller sea lions are present in the MCR area and could be disturbed by the presence of a hopper dredge and forced temporarily from preferred foraging areas. However, monitoring and disposal at the nearshore material placement sites would not likely adversely affect Steller sea lions.

Blue whales, fin whales, humpback whales, Southern Resident killer whales may occur in area off the MCR but are not generally distributed nearshore; their presence in the proposed nearshore material placement sites is unlikely. In the event marine mammals are present during disposal activities, vessel operations, monitoring actions, and dredge discharge procedures associated with the proposed action may cause a temporary disturbance.

Federally listed marine turtles that could occur in the vicinity of the MCR are generally not found close to shore and are highly mobile. The MCR is likely not the preferred habitat for any of the listed marine turtle species because the area is not located within a migration corridor, and they are unlikely to feed in the vicinity of the MCR. The proposed action is not expected to adversely affect any federally listed marine turtle species.

Any monitoring action may encroach on the soundscape of water-based species. The action of using sonar to determine the bathymetry of a disposal site may temporarily drive fish and mammal species away. However, the use of sonar is a temporary action. It is likely that fish and mammals may not be deterred by sonar and other monitoring actions undertaken within the disposal area. (Popper 2008; Popper and Hastings 2009)

The Corps has determined that the proposed action of including the proposed nearshore and Benson Beach disposal sites into the MCR disposal network will not affect green sturgeon, Steller sea lions, marine whales, and marine turtles or their critical habitat. In NMFS's 2012 BiOp, NMFS concluded that the proposed action is not likely to adversely affect the leatherback sea turtle, the Steller sea lion, the Southern Resident Killer Whale, humpback whales, blue whales, sei whales, fin whales and sperm whale. The action area includes designated critical habitat for the leatherback sea turtle. NMFS concluded the proposed action is not likely to adversely affect the leatherback sea turtle designated critical habitat.

4.2.4.1. Essential Fish Habitat

No adverse effects are expected on EFH designated for groundfish, coastal pelagics, or coho and Chinook salmon from placing dredged sand at the South Jetty nearshore sites. Disposal would be intermittent, as the fill/dispose cycle takes several hours. The disposal could bury groundfish and coastal pelagics, although it is unlikely that the overall population levels of fish would be adversely impacted. Species found nearshore should be of sufficient age and size to initiate avoidance behavior and move out of the

disturbance area. Food resources would temporarily decline at the dredge material disposal sites because disposal will cover the substrate and any substrate dwelling organisms will be buried. These areas are in high-energy, nearshore zones that are typically inhabited by opportunistic organisms tolerant of disturbance.

Onshore disposal of dredged material at the Benson Beach site would have little effect on EFH designated for groundfish, coastal pelagics, and coho and Chinook salmon. The material would be deposited up on the beach or in very shallow water where few of the EFH species and their associated habitat are likely to be present.

The Corps has determined that the proposed action of including the proposed nearshore and Benson Beach disposal sites into the MCR disposal network may affect, but is not likely to adversely affect EFH.

4.2.5. ESA-listed Species under USFWS Jurisdiction

The proposed action would have no effect on short-tailed albatross and Columbian white-tailed deer because these species are not within the vicinity of the MCR. Also, no Oregon silverspot butterfly populations are known to occur in the project area, and the proposed action would not affect their preferred habitat types.

The proposed action is not likely to adversely affect marbled murrelet. Marbled murrelets may fly in the vicinity of the proposed action but are expected to easily avoid the disposal areas. There may be impact to sand lance, an important prey for marbled murrelet. Monitoring actions undertaken by various Federal (including the Corps) and private entities are intended to determine if there is impact to benthic organisms and assess the recolonization rates within the disposal placement area. The proposed action may have beneficial impacts to western snowy plover. By placing clean sediment within the littoral cell, deposition and accretion of sand along Clatsop spit may create plover nesting habitat; Clatsop Spit is currently proposed as critical habitat for the species. Assessment of snowy plovers habitat through the use of South Jetty Intertidal site is not a part of the proposed action.

The Corps has determined that the proposed action would have no effect on bull trout. Anadromous bull trout typically migrate into freshwater May through June and reach spawning habitat by September. Anadromous bull trout typically over-winter in the ocean. The disposal operations generally occur outside the time frame that bull trout would utilize the coastal environment.

4.3. CULTURAL AND HISTORIC RESOURCES

The proposed action is being conducted in an area that is highly erosive and has previously been disturbed by jetty construction. The Corps has determined that the proposed disposal actions would not permanently impact or degrade any potential historical remnants or shipwrecks that might be found in the disposal network. It is expected that the placement of dredged material in the nearshore environment would be quickly dispersed within the littoral cell.

4.4. TRIBAL RESOURCES

The two proposed nearshore disposal sites are located in the ocean environment in areas impacted by previous disposal activities or fishing and crabbing activities. Any impacts to fish, clams, or crabs are expected to be minimal and short term, if at all. For these reasons, the addition of the proposed disposal

sites into the MCR disposal network is not expected to impact tribal or cultural resources. In the event human remains and/or cultural resources are discovered during any phase of the disposal, work shall immediately cease and Corps' archeologists will be notified.

4.5. SOCIO-ECONOMIC RESOURCES

Disposal of dredged material in the proposed nearshore and Benson Beach disposal sites would not cause changes in population, economics, or other indicators of social well being in the MCR area. The proposed action would not result in a disproportionately high or adverse effect on minority populations or low-income populations.

Almost all of the MCR area experiences some type of commercial fishing activity. The major fisheries are for bottom fish, salmon, Dungeness crab, and Pacific razor clam. No adverse impacts to commercial fishing or crabbing would be expected from the addition of the proposed disposal sites to the MCR disposal network. As discussed in Section 4.2.1, disposal of dredged material at the proposed disposal sites would be expected to have little to no impact on bottom fish and salmon as these species are typically not found in the surf zone and/or would be expected to avoid the general vicinity during disposal. Because the dredged material (sand) being disposed of is very similar to native bed material and thin-layer dispersal methods will be used by the hopper dredge, no adverse impacts to Dungeness crab and razor clams would be expected. However, because of concerns by the Columbia River Crab Fishermen's Association, the use of the South Jetty Nearshore site would be limited by site management provisions that only allow for disposal after August 15, when the crab season in Oregon ends.

The proposed action at the Benson Beach disposal site would have a temporary impact to recreationists at Cape Disappointment State Park. Park visitors are likely to be disturbed by construction equipment noise during placement of intertidal sediment. A number of restrictions would be in place near the construction zone at the site to protect park visitors and the public. The reduction in the levels of recreational activity would be temporary and may slightly affect the local economy of the Long Beach peninsula, which is highly dependent on tourism. Reintroduction of sediment into the littoral cell at MCR is expected to have a long-term, positive impact on commercial and recreational interests by reducing long-term erosion impacts. The proposed action would have no effect on utilities and public services in the area.

As analyzed through a cost risk analysis, the average dredging cycle costs (dredging, transit, and dispersal time) could be reduced 4% by utilizing the South Jetty Nearshore site over the DWS. The average dredging cycle costs could be reduced by 12% by utilizing the North Head Nearshore site over the DWS (Corps Walla Walla District). This would reduce overall costs via increasing productivity through shorter transit times. Retaining the sediment within the littoral cell also could reduce future costs towards shoreline erosion rehabilitation.

4.6. CUMULATIVE EFFECTS

Cumulative effects are those effects from activities that are reasonably certain to occur in the area that would add to the effect of the proposed action. Implementation of the proposed action is not projected to contribute adverse impacts when considering it in the context of other related past, present and reasonably foreseeable actions. Other actions or proposed actions in the vicinity of MCR include operations and maintenance dredging of the Columbia River navigation channel; dredged material disposal at ocean disposal sites (SWS and DWS) and the NJS; repair and rehabilitation of the MCR jetties; the use and development of Fort Stevens (OR) and Cape Disappointment (WA) State Parks; and continued efforts to

address and implement habitat restoration within the project area (the Corps coordination with OPRD through the HCP).

The proposed action would use dredged material (sand) beneficially, thereby offsetting some of the negative impacts that the Columbia River jetties and maintenance dredging may have on natural coastal processes. The incremental effect of implementation of the proposed action is expected to be positive. While operations and maintenance dredging will continue at the MCR, the proposed action is intended to reduce the migration of littoral drift into the navigation channel, and may, in time, reduce the volumes and frequency of dredging needed at the mouth. The addition of the proposed disposal sites into the existing network of disposal sites does not inherently increase the volume of material being disposed at the MCR. Rather, the proposed sites allow for increased opportunity to rebalance the littoral budget on a broader geographic scale while maintaining current dredging volume. The placement of sediment within MCR's nearshore environment is intended to mimic the pre-jetty conditions of sediment movement along the southwest Washington coast and northwest Oregon coast by returning sand to the littoral drift along the southwest Washington coast. Managing the MCR's sediment budget via strategic placement of dredged materials will likely preserve Benson Beach and Clatsop Spit, as well as areas further north and south along the Columbia River littoral cell in southwest Washington. The addition of the proposed disposal sites would also help facilitate more effective operations and maintenance practices in the MCR area and reduce the future maintenance and repair costs for the MCR jetties by reintroducing sediment back onto the shoals of which the jetties are based.

5. COORDINATION

This section contains the summary of comments received from both the first and second posting of the draft EA. Corps responses are provided.

A public notice was first issued on March 1, 2012 indicating that the draft EA for the proposed action was available for public review through March 30, 2012. During this public review period, the Corps received a total of 13 written letters and emails commenting on the March draft EA. A second public notice was issued on April 24, 2012 indicating that a second draft EA for the proposed action was available for public review through May 8, 2012. During this public review period, the Corps received a total of 3 written letters and emails commenting on the May draft EA.

A summary of the comments received for both postings of the draft EA is provided below, followed by the Corps' response and subsequent changes to the EA, as appropriate.

First set of comments received during the 30-day public notice posting period March 1 to March 30, 2012.

1) **Oregon Parks and Recreation Department (OPRD), letter dated March 29, 2012.**

- a) The draft EA notes that "Clatsop Spit is not designated as critical habitat for the species." The Columbia River Spit (OR1) is listed as proposed Western Snowy Plover critical habitat. [...] The proposed critical habitat designation along with the existing designation of a SPMA on the river side of Clatsop Spit should be taken into account during the Corps review of potential impacts to the ESA-listed Western Snowy Plover.

Corps Response: Sections 3.5.3 and 4.2.5 have been revised in response to this comment.

- b) OPRD recognizes that the area of Clatsop Spit immediately adjacent to the South Jetty is experiencing erosion and understands the damage that would be caused to the shipping route should the jetty become breached. However, the suggestion that the entire littoral cell south of the jetty has lost its accreted sediment and is now sediment starved is not consistent with what has been directly observed by park staff – the shoreline continues to pro-grad throughout much of the park and dune heights continue to rise. OPRD would value a more comprehensive look at the sediment budget of the entire littoral cell.

Corps Response: The Corps concurs with this assessment. The nodal point between littoral sediment accretion and deficit, along the Clatsop Plains, is approximately 3.5 miles south of the MCR south jetty. Moving northward from the Peter Iredale wreck, the Clatsop Plains littoral cell becomes progressively more deficient of sediment along the nearshore (subtidal to -60 ft) and foreshore (intertidal to dune toe) profile. Moving southward from the Peter Iredale wreck, the Clatsop Plains littoral cell becomes progressively more accretionary for sediment along the nearshore and foreshore profile.

2) **Columbia River Crab Fisherman's Association, letter received March 28, 2012**

- a) It is realized that to continue to move forward and accomplish the pending science this dredge season in the South Jetty Site this progress must now be through a temporary experimental disposal permit.

Corps Response: A pilot project was completed in 2005. The data gathered from the pilot project provided the information needed to move forward with the nearshore disposal. The necessary laws, regulations, and permits have been obtained and/or evaluated in Section 6.

- b) Baseline bathymetry **MUST** be established prior to any dredge disposal at both the South Jetty Site and North Head Site so that the **MAXIMUM** one foot of dredge disposal can be adequately monitored and reported in a timely manner with applied oversight that can call a **STOP** to disposal if the dredge disposal mound exceeds the one foot mound criteria in the nearshore sites. This is an essential criterion that must be clearly understood and adhered to, and incorporated into the EA as a **REQUIREMENT** that cannot be overshadowed by an AUP that has no oversight.

Corps Response: All disposal sites are bathymetrically surveyed prior to use and throughout the dredging season. The South Jetty Nearshore Site will only be used as thin-layer placement. The Corps will not exceed one foot mounds per dredging season.

- c) The RSM program has continuously incorporated beneficial use standards for nearshore disposal that are a higher standard for both human health and safety and environmental protections that exceed existing legal requirements and practices. The current draft EA and Draft FONSI only support the minimal existing “legal” requirements and discard the higher LCSG/USACE beneficial use standards; course correction and reinstatement of the collaborative LCSG/USACE agreements is required before these sites move forward which requires a formal withdrawal of the original draft EA, new draft EA ~~embracing~~ incorporating the results oriented gentler beneficial use standards including DO NO HARM and re-establish public hearings on the coast that must be incorporated to continue advancing the collaborative nationally recognized RSM program that has brought additional federal funding into the program.

Corps Response: A second draft EA was posted on April 24 reflecting the information gathered through the discussions during LCSG meetings, workshops, and through the review of the public comments received during the two public notices of the EA and the public meeting held 2 May 2012 at Warrenton, Oregon. The final proposed action reflects requests for more information on the North Head Nearshore Site. The Corps is actively engaged with the public to ensure that this collaborative effort is continued; however, the Corps is not aware of Beneficial Use Standards developed by the LCSG.

- d) In addition, suspension of the public hearings on the original draft EA triggers a NEPA abnormality that must be remedied before moving forward. CRCFA demands a new public comment period on the new draft EA and an open public hearing process on the coast on the new draft EA before this NEPA process is allowed to move forward.

Corps Response: The Corps issued a second draft EA and held a public meeting for 2 May 2012, in Warrenton, Oregon. This meeting was attended by over 20 members of the public. Comments received at this meeting are discussed in the second set of comment reviews. The Corps incorporated information gathered through the discussions at the LCSG meetings, workshops, and through the review of the public comments received during the two public notices of the EA. The final proposed action reflects requests obtained during the NEPA process and at LCSG meetings. The Corps is actively engaged with the public to ensure that this collaborative effort is continued.

- e) Cumulative Federal, state, local impacts must be a limiting factor in industrialization of our local offshore waters.
 - i) Current dredge disposal has a negative impact on the coastal economy – crab mortality
 - ii) Current dredge disposal has contributed to far too many fishing mortalities.
 - iii) Current dredge disposal has cost the fleet fishing days by increasing transit time when only short weather windows are available to go fishing
 - iv) Federal obligations to northern Washington tribal treaties has overly divided the local crab pie by ~ 75 additional vessels in the local area and removed over \$100 million from the coastal crab fishery.
 - v) Federal obligation to tribal treaties has removed 91% of our local crab fleet’s access to fishing the Washington Coast over-crowding local fishing grounds even further south of Klipsan Beach, 13 miles north of the MCR into southern Washington and northern Oregon.
 - vi) Camp Rilea offshore industrial ocean energy facility has the potential to snare 1000s of crab pots that move in winter time storms and may cause a total RESTRICTED NAVIGATION AREA and total loss of fishing access in the US ARMY live firing range.
 - vii) Oregon Marine Reserve at Cape Falcon, even though not excessive in size is a cumulative loss to the fishing fleet.
 - viii) The MCR has over 60 square miles of no fishing zones in the entrance areas of the MCR by industry to industry cooperative agreement with the towboat industry.
 - ix) The MCR has more ship and tug traffic than all other ports from San Francisco to Neah Bay combined with a proportionate pot loss that is very substantial cumulative loss.
 - x) Washington has a No trawling zone on the entire Washington coast from 0 – 3 miles offshore; a Defacto marine reserve.
 - xi) PFMC trawl fishery closures are very extensive offshore in the MCR area
 - xii) PFMC and state regulations denied local access to troll and gillnet salmon to near zero in the local area.
 - xiii) Each impact may not be catastrophic by itself but in total make it extremely difficult to maintain a bottom line family wage from fishing; when fishing disappears so will a lot of shore side businesses; too many are already gone.

Corps Response: 40 CFR 1508.7-8 specifies cumulative effect. Section 4.6 identifies the direct and indirect effects of this action, federal and/or non-federal for the past, present, and reasonably foreseeable future within the proposed action’s project area.

It is expected that the project will have minimal impact to the crabbing industry, as the action is occurring outside of the crabbing season. Based on available information and literature review, impacts to crab and benthic species are expected to be temporally and spatially very low.

Navigational safety is addressed in Section 2.4 – Proposed Action. Additionally, the Coast Guard publishes local notice to mariners weekly that outlines dredging and disposal operations that will be occurring.

It is expected that the project will have minimal impact to the fishing industry. The dredging or disposal areas will not be closed to recreational access. Commercial access or marine reserve access will not be impacted by this proposed action, nor will the access be altered as a result of the proposed action.

The project at Camp Rilea is outside of the proposed action’s project area.

- f) The EA has not one word in the document stating that the dredge disposal mounds will never exceed one foot mound height agreement that was discussed and agreed to at the LCSG/USACE nearshore disposal meetings leaving full discretion to the Corps and their Annual Use Plan with NO LCSG oversight

Corps Response: Refer to the Corps Response of comment 2b in reference to the one foot mound height statement of comment f. The AUP is prepared by the Corps and approved by EPA.

- g) Navigational Safety vs. Fishing Safety needs to be clarified for the record.

Corps Response: The Coast Guard publishes local notice to mariners weekly that outlines dredging and disposal operations that will be occurring.

- h) Eliminating Rainbow Spray as an alternative in the original EA was an arbitrary unsupported unilateral action that MUST stay on the table until removed through actual field testing to be impractical do to safety concerns or other valid parameters other than strictly “least cost”.

Corps Response: The Corps recognizes the “rainbow spray” method and determined it is not a viable option at this time. Rainbow spray is a relatively new method of disposal. Disposal via dispersed aerial spray has not been evaluated for dispersed movement of sediment through the water and air column and the impact to aquatic species is unknown. Refer to section 2 for additional limiting factors for the use of rainbow spray.

- i) It should also be noted at this time that CONVENTIONAL BELLY DUMPING IN THE NEW NEARSHORE DREDGE DISPOSAL SITES WILL NOT BE ALLOWED, IN FACT PROHIBITED; not a part of Beneficial Site Use.

Corps Response: The Corps will be placing dredged materials in the South Jetty Nearshore Site using the thin-layer placement method. While the thin-layer placement is conducted via hopper dredge, the intent is to place material thinly, evenly, and accurately utilizing an operational method where the hopper doors are opened slowly while moving forward. Dredged material placement at the proposed nearshore site will not be placed “conventionally”, where all material is dropped from the hopper in one mound rapidly.

- j) The inside depths of the new nearshore sites are a function of dredge safety and must be established on a day to day basis by the dredge captain at the time of disposal. Limiting the inner side of the South Jetty Site to 40 feet or more will reduce the site capacity. CRCFA suggests moving the inner portion of the site shoreward commensurate with dredge safety which will be closer to shore in mild sea conditions to increase site capacity. Dredge safety is a concern and the inner portion of the North Head Site is listed at 20 feet, we question this depth for dredge safety reasons unless Rainbow Spray is the utilized where no dredge disposal doors are opened and the sediment could be sent shoreward with areal delivery outside 20 fathoms.

Corps Response: The use of the North Head Nearshore Site at this time has been removed from the proposed action. Dredge Essayons will be placing material at the South Jetty Nearshore Site; Dredge Essayons has an operational limitation of -40 ft. deep.

- k) The Benson Beach Site should start at the root of the North Jetty and proceed north as far as the intertidal site was identified by the LCSG team. The drawing of the site on page 10 needs to be

more accurate and accommodate the placement site just north of the North Jetty that the Corps as already used on several occasions.

Corps Response: Actions undertaken at Benson Beach adjacent to the North Jetty is authorized under the operation and maintenance of the North Jetty. The Benson Beach Intertidal Site is designed to not overlap with the North Jetty Operations and Maintenance project boundary.

- l) Clatsop Beach starting at the base of the South Jetty needs to be identified as a site in this EA since it will not be too many years and a breach into Trestle Bay will occur and a permit needs to be in place to address that emergency especially since that is a reasonable foreseeable event with the tall erosion cliffs highly visible today. Page 14 (2.4) prematurely truncates this direct beach placement option without proper investigation.

Corps Response: The use of South Jetty Intertidal site is not a part of the proposed action at this time. Refer to section 2 for the alternative process.

- m) EA comments on page 14 (2.3.3) are inaccurate and misleading. 1) Any sediment dumped in the littoral drift outside the 60 foot contour are outside the recognized outer depth of closure will not significantly contribute to the littoral drift system and cannot be considered a beneficial use.

Corps Response: The proposed action states that the placement will occur between -40 ft and -60 ft contours of the South Jetty Nearshore Site. It is expected that the sediment will be retained in the littoral drift system.

- n) The top half of page 15 is not acceptable.
 - i) Corps incorrectly assumes that dumping will occur without funding for study. NO study no dumping.
 - ii) Baseline studies and monitoring design will be done by the technical committee of the LCSG not the single Corps entity.
 - iii) The 1, 2, 3 priorities are not honest, period. Everyone associated with the MCR dredge process knows that option 2, placing sediment on Benson Beach is misrepresentative of the USACE reality. Placing 2 ahead of 3 is not going to happen and everyone knows the truth – pure fabrication. The Mudhole at North Head will be option 2 after the 3 – 500,000 cy yards is placed in the South Jetty Site. The Corps appears to be headed for the same resource negative AUP for the South Jetty Site and that is not acceptable. NO EXCEPTION. Resource will not suffer as a result of disposal in the new near shore sites, period, not acceptable. Placing excessive control of the operations in the AUP will end in disaster for the coastal communities forfeiting considerable economic return as crab mortality increases unchecked just like in the SWS which is abuse of the coastal communities for the sake of “least cost”. This EA is beginning to smell like the Corps is going to place a mcyc per year in the South Jetty Site and they will be able to use the AUP as a tool that is not double checked for abuse by the LCSG.
 - iv) Substantive Results must be of the highest scientific standards capable of outside (“outside” being the KEY) peer review at any stage in the development of supporting documents, not just after the documents are complete. Peer, public, and agency reviews must be continually incorporated into project design, not ignored or changed at the very last minute that is illicit common practice.

Corps Response: The proposed action is outlined in the EA. The North Head Nearshore site is not considered a part of the proposed action; the priorities are as stated in section 2.4.1. Monitoring is undertaken by various Federal and private entities. The Corps is collaborating with NMFS for proposed monitoring at the South Jetty Nearshore Site.

- o) DATA used must be of the highest scientific uncompromised INTEGRITY.
 - i) DATA must be openly available to the public at all stages of development.
 - ii) Public comments must be actually incorporated into the final project decisions, or rejected based on sound scientific reasoning.
 - iii) The best scientific methodology must be used to resolve scientific differences, not agency opinion as currently upheld by the courts as alluded to in the draft FONSI.
 - iv) Scientific studies need current information; not outdated, under accomplished data use that influences the wrong decisions as it has in the past. This time MUST be different. Modern Science must dictate outcomes, not legal technicalities.
 - v) Studies are often truncated in design to knowingly omit KEY information vital to informed decisions, negatively influencing study impartiality leading to the WRONG endpoint.
 - vi) Studies are sometimes designed to "MISS" peaks in resource abundance by design - EGREGIOUS.
 - vii) Studies need to use the "BEST" collection devices and practices available that lead to numerically clear, not inferred endpoints designed to hide TRUE variations in collection results.
 - viii) Studies and the underlying data need to be made available before decisions are made not only to agencies but the general public as well increasing the transparency of the NEPA process not hiding in legalese.
 - ix) Studies are often released in stages (great) but the graphic depictions are displayed with variations in magnitude that distorts the end result making the impact look larger or smaller than it really is to the untrained eye of the public and all too many decision makers.
 - x) Studies need to use differences, not averages which usually hide true results over wide areas.
 - xi) Studies that are shared with decision makers and the public are often preceded by leading statements; CHANGE REQUIRED.

Corps Response: The Corps posts the most recent bathymetric survey on the Corps public website: <http://www.nwp.usace.army.mil/Missions/Navigation.aspx>. The Corps is collaborating with LCSG to utilize Institute for Natural Resources at Oregon State University to develop a document database for relevant data, studies, papers, etc., related to the MCR. The studies are being conducted by Federal, State, and local agencies as well as private entities. Many of the studies are the result of research questions developed during LCSG meetings. The study methods to address research questions posed by LCSG were developed through various discussions and workshops. The study methods are reviewed by the LCSG's technical group.

- p) The existing comment found on page 7, "For biological species, a key determinant is evidence of any greater effect than what occurs with current dredging practices." Is not acceptable, should not have been included in the report conclusions and MUST not be cited here as a pre-condition for nearshore disposal impacts. The page 7 reference to the, "detailed wave analysis for the area south of the South Jetty," must also be noted that the range of mound induced wave amplifications was limited to a 4 foot mound or less and at the time the USACE was predicting dredge disposal to 7 feet which has been shown to be considerably above the accepted maximum 10% wave increase guideline for Navigational Safety in use at the MRC by all existing peer review that has been documented outside the USACE. This limitation on analysis limited to only

4 feet triggered considerable concern on the part of all small vessel navigators including CRCFA at the time and still is a major ongoing point of contention. Historically the USACE has used the 7 foot mound as their internal trigger to stop nearshore disposal mounding – way way over the 10% agreed to maximum.

Corps Response: The Corps evaluates impacts in Section 4. The Corps proposed action is to utilize thin-layer placement and to not exceed one foot in bathymetric depths annually.

- q) Timely Open ACCESS to data and studies is essential to producing a “Results Oriented” Water Resource Development Projects before decisions are made and will improve the scientific integrity of the process.
 - i) Access to original DATA is essential to peer review and ability to reproduce, support, or deny conclusions of the Water Resource Development Project.
 - ii) Access to data breeds confidence and TRUST in getting to an “HONEST” answer.
 - iii) Access to data will improve data quality, numbers supporting a pre-determined end point will be harder to arbitrarily inject just to benefit or deny the project.
 - iv) Access to data will increase public TRANSPARENCY.
 - v) Access to data will improve overall project design.
 - vi) Access to data must be "User Friendly" to the general public and freely available.
 - vii) The materials must be in a format readily available and understandable to the public at minimal cost.
 - viii) Websites "obstructionary" design must CHANGE with improved open navigation using key word or phrase searches that lead directly to the desired materials.
 - ix) Documents and materials must be properly page numbered, indexed, electronically word and phrase searchable; not scanned documents impossible to navigate to desired information.
 - x) Documents and materials need complete "Scientific Integrity and standardization" throughout that is straight forward, not half-truths, purposeful omissions, continual adjustments to scale of presentation[example, changing numerical representation of the same dot size], color change for the same information, averaging, and other types of data manipulation designed to increase confusion in reaching informed decisions.

Corps Response: The Corps posts the most recent bathymetric survey on the Corps public website: <http://www.nwp.usace.army.mil/Missions/Navigation.aspx>. The Corps is collaborating with LCSG to utilize Institute for Natural Resources at Oregon State University to develop a document database for relevant data, studies, papers, etc., related to the MCR.

- r) Ecosystems and the services they provide must be fully considered as a "cost" of the project and fully mitigated for unavoidable impacts that will occur.
 - i) Environmental BASELINE studies quantifying KEY species must be successfully completed before decisions to move ahead occur.
 - ii) Environmental Baseline studies must actually represent a PROPERLY FUNCTIONING ECOSYSTEM including the interrelationships of the biophysical interactions that key species need not only to survive but thrive.
 - iii) Environmental Baseline studies must present a clear understanding of the physical processes interactions prior to mutation by proposed actions.
 - iv) Baseline studies must accurately quantify natural resources that local communities depend upon for their economic activity.

- v) Environmental protection and ecosystem function must be a fundamental objective for water resource planning not strictly driven by project economic development objectives at least cost.
- vi) Economic Development needs to be environmentally sustainable as almost all mitigation falls well short of the original undamaged mutated ecosystem function.
- vii) Loss of cover and food source for juvenile and adult crab must be mitigated.
- viii) Any unavoidable loss of crab must be mitigated.
- ix) A Crab Mitigation Strategy similar to Grays Harbor but tailored to the Columbia River must be initiated.

Corps Response: 40 CFR 1508.20 outlines mitigation as:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.**
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.**
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.**
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.**
- (e) Compensating for the impact by replacing or providing substitute resources or environments.**

The Corps is minimizing their impacts of disposal actions by performing work outside of crabbing season, utilizing thin-layer disposal method, and following a disposal management plan that highly regulates amount and timing of dredged material placement.

- s) Adaptive Management needs to progress slowly and use intermediate steps to evaluate changing environmental conditions mutated by dredge actions so that a large initiated project will not produce irreversible ecosystem harm.
 - i) Adaptive Management currently means do the project and live with the results; NOT ACCEPTABLE; the standard needs to improve dramatically.
 - ii) Adaptive Management requires follow up studies to determine impact of an action and then correct the action if it is found to not meet the criteria for crab to enter the fishery or that fishing safety is impaired. Fishing Safety cannot be determined by a desktop computer in an inland office, but field tested under actual fishing conditions by real fishermen that survive to report on the conditions they find in the critical winter months of December, January, and February where the real field testing is done.

Corps Response: The Corps will continually consider management options as information and monitoring occurs; the Corps will implement adaptive management principles at the proposed sites.

- t) Human health and SAFETY must be strictly adhered to with the mound induced wave climate maintained well below the Navigational Safety guideline of 10% or less maximum wave height increase over pre-disposal conditions within any given disposal site in the nearshore network including the SWS. Adequate safeguards still need to be reviewed and approved that pass peer review by qualified investigators outside of the AUP process.

Corps Response: Navigational safety is addressed in Section 2.4 – Proposed Action. Additionally, the Coast Guard publishes local notice to mariners weekly that outlines dredging and disposal operations that will be occurring.

- u) A bathymetry grid of mound height vs. wave amplification at specific water depths needs to be constructed and field tested (suggested sample grid type previously submitted). CRCFA has requested this simple guide on numerous occasions using an agreed to model by the LCSG technical committee – Bousse 3D suggested – STWAVE is not the accepted wave model for this grid as the larger longer period wave mound induced wave amplifications underestimate the amplification by up to 2 meters in marginal wave Navigational conditions. Example: ST output up to 12 feet. Alternate analysis Bousse 2or 3D 19 feet. Even a novice mariner will realize that a 19 foot breaker is detrimental to SAFE navigation and possesses a significant increase in RISK to small vessel navigation. Wave analysis must account for arrhythmic sea conditions for the higher end of a natural wave spectrum as the small vessel mariners do not navigate the average wave condition; they MUST navigate every wave including the highest, longest period, most powerful wave in the natural marine environment to be able to come home safely at the end of the day. Small recreational craft safety must also be considered.

Corps Response: The Coast Guard publishes local notice to mariners weekly that outlines dredging and disposal operations that will be occurring. The proposed action is outlined in Section 2 and the effects to the physical environment is described in Section 4.

- v) Safety is the #1 concern and must be the first issue resolved in a manner that without exception protects human life in both the navigational and fishing conditions that all too often greet the small vessel navigator with quite rude results. If the one foot maximum "if" is the critical word is to be applied successfully that safety requirement MUST meet field testing by the experience of the wintertime crab fleet operations without incident. To further minimize impact to the fishery both sites should be sized as small as possible to accept a maximum of 500,000 cy of sediment disposal per year on a 3 year rotational program that allows support ecology to recover before additional deposition occurs. The chicken foot design would allow faster recovery than internal side by side site configuration with reduced overall ecosystem impacts.

Corps Response: The use of the North Head Nearshore Site at this time has been removed from the proposed action. The Coast Guard publishes local notice to mariners weekly that outlines dredging and disposal operations that will be occurring. The proposed action is outlined in Section 2 and the effects to the physical environment is described in Section 4.

3) Northwest Environmental Advocates, email letter dated March 26, 2012.

- a) The public notice for the draft EA states that comments will be taken until March 30, 2012. Relying on the statement that the Corps "plan[s] to issue an updated environmental assessment" for this project, Northwest Environmental Advocates is not commenting on the admittedly inadequate EA that is currently out for public comment. NWEA interprets this statement by the Corps as not waiving the rights of any member of the public to comment on a future draft EA that the Corps plans to issue for this project. If we are incorrectly interpreting these Corps' statements, we ask that we be informed of our misinterpretation immediately and that, given the confusion caused by the agency's statements, the Corps extend the public comment period on the current draft EA by 30 days.

Corps Response: A response was sent to Northwest Environmental Advocates 26 March, 2012, indicating that the Corps would be reissuing a clarified draft EA open for public comment. The agency was informed of the second public notice upon posting of the second draft EA on 26 April 2012.

- 4) **U.S. Fish and Wildlife, letter dated March 29, 2012 and email dated March 30, 2012.**
- a) We [U.S. Fish and Wildlife] discovered it does not contain the most current information on the Western snowy plover (*Charadrius nivosus nivosus*) (plover). We request the Corps update the current siting information, and discuss the coordinated jurisdictional responsibilities of the plover with the Corps and Oregon Parks and Recreation Department's (OPRD) Habitat Conservation Plan (HCP) for the plover on Clatsop Spit. We also request the EA discuss the potential effects to the plover from the proposed action and include potential beneficial actions to enhance nesting opportunities for the plover through shoreline placement of dredge material. Update current information on the plover: As listed items a-f, as listed items a and b, and as listed, item a.

Corps Response: Sections 3.5.3 and 4.2.5 have been revised in response to this comment. There is no intertidal placement proposed at the South Jetty at this time. By placing clean sediment within the littoral cell, deposition and accretion of sand along Clatsop spit may create plover nesting habitat; Clatsop Spit is currently proposed as critical habitat for the species.

- 5) **Washington Department of Natural Resources, email dated March 23, 2012.**
- a) WDNR is a signatory on the Declaration of Cooperation for the MCR. Looking to the future, I'd like to work with you on any State authorizations that may be needed for these sites, at least on the Washington side.

Corps Response: Comment noted.

- 6) **Clatsop County Board of Commissioners, letter dated March 19, 2012.**
- a) The Board of Commissioners find the current draft environmental assessment to be deficient, and recommends that the Corps of Engineers to withdraw and rewrite the assessment to, among other matters:
- i) Recognize the cooperative process of the Lower Columbia Solutions Group and the Regional Sediment Management Plan;
 - ii) Recognize and honor the science developed through the Lower Columbia Solutions Group; and
 - iii) Express a firm commitment to Adaptive Management in relation to the proposed disposal sites, and to begin use of these sites only as informed by new research designed by the RSMP Technical Team and reviewed by the RSMP Management Team.

Corps Response: The EA has provided further clarification of the Regional Sediment Management Program, development of the Regional Sediment Management Plan, and the LCSG as discussed in Section 1.3.1, 1.4.4.2, and 1.4.5. This clarification provides the history and intent of the Regional Sediment Management Program. The added language better reflects the pressing need for a network of nearshore/intertidal dredged material placement sites.

- 7) **Pacific Northwest Waterways, letter dated March 16, 2012.**
- a) Supports the proposed project.

Corps Response: Comment noted.

- 8) **U.S. Fish and Wildlife, letter dated March 16, 2012.**
- a) The Service requests the Corps revised this Environmental Assessment. The EA fails to reflect the cooperative process agreed to in the Declaration of Cooperation [The Service has worked

closely with the Corps and other partners on this proposed project and signed a Declaration of Cooperation with the Corps on November 30 2011].

Corps Response: The Corps incorporated information gathered through the discussions at the LCSG meetings, workshops, and through the review of the public comments received during the two public notices of the EA. The Corps is actively engaged with the public and LCSG to ensure that this collaborative effort is continued.

- b) It is our understanding that the actions committed to on the grounds would only move forward utilizing the results of sound science, and beneficial nearshore disposal actions would be agreed to under an adaptive management program established by the adaptive management team, including the Corps. We recommend the Corps revise this EA to reflect the cooperative process, including a commitment to an adaptive management team approach as stated in the Declaration of Cooperation. We also request the Corps withdraw the coordinates of the proposed North Head Nearshore site, include in the EA the planned first-year and future continuing experimental research of a Before-After/Control-Impact (BACI) design to study the effects of disposal on Dungeness crab (*Cancer magister*), Pacific razor clams (*Siliqua patula*), benthic organisms, and fish. The Environmental Consequences section could be re-written to include the studies the Corps will be conducting this year and later in time (as described under the proposed action 2.4) in order to answer some of these uncertainties. For instance, one of the intended studies is to determine *in situ* the effects of disposal on Dungeness crabs.

Corps Response: See response to 8a. The Corps identified the adaptive management process and monitoring actions that will be undertaken in Section 2.4.1; other research and monitoring actions will be undertaken by other federal, state, local, and private entities. The Corps, through a cooperation agreement with NMFS, will conduct studies on crab motility and mortality during disposal undertaken during the 2012 dredging season. Information gathered during the 2012 will inform future actions.

- c) Alternatives including the proposed action, 2.2.2 North Head Nearshore Site, Page 12, 2nd paragraph: The coordinates for the North Head Nearshore site should be removed. The Service was not aware that the Corps would establish such a large area. We believe the actual coordinates should be selected in cooperation with the Adaptive Management Team. We prefer the Corps should approximate a rough size of a disposal area including a control site, and identify that the Adaptive Management Team will agree on a specific location which meets the needs for a maximum 500,000 cubic yards disposal, and targets an area known to meet minimum impacts to aquatic resources.

Corps Response: The use of the North Head Nearshore Site at this time has been removed from the proposed action.

- d) Alternatives not selected for further evaluation, 2.3.2 Pump-off disposal method, page 14, 1st paragraph: We believe the “rainbow spray” method suggested by one of our team members is a viable alternative and should not be dismissed from the EA as a method of disposal. Although the Portland District Corps has not used this technique, and it may be more costly, this method may prove to be the best way to minimize effects on benthic species and fish.

Corps Response: The Corps recognizes the “rainbow spray” method and determined it is not a viable option at this time. Rainbow spray is a relatively new method of disposal. Disposal via

dispersed aerial spray has not been evaluated for dispersed movement of sediment through the water and air column and the impact to aquatic species is unknown.

- e) 2.4 Proposed Action, 2.4.1 Adaptive Management Approach, page 16, 2nd paragraph: The EA indicates the disposal by a hopper dredge will be able to deposit a thin layer or “maximum thickness” of 12 cm (4.7 inches). This thin disposal layer is assumed to be deployable and will mainly be implemented to protect Dungeness crab. Although this layer of thickness has been modeled, it has not been implemented by the Portland District Corps. We suggest the EA discusses how the Corps will implement an adaptive management strategy to modify if necessary their disposal operations. We believe the Corps needs to determine if disposal operations can maintain a thin disposal layer, and whether this layer does minimize adverse impacts to Dungeness crab.

Corps Response: Through the 2005 pilot study conducted at the South Jetty Nearshore site, the depositional depth of the dredged material footprint was estimated to average from 2.03 to 2.69 inches (SAIC). Frequent bathymetry monitoring will be undertaken throughout the course of the season. Adaptive management strategies and monitoring of impacts to biological resources are discussed in 2.4.1.

- f) Environmental Consequences, 4.2 Fish and Wildlife, 4.2.1 Aquatic Resources 4.2.1.1. Fish, page 33, 1st paragraph: We request the EA discuss the potential effects of dredge disposal on non-ESA listed benthic fish such as soles and halibut (*Pleuronectidae*), and Pacific sand lance (*Ammodytes hexapterus*). Sand lance are known to be an important main prey item for the marbled murrelet (*Brachyramphus marmoratus*), a threatened species listed under the Endangered Species Act. As with Dungeness crab, it is unknown if the thin disposal layer of dredged material will be thin enough to minimize adverse effects to these benthic organisms.

Corps Response: Consequences to fish and benthic species have been assessed in Section 4. It is expected that benthic fish will avoid the general vicinity during disposal. The Biological Opinion assesses the effect to Essential Fish Habitat. Impacts to crab are also discussed in Section 4.

- g) Environmental Consequences, 4.2.4. ESA-listed Species under NMFS Jurisdiction, 4.2.4.1. Anadromous Salmonids, page 35, 3rd paragraph: The EA states that disposal of dredged material at the nearshore sites will result in the burying of benthic organisms found below the hopper dredge zone, and that benthic organisms will rapidly recolonize the area buried within the dispersal zone after the action occurs. We believe that recolonization probably occurs over time, but we do not know how long it takes. We believe the Corps needs to clarify that this statement is only an assumption which needs further evaluation.

Corps Response: Similar studies have been conducted to assess recolonization rates after dredged material placement and have found that benthic organisms do recolonize the area of placed dredged material. (Wilson, Fredette, et al. 2008; Wilber, Clarke, and Rees 2006)

- 9) Environmental Consequences, 4.2.5. ESA-listed Species under USFWS Jurisdiction. Page 37, 2nd paragraph: Please correct the effect determination for marbled murrelet from “no effect” to “not likely to adversely affect.” This proposed action is covered under the Columbia River Channel Operations and Maintenance, Mouth of the Columbia River to Bonneville Dam (USFWS Number: 13420-2010-I-0165) a letter of concurrence.

Corps Response: This section was revised in response to this comment.

10) Lower Columbia Alliance for Sustainable Fisheries, letter dated March 30, 2012.

- a) [The Lower Columbia Alliance for Sustainable Fisheries] respectfully asks that the Corps work closely with the Lower Columbia Solutions Group regarding dredge spoils sites at the mouth of the Columbia.

Corps Response: The Corps incorporated information gathered through discussions at the LCSG meetings, workshops, and through the review of the public comments received during the two public notices of the EA. The final proposed action reflects requests for more information on the North Head Nearshore Site. The Corps continues to be an active participant on the LCSG.

- b) With each additional closed to fishing area, adjustments have to be made by our commercial and sport fleets. Usually in the form of taking more chances, thereby working less safe. Home and boat mortgages don't go away when more area to fish is taken away. We are beginning to work on mitigation for any more area closures, however not getting a lot of cooperation, so far. It is our understanding that dredge spoils areas off the Columbia may become unsafe. That is totally unacceptable to our Alliance. We would hope the Corps would keep these areas a safe place to fish and transit.

Corps Response: No fishing areas will be closed. Use of the proposed site will be monitored and managed to avoid impacts to the wave climate.

11) Port of Portland, letter dated March 27, 2012.

- a) Supports the proposed project.

Corps Response: Comment noted.

12) Environmental Protection Agency, letter dated April 3, 2012 and email dated April 4, 2012.

- a) The purpose and need section of the EA is sufficiently broad to allow analysis of an array of alternatives broad enough to incorporate the goals of MCR Regional Sediment Management Plan (RSM plan). However, the alternative presented in the EA does not appear to allow flexibility to adopt the adaptive management strategy envisioned in the RSM plan, nor does it allow monitoring studies being contemplated for the 2012 season and beyond to inform development and revision of future site use and management options.

Corps Response: Section 2.4.1 outlines the Adaptive Management strategies that the Corps will be employ. Additionally, the RSM Program guides the trajectory of the MCR dredging program. The Corps will conduct monitoring studies as defined in Section 2.4.1. The results of the monitoring will be used to guide future use of the sites.

- b) We also recognize the inherent constraints related to the use of two hopper dredge, as you have discussed in the EA. Accordingly, we recommend that the revised EA consider development of site and management options for the preferred alternative which include the following:
 - i) Phased implementation of site use, pending the results of monitoring studies;
 - ii) Allowance for flexible disposal quantities of material each year at one or more of the three proposed sites, based upon the results of monitoring studies;
 - iii) Allow flexibility in determining the site boundary of the North Head Nearshore site, ie., use of a smaller site if monitoring data warrants;

- iv) Options for the utilization of a several different site prioritization scenarios, dependent on the results of future monitoring studies and future bathymetric data; Options for the development of other disposal sites in the future if the need arises and a practical disposal site is identified.

Corps Response: The Corps will continually consider management options as information and monitoring occurs; the Corps will implement adaptive management principles at the proposed sites.

- c) Several specific comments are noted below:
 - i) Pg. 5; first paragraph, line 7: “While only EPA designated disposal sites... are required to be in the Annual Use Plan (AUP), the Corps will include all disposal sites...”. Add the following at the end of this paragraph: “The AUP is written by the Corps for approval by EPA.”
 - ii) Pg. 5 second paragraph: While the principal goal of the AUP is correctly stated – to avoid mounding which could result in wave amplification – it should be mentioned that the SMMP has five Site Management Objectives:
 - (1) Control mounding
 - (2) Minimize impacts to marine resources to the extent practicable
 - (3) Minimize interference with other uses of the ocean
 - (4) Beneficially use dredged material when practical, and
 - (5) Safe and efficient dredged operations
 - iii) Pg. 8 Section 2.1.2.2: A link to the document entitled “The Southwest Washington Littoral Drift Restoration EA” (Corps 2008a) should be provided.

Corps Response: Comment noted. “The Southwest Washington Littoral Drift Restoration EA” (2008a, Corps) will be provided upon request.

13) Individual 1, email dated March 30, 2012.

- a) The cancellation of public meetings while maintaining the original schedule for comment and approval provides an inadequate public involvement process.

Corps Response: The Corps issued a second draft EA and held a public meeting for 2 May 2012, in Warrenton, Oregon. This meeting was attended by over 20 members of the public. Comments received at this meeting are discussed in the second set of comment reviews.

- b) The Beneficial Use Standards as developed by the Lower Columbia River Solutions Group provides a much tighter protocol for monitoring the effects of the proposed dumping methods and the resulting impacts on both the crab resources and navigational in these areas.

Corps Response: The Corps is not aware of Beneficial Use Standards developed by the LCSG.

14) Individual 2, email dated March 30, 2012.

- a) Former collaborative agreements with Lower Columbia Solutions Group should be honored.

Corps Response: The Corps incorporated information gathered through the discussions at the LCSG meetings, workshops, and through the review of the public comments received during the two public notices of the EA. The final proposed action reflects requests for more information on the North Head Nearshore Site. The Corps continues to be an active participant on the LCSG.

- b) As I understand current plans there is not enough certainty that sea-life including crabs will not be damaged by deposits over one foot in depth.

Corps Response: Effects to crabs are discussed in Section 4.2.1.2.

Second set of comments received during the 15-day public notice posting period April 24 to May 8 2012.

1) **Pacific County Marine Resource Committee, letter dated May 7, 2012.**

- a) The NEPA process must have a minimum, one public meeting.

Corps Response: The Corps held a public meeting on 2 May 2012, in Warrenton, Oregon. This meeting was attended by approximately 20 members of the public. Comments received during this meeting are detailed at the end of this comment section.

- b) The process should have incorporated the Water Quality and CZM state certifications at the public meetings as well.

Corps Response: The review of the Clean Water Act and the Coastal Zone Management Act is covered in Section 6.3 and 6.4. Additionally, at the public meeting held on 2 May 2012, the Corps declared their intent to withdraw the Water Quality Certification (WQC) and Coastal Zone Management Act Consistency Determination (CZMA CD) for the North Head Nearshore Site, both applications through the Washington State Department of Ecology. The North Head Nearshore Site WQC and CZMA CD were withdrawn.

- c) Public comments need to be adequately addressed and incorporated into the EA before a FONSI is declared.

Corps Response: The public comments received on the EA are addressed in this chapter (Chapter 5) of this final EA.

- d) No net loss of natural resources and use was not addressed.

Corps Response: The use of the North Head Nearshore site has been removed from the proposed action. The preferred alternative would have some impacts to both beneficial and adverse to natural and economic resources. Adverse impacts would be minimized as noted in response to item (2) (s) of this chapter.

- e) Compensatory replacement mitigation for unavoidable impacts was not addressed associated with crab mortality, burial of habitat, or loss of use of the areas.

Corps Response: The disposal at the South Jetty Intertidal Site will only occur after the close of the crabbing season. During dredging operations, all dredged and disposal placement areas remains accessible. Effects to crabs are discussed in Section 4.2.1.2.

- f) The North Head Site must be moved out of fishing grounds that are irreplaceable to the fleet further to the north out of the highest used area of the crab fishery.

Corps Response: The use of the North Head Nearshore Site at this time has been removed from the proposed action.

- g) There is only one alternative presented. No action, Clatsop Beach, and Rainbow spray must be part of the process moving forward.

Corps Response: Section 2.3 details the alternative identification process.

- h) The EA does not connect the nearshore disposal to measurable effects on the beach to impact erosion.

Corps Response: Section 4.1 addresses this comment.

- i) Fails any discussion of Coastal Sediment Rights that have been terminated by federal actions...

Corps Response: The Corps is not aware of ‘Coastal Sediment Rights’. The impacts are addressed in Section 4.

- j) Both the South Jetty and North Head Sites needs further evaluation and consideration prior to inclusion into the network of disposal sites for the same reason that the Corps removed the Clatsop Beach Site from consideration.

Corps Response: The Corps assessed the impacts on the South Jetty Nearshore site and updated the action in this revised and final EA. The use of the North Head Nearshore Site at this time has been removed from the proposed action.

- k) A creeping bathymetric baseline is problematic to safety risk at the nearshore site.

Corps Response: Through the pilot study conducted at the South Jetty Nearshore site, it was found that the depositional depth of the dredged material footprint was estimated to average from 2.03 to 2.69 inches (SAIC). Frequent bathymetry monitoring will be undertaken throughout the course of the season. Adaptive management strategies and monitoring of impacts to bathymetry and biological resources are discussed in 2.4.1.

- l) Disposal at the Nearshore sites need to be timed to miss the crab in soft-shelled condition.

Corps Response: In order to address the concerns of the Columbia River Crab Fishermen’s Association posed at the 4 January 2012 LCSG meeting, the use of the South Jetty Nearshore site would be limited by site management provisions that only allow material placement after August 15, when the crab season in Oregon ends and the crab pots are removed from the water. It is not feasible or safe for the dredges to operate at the MCR during the high-energy wave events that occur from late fall to early summer.

- m) The Annual Use Plan needs Lower Columbia Solutions Group oversight on an annual basis and must be addressed successfully each year before dredging begins.

Corps Response: Based on pre-season bathymetric surveys, the Corps incorporates adaptive management principles to develop the AUP for the MPRSA 102 Sites. The intent of the AUP is to provide a comprehensive annual forecast of the disposal network use at MCR. The Corps also includes information about the CWA 404 sites (the 404 sites are authorized by the Clean Water Act). The AUP is submitted to EPA for approval. The AUP is made available to the LCSG.

- n) Direct beach placement of sediments is the only method to guarantee the best use of dredge material as support by all the scientists at the 2007 LCSG scientific forum at Cape Disappointment.

Corps Response: A link to the information presented at the LCSG scientific forum as follows: http://www.lowercolumbiasolutions.org/index.php?option=com_content&task=view&id=28&Itemid=45. A review of the panel discussion points indicate that there were a variety of solutions addressing coastal erosion presented. Panel 1 discussion notes list potential recommendations of proposing a candidate disposal site off North Head at depths of 40 ft. Panel 2 discussion points declare that placement of all material intended for the Deep Water Site directly on Benson Beach wouldn't necessarily stop its erosion. Panel 2 further notes that nearshore dynamics are dominated by sand bar formation approximately at 8 m deep.

2) Lower Columbia Solutions Group, e-mail dated May 8, 2012.

- a) Ensuring navigational safety should be integrated as a Purpose and Need.

Corps Response: Navigational safety is addressed in Section 2.4 – Proposed Action.

- b) In Section 1.3, recognize the RSMP as a LCSG product in which the Corps participated.

Corps Response: Section 1.3 is the Regional Sediment Management Program, the national policy guideline driving the trajectory for the MCR's dredging operations and maintenance program. In Section 1.4.4.2, it is recognized that the Corps have worked with stakeholders, state agencies, and other federal agencies to develop regional sediment management objects. These objectives were detailed in the *Mouth of Columbia River Regional Sediment Management Plan (LCSG 2011)*.

- c) The discussion in Section 1.4.4.2 regarding LCSG and the AUP should be more front and center in the EA...

Corps Response: comment noted.

- d) Selection criteria in Section 2.1.3 should include consistency with RSMP.

Corps Response: The RSM Plan is taken into consideration as directed by the RSM Program.

- e) The rationale for dismissal of rainbow spraying as an alternative (section 2.1.3) does not hold up when everything is really an experiment at this point. Just why it would require additional environmental analysis is not clear.

Corps Response: The Corps recognizes the "rainbow spray" method and determined it is not a viable option at this time. Rainbow spray is a relatively new method of disposal. Disposal via dispersed aerial spray has not been evaluated for dispersed movement of sediment through the water and air column and the impact to aquatic species is unknown.

- f) In section 2.2.1, the bathymetric surveys for the South Jetty site as described. It would be beneficial to reference that other monitoring (e.g., effects on focal species) is to be developed.

Corps Response: Section 2.4.1 describes monitoring actions.

- g) In describing the adaptive management approach in Section 2.4.1, no mention is made that any or all of the sites may not be used if the potential for adverse effects to navigation safety or biological resources is determined or if funding is unavailable for adequate monitoring of effects.

Corps Response: This statement is addressed in Section 2.4.1.

- h) In Section 2.2.2, identify the North Head site as a general area for future study as a beneficial use site, with its specific location to be determined. Indicate that no state water quality certification is being sought at this time but that baseline data will be collected as funding allows.

Corps Response: The use of the North Head Nearshore Site at this time has been removed from the proposed action. However, it is indicated in Section 2.4.1 that a 2- by 2-mile area north of the North Jetty on Peacock Spit is included for informational bathymetric survey conducted by the Corps.

3) **Columbia River Crab Fisherman's Association, letter dated May 6, 2012.**

- a) Direct beach placement will have the only measurable impact; all other indirect sediment use is a total waste of time and the sand resource which is already an irreplaceable commodity to be hoarded on the beach as if it were gold; it is, we just have not given it the value it deserves.

Corps Response: The Corps is seeking to retain sediment within the littoral cell. The Corps has stated their intent for placement of dredged material in Section 1.2.

- b) Opportunity for public input was curtailed by cancelation and failure to reschedule open public hearings on the original draft EA shortchanging public participation and then moving on to a final EA with truncated public input was an abuse of the NEPA process that removed input of concerned citizens.

Corps Response: The Corps issued a second draft EA and held a public meeting for 2 May 2012, in Warrenton, Oregon. Over 20 members of the public attended this meeting. Comments received at this meeting are discussed in the second set of comment reviews.

- c) Our second objection is that the Corps failed to involve their collaborative partners at the LCSG in a meaningful way in revision of the first draft and after it became obvious that the 1st draft eliminated all the hard work and collaboration to establish an MCR RSM program that was not adequately reflected in the original EA that the LCSG was again pushed out of the re-draft of the EA even though there is NEPA precedence for such a collaborative action.

Corps Response: LCSG comments were addressed in this EA, see review of public comment number 2.

- d) This NEPA process needs a proper public hearing process that actually incorporates the public comments in such a way that the comments are addressed and not simply "noted". Adequate public notice time was not available to get the notice in the local newspaper; the notice did not come out until April 24, day after Chinook Observer publication, and could not be put in the paper until the day of the event; May 2nd - inadequate.

Corps Response: The Corps placed notices with the following media sources for the first and second posting of the draft EA. The EA was widely distributed for review.

"KQCB-FM

Associated Press
Bandon Western World
Cannon Beach Gazette
Chinook Observer
Coquille Valley Sentinel
Corvallis Gazette-Times
Curry Coastal Pilot
Curry County Reporter
Daily Astorian
Forest Grove News Times
Headlight-Herald
KAST-AM
KBBR-AM
KSHR-FM
KJMX-FM
KWRO-AM
KHSN-AM
KBCH-AM
KBVR-FM
KCBY-TV
KCRF-FM
KMUN-FM
KNPT-AM [Newstalk 1310]
KPPT-FM [100.7 Boss FM]
KPTV-TV [Fox 12 Oregon]
KRCW-TV [NW 32 TV]
KSHL-FM [K-Shell Country]
KSHR-FM [K-Shore]
KSND-FM
KTIL-AM [The Alternative]

KTIL-FM [KTIL Country 95.9]
KUIK-AM [Westside Talk Radio]
KWDP-AM
KYTE-FM [KYTE 102.7]
Linfield Review
Moron Patrol; KGBR-FM [The Bridge]
Myrtle Point Herald
Newport News-Times
North Coast Citizen
Polk County Itemizer-Observer
Port Orford News
Seaside Signal
Siuslaw News
SK Media
South County Spotlight
South Lincoln County News
The Chronicle
The Clatskanie Chief
The Creswell Chronicle
The Daily Barometer
The Daily News
The Hillsboro Argus
The Newberg Graphic
The Oregonian
The Times-Journal
The Wahkiakum County Eagle
Water Resources Research
www.Salem-News.com
Yamhill valley News-Register

Tillamook Today

- e) The May 2nd “informational” meeting at the Warrenton Community Center contained a lot of the public comments directed at the North Head Site. Without exception, comments were highly critical of dumping any sediment in the proposed high value fishing area. The questions about how much impact to the local economy was the nearshore disposals going to do were not answered. In general the public that was at the question & answer meeting was not satisfied by the Corps responses to questions.

Corps Response: The use of the North Head Nearshore Site at this time has been removed from the proposed action. The Corps answered questions with the most currently available data and information.

- f) The discussion about the thickness of individual disposal events reaching 8 to 12” thick was a very serious red flag that requires field testing [actual network of physical measuring sticks read and recorded by EPA divers] this summer since this is an excessive dump thickness not ever placed on the discussion table prior to the Warrenton meeting **invalidating all prior actions in the process of nearshore disposal**. Enhanced nearshore dumping must be in the range of 4” or less. The second red flag was emptying the dredge in as little as 8 minutes during thin layer disposal. The prior 2005 30,000 cy experiment was also not represented very well – the SPI cameras only penetrated the freshly dumped sediment about 2” and failed to establish any depth of accumulation. Also, all of the electronic depth measurements utilized hardware that has a 7 – 9-cm (~3”) margin of error making it almost impossible to measure the height of the individual disposal event that must only be in the range of 3 to 4” thick but at the Warrenton meeting almost tripled to and astounding and unrealistic 10” accumulation for a single dump event.

Corps Response: The proposed action is stated in Section 2.4.

- g) And the 401/4 and CZM certifications must be attached to the Annual Use Plan with oversight by the issuing agencies with a public review period as well, meaning that the AUP must be issued early enough in the year to accommodate public notices as well.

Corps Response: The Corps compliance with relevant laws and regulations are addressed in Section 6. The preparation and approval of the AUP is a separate process from NEPA.

- h) The **North Head Site** if to exist at all, MUST be moved north of 46 19 to avoid the heart of the local crab fishery; current location is **TOTALLY UNACCEPTABLE** on multiple levels.

Corps Response: The use of the North Head Nearshore Site at this time has been removed from the proposed action.

- i) CRCFA does have one problem with the Benson Beach Site that needs to be addressed. The intertidal site does not extend to the north jetty to close the breach that has had direct beach placement on 3 separate occasions already. This is a deficiency that must be corrected to better protect the jetty in the future. The Benson Beach Site needs to be extended south to the North Jetty.

Corps Response: Actions undertaken at Benson Beach adjacent to the North Jetty is authorized under the operation and maintenance of the North Jetty.

- j) Even this 2nd EA action does not adequately address the NEED of this RSM project to address the coastal sediment starvation problem or adequately reflect the recent increase in wave climate in the area that appear to be a long term trend identified by USACE analysis.

Corps Response: The Corps is continually assessing coastal sediment movement, information, and project opportunities as guided by the RSM Program.

- k) The feds are responsible for this problem and the feds need to fix it; not a minimalist “least cost” bandage a mile or more offshore where the sediment contribution to the coastal erosion problem is immeasurable. The pending breach at the base of the South Jetty is real and increasing annually which needs to be addressed directly.

Corps Response: Operations and maintenance of the South Jetty is not included in this EA.

- l) Wherever the North Head Site is placed compensatory mitigation for loss of natural resource production and loss of use of the area will still be necessary. **Mitigation is not currently addressed in this EA** and required by Washington law.

Corps Response: The use of the North Head Nearshore Site has been removed from the proposed action in this EA.

- m) Direct deposition thicknesses in the nearshore area can and must be measured as a part of the analysis to answer the pivotal question of how thin is thin enough.

Corps Response: The Corps is working with the LCSG to develop a monitoring plan.

- n) This basic concern is further heightened by the inclusion of the statement in the EA that, “The addition of material to the substrate will help maintain and protect the structural integrity of the jetty by reducing wave energy on the jetty.” OSU analyzed a maximum 4 foot mound in the South Jetty Site and concluded that a 4 foot mound was insufficient to reduce the wave climate on the South Jetty. No analysis was performed to indicate what mound height would actually reduce wave power sufficiently to prevent deteriorating the jetty; but that mound would have to be significantly higher than 4 feet. A mound higher than 4 feet will cause an unacceptable SAFETY RISK that must not be perpetrated on the small vessel navigator. Human life and safety must be protected, the increase in mound sufficient to lower the existing wave climate at the jetty would be deadly in the area

Corps Response: The intent is to reintroduce sediment to an area that has lost sediment over the years; thus reducing the continual loss of sediment, and the associated increase in depth/scour affecting the south jetty. It is expected that over time, active use of the South Jetty Nearshore Site would add more material to the nearshore area than is presently being lost; placement of sediment would not just reduce the loss of sediment, but add sediment to the system.

- o) **NO MONITORING NO DUMPING.** The USACE comments that monitoring crab impacts requires “extra funding” is an alarm bell that is still ringing in the ears of CRCFA.

Corps Response: The Corps incorporated information gathered through the discussions gathered at the LCSG meetings, workshops, and through the review of the public comments received during the two public notices of the EA. The Corps is actively engaged with the public to ensure that this collaborative effort is continued.

- p) **NO HARM or NO DUMP, NO EXCEPTION!** This qualifier is not spelled out in this EA and is necessary requirement to move sediments into these NEW sites

Corps Response: The Corps is complying with all applicable laws and regulations as covered in Section 6. The Corps assessed the impacts of the proposed action and has incorporated measures to minimize adverse effects.

- q) Recent contractor bids at Benson Beach in 2010 were very close to the existing haul expenses to the DWS and cheaper than the cost if the prior site designation process would not have manipulated the data that caused additional harm to the crab fleet and illicitly shortened the haul

distance reducing costs by cutting deeply into the local coastal economy which seems to have no limits in this NED analysis as was brought out in the May 2nd, 2012 “informational meeting” at the Warrenton Community Center that was not recorded and all the comments will be lost to future reference as if they were not even made, let alone addressed in any meaningful manner moving forward.

Corps Response: The Corps used an approved method to determine the life cycle costs of the project. The cost benefit analysis conducted for the dredging operations reflects the true cost of the dredging program for the MCR. Any comments received via email or written at the public meeting have been reviewed and addressed as applicable.

- r) Legally the Corps’ nearshore sites must meet CZMA consistency requirements of both Washington and Oregon State and local laws that are compliant with Goal 19 and Pacific County SMP and Washington ecology WAC’s and state RCW’s associated with ocean disposal

Corps Response: The Corps is complying the Coastal Zone Management Act (CZMA) and with all applicable laws and regulations as covered in Section 6.

- s) **This grid Mound/Bathymetry/10% grid still needs to be developed and adhered to**, to insure SAFETY of all coastal mariners. Mounding to 6 or 7’ in 45 feet of water is serious abuse of the 10% wave amplification standard and an unacceptable practice that EPA oversight has not corrected; a serious and negligent failure of the AUP process that needs to be corrected. CRCFA has always, without faltering attempted to remove ALL dumping spoils on soft-shelled crab and have time and again deplored the dumping of spoils on the outer half of the SWS after August 15th soft shelled protective biowindow was unilaterally opened by an illicit AUP action without any public review

Corps Response: The use of the South Jetty Nearshore Site will be included as information in the AUP. The regulation of the 404 sites is not managed by the AUP but is included in the AUP in order to provide complete description of disposal action.

- t) CRCFA expects to be directly notified of any state certifications in both Oregon and Washington and given sufficient comment period to respond with additional comments.

Corps Response: The LCSG, a group of which CRCFA is a member, was notified by the Corps when these public notice periods opened for all applicable permits.

- 4) **Individual 3, comment form received during public information meeting held May 2, 2012.**
 - a) I would like to see the disposal site for nearshore sand be on Benson Beach.

Corps Response: Benson Beach is one of the two currently proposed disposal sites in this EA.

- b) There’s no doubt that you [the Corps] could put a permanent pipe through the N. Jetty and put a considerable amount on the beach area.

Corps Response: Any modification to the jetty beyond operation and maintenance must be authorized for funding appropriations for that specific project.

- c) Go nearshore north of the Northhead Light (we call that area – the mud hole). Definitely don't put it offshore of Benson Beach. This whole area gets lots of shoaling from the site E dumping [shallow water site].

Corps Response: The use of the North Head Nearshore Site at this time has been removed from the proposed action.

- d) The crab industry has to have some solid device (black box) to verify that your [the Corps] dumping is done with a guarantee that it won't be any deeper than 4 – 5 inches.

Corps Response: Data collected during the monitoring will be made available to the public. The bathymetric surveys will be posted at: <http://www.nwp.usace.army.mil/Missions/Navigation.aspx>

The public notice for both draft EAs were sent to the following agencies and groups:

U.S. Fish and Wildlife Service	Port of Ilwaco
National Marine Fisheries Service	Port of Longview
U.S. Environmental Protection Agency	Port of Portland
U.S. Coast Guard	Port of Vancouver
Confederated Tribes of Siletz	American Rivers
Confederated Tribes of the Grande Ronde	Columbia River Bar Pilots Columbia River
Cowlitz Indian Tribe	Business Alliance
Clatsop County, Oregon	Columbia River Channel Coalition
Oregon State Historic Preservation Office	Columbia River Estuary Study Taskforce
Oregon Department of Land Conservation and Development	Columbia River Crab Fishermen's Association
Oregon Department of State Lands	Columbia River Fishermen's Protective Union
Oregon Department of Fish and Wildlife	Columbia River Inter-Tribal Fish Commission
Oregon Department of Parks and Recreation	Lower Columbia River Estuary Partnership
Oregon Department of Environmental Quality	Lower Columbia Ports Coalition
Oregon Department of Geology and Mineral Industries	Northwest Environmental Advocates
Oregon Department of Fish and Wildlife	Oregon State University
State of Oregon Governor's Office	Oregon Natural Resources Council
Pacific County, Washington	Oregon Charter Boat Association
Washington State Historic Preservation Office	Oregon Sea Grant
Washington Department of Ecology	Oregon Coastal Management Program
Washington Department of Fish and Wildlife	Pacific States Marine Fish Commission
Washington Department of Natural Resources	Pacific Northwest Waterways
State of Washington Governor's Office	Portland Audubon Society
Port of Astoria	Salmon for All
Port of Chinook	Save Our Wild Salmon
	Washington Public Ports Association
	Wahkiakum Port District #1 and #2

6. COMPLIANCE WITH LAWS AND REGULATIONS

6.1. NATIONAL ENVIRONMENTAL POLICY ACT

This Act requires that all agencies of the Federal Government conduct an appropriate environmental review before taking any action. This Environmental Assessment satisfies the requirements of the National Environmental Policy Act of 1969, as amended.

6.2. CLEAN AIR ACT

This Act established a comprehensive program for improving and maintaining air quality throughout the United States. Its goals are achieved through permitting of stationary sources, restricting the emission of toxic substances from stationary and mobile sources, and establishing National Ambient Air Quality Standards. Title IV of the Act includes provisions for complying with noise pollution standards. As discussed in the EA, there would be an intermittent, short-term reduction in air quality during disposal operations due to emissions from dredges and equipment that may be used for onshore disposal. There also would be an intermittent, short-term increase in noise levels during disposal operations. No permanent, adverse air quality or noise impacts are expected from the proposed action.

6.3. CLEAN WATER ACT

The Clean Water Act governs the release of pollutants into waterways.

Section 401– Requires certification from the state that a discharge to waters of the U.S. in that state will not violate the states’ water quality standards. EPA retains jurisdiction in limited cases. Oregon Department of Environmental Quality (DEQ) posted the Water Quality Certificate on Public Notice for the use of the South Jetty Nearshore Site. The Corps received the approved DEQ Water Quality Certificate 12 July 2012. Benson Beach intertidal site has an existing Washington Department of Ecology (DOE) Water Quality Certificate in place.

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 program. A 1200-C National Pollutant Discharge Elimination System (Section 402) permit was obtained for this construction project. A NPDES permit is in place for any stormwater discharges during berm building actions undertaken at the Benson Beach Intertidal Site.

Section 404 – Prohibits the discharge of dredge or fill material into navigable waters without a permit from the Corps of Engineers. 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. Only when there is no practicable alternative will any discharge of fill material occur. A 404(b)1 analysis has been conducted for the proposed project.

6.4. COASTAL ZONE MANAGEMENT ACT

This Act requires federal agencies to comply with the federal consistency requirement of the Coastal Zone Management Act. Oregon Department of Land Conservation and Development (DLCD) reviewed the consistency determination for the South Jetty Nearshore site. DLCD concurred with the consistency

determination on 12 July 2012. Benson Beach Intertidal site remains consistent with the current consistency determination issued by DOE.

6.5. ENDANGERED SPECIES ACT

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. An Amendment to the *Biological Assessment for Anadromous Salmonids, Green Sturgeon, Pacific Eulachon, Marine Mammals & Marine Turtles for Columbia River Channel Operations and Maintenance* (April 2011) was prepared for the proposed action and submitted to NMFS. The Corps has determined that the proposed action of including the proposed nearshore and Benson Beach intertidal disposal sites into the MCR disposal network is not likely to jeopardize the ESA-listed anadromous salmonids, green sturgeon, Steller sea lions, marine whales, and marine turtles or their critical habitat. The NMFS issued a Biological Opinion 11 July 2012, as reviewed in section 4.2.4.

For USFWS listed species, the Corps determined that the proposed action would have no effect on short-tailed albatross, Columbian white-tailed deer, Oregon silverspot butterfly, western snowy plover, or bull trout.¹ The Corps determined that the proposed action would not likely adversely affect the USFWS listed species marbled murrelet. The proposed action is covered by the Columbia River Channel Operations and Maintenance, Mouth of the Columbia River to Bonneville Dam (USFWS Number: 13420-2010-I-0165) letter of concurrence.

6.6. FISH AND WILDLIFE COORDINATION ACT

This Act states that federal agencies involved in water resource development are to consult with the USFWS concerning proposed actions or plans. The proposed action has been coordinated with the USFWS in accordance with this Act.

6.7. MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT

The Sustainable Fisheries Act of 1996 amended the Magnuson-Stevens Act establishing requirements for essential fish habitat (EFH) for commercially important fish. Pursuant to the Magnuson-Stevens Act, an EFH consultation is necessary for the proposed action. Essential fish habitat is defined by the Act as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The estuary and the Pacific Ocean off of the MCR are designated as EFH for various groundfish and coastal pelagic and salmon species. The Corps determined that the proposed action may affect, but is not likely to adversely affect EFH. In its Biological Opinion, the NMFS set forth terms and conditions in order to minimize impacts of the proposed action on EFH.

6.8. MARINE MAMMAL PROTECTION ACT

This Act prohibits the take or harassment of marine mammals. It is possible that the proposed action could disturb the federally listed Steller sea lion and other pinnipeds with the movement of dredges through the MCR area as they dispose of material, but it is unlikely that the effects would rise to the level of harm or harassment. Impacts to this species were evaluated and are described in the BA submitted to

¹ Roberts, Kathy, email message to Gretchen Smith, January 24, 2012.

the NMFS and are discussed in this EA. No adverse impacts are expected to Steller sea lions from the proposed action. In its Biological Opinion, the NMFS set forth terms and conditions in order to minimize impacts of the proposed action on marine mammals in the project area.

6.9. MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

These acts require that migratory birds not be harmed or harassed. Under the Migratory Bird Treaty Act, “migratory birds” essentially include all birds native to the U.S. and the Act pertains to any time of the year, not just during migration. The Migratory Bird Conservation Act aims to protect game birds. The movement of dredges through the MCR area as they dispose of material could displace birds by causing flushing, altering flight patterns, or cause other behavioral changes; however, it is not expected that effects would rise to the level of harm or harassment.

6.10. NATURAL HISTORIC PRESERVATION ACT

Section 106 of this Act requires that federally assisted or federally permitted projects account for the potential effects on sites, districts, buildings, structures, or objects that are included in or eligible for inclusion in the National Register of Historic Places. The proposed action is being conducted in an area that is highly erosive and has previously been disturbed by MCR jetty construction and prior dredging and disposal. Portland District staff archaeologists have reviewed the proposed action and concluded that there would be no effect on historic properties as defined by this Act. The proposed action has been coordinated with the Washington and Oregon State Historic Preservation Offices in compliance with this Act, and they concurred with the no effect determination findings declared by District archaeological staff.

6.11. NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT

This Act provides for the protection of Native American (and Native Hawaiian) cultural items, established ownership and control of Native American cultural items, human remains, and associated funerary objects to Native Americans. It also establishes requirements for the treatment of Native American human remains and sacred or cultural objects found on federal land. This Act also provides for the protection, inventory, and repatriation of Native American cultural items, human remains, and associated funerary objects. There are no recorded historic properties within the immediate project area and the probability of locating human remains in this area is low. However, if human remains are discovered, the Corps and/or the Contractor will be responsible for following all requirements of the Act.

6.12. EXECUTIVE ORDER 12898, ENVIRONMENTAL JUSTICE

This Executive Order requires federal agencies to consider and minimize potential impacts on subsistence, low-income, or minority communities. Its goal is to ensure that no person or group of people shoulder a disproportionate share of the negative environmental impacts resulting from execution of domestic and foreign policy programs. The proposed action is not expected to disproportionately affect low income and/or minority populations, and is in compliance with this Executive Order.

6.13. EXECUTIVE ORDER 11988, FLOODPLAIN MANAGEMENT

The proposed action would not encourage development in, or alter any floodplain areas.

6.14. EXECUTIVE ORDER 11990, PROTECTION OF WETLANDS

The proposed action would not involve the destruction, loss or degradation of wetlands.

6.15. PRIME AND UNIQUE FARMLANDS

No prime or unique farmlands occur in the vicinity of the proposed action.

6.16. COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT AND RESOURCE CONSERVATION AND RECOVERY ACT

There is no indication that any hazardous, toxic, and radioactive wastes are in the vicinity of the MCR disposal network. Any presence of these types of wastes would be responded to within the requirements of the law and Corps' regulations and guidelines.

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