US Army Corps
of Engineers ®
Portland District

Yaquina Bay, Oregon
Ocean Dredged Material Disposal Sites Evaluation Study and Environmental Assessment

U.S. Army USACE of Engineers, Portland District

U.S. Environmental Protection Agency, Region 10

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PURPOSE AND NEED

This Ocean Dredged Material Disposal Site (ODMDS) Evaluation and Environmental Assessment has been jointly prepared by the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (EPA). The purpose of this evaluation is to provide documentation in support of final designation by EPA of two ODMDSs needed for long-term use by the authorized Yaquina Bay navigation projects. This evaluation will determine if the proposed North and South ODMDS offshore of Yaquina Bay, Oregon, fully meets all criteria and factors set forth in Parts 228.5 and 228.6 of Title 40 Code of Federal Regulations (CFR). These regulations were promulgated in accordance with the criteria set out in Sections 102 and 103 of the Marine Protection, Research and Sanctuaries Act of 1972. Further, this document is intended to provide sufficient information to determine compliance with the National Environmental Policy Act, the National Historic Preservation Act, the Coastal Zone Management Act, and Endangered Species Act. Use of the sites would be for disposal of material dredged for operation and maintenance of the federally authorized navigation project at Yaquina Bay, as well as through separate Section 103 permit evaluation for disposal of dredged material from other dredging projects.

The availability of ODMDSs in the vicinity of Yaquina Bay are necessary to maintain safe deep-draft navigation through authorized federal channels and permitted actions. The historic Interim and nearshore Section 103 site experienced mounding, generating a potentially hazardous navigation safety condition, and had limited site capacity to receive future dredge material disposals. Commercial shippers, crab fishermen, and the U.S. Coast Guard expressed concern over this situation to both the USACE and EPA. While the situation may not have constituted an imminent hazard to life and property, which would warrant an emergency, the EPA and USACE agreed that prudent management action was required in order to prevent any further adverse conditions from developing. Efforts were undertaken by the federal government to temporarily expand the historic Interim and nearshore Section 103 sites in 1998 and to manage distribution of the maintenance dredged material within the available site while seeking a more permanent management solution. The need for ocean dumping and implementation of a management solution by USACE and EPA were at a point where the ability to maintain the Yaquina Bay project was at risk. Unless the Yaquina Bay project can be maintained, continued commercial use of the existing navigation channels at their authorized depth would not be possible.

The rough seas encountered at the Yaquina Bay entrance preclude the safe and efficient operation of any dredge other than a hopper dredge. Upland disposal of dredged material from a hopper dredge operation is not economical due to the need to double handle the material and sufficient upland capacity is unavailable. Disposal of material dredged from Yaquina Bay, therefore, must occur at an in-water site.

While it is possible to dredge and transport material back into the estuary for disposal, there is a lack of suitable estuarine and upland disposal sites. Further, estuarine habitats are unique and far less extensive than are sandy nearshore oceanic habitats. Estuarine disposal would cause greater adverse environmental impacts than would ocean disposal.

Table B-1 in Appendix B provides dredged material volumes estimated for the Yaquina Bay federal navigation project from 1928 to 2010. Future estimated total disposal quantity for the long-term maintenance dredging of the navigation channel is expected to remain relatively constant.

Though the volume is expected to be minor compared to the federal dredging volumes, the designated sites may receive material dredged by non-USACE entities and disposed under specific permits issued by USACE. With the fundamental need for ocean dumping having been demonstrated, USACE and EPA had to consider the needed disposal capacity which influences the number and/or size of site(s). The USACE conducts their site capacity modeling based on a 20-year outlook (Appendix B).

Given their modeling results, two ocean disposal sites, the North ODMDS and South ODMDS, are proposed (Figure 1). Due to their size, disposal capacity was considered sufficient for approximately 20 years or more for each. These proposed sites replace the nearshore Section 103 Site in the government's preferred action for management of dredged material at Yaquina Bay. The need for designation of these sites pursuant to 40 CFR 227 Subpart C is considered demonstrated.

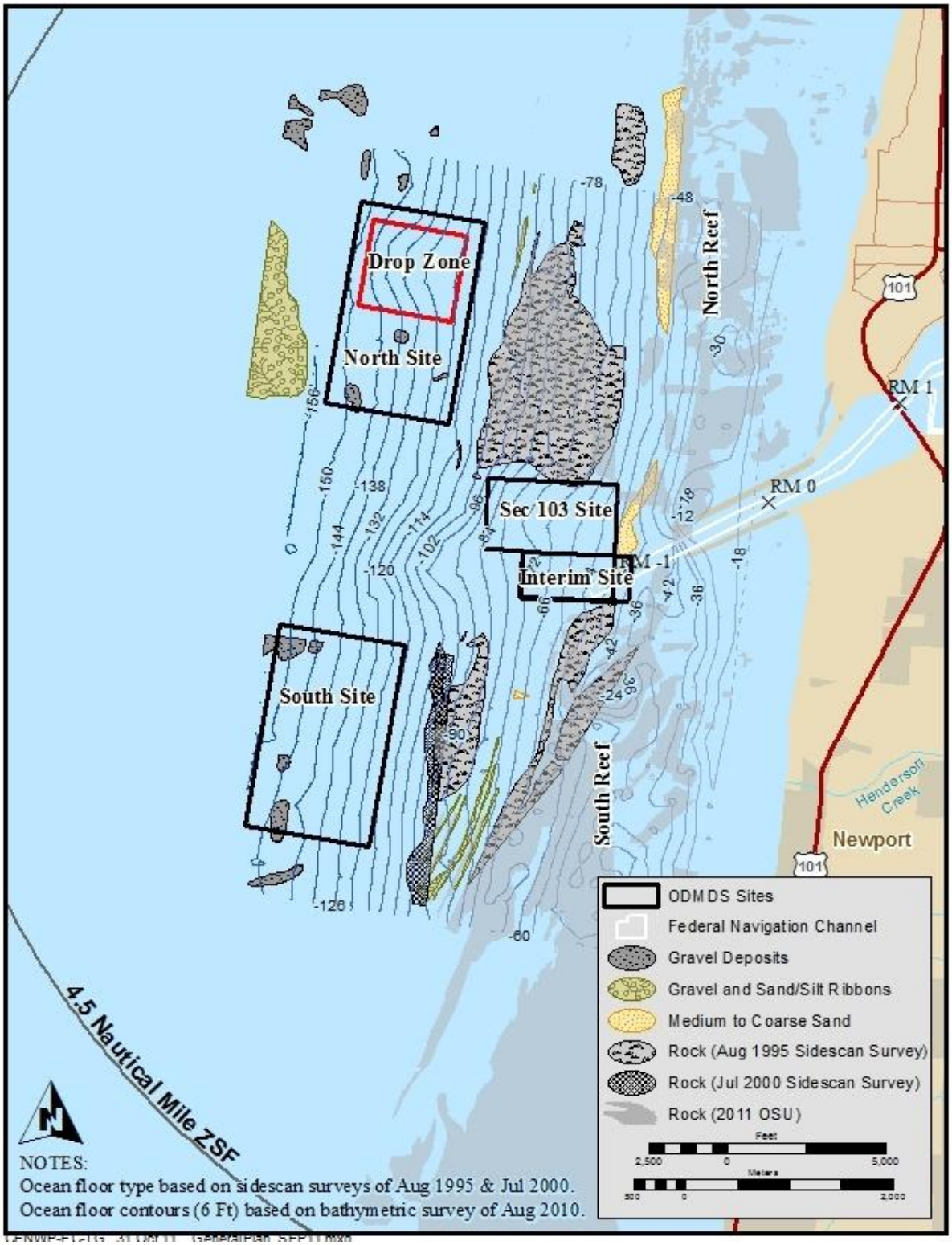
BACKGROUND

Statutory and Regulatory Requirements

The Marine Protection, Research and Sanctuaries Act of 1972, as amended (MPRSA), also known as the Ocean Dumping Act, was passed in recognition of the fact that the disposal of material into ocean waters could potentially result in unacceptable adverse environmental effects. Under Title I of the MPRSA, the EPA and USACE were assigned responsibility for developing and implementing regulatory programs to ensure that ocean disposal would not "... unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities."

The EPA administers and enforces the overall program for ocean disposal. Under Section 102 of the MPRSA, EPA in consultation with USACE established environmental criteria that are to be addressed before an ocean dredged material disposal permit can be granted. The USACE issues permits for the transportation of dredged material for the purpose of ocean disposal, after consultation with EPA, which are in compliance with these criteria. While USACE does not administratively issue itself a permit, the requirements that must be met before dredged material derived from USACE projects can be discharged into ocean waters are the same as those where a permit would be issued.

Figure 1. Proposed Yaquina North and South Ocean Disposal Sites



The MPRSA criteria (40 CFR, Part 228) states that final site designation under Section 102(c) must be based on environmental studies of each site and on historical knowledge of the impact of dredged material disposal on areas similar to such sites in physical, chemical, and biological characteristics. General criteria (40 CFR 228.5) and specific factors (40 CFR 228.6) that must be considered prior to site designation are described and evaluated in this evaluation. Related federal statutes applicable to the site designation process include the National Environmental Policy Act of 1969, as amended; the Coastal Zone Management Act of 1972 as amended; the National Historic Preservation Act and the Endangered Species Act of 1973, as amended. As required by Section 104(a)(3) of the MPRSA, ocean disposal of dredged material can occur only at a site that has been designated to receive dredged material. Pursuant to Section 102(c), the EPA has the responsibility for site designation. Section 103(b), while encouraging use of EPA-designated sites where feasible, does provide for alternative site selection by the USACE when a suitable EPA-designated site is not available. However, the same ocean dumping criteria (40 CFR 228.5-228.6) are used in the evaluation process that leads to alternative site selection and the EPA must concur with the selection.

An EPA-designated site requires a site management and monitoring plan. Use of the designated site is subject to any restrictions included in the management and monitoring plan and EPA's designation regulations. These restrictions are based on an in-depth evaluation of the site pursuant to the regulations (40 CFR 220-229) and potential disposal activity as well as public review and comment. Designation of an ODMDS in itself does not result in disposal of dredged material. A separate evaluation of the suitability of dredged material for ocean disposal must be undertaken for each proposed use of the site by either the USACE or non-USACE permit applicant. Typically, as in this case, this involves evaluation of the specific disposal activity under the Criteria, circulation of a *Public Notice* (which can include multiple years of use), and specific coordination with stakeholders as well as concurrence by the appropriate EPA Region.

Yaquina Bay Navigation

Yaquina River enters the Pacific Ocean near the city of Newport, Oregon, approximately 115 miles south of the Columbia River. Yaquina Bay is the fourth largest estuary in Oregon. The estuary is fed mainly by the Yaquina River, which drains 253 square miles and is 58.8 miles from its mouth to headwaters. The Portland District, USACE of Engineers has been responsible for maintenance of navigable waterways of the north Pacific coast since 1871. The need for improved navigation controls in the Yaquina Bay estuary began with the founding of a port city at Yaquina. Because of the navigation need, two rubble-mound jetties were constructed in 1896, and Congress authorized dredging in the bay in 1919. The federally authorized project includes jetties, groins, and river channel outside the scope of the present study.

The Yaquina Bay federal navigation project was authorized for the following purposes:

- Provide an entrance channel, which would allow the upriver channel to be fully utilized.
- Decrease tide-caused delays for commercial ships crossing the bar.
- Provide improved safety by reducing the possibility of commercial ship grounding and a channel that allows for compatible use by commercial and noncommercial vessels.
- Provide mooring facilities for small boats that take advantage of project facilities.

- Permit barge and small boat traffic upstream to river mile (RM) 14.
- Provide a harbor of refuge.

The federally authorized entrance channel at Yaquina extends from RM -1 to RM 4.4. Up to 370,000 cy of material is dredged from the entrance channel annually. Maximum dredge depth is -45 feet (RM -1 to RM 0), -32 feet (RM 0 to RM 2+20), and -20 feet (RM 2+20 to 4+20) as measured from MLLW, including advanced maintenance dredging.

The South Beach Marina access channel is approximately 2,035-feet long and runs from Yaquina RM 1 to the marina. Dredging will occur once every 5 to 8 years. Maximum dredge depth is -11 feet, as measured from MLLW, including 1 foot of advanced maintenance dredging. Up to 25,000 cy of material is removed per dredging effort.

The federal navigation channel is approximately 10 miles long and extends from RM 4 to 14, including Depot Slough; however, only Depot Slough is maintained. Dredging typically occurs once every 5 to 8 years. Maximum dredge depth is -12 feet, as measured from MLLW, including 2 feet of advanced maintenance dredging. A maximum of 100,000 cy of material is removed per dredging effort.

Historic Offshore Disposal (pre-1977)

Prior to the Interim Site receiving designation in 1977, the USACE had historically used the general area for dredged material disposal since at least 1916. Approximately 200,000 cubic yards (cy) annually were dredged annually from the project from 1919 to 1968 when the project was deepened to its present depth. USACE records of dredging the entrance bar, inner channel, and turning and small boat basins from 1959 to 1969 (excluding 1968) show that 247,737 cy was fairly typical of quantities removed (Percy et al. 1974). Interim site designations in 1977 were an attempt by EPA to document and establish coordinates for historically used USACE disposal sites.

Offshore Disposal (1977-2000)

In January 1977, the Interim Site received its interim designation when EPA issued the final Ocean Dumping Regulations (40 CFR 228). Between 1977 and 1985, material was placed in the EPA Interim Site. Due to the increased mounding at the Interim Site and its potential adverse effect on navigation safety, in 1986 the USACE selected an alternate ODMDS under its Section 103 authority. The 1986 nearshore Section 103 Site was located to the north and further offshore of the interim site in water depths ranging from 50 to 102 feet (see Figure 1). Between 1986-2000, dredged material was placed in the nearshore Section 103 Site selected by USACE. Due to mounding, the nearshore Section 103 site was expanded in 1998 to include the outer two-thirds of the EPA Interim Site; material was placed in this expanded area in 1999.

Offshore Disposal (2001-Present)

In 2001, the USACE Portland District, under its Section 103 authority, selected two new ODMDSs (North Site and South Site) for the disposal of dredged material. EPA concurred in a July 19, 2001 letter for the first 5-year period. The North Site was first used in 2001 so expired

in 2006 with an option for an additional 5 years. EPA issued a second Section 103 concurrence letter dated April 27, 2007 for continued use of the North Site. This allowed use of the North Site until the end of the 2011 dredging season.

Between 2001 and 2009, all dredged material was placed in the northern half of the Section 103 North Site. Maximum mound height in 2007 reached 5 feet, while in 2008 it reached 6 feet and in 2009 the maximum mound height reached 10 feet relative to July 2001. In 2009-2010 material from Depot Slough was dredged by clamshell and barged to the North Site. Also a portion of the material from the Yaquina Bay federal project was placed in the southern half of the North Site. Portions of the north half of the North Site have mounded 10-12 feet above the 2001 baseline bathymetry. All dredged material was placed in the southern half of the North Site during the 2011 dredging season. No material has been placed in the South Site as of the end of the 2011 dredging season.

ANALYSIS OF ALTERNATIVES

Overview of Dredge Types

Three basic types of dredges exist: mechanical dredges (which include clamshell), pipeline or suction dredges, and hopper dredges. Hopper dredges are self-propelled, seagoing vessels and are the only type of dredge that can work effectively in rough open water. Larger hopper dredges can work in sea swell conditions to about 10 feet. Hopper dredges are very mobile and can move quickly to minimize interference with navigation traffic and can adjust to rapidly changing weather and sea conditions. Pipeline and clamshell dredges are typically not self-propelled and cannot operate safely and effectively in conditions with waves greater than 3-4 feet. They also are unable to handle strong currents such as those that occur during tidal shifts. Both pipeline and clamshell dredges employ spuds and/or anchors to station them in the work area and cannot be quickly moved to accommodate traffic, changing weather, or sea conditions. The different dredge types do not necessarily preclude use of the different disposal options. For example, sediments removed by pipeline can be placed into a barge and the material dumped into the ocean. However, greater efficiencies can be realized by matching the dredge type to the disposal option [also see section on Defining a Zone of Siting Feasibility (ZSF)].

The typically rough seas and strong currents encountered at the entrance to the Yaquina Bay project are too dangerous for safe operation of pipeline or mechanical dredges and hopper dredges must be used. Pipeline and mechanical dredges can operate within the estuary to maintain the main and smaller navigation channels as well as harbor or marina areas. Hopper dredges also have been used historically to maintain the Coos Bay, Columbia River, and the other small coastal navigation channels.

Overview of Disposal Options

The alternatives for ocean dumping of dredged material from the Yaquina Bay project that were considered by the EPA and USACE include no action, upland/beach disposal, and estuarine disposal. The alternatives considered under the ocean disposal option include disposal off the continental shelf, continued use of existing sites, and designation of new ocean disposal sites.

No Action Alternative

Within the context of ocean dumping alone, the no action alternative would be for EPA to refrain from designating new ODMDSs for the placement of dredged material. One option under this alternative would include continuing use of the existing Section 103 Site. However, the site already has mounded and further use is restricted by the USACE and EPA. By regulation, if there are no suitable EPA designated sites, then the USACE has the authority to select alternate sites under its MPRSA Section 103 authority, although the selection would still be subject to meeting the criteria and would have to receive the concurrence of EPA. As the substantive requirements for information and evaluation of a Section 103 action are similar to those of an EPA formal designation under Section 102. However, use of a Section 103 site is limited to 5 years with one possible 5-year extension. ODMDS "selections" by the USACE are temporary and offer only a stopgap solution.

The most plausible outcome of the no action alternative is that existing and proposed navigation projects may be terminated. Future temporary actions are not seen as desirable by the government or the private sector. None of the disposal options under the no action alternative meet the needs for long-term maintenance of the Yaquina Bay project. Terminating maintenance dredging would reduce the safety of the channel for both small and large ships, and would have an adverse economic impact to the Pacific Northwest and the nation. For these reasons, the no action alternative is judged by both the USACE and EPA to be an unacceptable alternative and has been dropped from further evaluation.

Upland/Beach Disposal Alternative

Upland disposal for all of the material from the Yaquina Bay project is not feasible for operational, economic, and environmental reasons. Material from the entrance must be dredged with a hopper dredge. Upland disposal would require suitable pump-out facilities or construction of an in-bay sump. Stockpiling of material and re-dredging and transporting of the material to upland sites is not considered environmentally acceptable or economically feasible. In addition, there are no known suitable upland areas in the immediate vicinity of the estuary with sufficient capacity to meet long-term disposal needs. Most of the lands adjacent to the ocean and estuary are wetlands, or too steep, or are already developed (including state park lands). On an irregular basis, small quantities are dredged from the South Beach Marina with a small pipeline dredge and upland disposal. Material from Depot Slough dredged under permit has also gone upland, but again the quantities dredged were small. No suitable upland area that could be accessed by a hopper dredge or that could accept the large volume of material annually dredged for the Yaquina Bay project has been identified.

Placement of dredged material directly on ocean beaches by hopper dredge is not practicable at Yaquina Bay. As with upland disposal, direct placement on the beach would require suitable pump-out facilities or construction of an in-bay sump. Stockpiling of material and re-dredging and transporting it directly to the beach with a pipeline dredge is not considered environmentally acceptable or economically feasible.

Placement of material offshore in the active littoral zone at Yaquina Bay is complicated by the unique neritic reef structure. Seaward of about -40 feet, the sand movement by wave action is

influenced by near-bottom and downslope movement. At Yaquina, the -40 foot boundary coincides with the offshore reef complex for several miles north and south of the jetties. Movement of sand seaward of the reefs and deeper than about -40 feet is predominantly offshore. Away from the tidal exchange effects of the entrance channel bottom, movement may have either a northward component or southward. There is no onshore sand movement beyond Yaquina Reef and no sand movement around the jetties toward the north. This limits sand transport into the nearshore north of the jetties so there is a potential for net loss of material. This is supported by significant shoreline erosion throughout much of the area from the North Jetty to Yaquina Head.

The shoreline north of Yaquina Head has also experienced erosion to the point portions of Highway 101 have failed. Some portions of the highway have been moved. While there is a recognized need in the area for beach nourishment, no local sponsor has been identified. Further studies for suitable nearshore feeder berms that would feed the beach would be required. These studies are beyond the scope of this Yaquina Bay ODMDS site evaluation study. Because of the need to dredge the Yaquina Bay federal navigation project with a hopper dredge, the lack of sufficient upland or beach nourishment disposal sites, and no identified local sponsorship for a beneficial use option, the use of upland or beach disposal as an alternative to ocean disposal is not considered to be practicable.

Estuarine Disposal Alternative

Estuarine habitat is limited and environmentally sensitive. The estuary is comprised primarily of its major tributary, the Yaquina River, which drains 252 square miles and is relatively short with a length of 58.8 miles. Tidelands cover between 35% and 61% of the total area that are mostly within three tide flats at Sally's Bend, King's Slough, and the area between Idaho Point and the Marine Science Center. From its mouth to the head of high tide at RM 26, the river has one major tributary (Elk Creek at RM 22.3) and about 30 smaller creeks and sloughs. No suitable estuarine disposal areas that could be accessed by a hopper dredge or accept the large volume of material annually dredged have been identified. In 1994 however, several hopper loads of dredged material consisting primarily of large shell hash from RM 1.5 were placed at an estuarine location near RM 8. The Oregon Department of Fish and Wildlife (ODFW) requested that this dredged material be placed at selected locations in the upper estuary for the purpose of restoring native oyster habitat.

Ocean Disposal Alternatives

Based on evaluation of the alternative solutions previously discussed, continued disposal of dredged material from the Yaquina Bay project into the ocean is necessary and unavoidable. Options include disposal of the material off the continental shelf, use of previous disposal ODMDSs, and the designation of new ODMDSs.

Disposal Off the Continental Shelf

The direction for EPA to locate dump sites off the continental shelf is one of the five general criteria [40 CFR 228.5(e)]; however, that direction is subject to a determination of feasibility. At Yaquina Bay, potential disposal areas located off the continental shelf would be at least 20

nautical miles offshore in water depths of 600 feet or greater. This distance is well beyond the economical haul distance for hopper dredges working the Yaquina Bay project given the size of the west coast hopper fleet (see the section describing development of the ZSF).

Transporting dredged material off the continental shelf presents potentially significant environmental concerns. Benthic and pelagic ecosystems near the shelf contain important fishery resources and the effects of disposal operations on them are not well understood. Fine-grain sediment and rocky habitats would be directly impacted by disposal. These deep-water areas are stable and generally not disturbed by wave action or sediment movement. Consequently, the benthic invertebrate communities in these deep, offshore environments are adapted to very stable conditions and would be less able to survive disturbance from the immediate impact of disposal and the long-term alteration of substrate type. Little is known of the ecology of benthic communities on the continental slope; however, disposal onto those communities would cause severe and long-term impacts. Bottom gradients can be 5% to 25% on the continental slope, making accumulated unconsolidated sediments susceptible to slumping. Deposited sediments could be transported long distances downslope as turbidity currents and offshore by near-bottom currents, potentially affecting organisms outside of any designated site.

The cost for site evaluation necessary to designate a site and subsequent baseline and monitoring, along with unanswered environmental concerns about the effects of disposal in such areas, makes off-shelf disposal undesirable as well as infeasible. Further, disposal off the continental shelf would remove natural sediments from the nearshore littoral transport system, a system that functions with largely non-renewable quantities of sand in Oregon. While the loss of the present volumes of USACE dredged material are unlikely to result in disruption of the mass balance of the littoral system, the State of Oregon is already experiencing erosion/accretion patterns that are adversely impacting beaches, spits, wetlands, and other shoreline habitats.

Use of Previous ODMDSs

The small size of the historic Interim and nearshore Section 103 Sites and the large quantity of material requiring ocean disposal resulted in mounding of material and potential navigation hazards (see the previous section on No Action Alternative). That situation would persist and become worse with continued use without significant expansion. A return to disposing at those sites would result in mounding and impacts to navigation. Local fishers, their associations, the Port of Newport, and the Coast Guard expressed strong opposition to the use of the nearshore Section 103 Site and its surrounding area. Use of the expanded nearshore Section 103 Site, the result of the USACE Section 103 action in 1998, expired in 2003. Because of its limited size, continued mounding, and navigational safety concerns, the nearshore Section 103 Site was not considered by USACE and EPA as suitable for long-term use.

New Ocean Dredged Material Disposal Sites

Based on evaluation of the alternatives previously discussed, USACE and EPA concluded that the designation of the proposed North and South ODMDS is necessary to meet the long-term disposal needs for Yaquina Bay.

OCEAN DUMPING SITE DESIGNATION PROCESS

Overview

The dumping of material, including dredged sediments, into the ocean is permitted only at sites or in areas selected to minimize the interference of disposal activities with other activities in the marine environment. Formal designation of ocean dumping sites is the responsibility of EPA as stated in 40 CFR 228 of the ocean dumping regulations. The process followed by EPA, Region 10, and USACE for the Yaquina Bay project generally follows the site designation procedures developed by a joint task force of EPA and USACE personnel titled, *General Approach to Designation Studies for Ocean Dredged Material Disposal Sites* (EPA and USACE 1984).

The procedures utilize a hierarchical framework that initially establishes the broadest economically and operationally feasible area of consideration for site location. A step-by-step sequence of activities is then conducted to eliminate critical and/or unsuitable subareas. Further evaluation of alternative sites (candidate sites) within this area entails various levels of assessment as suggested by the sensitivity and value of critical resources or uses at risk, and potential for unreasonable adverse impact presented by the dredged material to be disposed. The site designation criteria at 40 CFR 228.5 and 228.6 are applied to the information assembled through this process, and a final site or sites are selected and proposed for formal designation.

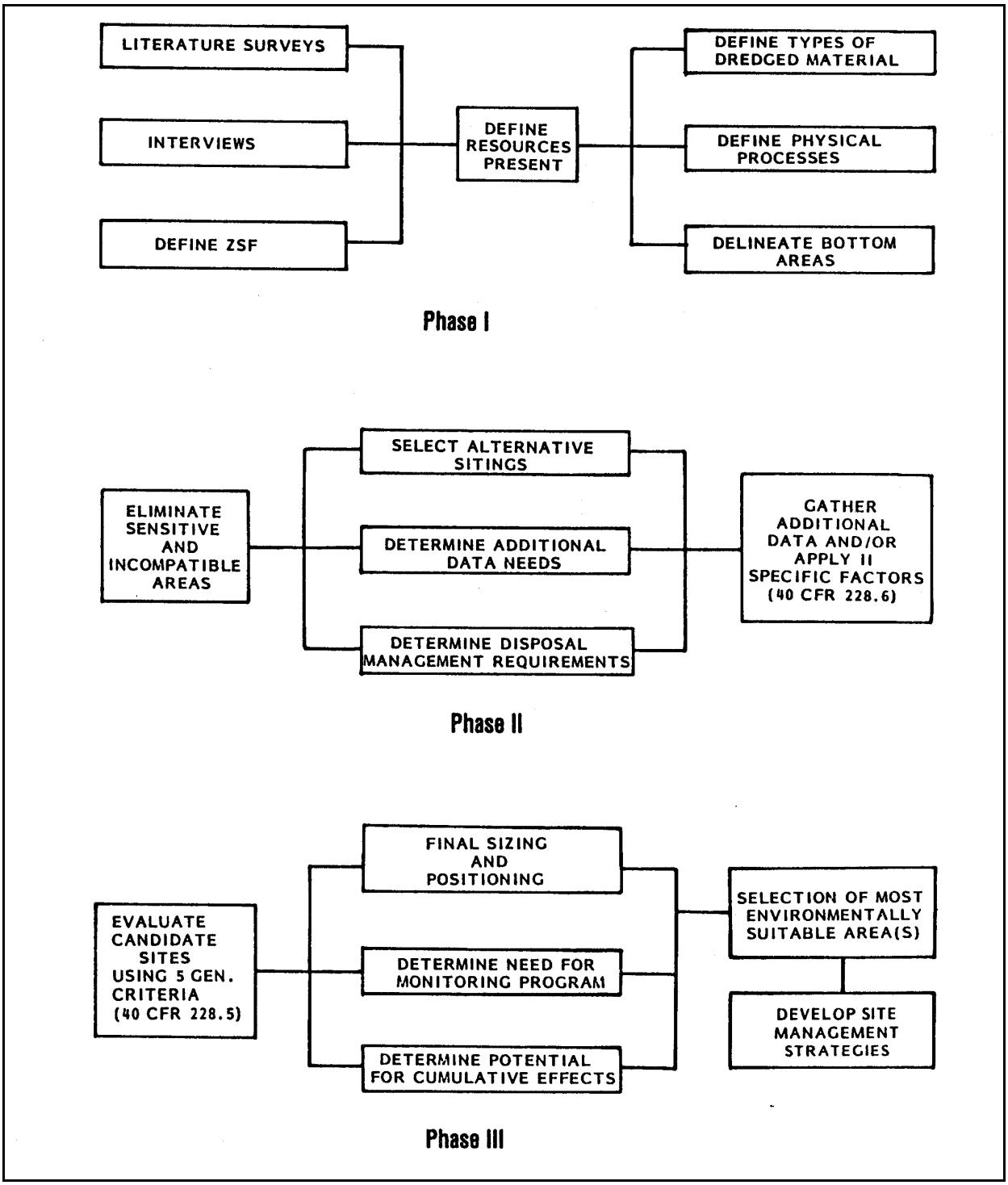
The site designation process is structured into three major phases (Figure 2). Phase I includes the delineation of the general area being considered for locating a site and the identification and collection of the necessary information on critical resources and uses and on the physical and environmental processes for the area. Reasonable distance of haul is the determining factor and will be affected by considerations such as available dredging equipment, energy use constraints, costs, and safety considerations. Then a preliminary analysis, based on available data, is applied to identify and map reach boundaries for critical resources, as well as areas of incompatibility. Such critical areas and resources may include clustered areas of geographically limited habitats, fisheries and shellfisheries, navigation lanes, beaches, and marine sanctuaries.

Phase II primarily involves the elimination of sensitive and incompatible areas, determining additional data needs, and identification of candidate sites within the area based on the information collected and processed in Phase I. Phase III primarily involves the evaluation of candidate sites, selection of a proposed site or sites for designation, and the development of management strategies.

Defining a Zone of Siting Feasibility

Joint EPA and USACE guidance for site designation suggests establishing a ZSF, as ocean disposal sites must be located within an operationally and economically feasible distance from the point of dredging (EPA and USACE 1984). By doing so, study efforts can be focused on areas that will actually meet project needs.

Figure 2. Phases of the Site Designation Process



Presently, the availability of dredging equipment is a major constraint that must be considered in the determination of a ZSF for any navigation project, but particularly so for ocean entrance projects on the west coast of the United States. The Jones Act precludes the USACE from contracting with foreign-owned vessels, limiting the accessible pool to U.S. Government or privately owned (contract) equipment. The USACE evaluates the availability of U.S. Government or contract equipment annually and allocates the use of government dredges for the nation. As described previously, hopper dredges are the only feasible equipment for dredging most ocean entrance channel/bar situations.

Hopper dredge availability on the west coast has been limited. Many hopper dredges working in the United States are often committed to maintaining projects on the Atlantic and Gulf of Mexico coasts and are not available for use elsewhere, except perhaps on an emergency basis. As a result, there are typically three hopper dredges working on the west coast that can work safely at Yaquina Bay and these dredges must also maintain other projects in Oregon, Washington, California, as well as occasionally Hawaii and Alaska. Additional capability could occur through construction of new dredges by the U.S. Government or private industry.

Weather is also a significant limiting factor for dredging and ocean dumping of material along the west coast that must be considered in development of the ZSF. Typically, hopper dredges are able to work safely in Pacific Northwest coastal waters, including the Yaquina Bay project, from May to mid-October, with a very high and consistent probability of down time due to rough seas or other adverse weather conditions at either end of that period. During this same May through October window, all other west coast entrance dredging also must occur.

Yaquina Bay Zone of Siting Feasibility

The amount of time necessary to maintain a coastal project (exclusive of weather downtime) is a function of dredging a hopper full of material (loading), then transporting that material to and placing it at the disposal site(s). This is called "cycle time" and the cycle time can be different for each dredge. Loading time is essentially fixed based on the characteristics of the sediments being dredged, the dredge itself (pumps, size of hopper, drag arms, etc.) and the dredging site conditions. The time to discharge material also is basically fixed for a given dredge and the type of material. Transport time depends primarily on the haul distance to the disposal site because the speed of different hopper dredges is similar.

Thus, the critical element for new construction or maintenance dredging is haul distance between the dredging site and disposal site from both a time and cost perspective. A significant haul distance will affect the ability to construct or maintain the individual project and very probably would have repercussions on the ability of USACE to maintain other west coast projects.

The 1985 evaluation study (USACE 1985) calculated a 2 nautical mile ZSF for the project. This calculation was based upon the removal at that time of up to 700,000 cy of dredged material using both contract and government dredges. A total of 60 days for a contract dredge and 10 days for a government dredge were allocated for the work at Yaquina Bay. Production capability with a 2 nautical mile ZSF was determined to be 10,000 cy per day.

Under current and foreseeable conditions at the project, the estimated volume of material to be removed annually is expected to remain at an average of 310,000 cy. Based upon workload, available funding and other constraints, the government owned hopper dredge YAQUINA is typically available 35 days at the Yaquina Bay project or a contract dredge is available for a similar length of time. This translates into an 8,943 cy per day average production requirement. The rated capacity for the YAQUINA is 1,000 cy. Load time typically is around 1 hour for most projects; however, Yaquina Bay is the deepest project that the YAQUINA dredges and productivity is likely less. Dump time is 5 to 10 minutes. The dredge typically works 24 hours per day except for Thursday when crews are changed.

The ZSF can be calculated as follows:

Assume 9 loads per day (8,943 cy ÷ 1,000 cy/load = 8.9 loads)

Load time (1 hour) + Dump time (0.17 hour) = 1.17 hour/load or 10.5 hours/day

24 hours/day - 10.5 hours/day = 13.5 hours/day for transit to/from the disposal site

13.5 hours/day ÷ 9 loads/day = 1.5 hour transit time for one round trip

1.5 hour ÷ 2 = 0.75 hour transit time for one way

0.75 x 6 nautical mile vessel speed = 4.5 nautical miles

Therefore, the outer limit of the ZSF as defined by the capacity of the available dredging plant, average annual dredging quaintly, and limited dredging time period is 4.5 nautical miles for the Yaquina Bay project.

Conflict Matrix Analysis

The USACE developed a conflict matrix format to simplify and consolidate scoring for the general and specific site criteria review process. The USACE and EPA have employed the conflict matrix method since 1984. Each area of consideration on the conflict matrix addresses at least one general or specific criterion. Tables 1 through 3 are conflict matrices developed to compare the historic Interim and nearshore Section 103 site to the proposed new sites and their potential conflicts with the four general and eleven specific site selection criteria. In general, the proposed new sites result in fewer conflicts with the criteria than the historic Interim and nearshore Section 103 site. A legend defining the matrix categories follows the tables (Figure 3).

Table 1. ODMDS Conflict Matrix for Interim and Nearshore Section 103 Sites

Interim and Nearshore Section 103 Sites

AREA OF CONSIDERATION [1/]	CONFLICT [2/]	POTENTIAL CONFLICT	NO CONFLICT	BENEFICIAL USE	COMMENTS	RELEVANT SPECIFIC FACTORS Eleven Specific Factors [3/] (40 CFR 228.6)	RELEVANT SPECIFIC FACTORS Four General Criteria [4/] (40 CFR 228.5)
1. Unusual Topography/Unique Bottom Features	X				Close proximity to neritic reef.	1, 6, 8, 11	a
2. Physical Sediment Compatibility			X		Similar material though ~5% is finer.	3, 4, 9	b, d
3. Chemical Sediment Compatibility			X			3, 4, 7, 9	a, b, d
4. Influence of Past Disposal	X				Excessive mounding.	5, 7, 9, 10	a, b, d
5. Living Resources of Limited Distribution		X			Kelp and reef life forms could be affected by sediment transport.	2, 3, 6, 8, 11	a, b, d
6. Commercial Fisheries			X			2, 8	a, b
7. Recreational Fisheries		X			Minor conflict with dredge traffic.	2, 8	a, b
8. Breeding/Spawning Areas		X			Resident and migrating fish use the area.	2, 8	a, b
9. Nursery Areas		X			Juvenile flatfish.	2, 8	a, b
10. Feeding Areas		X			Feeding areas could be affected.	2, 8	a, b
11. Migration Routes		X			Anadromous fish route.	2, 8	a, b
12. Critical Habitat of Threatened or Endangered Species		X			Designated critical habitat for southern green sturgeon. Proposed critical habitat for leatherback sea turtle.	2, 8	a, b
13. Spatial Distribution of Benthos			X			2, 8, 10	a, b
14. Marine Mammals		X			Feeding area.	2, 8	a, b
15. Mineral Deposits			X			1, 8	a, b
16. Navigation Hazard	X				Wave amplification due to excessive mounding.	1, 8	a, b, d
17. Other uses of Ocean (cables, pipelines etc.)			X			8	a, b, d
18. Degraded Areas			X			4, 6, 7	a, b, d
19. Water Column Chem./Phys. Characteristics			X			4, 6, 9	a, b, d
20. Recreational Uses		X			See item 7.	2, 8, 11	a, b, d
21. Cultural/Historic Sites			X			11	b
22. Physical Oceanography: Waves/Circulation	X				Wave amplification due to mounding, potential current effects.	1, 3, 6, 7	a, b, d
23. Direction of Transport/Potential for Settlement				X	Reintroduces sand to littoral budget.	1, 3, 6, 7	a, b, d
24. Monitoring			X			5	d
25. Shape/size of Candidate Site	X				No remaining capacity.	1, 4, 7	d
26. Size of Buffer Zone		X			See item 1.	2, 3, 4, 7, 11	b, d
27. Potential for Cumulative Effects			X		No known adverse activities.	4, 7	d

Table 2. ODMDS Conflict Matrix for the North Site

North Site

AREA OF CONSIDERATION [1/]	CONFLICT [2/]	POTENTIAL CONFLICT	NO CONFLICT	BENEFICIAL USE	COMMENTS	RELEVANT SPECIFIC FACTORS Eleven Specific Factors [3/] (40 CFR 228.6)	RELEVANT SPECIFIC FACTORS Four General Criteria [4/] (40 CFR 228.5)
1. Unusual Topography/Unique Bottom Features		X			Gravel areas.	1, 6, 8, 11	a
2. Physical Sediment Compatibility			X		Similar material though ~5% is finer.	3, 4, 9	b, d
3. Chemical Sediment Compatibility			X			3, 4, 7, 9	a, b, d
4. Influence of Past Disposal		X			Disposal from 2001-2010 has been managed under a disposal plan. A disposal plan will continue to be in place for future disposals at the site.	5, 7, 9, 10	a, b, d
5. Living Resources of Limited Distribution			X			2, 3, 6, 8, 11	a, b, d
6. Commercial Fisheries		X			Interference with dredge during disposal.	2, 8	a, b
7. Recreational Fisheries		X			Interference with dredge during disposal.	2, 8	a, b
8. Breeding/Spawning Areas		X			Resident and migrating fish use area.	2, 8	a, b
9. Nursery Areas		X			Juvenile flatfish.	2, 8	a, b
10. Feeding Areas		X			Resident and migrating fish use area.	2, 8	a, b
11. Migration Routes		X			Anadromous fish/ mammals/ flatfish.	2, 8	a, b
12. Critical Habitat of Threatened or Endangered Species		X			Designated critical habitat for southern green sturgeon. Proposed critical habitat for leatherback sea turtle.	2, 8	a, b
13. Spatial Distribution of Benthos			X			2, 8, 10	a, b
14. Marine Mammals		X			Feeding area/ migration route.	2, 8	a, b
15. Mineral Deposits			X			1, 8	a, b
16. Navigation Hazard			X			1, 8	a, b, d
17. Other uses of Ocean (cables, pipelines etc.)			X			8	a, b, d
18. Degraded Areas			X			4, 6, 7	a, b, d
19. Water Column Chem./Phys. Characteristics			X			4, 6, 9	a, b, d
20. Recreational Uses		X			See item 7.	2, 8, 11	a, b, d
21. Cultural/Historic Sites			X			11	b
22. Physical Oceanography: Waves/Circulation			X			1, 3, 6, 7	a, b, d
23. Direction of Transport/Potential for Settlement		X			Loss of sand from the littoral budget.	1, 3, 6, 7	a, b, d
24. Monitoring			X			5	d
25. Shape/size of Candidate Site			X			1, 4, 7	d
26. Size of Buffer Zone			X			2, 3, 4, 7, 11	b, d
27. Potential for Cumulative Effects			X		No known adverse activities.	4, 7	d

Table 3. ODMDS Conflict Matrix for the South Site

South Site

AREA OF CONSIDERATION [1/]	CONFLICT [2/]	POTENTIAL CONFLICT	NO CONFLICT	BENEFICIAL USE	COMMENTS	RELEVANT SPECIFIC FACTORS Eleven Specific Factors [3/] (40 CFR 228.6)	RELEVANT SPECIFIC FACTORS Four General Criteria [4/] (40 CFR 228.5)
1. Unusual Topography/Unique Bottom Features		X			Gravel areas.	1, 6, 8, 11	a
2. Physical Sediment Compatibility			X		Similar material though ~5% is finer.	3, 4, 9	b, d
3. Chemical Sediment Compatibility			X			3, 4, 7, 9	a, b, d
4. Influence of Past Disposal			X			5, 7, 9, 10	a, b, d
5. Living Resources of Limited Distribution			X			2, 3, 6, 8, 11	a, b, d
6. Commercial Fisheries		X			Interference with dredge during disposal.	2, 8	a, b
7. Recreational Fisheries		X			Interference with dredge during disposal.	2, 8	a, b
8. Breeding/Spawning Areas		X			Resident and migrating fish use area.	2, 8	a, b
9. Nursery Areas		X			Juvenile flatfish.	2, 8	a, b
10. Feeding Areas		X			Resident and migrating fish use area.	2, 8	a, b
11. Migration Routes		X			Anadromous fish/ mammals/ flatfish.	2, 8	a, b
12. Critical Habitat of Threatened or Endangered Species		X			Designated critical habitat for southern green sturgeon. Proposed critical habitat for leatherback sea turtle.	2, 8	a, b
13. Spatial Distribution of Benthos			X			2, 8, 10	a, b
14. Marine Mammals		X			Feeding area/ migration route.	2, 8	a, b
15. Mineral Deposits			X			1, 8	a, b
16. Navigation Hazard			X			1, 8	a, b, d
17. Other uses of Ocean (cables, pipelines etc.)			X			8	a, b, d
18. Degraded Areas			X			4, 6, 7	a, b, d
19. Water Column Chem./Phys. Characteristics			X			4, 6, 9	a, b, d
20. Recreational Uses		X			See item 7.	2, 8, 11	a, b, d
21. Cultural/Historic Sites			X			11	b
22. Physical Oceanography: Waves/Circulation			X			1, 3, 6, 7	a, b, d
23. Direction of Transport/Potential for Settlement		X			Loss of sand from the littoral budget.	1, 3, 6, 7	a, b, d
24. Monitoring			X			5	d
25. Shape/size of Candidate Site			X			1, 4, 7	d
26. Size of Buffer Zone			X			2, 3, 4, 7, 11	b, d
27. Potential for Cumulative Effects			X		No known adverse activities.	4, 7	d

Figure 3. Conflict Matrix Legend

1/ Definition of "Areas of Consideration"

1. Unusual Topography/Unique Bottom Features: Would placement of material in this candidate site affect physical bottom feature that is unique within the local or regional area?

2. Physical Sediment Compatibility: Does the candidate site have similar sediment characteristics to anticipated redged material?

3. Chemical Sediment Compatibility: Does the candidate site have similar chemical characteristics to anticipated dredged material?

4. Influence of Past Disposal: Would placement of material in this candidate site be affected by previous disposal of dredge material?

5. Living Resources of Limited Distribution: Would placement of material in this candidate site affect any living resources that do not have a coast-wide distribution?

6. Commercial Fisheries: Would placement of material in this candidate site affect any commercial fishing activity (resource impacts are covered in 8-11)?

7. Recreational Fisheries: Would placement of material in this candidate site affect any recreational fishing activity (resource impacts are covered in 8-11)?

8. Breeding/Spawning Areas: Would placement of material in this candidate site affect breeding and spawning areas of any species?

9. Nursery Areas: Would placement of material in this candidate site affect nursery areas of any species?

10. Feeding Areas: Would placement of material in this candidate site affect feeding areas of any species?

11. Migration Routes: Would placement of material in this candidate site affect migration routes of species?

12. Critical Habitat of Threatened or Endangered Species: Would placement of material in this candidate site affect critical habitat of threatened or endangered species?

13. Spatial Distribution of Benthos: Would placement of material in this candidate site change the benthic invertebrate community structure, e.g., fine-grain species to coarse-grain species, etc?

14. Marine Mammals: Would placement of material in this candidate site affect marine mammals or their habitat, e.g., gray whale feeding areas etc?

15. Mineral Deposits: Would any known mineral deposits be affected by the placement of material?

16. Navigation Hazard: Would the placement of material create a navigation hazard?

17. Other Uses of Ocean: Would placement of material impact other uses of the ocean not addressed elsewhere, such as cables, pipelines, tow boat lanes, and pilot transfer points?

18. Degraded Areas: Would disposal in this candidate site continue to affect or improve the degraded area?

19. Water Column Chemical/Physical Characteristics: Would placement of material in this candidate site affect water column chemical/physical characteristics?

20. Recreational Uses: Would placement of material affect recreational uses?

21. Cultural/Historic Sites: Would placement of material in this candidate site impact or protect a cultural/historic site?

22. Physical Oceanography: Waves/Circulation: Would placement of material affect wave/circulation patterns?

23. Direction of Transport/potential for Settlement: Would placement of material affect direction of sediment transport and/or potential for settlement?

24. Monitoring: Would use of this candidate site affect either on-going monitoring or the ability to monitor using conventional methods? Monitoring typically would include periodic hydrographic surveys, could include sediment sampling or biological data collection.

25. Shape/size of Candidate Site: Is the candidate site suitable for the operation of a dredge?
Maneuverability of the dredge?
Is it orientated so the dredge can place material while heading into the waves?
Is the depth of water sufficient to open the hopper doors/dump scow?
Can the dredge operate safely?
Is the size of the candidate site large enough for long term use?

26. Size of Buffer Zone: Is the candidates site a sufficient distance from important resources or features to protect them from any affect of disposal?

Figure 3 (continued). Conflict Matrix Legend

27. Potential for Cumulative Effects: Would placement of material contribute to cumulative effects from other activities?

2/ Definition of Degrees of Conflict
Conflict: There will definitely be an adverse impact on the resource or the use.
Potential Conflict: There is a possibility of an adverse impact; however, extent and significance are unknown.
No Conflict: There will definitely not be an adverse impact on the resource or the use.
Beneficial Use: There will be a positive impact on the resource or the use.

3/ Eleven Specific Factors for Ocean Disposal Site Selection (40 CFR 228.6)
1. Geographical position, depth of water, bottom topography, and distance from coast.
2. Location in relation to breeding, spawning, nursery, feeding or passage areas of living resources in adult or juvenile phases.
3. Location in relation to beaches or other amenity areas.
4. Types and quantities of waste proposed to be disposed and proposed methods of release, including methods of packaging the waste, if any.
5. Feasibility of surveillance and monitoring.
6. Dispersal, horizontal transport, and vertical mixing characteristics of the area, including prevailing current velocity, if any.
7. Existence and effects of present or previous discharges and dumping in the area (including cumulative effects).
8. Interference with shipping, fishing, recreation, mineral extraction, desalination, shellfish culture, areas of special scientific importance and other legitimate uses of the ocean.
9. Existing water quality and ecology of the site, as determined by available data or by trend assessment or baseline surveys.
10. Potential for the development or recruitment of nuisance species within the disposal site.
11. Existence at or in close proximity to the site of any significant natural or cultural features of historical importance.

4/ General Criteria for the Selection of Ocean Disposal Sites (40 CFR 228.5)
a. The dumping of material into the ocean will be permitted only at sites or in areas selected to minimize the interference of disposal activities with other activities in the marine environment, particularly avoiding areas of existing fisheries or shell fisheries, and regions of heavy commercial or recreational navigation.
b. Locations and boundaries of disposal sites will be chosen so that temporary perturbations in water quality or other environmental conditions during initial mixing caused by disposal operations anywhere within the site can be expected to be reduced to normal ambient seawater levels or to undetectable contaminant concentrations or effects before reaching any beach, shoreline, marine sanctuary, or known geographically limited fishery or shell fishery.
c. Effective January 9, 2009, 40 CFR Part 288.5 was amended by removing and reserving paragraph (c).
d. The sizes of ocean disposal sites will be limited in order to localize, for identification and control, any immediate adverse impacts and to permit the implementation of effective monitoring and surveillance programs to prevent adverse, long-range impacts. The size, configuration, and location of any disposal site will be determined as a part of the disposal site evaluation or designation study.
e. EPA will, whenever feasible, designate ocean dumping sites beyond the edge of the continental shelf and other such sites that have been historically used.

Eleven Specific Factors and Four General Criteria for Ocean Disposal Site Selection

The determination to designate an ODMDS will be based on the government's evaluation of compliance with the eleven specific factors and four general criteria at 40 CFR 228.6 and 228.5. A discussion of each factor and criteria for the proposed North and South sites follow.

Application of Eleven Specific Criteria (40 CFR 228.6)

Geographical Position, Depth of Water, Bottom Topography and Distance from the Coast (1). Figure 1 shows the location and bottom topography of the North Site and the South Site. Designated sites would be used for disposal of dredged material from the Yaquina Bay navigation project and other permitted projects.

Site coordinates (degrees, minutes, seconds; North American Datum 1983) and dimensions of North Site and the South Site are as follows:

North Site

Corner Coordinates:	*Dimensions*:
44° 38' 17.98" N, 124° 07' 25.95" W	4,000-feet wide by 6,500-feet long
44° 38' 12.86" N, 124° 06' 31.10" W	597 acres
44° 37' 14.33" N, 124° 07' 37.57" W	Azimuth (long axis): 10° T
44° 37' 09.22" N, 124° 06' 42.73" W	Depth: 112-152 feet

South Site

Corner Coordinates:	*Dimensions*:
44° 36' 04.50" N, 124° 07' 52.66" W	4,000-feet wide by 6,500-feet long
44° 35' 59.39" N, 124° 06' 57.84" W	597 acres
44° 35' 00.85" N, 124° 08' 04.27" W	Azimuth (long axis): 10° T
44° 34' 55.75" N, 124° 07' 09.47" W	Depth: 112-152 feet

Based upon consideration of the location, depth of water, bottom topography, and distance from the coast, the North and South Sites are suitable for the disposal of dredged material when placed in accordance with the Site Management and Monitoring Plan (SMMP; see Appendix F).

Location in Relation to Breeding, Spawning, Nursery, Feeding, or Passage Areas of Living Resources in Adult of Juvenile Phases (2). The North and South ODMD Sites are located approximately 2.5 miles offshore where species characteristic of nearshore sandy areas occur. A broad scale assessment of physical, chemical and biological characteristics of this area of the Pacific Ocean encompassing the Sites are described in Richardson 1973; Peterson and Miller 1977; Richardson and Pearcy 1977; Brodeur et al., 1985; Keister and Peterson 2003; Auth and Brodeur 2006; Auth et al., 2007. Marine pelagic communities of zooplankton (copepods, euphausiids, pteropods, and chaetognaths), meroplankton (fish, crab and other invertebrate larvae), forage species, and pelagic predators have coast-wide distribution and generally display seasonal changes in abundance. Research conducted to study large scale marine ecosystem patterns along the Oregon coast and out to the shelf break indicate that these species have not

been shown to congregate offshore of Yaquina Bay when compared to other river mouths on the Oregon coast.

Spawning. The disposal sites support a variety of pelagic and demersal fish species and epibenthic invertebrates including Dungeness crab. Many of these species have a reproductive strategy that includes releasing a large quantity of eggs so that some individuals will survive the substantial mortality common to the species during the larval and juvenile stages. Crabs in particular release large numbers of eggs into the water column. The larvae that hatch are planktonic for several months before settling to the bottom of the estuary as young crab. As they mature, they typically move out of the estuaries and nearshore areas that have structure into sand-dominated, unstructured environments such as those found at the North and South Sites.

Passage Areas. Coho, steelhead, and Chinook salmon that spawn in the Yaquina River watershed may pass over the disposal site areas. NMFS concluded in their Biological Opinion for the Corps Operations and Maintenance dredging program that adult Oregon Coast coho salmon listed as threatened on the Endangered Species Act (ESA) are not likely be adversely affected by disposal, but some juveniles may be injured or killed. However, the number of fish injured or killed is not significant to the existence of the population, and hence it would not affect the viability of the species. For ESA-listed southern green sturgeon, both disposal sites and the entire ZSF is designated critical habitat because it is used as a migratory corridor by subadults and adults of this species. In NMFS' Biological Opinion for the Corps Operation and Maintenance dredging program, they concluded that disposal of dredged material would not adversely modify or destroy their critical habitat.

Nursery Areas. Sandy substrate along the Oregon Coast is used as nursery areas for juvenile flatfish such as English sole, Pacific sanddab, Speckled sanddab, Butter sole. Juvenile flatfish are found at these sites during spring and summer.

Feeding. The disposal sites are not known to congregate organisms because of food resources, however, the substrate does provide prey items (polychaetes, amphipods, sand dollars, gastropods, shrimp, etc) that are consumed by flatfish, green sturgeon, crab, and other demersal organisms.

In summary, the proposed Yaquina ODMD Sites encompass these resources however these Sites are not providing unique breeding, spawning, nursery, feeding, or passage habitat. The habitat for these species is not geographically limited and the disposal of dredged material occurs for discrete periods of time over a discrete spatial area. Thus, effects to these habitat types are not likely to translate into significant effects at a population or species level.

Location in Relation to Beaches and other Amenity Areas (3). The proposed North and South Sites are located to the north and to the south of the entrance to the mouth of Yaquina Bay. The shoreward edges of both are approximately 2 nautical miles off the beach in 112 feet of water beyond the neritic reefs. The seaward edge extends to 152-foot depth contour. The EPA and the Corps attempt to keep material within the littoral cell to the maximum extent practicable. However, for Yaquina's ODMD Sites, this is not possible because the Yaquina reef complex runs parallel and near to the shore for the length of the ZSF. Given the reef complex's

juxtaposition near shore at shallow depths, it is not operationally feasible nor safe for dredges to dispose of dredged material inshore of the reefs. Thus, the EPA and the Corps have chosen sites offshore of the Yaquina reef at depths where sediment is not expected to return to the Newport littoral cell. The loss of this material is not expected to affect Newport's beaches because Pacific Northwest beaches tend to respond strongly to storm effects, the episodic nature of which would mask any long-term discrete changes.[1]

Types and Quantity of Wastes Proposed to be Disposed of, and Proposed Methods of Release, including Methods of Packing the Waste, if Any (4). Dredged material subject to the MPRSA is not a waste. Sites that are designated will receive dredged materials transported by either government or private contractor hopper dredges or dump barges. Current hopper dredges or dump barges available for use have hopper capacities ranging from 800 to 6,000 cy. This would be the likely volume range of dredged material deposited in any one dredging placement cycle. The dredged material to be removed annually from the Yaquina Bay project could be placed at the sites in one dredging season by any combination of private and government dredges. The dredges or barges would be under power and moving during disposal, allowing the maintenance of steerage.

The majority of the dredged material disposed in the ocean traditionally comes from shoals in the Yaquina Bay entrance channel. They consist primarily of marine sand transported into the entrance. The material is clean, contains no contaminants of concern in excess levels, is far removed from known sources of contaminants, and is acceptable for unconfined open-water disposal. Material proposed to be dredged from the turning basin (RM 2+00 to 2+25), the South Beach Marina, North Marina, and Depot Slough is finer but has been evaluated and found acceptable for unconfined open-water disposal. Fine-grained material from these areas and other side channels or backwater areas may be placed offshore in the future which will require testing and evaluation. The sites have been sized to accommodate the quantity of material to be placed.

Feasibility of Surveillance and Monitoring (5). The feasibility of surveillance and monitoring is maximized when disposal sites are located near shore and a port where research vessels can be launched. The closer the sites are to such facilities the lower the cost to monitor (lower fuel costs, less time). Thus, when considering feasibility, sites are chosen as close to shore as possible to meet criteria for operational capability and safety for dredges, and to match the grain size of the dredged material as closely as possible. The EPA will monitor the selected sites for physical, biological, and chemical attributes. The seafloor will be surveyed for bathymetry annually, the contaminant levels in the material will be analyzed prior to dumping, and the benthic infauna and epibenthic organisms will be monitored every 5 years, as funding allows. The Hatfield Marine Science Center is a hub for federal, state, and academic researchers focused on marine resources. The EPA intends to collaborate with marine resource entities based in Newport for routine monitoring and special studies.

Dispersal, Horizontal Transport and Vertical Mixing Characteristics of the Area Including Prevailing Current Direction and Velocity, if Any (6). Appendix B provides a detailed discussion regarding this criterion. The proposed North Site and South Site are located in water depth of 115 to 150 feet along the boundary between the inner shelf and the mid-shelf. Waves

[1] Personal communication. Email from J. Allen (DOGAMI) to B. Lohrman (EPA). August 22, 2011.

and wind-driven currents are the most important factors influencing water motion (and potentially transport of bottom sediment) on the inner and mid-shelf. Mean circulation on the shelf tends to be along the bathymetric contours and is subject to seasonal reversal, being northward during winter and southward during summer. Mean depth-averaged current during winter is about 1.3 feet/second @ 298° (T); during summer it is 0.5 feet/second @ 202° (T). During winter storms, waves can exceed 30 feet and depth averaged currents can exceed 2 feet/second. Superimposed on the mean circulation of the shelf are tidal currents that are believed to account for more than half of the water motion over periods of several days. Appendix B provides additional information.

Although intense winter storms are capable of transporting sand at depths of 150 feet, the transport will be episodic over the long term. Consequently, sand placed at the proposed North and South Sites will likely remain within the sites for 10 to 20 years. The direction of net transport during significant winter storm activity will be to the north and offshore. During summer, transport will be much less but will be toward shore.

Existence and Effects of Current and Previous Discharges and Dumping in the Area (including Cumulative Effects) (7). Between 1977 and 1985, material was placed in the EPA Interim Site. Between 1986-2000, dredged material was placed in the nearshore Section 103 site selected by the Corps. Due to mounding, the nearshore Section 103 site was expanded in 1998 to include the outer two-thirds of the EPA Interim Site; material was placed in this expanded area in 1999. In 2000, a total of 79,800 cy of dredged material was placed in the southwest corner of the 1986 nearshore Section 103 site.

In 2001, the Corps, Portland District, under its Section 103 authority, selected two new ODMDSs (North Site and South Site) for the disposal of dredged material. Between 2001 and 2009, all dredged material was placed in the northern half of the Section 103 North Site. Maximum mound height in 2007 reached 5 feet, while in 2008 it reached 6 feet and in 2009 the maximum mound height reached 10 feet relative to July 2001. In 2009-2010, material from Depot Slough was dredged by clamshell and barged to the North Site. Also a portion of the material from the Yaquina Bay federal project was placed in the southern half of the North Site. Portions of the north half of the North Site have mounded 10-12 feet above the 2001 baseline bathymetry. All dredged material was placed in the southern half of the North Site during the 2011 dredging season. No material has been placed in the South Site as of the end of the 2011 dredging season.

As with other areas along the Oregon coast, mounding of dredged material has been the most significant effect within and in the vicinity of the existing disposal site at Yaquina Bay. The benthic studies at the North and South Sites are typical for these marine sandy substrates. Baseline studies at the Sites were conducted by the Corps in summer 1999 and 2000. The Corps carried out additional benthic sampling in 2002. In 2008, the EPA surveyed benthic infauna within and outside the disposal sites. The results suggest that immediately after dredged material was dumped, the number of species decreased in the direct disposal areas. There was a slight decrease in the number of species per grab within the disposal area when compared to outside the disposal area. Thus, prey resources were reduced shortly after a disposal but not lost. The

abundance or diversity of epibenthic fish did not appear affected when trawls within and outside the disposal sites were compared (Appendix A; pages A15-A21).

Interference with Shipping, Fishing, Recreation, Mining Extraction, Desalination, Fish and Shellfish Culture, Areas of Special Scientific Importance and Other Legitimate Uses of the Ocean (8).

Shipping. The EPA does not anticipate conflicts with commercial navigation at the North or South Sites. The north end of the South Site overlaps slightly with the shallow and deep draft commercial shipping lane for Yaquina Bay, however, the infrequency with which the dredge will be at the Sites (up to 38 days per year) and the length of time they will be disposing (approximately 5 minutes) minimizes the likelihood of a spatial conflict with other vessels. The potential for conflict with dredges or tug and barge combinations transiting to the Sites are recognized but can be managed through coordination with the boat pilots, the U.S. Coast Guard, and others.

Commercial and Recreational Fishing. The coho and Chinook salmon fishery and recreational and commercial Dungeness crab fisheries occur at the Sites. These activities occur almost within the entire ZSF but vary annually in intensity because of shifting movement of these resources and seasonal restrictions.

The principal recreational fishing off the coast near Yaquina Bay is for salmon and bottom fish; salmon fishing is done primarily from charter and private boats, and although it occurs in the same areas as commercial fishing, it is generally done closer to shore. Private and charter boats also conduct bottom fishing for halibut, rockfish, and lingcod, which are generally associated with rocky areas. Other recreational activities in this area include clamming in the bay and along the beach, and fishing off the jetties.

The potential exists for conflicts between the dredge and fishing boats; however, this has not been a problem in the past. When the Interim and nearshore Section 103 sites were in use, crab fishermen stated that the mounds created by the disposal of material affected their ability to navigate in and out of the bay safely, which affected the success of their fishery. Mounding is a primary concern at the historic Yaquina Bay ODMDS, thus facilitating the need for designating new disposal sites. Bathymetric monitoring will be conducted to prevent creation of disposal mounds that would cause navigation hazards. The shift to using the larger North Site and South Site will provide greater site management opportunity to reduce the potential effects of mounding. Disposal at these Sites will create a permanent bathymetric change; however, greater water depths, mound height restriction, and site monitoring will avoid interference with small and large vessel navigation.

Recreation. The Yaquina Bay vicinity offers a wide variety of recreation opportunities during all seasons of the year. The primary categories of activities are things like beachcombing, wildlife viewing from shore or a boat, and fishing (Appendix E, Figure E-1). Nearby beaches and entrance jetties receive a continual influx of recreationists. South Beach State Park is located adjacent to the Yaquina Bay south jetty and provides camping and day-use facilities and beach access. Based on a survey by Surfrider, the proposed Sites have minimal overlap with common

recreational activities offshore of Newport (Appendix E, pages E-3 to E-6). Given the discrete spatial and temporal components of disposal, it is unlikely that any interference would occur with these activities.

Mineral Extraction. There are no known mineral extraction operations or proposed operations in the vicinity of the proposed disposal sites. The disposal sites are not expected to interfere with any future offshore mining or oil/gas exploration or extraction.

Desalination. There are no desalination plants in the area of Yaquina Bay.

Fish and Shellfish Culture. There are no commercial fish or shellfish aquaculture operations that would be impacted by use of the proposed North Site and South Site.

Areas of Special Scientific Importance. There are numerous oceanographic research efforts within the vicinity of the proposed ODMDS. The Newport Hydrographic line is likely the most consistently studied transect in Oregon. It runs east-west and is located approximately 0.83 nautical miles north of the North ODMDS. There is also the Oregon, California, Washington line-transect and ecosystem (ORCAWALE) survey that runs north-south along the eastern edge (at an approximately 0.20 nautical mile distance) of the proposed ODMDS. This survey looks at birds, cetaceans, plankton, squid, and physical parameters of the water column. In addition, the Northwest National Marine Renewable Energy Center is intending to establish a wave energy testing area anywhere between 0.92 and 3 nautical miles north of the North ODMDS. None of these on-going studies would be impacted by disposal at the proposed Sites.

Coastal Zone Management. The preferred action (designation and use of the North Site and South Site) has been determined by the USACE and EPA to be consistent with the acknowledged local comprehensive plans and State of Oregon Coastal Zone Management Programs. The Oregon Department of Land Conservation and Development will review this consistency determination with a request to provide written notification of their findings.

The Existing Water Quality and Ecology of the Site as Determined by Available Data or by Trend Assessment or Baseline Survey (9). Water and sediment quality analyses conducted in the study area and experience with past disposals in this region have not identified any adverse water quality impacts from ocean disposal of dredged material. The ecology of the offshore area is a northeast Pacific mobile sand community. This determination is based mainly on fisheries and benthic data. Neither the pelagic or benthic communities should sustain long-term adverse effects because of their resilience to episodic disturbance and widespread distribution off the Oregon coast.

Potentiality for the Development or Recruitment of Nuisance Species in the Disposal Site (10). Nuisance species are considered as any undesirable organism not previously existing at the disposal site. They are either transported or recruited to the site because the disposal of dredged materials created an environment where they could establish. Materials dredged and transported to the disposal sites historically have been classified as uncontaminated marine sands similar to the sediment at the ODMDSs. Potential material dredged from the federal turning basin (RM 2+00 to RM 2+25), South Beach Marina, Depot Slough, or other in-bay area may include fine-

grained material. Limited quantities of fine-grained material from the turning basin and Depot Slough have been placed in the ocean. Any material proposed for placement at any site would be subject to sediment quality evaluation. Therefore, it is highly unlikely that any nuisance species could be established at the proposed disposal sites since habitat or contaminant levels are unlikely to change over the long term.

Existence at or in Close Proximity to the Site of any Significant Natural or Cultural Features of Historical Importance (11). The neritic reefs off the Oregon coast comprise a unique ecological feature. They support a wide variety of invertebrates and fish species, as well as a bull kelp community.

The cultural resource literature search conducted for the Yaquina Bay study area (Appendix D) resulted in the documentation of wrecked vessels in the nearshore area. Although the majority of these shipwrecks occurred on the bar, ocean currents deposited some of these vessels on South Beach. In addition, other vessels were towed and then abandoned on South Beach. Given the characteristics of Yaquina Bar, onshore current pattern, hard sand bottom, and the fact that the ship channel over the bar has been actively maintained by dredging and removal of shipwrecks from the 1860s to present, it is unlikely that any shipwrecks have survived in the vicinity. Shipwrecks within these areas would likely be torn apart due to the high-energy wave climate. Deeper water would buffer the high-energy wave climate so shipwrecks in deeper water would be less prone to damage. The shipwrecks in deeper water tend to have more cultural value than shipwrecks nearshore.

Undiscovered shipwrecks could occur in the area, however. Several sidescan sonar studies were conducted at the two proposed sites. No potential shipwrecks or other cultural feature was noted. Based on this information, it is unlikely that any significant cultural resources will be affected from designation and use of the disposal site.

Application of Four General Criteria (40 CFR 228.5)

Minimize Interference with Other Activities (a.). The first of the four general criteria requires that a determination be made as to whether the proposed sites or their use will minimize interference with other activities in the marine environment. EPA used information from a variety of sources to determine what activities may interfere with disposal of dredged material at the proposed Yaquina ODMDS. EPA considered recreational activities (extractive and non-extractive), commercial fishing areas, cultural or historically significant areas, commercial and recreational navigation, and existing scientific research activities. The information as to where these activities occur was obtained from the State of Oregon's Ocean Information web site (http://www.oregonocean.info/) that included GIS data for non-extractive recreational activities, commercial fishing areas, towlane agreements, existing scientific research areas. Information on cultural resources was obtained from NOAA's Office of Coast Survey (http://www.nauticalcharts.noaa.gov/). Information on commercial and recreational finfish and shellfish areas was also obtained from ODFW.[2] This information is provided in maps in Appendices A, D, and E. The use of this information allows EPA to determine the degree to

[2] Personal communication between B. Lohrman (EPA) and M. Donnellan (ODFW), September 2011.

which this area is used by existing users, and how might the indirect effect of site designation and disposal of dredged material would interfere with these activities.

In terms of interference with other activities, the known activities that spatially overlap with the proposed ODMDS include recreational activities such as boating and whale watching, recreational finfish or Dungeness crab fishing, commercial finfish or Dungeness crab fishing, tow lane agreements between tow boat operations and Dungeness crab fishermen, and recreational and commercial navigation. Even though these activities may spatially overlap, the proposed ODMDS and the disposal of dredged material in the sites either do not interfere with the activities at all (whale watching, boating, navigation into or out of Yaquina Bay), or do not interfere with the activities at a level that would result in significant effects to the activity. An example of such an activity would be commercial or recreational fishing. Disposal occurs for a finite number of days per year (up to 32 days), so any interaction between the dredge vessel and fishing vessels would be extremely limited. In addition, disposal occurs for approximately 20 minutes, so the time disposal is occurring at the site is extremely limited.

The information gathered about existing activities at the proposed ODMDS has not identified any potential conflicts that would eliminate the sites from consideration for final ODMDS designation.

Minimizes Changes in Water Quality (b.). The second of the four general criteria requires changes to ambient seawater quality levels occurring outside the disposal site to be within water quality criteria, and that no detectable contaminants reach beaches, shoreline, sanctuaries, or geographically limited fisheries or shellfisheries. No significant contaminant or suspended solids releases are expected. Based on previous work at Yaquina Bay, disposal of either sandy or fine-grained material would not have any long-term impact on the water quality. There would be no water quality perturbations to be concerned with moving toward any beach, shoreline, marine sanctuary, or known geographically limited fishery or shellfishery. Bottom movement of deposited material generally shows a net offshore movement for the finer fractions. Coarser size fractions stay in the same general area as deposited.

Interim Sites Which Do Not Meet Criteria (c.). Effective January 9, 2009, 40 CFR Part 288.5 was amended by removing and reserving paragraph (c).

Size of Sites (d.). The fourth general criterion requires that the size, configuration and location of the site be evaluated as part of the study and that the size be limited. Ocean disposal sites are sized to localize, for identification and control, any immediate adverse impact and permit the implementation of effective monitoring and surveillance programs to prevent long-ranged impacts. This in the past was interpreted to mean the absolute minimum size possible. The size of the Interim Site was based upon the minimum size site that a hopper dredge can operationally use. This narrow interpretation maximized the effects of disposal in these small sites. As a result, mounding of dredged material occurred to the point that the wave climate was altered and imperiled navigation safety, especially for small boats transiting the area. Therefore, the only management option available was to discontinue placement of material in the Interim Site and select an alternate site.

The proposed North and South sites have been sized to provide sufficient capacity to accommodate material dredged from the Yaquina project, as well as material from other projects. The size of the North and South sites was modeled based on the requirement to provide at least 20 years of disposal capacity per site, without the sites accumulating dredged material to a height that could potentially amplify waves. Since the average water depth at the proposed sites is 135 feet, dispersion of dredged material was assumed to be negligible. This required that the each site have the capacity to "store" all material placed without forming a mound higher than 14 feet which led to minimum required size of 3,900 feet x 3,900 feet. The effective usable area for each proposed site was set at 5,500 feet x 2,800 feet (equivalent to the minimum required size). The addition of a 500-foot buffer zone along the perimeter of each site produced the dimensions of 6,500 feet x 3,800 feet per site. Overall site dimensions were rounded up to 6,500 feet x 4,000 feet. Management of material placement in these larger, deeper sites will assure that the wave climate will not be significantly affected and navigational safety not compromised.

Annual bathymetric surveys of the placement area will be conducted as part of the SMMP (Appendix F). The results will be used to document the fate of the dredged material and provide information for future management.

Sites Off the Continental Shelf (e.). Potential disposal areas located off the continental shelf would be at least 20 nautical miles offshore in water depths of 600 feet or more. The haul distance to an off-shelf disposal site is much greater than the 4.5 nautical mile average operational limit of the Yaquina Bay project, making an off-shelf site infeasible for maintenance of the project. Material dredged by clamshell could be transported feasibly off the continental shelf by barge. However, the cost for evaluation and monitoring along with unanswered environmental concerns about disposal in such areas makes off-shelf disposal undesirable. Further, disposal would remove sediments from the nearshore littoral transport system, a system that functions with largely non-renewable quantities of sand in Oregon. Disruption in the mass balance of this system could alter erosion/accretion patterns impacting beaches, spits, wetlands, and other shoreline habitats.

Benthic and pelagic ecosystems near the shelf contain important fishery resources and the effects of disposal operations upon those resources are not well understood. Fine-grain sediment and rocky habitats would be directly impacted in disposal operations. These deep-water areas are stable and generally not disturbed by wave action or sediment movement. Consequently, these areas have benthic invertebrate communities that are adapted to very stable conditions and would not likely be able to survive disturbance from disposal. Little is known of the ecology of benthic communities on the continental slope, and disposal in this area could cause impacts of unknown severity and duration. Bottom gradients can be 5% to 25% on the continental slope, making accumulated unconsolidated sediments susceptible to slumping. Deposited sediments could be transported long distances downslope as turbidity currents and offshore by near-bottom currents.

DETERMINATION OF COMPLIANCE AND SELECTION FOR FORMAL DESIGNATION (40 CFR 227)

Determination of Environmental Acceptability of Ocean Disposal (Subpart B). The USACE and EPA have documented for the record via this evaluation the anticipated environmental

effects from designation of ocean dredged material disposal sites offshore of Yaquina Bay and from the potential future regulated use of those sites pursuant to the SMMP (Appendix F) for disposal of dredged materials. Designation of ocean dredged material disposal sites does not mandate use; however, once designated, use of sites is anticipated. Material that could be disposed in the ocean is anticipated to be clean gravel, sand, silt and clay from the Yaquina Bay and estuary.

By regulation, dredged sediments suitable for ocean dumping may not contain any materials listed in Section 227.5 or contain any of the materials listed in Section 227.6 except as trace contaminants. Determination of trace contaminants is accomplished by USACE and EPA evaluation of the dredged material employing the procedures of applicable national and regional testing manuals. Compliance with the applicable prohibitions, limits, and conditions for site use will assure that formal designation of ocean dredged material disposal sites and their use will not unduly degrade of endanger the marine environment.

With respect to this subpart, it is concluded that site designation and use would present:

a) No unacceptable adverse effects on human health and no significant damage to the resources of the marine environment;
b) No unacceptable adverse effect on the marine ecosystem;
c) No unacceptable adverse persistent or permanent effects due to the dumping of dredged materials; and
d) No unacceptable adverse effect on the ocean for other uses as a result of direct environmental impact.

Determination of Need for Designation of Sites (Subpart C). The need for ocean dumping has been adequately documented by a thorough evaluation of the factors listed in Section 227.15. No practicable alternatives presently exist to manage dredged sediments from the Yaquina Bay federal project. Designation of ocean dredged material disposal sites to fulfill the present and anticipated future need is required. While the use of designated sites is anticipated, that use is not mandated by the designation. Notwithstanding compliance with the other ocean dumping criteria, ocean dumping of dredged material may not be authorized if there is no need for the dumping, and alternative means of disposal are available, as determined in accordance with Subpart C. These factors must be evaluated and documented for the record for each proposed dumping on an individual project basis.

Impact on Esthetics, Recreational and Economic Values (Subpart D). In itself, designation of the proposed ODMDSs has no effect on esthetics, recreational or economic values. Designation of the ODMDSs does not mandate use. However, use of sites once designated is anticipated and the potential for unacceptable adverse effects results from the individual and cumulative disposals at the designated sites and management by the government.

Sites are located to minimize resource impacts and use conflicts to acceptable levels, not necessarily to avoid all conflicts. Potential impacts of using designated sites offshore of Yaquina Bay were evaluated by USACE and EPA and are documented in this evaluation study. Recreational use areas and the potential effects of disposal operations on recreation are described

in detail in Appendix E. The EPA's site designation rule will define site use conditions that, in conjunction with the SMMP (Appendix F), will limit the extent and severity of any impacts to acceptable levels. Also, the impact of dumping on esthetic, recreational and economic values must be evaluated on an individual project basis for each proposed dumping. Placement of dredged material into the proposed sites will be managed to avoid formation of mounds that could interfere with commercial fishing activities.

The government must also consider the consequences of not authorizing disposal sites and use of those sites, including without limitation, the impact on esthetic, recreation and economic values with respect to the municipalities and industries involved. Without ocean dumping, the federal entrance channel and main navigation channel in Yaquina Bay cannot be economically maintained. The benefits associated with continued ocean commerce of the Yaquina Bay system are substantial on a regional and national scale. While all economic values would not be completely lost, failure to maintain the navigation projects would necessarily result in severe economic disruption to municipalities, industries, and individuals throughout the Pacific Northwest. Failure to maintain the navigation projects would not be expected to directly impact recreational uses or esthetic values defined by this subpart.

With respect to this subpart, it is concluded that designation and use of the proposed ODMDSs would not result in unacceptable adverse effects to esthetic, recreational and economic values. Further, it is concluded that in the absence of ocean dumping, unacceptable adverse economic effects to municipalities and industries will occur throughout the interior portion of the Pacific Northwest region and the western portion of the nation.

Impact on Other Uses of the Ocean (Subpart E). This evaluation study identified and assessed the nature and extent of existing and potential uses of the disposal sites themselves and of any areas that reasonably may be affected by designation of sites and their use. Temporary and long-range effects were evaluated with particular emphasis on any irreversible or irretrievable commitment of resources that would result from use of the designated sites. Based on these evaluations, it is concluded that there would be no unacceptable adverse effect on other uses of the ocean as defined by this subpart.

AFFECTED ENVIRONMENT

Physical Resources

General

The Yaquina River flows into the Pacific Ocean through a jettied entrance approximately 115 miles south of the Columbia River. Although Yaquina Bay is the fourth largest estuary in Oregon, its drainage basin ranks only eleventh in area. The estuary is fed mainly by the Yaquina River, which drains 253 square miles and has a relatively short length of 58.8 miles from its mouth to headwaters. From its mouth to head of high tide at RM 26, it has one major tributary (Elk Creek at RM 22.3) and about 30 smaller creeks and sloughs discharging into it. The normal flow rate has been estimated at 1,078 cubic feet per second (cfs). The basin consists of 87% forest, 4% cropland, 2% rangeland, and 7% other. Elevations range from sea level to 2,300 feet. Annual rainfall averages 60 inches along the coast to 100-110 inches in the eastern portions.

Yaquina Bay is described as being moderately exposed to waves. Tidal influences extend as far as RM 26 of the Yaquina River and several miles up Elk Creek. The mean tide range is 5.9 feet with a diurnal range of 7.9 feet and an extreme range of 11.5 feet. Tidal prism on mean range is 8.35 x 10 cubic feet with a diurnal range of 11.5 x 10 cubic feet. Currents off Newport are quite variable and reportedly exhibit the characteristics of a large eddy.

Yaquina Bay Sediments

The USACE conducted physical and chemical analyses of sediment samples from Yaquina Bay and South Beach marina in 1980, 1986, 1990, 1991, 1995, 2000, 2005, and 2010. Potential sources of contaminants to the federal navigation channel are logging, wood processing, fish processing and urban runoff. From the USACE sediment sampling studies, the sediment is typically below screening levels (if they were identified at that time) for contaminants of concern. Consequently, sediment has been acceptable for in-water ocean disposal.

The federally authorized entrance reach extends from RM -1 to RM 4.4. Up to 370,000 cy of material is dredged from this reach annually. Material dredged from the entrance channel is approximately 94% sand. The South Beach Marina access channel is approximately 2,035-feet long and runs from Yaquina RM 1 to the marina. Up to 25,000 cy of material is dredged from the access channel every 5 to 8 years. Material dredged from the South Beach Marina access channel is approximately 45% sand. The authorized federal navigation channel is approximately 10 miles long and extends from RM 4 to 14, including Depot Slough; however only Depot Slough is maintained. Up to 100,000 cy of material is dredged from Depot Slough every 5 to 8 years. Material dredged from Depot Slough is predominantly silt/clay (up to 95%) with little sand (5%). Sediment evaluation reports, including sample locations, grain size, elutriate and bulk sediment test results are included in Appendix C.

ODMDS Sediments

The topography of the seabed in the vicinity of the proposed North and South ODMDS is fairly uniform. Depths at the sites range from 115 to 155 feet. The most recent study of sediment quality in support of EPA and USACE proposed site designation at Yaquina was conducted in June and August 2008 by the EPA. The sampling stations were selected based on the previous sampling efforts in 1999, 2000, and 2002 (USACE and EPA 2011). Sediment collected from 18 samples was primarily medium sand and showed little variation, ranging from 97.8% to 99.7% sand-sized grains ("percent sand") at stations in the North ODMDS drop zone and from 96.6% to 99.5% sand at the background stations. The mean grain size, calculated using percentage of grain size, was essentially the same at the North ODMDS drop zone stations (98.6%) as that of the background stations (98.3%). The mean grain sizes at the North ODMDS drop zone stations ranged from 0.195 millimeters (mm) to 0.213 mm, while those at the background stations ranged from 0.171 mm to 0.308 mm. The largest grain size (0.308 mm) was collected at the deepest location near the North ODMDS.

Sandy sediments such as these are common along the Oregon Coast with natural variation in percent fines occurring at different stations depending upon variations in local current patterns. The 1999 data showed a similar sand environment out to a depth of 160 feet off Yaquina Bay.

Material finer than silt constitutes less than 2.3%. Volatile solids are less than 1.3%. The material at the proposed ODMDS is very similar to that collected at the historic ODMDS sites. While fine-grained sediments placed at the disposal site would be carried in suspension and quickly removed from the site by longshore and offshore currents, the coarser sediments would remain at the site for longer periods. The zone of active sediment movement in the area extends to a depth of about -150 feet. The thinness of the sediment layer indicates that there is no long-term accumulation of sediment offshore from Yaquina Bay.

Oceanographic Circulation

Circulation of coastal waters on the continental shelf (near Yaquina Bay) results from an interaction of regional oceanic circulation, astronomical tides, local wind-generated surface waves and current, swell, and Yaquina River flow as affected by inland meteorological events. Time scales for coastal circulation processes range from seconds for wind generated waves to months for seasonal weather patterns to years for large-scale events such as El Nino and La Nina.

A generalized model for the seasonal changes in the along shore and offshore circulation along the Pacific coast of Oregon has been developed. The summer circulation of surface water on the continental shelf is influenced by the southward flowing California current, which attains maximum strength during the summer when surface winds are consistently from the north-northwest. Winter circulation of shelf waters is dominated by the northward flowing Davidson current, which attains maximum strength due to winter storm (wind stress) patterns. The subsurface part of the Davidson current (below 300 feet in depth) is believed to flow northward throughout the year, although the surface waters respond to seasonally varying wind stress patterns (reversals). Therefore, the net direction of bottom currents on the mid- and outer continental shelf (120 to 600 feet in depth) is believed to be northward and along shore.

The time-varying circulation of coastal waters controls the transport and seasonal distribution of bottom sediments and suspended material within the water column. Circulation that is consistent through time (flow through the Yaquina Bay jetties) tends to produce identifiable and relatively constant bathymetry features. Circulation that is highly variable (typically, flow along the open coast) tends to produce homogenous bathymetry having ephemeral features.

Inner Continental Shelf. The most active region along the continental shelf is the inner shelf (depth less than 120 feet), over which shoaling wind waves and swell, shelf-modified tidal currents, and estuarine-induced currents are at least as important as wind-driven currents for promoting the transport of bottom sediments. These variable processes act on ebb tidal shoal sediments at Yaquina Bay (depths less than 120 feet) to produce the bathymetric condition observed at any particular time. Circulation of coastal (inner shelf) waters is subject to seasonal reversal, generally being northward during winter and southward during summer. Bottom currents along the inner-shelf often reach speeds high enough to transport sand-sized sediment.

Middle and Outer Shelf. Circulation along the middle shelf (120 to 300 feet in depth) is governed mainly by wind-driven currents. Circulation along the outer shelf (300 to 600 feet in depth) is affected by shoaling internal waves and seasonally modified regional currents. Bottom

currents along the middle and outer shelf generally do not reach speeds high enough to transport sand-sized sediment, but are capable of transporting fine-grain sediments (silt-size and smaller).

Geology

The coastal area of Oregon has been influenced by a combination of tectonic forces and glacial effects during the past few million years. Regional uplift, coupled with a fluctuating sea level, is evidenced by marine terraces up to 100 feet above present sea level. Beneath deposits of recent sands are rocks up to 40 million years old. At the maximum extent of the continental glaciers sea level was as much as 400 feet below present. Delta-like features formed from massive amounts of sediments, estimated up to 10 times present volumes. The last episode of glacial retreat began less than 20,000 years ago with sea level rising rapidly until 5,000 to 6,000 years ago. Filling the valley bottoms and the estuary are modern river sediments. These grade into marine sands near the river mouth, which continue offshore. Extensive coastal dunes and beaches have been formed in modern times by wind forces acting upon river/marine sands.

A succession of siltstones, mudstones, and sandstones dip seaward from 10° to 20°. A layer of basalt intrudes the sandstone layer and forms Yaquina Head and the offshore reefs. In the Newport area, marine terrace deposits over 50 feet thick overlie the much older eroded sandstones and mudstones. These terrace deposits form the steep sea cliffs north from the jetties but are absent for 1.5 miles to the south where modern sands form the South Beach area. Little, if any, sand is presently escaping from the estuary.

Biological Resources

Introduction

This section summarizes biological conditions in the ocean environment offshore of Yaquina Bay. Additional information is provided in Appendix A.

Plankton and Fish Larvae

Peterson and Miller (1976) and Peterson and others (1979) sampled the zooplankton community off Yaquina Bay and found copepods to be the dominant taxa. The species of copepods present varied with season. Of the 58 species collected, 8 occurred commonly in both summer and winter, 7 occurred only or predominantly in the summer, and 6 only or predominately in the winter. In general, winter species are less abundant than summer species.

Fish larvae are a transient member of the inshore coastal plankton community. Their abundance and distribution has been described by Richardson (1973), Richardson and Pearcy (1977), and Richardson and others (1980).

Keister and Peterson (2003) provided a discussion of the zooplankton community found off the central Oregon coast in the Newport coastal area (along the Newport hydrographic line). Keister and Peterson (2003) indicate that the zooplankton community is influenced strongly by seasonal variations in wind and current patterns. According to Peterson and Miller (1977), boreal neritic copepods such as *Pseudocalanus mimus, Calanus marshallae, Centropages abdominalis, Acartia*

longiremis, and *Acartia hudsonica* dominate the coastal plankton during summer. In winter, the coastal zooplankton is populated by warm-water species such as *Mesocalanus tenuicornis*, *Paracalanus parvus*, *Ctenocalanus vanus*, *Clausocalanus spp.*, *Acartia tonsa*, and *Corycaeus anglicus.*

Auth and Brodeur (2006) examined ichthyoplankton off the central Oregon coast (along the Newport hydrographic line). The dominant taxa collected were northern anchovy (*Engraulis mordax*), slender sole (*Lyopsetta exilis*), rockfishes (*Sebastes* spp.), northern lampfish (*Stenobrachius leucopsarus*), and blue lanternfish (*Tarletonbeania crenularis*). Relatively few larvae were found at depths greater than 100 meters (~328 feet), while highest larval concentrations generally were observed from depths of 0 to 50 meters (0 to ~164 feet). Larval diversity and concentration were higher offshore at 46-84 kilometers (~28.5 to 52 miles) off the coast than in nearshore areas at 9-28 kilometers (~5.6 to 17 miles) off the coast. Highest concentrations were normally found at an intermediate station, approximately 65 kilometers (~40 miles) off the coast. Species designated as either coastal or offshore species by previous studies were predominantly found in their respective shelf regions. Most larval concentrations were positively correlated with temperature and negatively correlated with salinity.

Benthic Invertebrates

Early Benthic Studies. Benthic invertebrate studies were conducted offshore of Yaquina Bay in 1984, 1986, 1989, 1999, and 2000. The invertebrate fauna collected during these early studies was typical of the nearshore, high-energy environment found along the Oregon coast. It also was similar to the communities found near other disposal sites along the Oregon coast. The community was dominated by highly mobile organisms that are adapted to a shifting sand environment. Dominant species and groups included gammaridean amphipods, sand dollars, surface-dwelling gastropods and various species of polychaete worms. These organisms provide a direct food source for other benthic organisms and demersal fishes, and also play an active role in the breakdown of organic debris, which reintroduces it back into the system.

Dominant molluscs in the early studies were the carnivorous gastropod *Olivella* spp. Three species of *Olivella* occur along the Oregon coast, two of which, *O. biplicata* and *O.pycna,* were collected off Yaquina Bay. Both species were present in significant numbers during 1984, 1986 and 1989 studies. In 1999, *O. biplicata* was not present, but the 1999 samples were taken in deeper water and *O. biplicata* is a shallow-water species, while *O. pycna* is more abundant in water depths from 30-150 feet. Dominant species of gammaridean amphipods in the early studies included *Mandibulophoxus gilesi, Synchelidium shoemakeri,* and *Psarnrnonyx longimerius.* These amphipods are scavengers and feed primarily on particles of organic debris found in the sediment.

Current Benthic Studies. The most recent study of benthic infauna at and near the proposed ocean disposal sites was conducted in June and August 2008 by EPA (USACE and EPA 2011). Appendix A provides detailed information on this study. The dominant species in the June 2008 data set included the polychaetes *Chaetozone* nr. *setosa*, *Magelona sacculata*, *Nephtys caecoides, Onuphis iridescens, Spio filicornis,* and *Spiophanes bombyx*; the crustaceans *Anchicolurus occidentalis* and *Eohaustorius estuarius*; and the miscellaneous phylum nemertinea. The number of polychaetes, specifically *Spiophanes bombyx* at a count of 3,313, far

exceeded the number of other individual organisms. There were a total of 106 taxa of which 46 were polychaetes, 18 were mollusca, 34 were crustacea, 3 were echinoderms, and 5 were miscellaneous groups. No Dungeness crab larvae or juveniles were collected.

The August 2008 survey data show a high-energy benthic community structure. The dominant species included the polychaetes *Magelona sacculata, Spio filicornis* and *Spiophanes bombyx*; the mollusca *Siliqua* sp. juvenile (razor clam); the crustacea *Anchicolurus occidentalis, Diastylopsis dawsoni* and *Photis* sp. indeterminate; and the miscellaneous phylum nemertinea. As in June, the count of *Spiophanes bombyx* exceeded the number of other individual organisms. There were a total of 98 taxa of which 45 were polychaetes, 20 were mollusca, 29 were crustacea, 2 were echinoderms, and 2 were miscellaneous groups. There were four Dungeness crab larvae or juveniles collected.

The species collected in the 2008 study are what would be expected and are very comparable to earlier and current studies of ODMDS areas along the Oregon coast. The benthic infauna found were typical of the sand dwelling communities found along the Oregon coast, and are well suited to survival in this dynamic environment by either being very mobile or being able to respond to both man made or natural perturbations. Either strategy allows re-colonization of disturbed areas such as dredging scars or disposal site events.

Fish and Epibenthic Species

Appendix A provides detailed information concerning the fish and epibenthic resources offshore of Yaquina Bay. The nearshore area supports a variety of pelagic and demersal fish species and epibenthic invertebrate species. The habitat at the proposed ocean disposal sites is not a rare or especially unique habitat for the Oregon coast, consisting of a primarily sand bottom with only a few gravel patches. Pelagic fish species include anadromous salmonids such as coho salmon, winter steelhead, and spring and fall Chinook salmon. Other pelagic species include the Pacific herring, northern anchovy, and surf smelt.

Demersal fish species in the nearshore area are mostly residents and include a number of sculpins, sea perch, and rockfish species associated rocky habitats, as well as flatfish species occurring predominantly over open sand flats. Flatfish include English sole, Pacific sanddab, and starry flounder. English sole and starry flounder and sand sole spawn in the inshore area in the summer and juveniles of these, as well as other marine species, may rear in Yaquina Bay.

The neritic reefs off Yaquina Bay are a unique feature of the coast and are associated with bull kelp beds. These beds provide important invertebrate and fish habitat and increase the overall productivity of the reef.

The commercially and recreationally important epibenthic invertebrate species in the Yaquina Bay nearshore area include shellfish and Dungeness crab. Razor clam beds are located north and south of the jetties along the beach. Recruitment to the inshore beaches comes from the subtidal spawning areas. Gaper clams are present in large numbers near the mouth and upriver in the estuary proper. Cockles are also present in the intertidal areas near the base of the jetties. Piddock clams occur in the sandstone outcroppings north of the estuary mouth. Dungeness crab adults occur on sandflat habitat along the entire Oregon coast. They spawn in offshore areas and

occur in the estuary when conditions are favorable in late summer and fall. There are currently no known squid spawning areas offshore of Yaquina Bay.

Field surveys were conducted in August 2008 by EPA to provide current information about the fish and epibenthic species present in the area of the proposed Yaquina ODMDS (USACE and EPA 2011). From all trawls, a total of 919 epibenthic fish typical of the Oregon coast were identified. The top five species caught were butter sole, English sole, Pacific sanddab, Pacific tomcod, and sand sole. Overall, the area north of the North ODMDS appeared to have a higher productivity than either the North or South ODMDS; it had the greatest number of individual fish collected during each trawl and the most fish species identified. Epibenthic invertebrates collected also showed a variety of species typical of the Oregon coast, with only Dungeness crab and short-spined pink star collected in all trawls. These data support that the area north of the North ODMDS is a more productive area, at least locally.

Commercial and Recreational Fisheries Economics

Based on data from the National Marine Fisheries Service (NMFS 2006) for commercial fishing, a total of 393 vessels, all commercially registered, delivered landings to Newport in 2000. Landings were in the following West Coast fisheries (data shown represents landings in metric tons/value of said landings/number of vessels making landings; NA = not available): coastal pelagic (158/$14,203/17), crab (1,613/$7,474,302/99), groundfish (40,389/$9,382,966/179), highly migratory species (1,403/$2,626,906/180), salmon (368/$1,361,844/181), shellfish (NA/NA/2), shrimp (3,628/$3,240,124/38), and other species (50/$222,093/106). Newport residents owned 90 vessels in 2000; in Toledo, community members owned 20 vessels.

For Newport, the 2000 recreational salmonid catch was 1,141 Chinook salmon and 9,124 coho salmon. The recreational non-salmonid catch was a total of 125,112 fish. The top species landed included black rockfish, blue rockfish, lingcod, Albacore tuna, Pacific halibut, chilipepper rockfish, California halibut, kelp greenling, yelloweye rockfish, and yellowtail rockfish.

Wildlife

Three species of seals and sea lions inhabit the Yaquina Bay coastal area. Steller sea lions, a federally threatened species, and harbor seals are year-round residents, while California sea lions are present most of the year. Steller sea lions forage at river mouths and nearshore areas along the Oregon coast. The closest Steller sea lion haul out site is located about 7 miles south of the Yaquina North Jetty (Seal Rock). Harbor seals breed in the estuary and on nearshore rocks. The Yaquina Bay nearshore area and shoreline provides habitat for shorebirds, waterfowl, herons, bald eagles, hawks, and many other species of birds. Pelagic birds (e.g., murres, auklets, cormorants) likely use Yaquina Bay and River, as well as adjacent waters for foraging.

Threatened or Endangered Species

There are 25 threatened or endangered species protected under the Endangered Species Act that may occur in the Yaquina Bay nearshore area. Appendix A provides detailed information concerning these species and their likelihood of occurrence in the area.

Salmonids. The threatened listing for Oregon Coast coho salmon includes all naturally spawned populations in Oregon coastal streams south of the Columbia River and north of Cape Blanco, including the Cow Creek coho hatchery program (73 Federal Register (FR) 7816). Critical habitat also was designated. Yaquina Bay and River were designated as critical habitat but ocean waters were not included. Coho salmon are present in the Yaquina offshore area as both adults and juveniles. Adults hold in the offshore area prior to entering the estuary to migrate up river to spawn. Juveniles rear in the nearshore ocean area after migrating downstream and transitioning to saltwater. Upstream migration of adult coho salmon ranges from August through November. Juvenile outmigration extends from April through June and peaks in May.

The threatened listing for Lower Columbia River coho salmon includes all naturally spawned populations in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers, and includes the Willamette River to Willamette Falls, Oregon, as well as 25 hatchery programs (70 FR 37160). While migrating individuals may utilize the coastal habitat off Yaquina Bay for migratory purposes, they are likely to be further offshore than the proposed ODMDS.

Several listed Chinook salmon (70 FR 37160) could potentially be in the ocean area off of Yaquina Bay. These include the Lower Columbia River (threatened), Upper Willamette River spring-run (threatened), Upper Columbia River spring-run (endangered), Snake River spring/summer run (threatened), and Snake River fall-run (threatened). All of these ESUs have designated critical habitat, but critical habitat does not include ocean waters. During their ocean life history residence period, these species have been found off Yaquina Bay.

Eulachon. Southern DPS Pacific eulachon is listed as threatened (75 FR 13012). Eulachon are a small, anadromous fish from the eastern Pacific Ocean. They occur in nearshore ocean waters and to 1,000 feet (300 meters) in depth, except for the brief spawning runs into their natal (birth) streams. Most eulachon originate in the Columbia Basin but eulachon has been documented in the Rogue and Umpqua rivers in Oregon. Although eulachon migrate along the coast, little is known about their use of nearshore and marine habitat. In January 2011, critical habitat was proposed (76 FR 515) and did not include any ocean waters.

According to NMFS analysis supporting their listing, the most significant threat to eulachon and their habitats are changes in ocean conditions due to climate change (75 FR 13018). Impacts associated with dredged material disposal were not identified as a threat. Even though eulachon are found in nearshore waters, the potential for eulachon to be in the area during disposal is low because: (1) eulachon are not known to use Yaquina Bay; thus, large numbers of returning outmigrants or adults are unlikely to be transiting through the proposed ODMDS areas; and (2) disposal actions occur for a limited number of days per year, which limits the likelihood of fish coming in contact with dredged material disposal.

Green Sturgeon. The Southern Distinct Population Segment (DPS) of green sturgeon was listed as threatened in 2006 (71 FR 17757) and critical habitat was designated in 2009 (74 FR 52300). According to NMFS analysis supporting the listing of the Southern DPS of green sturgeon, "The principal factor for decline of the Southern DPS is the reduction of the spawning area to a limited area of the Sacramento River" (71 FR 17762). The nearest spawning habitat is in the

Sacramento River. Southern DPS green sturgeon likely occur at the proposed Yaquina ODMDS as they migrate north and south to access estuaries during summer and early fall. Designated critical habitat includes all U.S. coastal marine waters out to the 60 fathom depth bathymetry line from Monterey Bay, California north and east to include waters in the Strait of Juan de Fuca, Washington, which encompasses the proposed ODMDS and all tidally influenced areas of Yaquina Bay up to the elevation of mean higher high water.

Marine Mammals and Sea Turtles. There are many whale and sea turtle species in Oregon's offshore coastal area that are federally listed. The blue, fin, sei, sperm, humpback, and southern resident killer whales are all federally endangered species and occur as migrants off the Oregon coast in waters typically farther from shore than within the proposed Yaquina ODMDS. The loggerhead, green, leatherback, and olive ridley sea turtles are federally listed and have been recorded from strandings along the Oregon and Washington coasts. The occurrence of sea turtles off the Oregon coast is associated with the appearance of albacore and jellyfish. Albacore occurrence is strongly associated with the warm waters of the Japanese current. Because these warm waters generally occur 30 to 60+ miles offshore, these sea turtle species do not typically occur in the nearshore area. However, NMFS proposed critical habitat for the leatherback sea turtle off the coast of Oregon, which includes the proposed North and South ODMDS.

Birds. Federally listed marine birds that may be present in the Yaquina offshore area include marbled murrelet and short-tailed albatross. Threatened marbled murrelets are observed in small flocks or as individuals in the ocean throughout the year. The endangered short-tailed albatross may forage in open ocean areas off the coast. The Pacific coast population of western snowy plover is a threatened species that breeds in coastal areas in California, Oregon and Washington. Western snowy plover breeding and feeding occur on beaches rather than in open water.

Socio-Economic Resources

The City of Newport is located on the central Oregon coast at the mouth of the Yaquina River and is the county seat of Lincoln County. The City of Toledo is located on the Yaquina River about 7 miles inland from the Pacific Ocean. The 2010 Census reports that Newport had a population of 9,989 people and 4.8% population growth (2000 to 2010), while Toledo had a population of 3,465 people and -0.2% population growth. According to the September 2011 Local Labor Trends newsletter, published by the Oregon Employment Department (http://www.qualityinfo.org), the major employers in Lincoln County include leisure and hospitality, retail trade, educational and health services, manufacturing, and government. The unemployment rate in Lincoln County was 10% in July 2011.

Cultural Resources

Appendix D provides detailed information concerning cultural resources offshore of Yaquina Bay. Prehistoric cultural resources are unlikely to be found within the Yaquina offshore area. It is possible that prehistoric Native Americans may have used portions of the offshore reefs as a fishery. Any remaining remnants of prehistoric fishing activity are unlikely or not retrievable. Shipwrecks are the most probable cultural resources expected to exist in the offshore area. Historical review indicates several recorded wrecks and all known shipwreck remnants are located in the South Beach area. It also is possible that unrecorded wrecks exist elsewhere in the

area. In July 2000, a side-scan sonar survey was conducted over a large area in and around the proposed Yaquina North and South ODMDS. No shipwrecks or other historic remnants were detected. Based on this information, it is unlikely that any significant cultural resources would be affected by designation of the proposed North and South ODMDS.

Recreational Uses

Recreational resources in the area of the proposed North and South ODMDS are described in Appendix E. Yaquina Bay area offers a wide variety of recreation opportunities during all seasons of the year. The primary activities include sightseeing, fishing, beachcombing and boating. Nearby beaches and entrance jetties receive a continual influx of recreationists. South Beach State Park is located adjacent to the Yaquina Bay south jetty and provides camping and day-use facilities and beach access. Yaquina Bay and the nearshore area are heavily used by recreational anglers and boaters. Clamming is also a popular recreation activity. The principal recreational fishing is for salmon and bottom fish. Salmon fishing is done by charter boat and private boat. Bottom fishing is done along the south reef area by charter boat for black rockfish and lingcod. The north reef is not fished to any extent because of its hazardous navigation conditions. Other recreational activities include clamming in the bay and along the beach, and spear fishing along the jetties.

Commercial Uses

The Yaquina Bay offshore area supports a moderate commercial fishery primarily for salmon, groundfish, and Dungeness crabs. Clams are commercially harvested in the estuary. The fishing and tourist industries are a primary source of income to the local economy. No significant mineral or petroleum deposits are known to exist in the vicinity of the proposed North and South ODMDS.

ENVIRONMENTAL EFFECTS

Physical Resources

Sand deposited at the proposed site most likely will disperse somewhat between annual dredging events. Sediment transport would include movement predominately to the northwest in the winter with some southerly movement either onshore or offshore in the summer. A 500-foot "setback zone" should be inscribed within the proposed sites to keep material within the ODMDS during dredged material placement. Dispersal would occur at a lower rate overall at the proposed sites since they are deeper than the existing sites.

Placement of material at the site will be managed to avoid creation of single conical mound features. Based on sediment fate modeling (Appendix B) the seabed at the ODMDSs would likely experience various degrees of accumulation. On a per dump basis, the seafloor at the sites could be subjected to individual burial events ranging from 0.01 to 0.3 feet thick covering an area of 5-20 acres. On a seasonal basis, the sites may be subjected to accumulations ranging from 1-10 feet thick covering an area of 100-500 acres. Total bottom accumulation would be limited to a maximum of generating wave height increases of 10% or less over existing conditions based upon model predictions.

Sediment characteristics would be modified from finer-grained bottom sediments to coarser-grained over much of the site for a short time following disposal. Prevailing conditions will redeposit finer-grained sediments within an estimated 6 months based on monitoring data for ocean disposal sites at similar depth off the mouth of the Columbia River (Siipola et al. 1993). Chemical analysis of sediments likely to be placed at the disposal sites indicate contaminants are well below levels of concern for in-water placement.

No significant contaminant or suspended solids releases are expected from use of the proposed ODMDS. Based on previous work at Yaquina Bay, disposal of either sandy or fine-grained material would not have any long-term impact on the water quality. There would be no water quality perturbations to be concerned with moving toward any beach, shoreline, marine sanctuary, or known geographically limited fishery or shellfishery. Bottom movement of deposited material generally shows a net offshore movement for the finer fractions. Coarser size fractions stay in the same general area as deposited.

Biological Resources

The most recent study of benthic infauna (USACE and EPA 2011) show a benthic community dominated by highly mobile organisms that are adapted to a shifting sand environments or periodic anthropogenic disturbances. A difference in the number of species and density of individuals between the North ODMDS drop zone (disposal has occurred) and areas outside of the drop zone (no disposal) was found. This indicates an effect from disposal of dredged material at the drop zone. The effect appears to be localized to the dredge disposal site itself, and likely does not persist for greater than a few months given the high reproductive rates of the majority of the benthic infauna encountered. It is not likely the effects on benthic infauna translate into an adverse effect on prey resources for benthic feeding fish or epibenthic invertebrates because of the discrete area of effect and likely short duration of effect (months).

In general, the locations of the proposed Yaquina ODMDS do not provide unique breeding, spawning, nursery, feeding, or passage habitat. It is unlikely that any of the larger organisms (fish, marine mammals, etc.) would experience physiological effects as a consequence of disposal because the resulting turbidity plume and physical disturbance to the water column would likely cause them to avoid the area. Based on modeling completed by USACE, water column turbidity would be expected to dissipate within a few minutes to half hour. Any avoidance behavior would be limited to the duration of this physical disturbance. Indirect impacts could occur if disposal operations changed the value of the habitat by burying the existing benthic community where dredged material is deposited. The benthic community would be expected to re-colonize within a period of a few weeks to months after disposal, limiting any effects to forage fish. In addition, evaluation of past disposal activities has not indicated that any long-term adverse impacts to living resources have occurred.

Disposal at the sites will result in the mortality of benthic organisms and some crabs and fish that are in the disposal location. From the 2008 benthic and epibenthic studies, all of the species collected were typical of nearshore, sand-dominated seafloor habitat. The effect to benthic invertebrates is localized to the disposal area and the effect is likely limited in duration, with full recovery expected prior to the following year's disposal events. Any further effect up the food chain, limited prey resources, is unlikely a limiting factor for species growth or reproduction.

EPA prepared a Biological Assessment (BA) to assess the potential effects of designating the Yaquina North and South ODMDS on the 25 ESA-listed species that may occur in the Yaquina nearshore area and submitted the BA to the NMFS and U.S. Fish and Wildlife Service. While site designation would not have a direct impact on any ESA-listed species, there would be indirect impacts associated with reasonably foreseeable future disposal activities. These indirect impacts include a short-term increase in suspended solids and turbidity in the water column when dredged material was disposed at the ODMDS, impacts to organisms in the water column during disposal, and an accumulation of material on the ocean floor. EPA concluded that its action may affect, but is not likely to adversely affect 18 ESA-listed species but would likely adversely affect Oregon Coast coho salmon. In addition, EPA concluded that the indirect effects of the designation of these Sites would not adversely affect designated critical habitat for southern green sturgeon.

Socio-Economic Resources

Designation and use of the proposed ODMDS would not result in unacceptable adverse effects to recreational, commercial fishing, and economic values. The proposed sites are located to minimize resource impacts and use conflicts to acceptable levels. Placement of dredged material into the proposed sites will be managed to avoid formation of mounds that could interfere with commercial fishing activities. Further, in the absence of ocean dumping, the Yaquina federal channels cannot be economically maintained. The benefits associated with continued ocean commerce of the Yaquina Bay system are substantial on a regional and national scale. While all economic values would not be completely lost, failure to maintain the navigation project would necessarily result in severe economic disruption to municipalities, industries, and individuals throughout the Pacific Northwest. Failure to maintain the navigation projects would not be expected to directly impact recreational uses or esthetic values defined.

The cultural resource literature search conducted (see Appendix D) resulted in documentation of wrecked vessels in the nearshore area. Although most of these shipwrecks occurred on the bar, ocean currents deposited some of these vessels on South Beach. In addition, other vessels were towed and then abandoned on South Beach. Given the characteristics of the bar, onshore current pattern, hard sand bottom, and the fact that the navigation channel over the bar has been actively maintained by dredging, it is unlikely that any shipwrecks have survived. Several sidescan sonar studies were conducted in the vicinity of the North and South ODMDS. No potential shipwrecks or other cultural features were noted. Thus, it is unlikely that any significant cultural resources will be affected from designation and use of the North and South ODMDS.

SUMMARY OF COORDINATION

Federal Action

The proposed federal action consists of designation of two ODMDS at Yaquina Bay. Site designation does not create or confer rights on any person to use a designated site upon the effective date of site designation. Persons or entities who seek to use a site must first obtain a federal permit, or in the case of the USACE, meet the substantive permit requirements, in order to actually use a designated ocean dredged material disposal site. This process would include

meeting the requirements of applicable statutes and regulations. The EPA recognizes, however, that site designation is intended to have a practical result. When sites are designated, it is expected that such sites will be used by persons or entities meeting the statutory and regulatory criteria for ocean disposal of dredged material. Therefore, actual disposal is an indirect effect of site designation and is included in the evaluation of effects under the below listed statutes.

Endangered Species Act

The EPA initiated consultation under Section 7 of the Endangered Species Act of 1973, as amended (16 United States Code (U.S.C.) Sections 1531 to 1544) with the U.S. Fish and Wildlife Service and National Marine Fisheries Service. EPA will not take final action on the proposed Yaquina ODMDS until consultation under the ESA is complete.

Magnuson-Stevens Act and Marine Mammal Protection Act

EPA prepared an essential fish habitat (EFH) assessment pursuant to Section 305(b), 16 U.S.C. 1855(b)(2), of the Magnuson-Stevens Act, as amended, 16 U.S.C. 1801 to 1891d, and submitted that assessment to the National Marine Fisheries Service. NMFS is reviewing EPA's EFH assessment and an Endangered Species Act BA for purposes of the Marine Mammal Protection Act of 1972, as amended, 16 U.S.C. 1361 to 1389. EPA will not take final action on the proposed Yaquina ODMDS until the NMFS review is complete.

Coastal Zone Management Act

The Coastal Zone Management Act, as amended, 16 U.S.C. 1451 to 1465, requires federal agencies to determine whether their actions will be consistent with the enforceable policies of approved state programs. EPA prepared a consistency determination for the Oregon Ocean and Coastal Management Program (OCMP), the approved state program in Oregon, to meet the requirements of the CZMA and submitted that determination to the Oregon Department of Land Conservation and Development (DLCD). EPA will not take final action on the proposed Yaquina ODMDS until the DLCD review of EPA's consistency determination is complete.

National Historic Preservation Act

EPA initiated consultation with the State of Oregon's Historic Preservation Officer (SHPO) to address the National Historic Preservation Act, as amended, 16 U.S.C. 470 to 470a-2, which requires federal agencies to take into account the effect of their actions on districts, sites, buildings, structures, or objects, included in, or eligible for inclusion in the National Register. EPA determined that no historic properties were affected, or would be affected, by designation of the Yaquina ODMDS. EPA did not find any historic properties within the geographic area of the sites. This determination was based on an extensive review of the National Register of Historic Districts in Oregon, the Oregon National Register list and an assessment of cultural resources near the sites. EPA will not take final action on the proposed Yaquina ODMDS until the coordination with the SHPO is complete.

Tribal Consultation

Government-to-government consultation letters were sent to the Coquille Indian Tribe, the Cow Creek Band of Umpqua Tribe of Indians, the Confederated Tribes of the Grand Ronde Community, the Confederated Tribes of the Siletz Indians, and the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians. Tribal comments were also solicited during the NHPA process.

SELECTION OF OCEAN DISPOSAL SITES FOR FORMAL DESIGNATION

Based on the evaluation of the criteria contained in 40 CFR Parts 220 through 228, the USACE and EPA have determined that the proposed North and South ODMDS are suitable for designation and use as disposal sites for ocean dumping of dredged material, when disposal and site management is performed in accordance with the Site Management and Monitoring Plan that was developed under 40 CFR 228.9 and with use restrictions that will be specified as part of this designation. The USACE and EPA have further determined that material dredged from the Yaquina Bay and estuary projects meet the criteria for dredged material dumping. The North and South ODMDS are proposed for designation by EPA through formal rulemaking, adopting this ODMDS Evaluation/EA/Section 103 study and the appendices to support this action.

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