

FINDING OF NO SIGNIFICANT IMPACT
EXPANSION OF OCEAN DISPOSAL SITES B AND E
MOUTH OF THE COLUMBIA RIVER, OREGON AND WASHINGTON

The proposed action is the temporary expansion of the existing EPA-designated ODMDSs B and E and changed management at these sites which will more specifically direct the disposal of dredged material at the expanded sites. A critical condition of this temporary measure will be the completion of a dredged material management study initiated by the EPA and the Corps. The temporary expansion will allow needed maintenance dredging of the MCR project without exacerbating the mounding problem while studies are conducted to develop a long-term management plan for disposal of dredged material from the mouth of the Columbia River and the estuary.

After full consideration of the potential environmental impacts, I have determined that the proposed action will not result in any significant effect on the human environment and that preparation of an Environmental Impact Statement for the temporary expansion and adjustment of disposal management practices would not be required.

EPA Region 10 has made a similar determination associated with their Section 102 site designation formal rule making process.

Date: 6/19/97


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**SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
EXPANSION OF OCEAN DREDGED MATERIAL DISPOSAL SITES B AND E
MOUTH OF COLUMBIA RIVER FEDERAL NAVIGATION CHANNEL (MCR)
OREGON AND WASHINGTON**

PURPOSE

This supplemental Environmental Assessment (EA) addresses the administrative action by Region 10, Environmental Protection Agency (EPA), and the Portland District, Corps of Engineers (Corps) to temporarily expand the existing EPA-designated ocean dredged material disposal sites B and E and to alter the use and management for disposal of dredged material of these sites and site F as provided for by Sections 102 and 103 of the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972. The expansion of sites and changed management is jointly proposed by the two agencies as a temporary measure to prevent the potential for developing navigation hazards and continue to allow the use of these sites by the Corps to maintain the Mouth of the Columbia River (MCR) channel. The Corps and the EPA have initiated the necessary studies to develop a long-term dredged material management plan with expected completion in 1999.

This Environmental Assessment will support the following actions related to the proposed action:

a. The Public Notice, dated 26 December 1996, by the Corps to identify the expanded ODMDS B and E under the provisions of Section 103 of the MPRSA and in accordance with Corps regulations 33 Parts 335-338 for Corps use to place maintenance dredged material from the MCR Federal Navigation project.

b. Concurrence or non-concurrence of the Section 103 action by EPA.

INTRODUCTION

Substantial quantities of sediments have been dredged annually at the Mouth of the Columbia River (MCR) since 1885 to maintain authorized navigation depths. In its present configuration, the entrance channel at MCR requires annual dredging of 3-5 million cubic yards of fine to medium-grained sand. Dredging in the channel is necessary to maintain the Federal project to the authorized depth of 55 feet (48 feet to the south) over the approximately five-mile entrance channel to allow safe passage of large commercial navigation to upriver ports. The dredging has traditionally and is expected to be continued to be accomplished by hopper dredges. Before 1977, when EPA designated the interim disposal sites A, B, E, and F, all ocean dredged material disposal sites were described only by approximate locations and the placement of dredged material within disposal sites was not strictly controlled. Dredged material placement was governed by the need to keep the material away from the navigation channel. Due to this operational "flexibility" of disposal site boundaries and vessel control prior to 1977, dredged

material was placed over a wider expanse than the present configuration of the ocean dredged material disposal sites (ODMDS) indicate (Corps, 1996).

The transition from an unregulated to a regulated dredged material program began in 1977 when EPA designated the four interim sites and fixed the corner coordinates to abide by the rules of the Ocean Dumping Act. The four sites were designated by EPA in a final rule published in the Federal Register (FR 29923-29927) on August 21, 1986 and the designation became effective on September 22, 1986. Their size and location were governed by the belief that by minimizing the areal extent of disposal, the magnitude of environmental impact due to open water disposal of dredged sediments was also minimized. This assumption has proved to be overly simplistic and erroneous particularly regarding mounding effects (see Problem).

Sites A, B, and F were expanded by the Corps and EPA under Section 103 authority in 1992 to alleviate persistent mounding at sites A and B. An Environmental Assessment and Section 103 Evaluation were prepared to address the effects of that action. No adverse comments were received during public review of those documents. The expanded configuration of these sites as a result of that action constitute the current "base condition".

PROBLEM

The unintended consequence of using the small ODMDSs has been the creation of hazards to navigation at MCR by mounding of placed dredged material. Mounding at sites A and B during the late 1980's and 1990's is attributed to three factors (Corps, 1996):

- a. The restriction of dredged material disposal within relatively small EPA-designated ODMDSs, rather than large unconfined areas and dispersive placement.
- b. Increased use of split-hull hopper dredges, which enhance mounding of dredged Material.
- c. The improvement of ODMDS navigation since 1990 which has allowed for precise positioning control during disposal and repeated dumping at the same location.

In some cases, the mounds rise 60-70 feet above the surrounding bathymetry. Mariners report that the mounds cause waves to steepen or break in the vicinity and shoreward of the ODMDSs and that the wave conditions are hazardous to navigation at MCR. In addition, the formation of the mounds impact the fauna by burying organisms not able to escape the relatively rapid accumulation of sediments from repeated disposals, changing bottom configurations and at least temporarily changing substrate conditions, and do not allow for "complete recovery" of the sites due to the frequent and concentrated use.

Ocean dredged material disposal sites which were intended to become moderately dispersive and have a 20-year life have reached capacity within 10 years of initial operation. Site capacity is that quantity of material which can be placed within the legally-designated disposal site without extending beyond the site boundaries or interfering with navigation. Dispersal rates have continued at lower rates than anticipated and Corps bathymetric surveys are showing significant

mounding at sites A and B with attendant adverse navigation effects. Site F (1992 expanded), located furthest offshore, has not mounded significantly since it is a larger site and less material had been placed there. Continued disposal at this site could, however, lead to mounding and creation of further hazards for commercial shippers and pilots as the only safe approach to the MCR channel from the ocean is directly in-line with the site. Site E, located adjacent to the entrance channel, has not mounded since limited quantities have been placed there in recent years and the site is the most dispersive of the four sites.

Commercial shippers, fishermen, and the U.S. Coast Guard have expressed concern over the present situation - potential hazards due to mounding, mounding-caused severe wave action, and to traffic conflicts between navigation and dredges. While the current situation does not constitute an imminent hazard to life and property to large ocean-going vessels, conditions sporadically occur which could swamp or overturn smaller craft especially in the vicinity of Sites A and B. EPA and the Corps are in agreement that prudent management action is required now in order to prevent such a situation from developing.

PROPOSED ACTION

In order to lessen the impact of future dredged material disposal on navigation at MCR and to lessen and avoid if possible, negative impacts on fauna, the Corps and EPA began to investigate other disposal techniques at MCR for both dispersive and non-dispersive sites. The Corps and the EPA concluded (Corps, 1996) that by optimally distributing, that is by thin-layer dredged material disposal over larger areas, maximum mound thickness per individual dump could be kept less than 0.3 feet (about 10 cm). To achieve that result, the dump areas need to be adequately sized so that the relatively-small area utilized by a single dredge dump would not be used again in the immediate term. To be effective, the technique must incorporate accurate dump vessel positioning and vessel speed.

The joint Corps-EPA plan of action incorporates an interim or short-term phase and a long-term phase. The interim phase includes site expansion that would allow continued maintenance of the MCR channel while studies are conducted to ascertain the extent of the problems, to develop and evaluate alternate solutions, change in site management, convene a site-designation work group in the summer of 1997, and preparation of a long-term response. It is expected that the long-term response could include designation of new ODMDSSs, permanent expansion of some or all of the existing ODMDSSs, de-designation of at least one existing ODMDSS, and development of a comprehensive management plan to guide disposal of dredged material from the MCR project and the Columbia River Navigation project within the estuary. This joint plan is expected to be completed in late 1999 in coordination with the proposed Columbia River Deepening Feasibility Study. EPA would complete the final site designation process using their authority under section 102 of the MPRSA.

Site Expansions. The short-term proposed action is the temporary expansion of the existing EPA-designated ODMDSSs B and E. The existing ODMDSSs and their proposed expansions are shown

on figure 1. Location descriptions and coordinates for the proposed expansion sites (North American Datum 1983) are listed below:

Site B. This ODMDS would be expanded to approximately 2 by 4 nautical miles for a surface area of 8 square nautical miles. The site would range in depth from - 55 feet MLLW inshore to -225 feet MLLW offshore. The four corner coordinates (NAD 1983) of the expanded site are:

SE:46° 14', 23" N;	124° 08', 40" W
SW:46° 15', 31" N;	124° 13', 46" W
NW:46° 14', 18" N;	124° 15', 07" W
NE:46° 16', 10" N;	124° 10', 01" W

Expansion of site B would increase disposal site area to approximately 12 times that of the existing (expanded 1992) site. The proposed expanded portion of the site has not directly received discharges of dredged material, although sediments placed within the boundaries of the existing site have moved into portions of the expanded area as a result of downslope movement and currents.

Site E. This ODMDS would be expanded about six times its existing size, from 1000 feet by 4000 feet to a trapezoidal shape with bases of 1000 feet and 3000 feet and an inshore to offshore length of 12000 feet. Depths of the expanded site range from - 45 feet MLLW to - 75 feet MLLW. The four corner coordinates of the expanded site are:

SE:46° 15', 35" N;	124° 05', 15" W
SW:46° 14', 31" N;	124° 07', 03" W
NW:46° 14', 58" N;	124° 07', 37" W
NE:46° 15', 42" N;	124° 05', 26" W

This expanded portion also has not received direct discharges of dredged material in the past, however, like the expanded Site B, this expanded area also has been influenced by the redistribution of sediments discharged at the designated site.

Site Management. Short-term management will focus on the distribution of dredged material among sites, distribution and manner of placement within sites, active bathymetric monitoring, and communication with interested parties on annual plans and results. Specifically, the following refers to the 1997 dredging and disposal season:

Site E. Disposal at this site will be maximized to the extent possible since it is known to be highly dispersive and most material placed there would be expected to remain in the littoral system. Initially, disposal quantities of approximately 2 million cy will be placed at expanded site E. If monitoring indicates that dredged material placed in the expanded site is not mounding or migrating into the navigation channel, this volume would be increased. Material would be distributed throughout the expanded site by strictly controlling dump vessel positioning and

speed.

Site B. Because of the concerns expressed for the crab fishery, disposal will be initially restricted to the existing (expanded 1992) site. Estimated remaining capacity of this site, before potentially affecting wave climate, is 1-2 million cy. For the 1997 dredging season an estimated 600,000 cy will be disposed in the outer portion of the site with close monitoring to assure that unacceptable mounding would not occur. Disposal in expanded site B would begin after the 1997 dredging season. Quantity of sediment to be disposed at the expanded site is not known at this time, but is estimated at approximately 1.5 million cy annually. The proposed disposal practice in the expanded site would be thin-layer, as previously described, to minimize adverse effects on navigation due to mounding, and smothering of benthic communities and other resources due to concentrated placement. Disposal locations would be coordinated each season to avoid or minimize crab fishery and other biological impacts. Additional biological evaluation, which would include determining whether impacts to crab populations are measurable, will be initiated prior to disposal in expanded Site B.

Site F. Existing Site F also would be utilized as much as possible given the concerns and possible conflicts between commercial navigation routes and dredge vessel locations. The estimated remaining capacity of Site F, before potentially affecting wave climate, is 8-10 million cy (Corps, 1996). The proposed disposal plan is to place up to 1-2 million cy of material evenly distributed over the site during 1997 with monitoring of the bathymetry.

Site A. Disposal would be discontinued indefinitely. Past mounding and possible effects on the navigation channel make future use unlikely.

ALTERNATIVES

General. Under the MPRSA, designation of ocean dumping sites follows specific requirements. In conjunction with the MPRSA, the Ocean Dumping Regulations, as well as related EPA and Corps of Engineers policies, must be followed. Guidance for the evaluation process is provided by a joint EPA/Corps workbook (1984). This process generally involved three major phases. Phase I includes delineation of the broad offshore area known as the Zone of Siting Feasibility (ZSF), i.e., the area within which disposal is economically and technically feasible. The ZSF is determined by establishing the reasonable haul distance, considering factors such as available dredging equipment, energy use constraints, costs, safety concerns, and anticipated dredging volumes. A four nautical mile ZSF was established for the MCR project (see below). Existing information on resources, uses, and environmental concerns within the ZSF are reviewed and critical resources and areas of incompatibility identified. Phase II involves identification of candidate sites within the ZSF based on information evaluated in Phase I. Additional studies can be conducted to further evaluate environmental and other factors, such as disposal site management considerations. Phase III consists of evaluation of candidate sites and selection of preferred site(s) for formal designation by EPA. Preparation of an EIS and the designation rule

by EPA is part of Phase III. The selection of sites for designation necessarily takes into account, and must often balance, conflicts between resources, equipment, and other constraints (see following paragraphs). This process was followed in the original designation of the four MCR sites in 1986 and those factors of consideration are still applicable in evaluating the proposed expansions today.

Dredging of Northwest coastal projects, including MCR, is limited to a season roughly from April through October. That limit is imposed by weather and sea conditions that predominate in the Northwest.

For the MCR project, a hopper dredge must be used because the sea and swell conditions encountered at the entrance are not suitable for safe operation of a pipeline dredge or clamshell dredge and barge. Analyzing the amount of work on the West Coast and availability of hopper dredges (Government and contractor) capable of dredging the MCR entrance, it is unlikely that more than 130 days would be available in any year to maintain MCR. Based on the production capability of the Corps dredge, *Essayons* (representing a typical dredge likely to be used on the project), and the historical volumes of sediment dredged (3-5 million cubic yards per year), a minimum of 120 working days would be needed to maintain the entrance channel, provided that the haul distance for disposal does not exceed 4 nautical miles. Longer hauling distances of dredged material increase vessel operating costs and the time required for completion of the work. Loss of production time due to adverse weather conditions must also be anticipated even during the summer months. These factors reduce dredging capability and could jeopardize the ability to maintain a safe and passable entrance channel.

Previous Alternative Analyses at MCR. The EPA site designation EIS (1983) evaluated various alternatives to ocean disposal. Increased disposal within the Columbia River estuary, use of upland sites, and disposal off the continental shelf were evaluated, but dropped from detailed consideration. Ocean disposal alternatives focused on the area within a 4 nautical mile radius from the entrance channel (Mile 0) identified as the ZSF (see above).

In 1992, an Environmental Assessment for the expansion of sites A, B, and F was prepared which tiered off of the 1983 EIS. Alternatives that were considered in detail in that EA included:

- 1) interim expansion of existing ODMDS sites;
- 2) permanent expansion of the existing ODMDS sites;
- 3) use of other existing ocean disposal sites;
- 4) designation of new ODMDS sites;
- 5) different site management; and
- 6) no action.

With the exception of interim expansion and different site management, these alternatives were determined to be environmentally or economically unacceptable, or illegal. Of particular pertinence at this time is the alternative "Designation of New ODMDS Sites" and the reasoning of

the government in its selection of the preferred alternative.

“In the judgment of Region 10 EPA and Portland District Corps, immediate and proactive attention to the development of mounds is a necessary and appropriate response. Both agencies have reviewed recently collected monitoring information at sites A, B, and F and have jointly concluded that this information is sufficient to support expansion of these sites, require changes in disposal operations for use of the sites, and to begin development of a long-term management plan for dredged material disposal at the mouth of the Columbia River. The existing information is not considered sufficient to direct EPA and the Corps to select a long-term solution to the MCR ocean dredged material disposal at this time. This question will be more thoroughly addressed in conjunction with other proposed actions (i.e., the proposal to deepen the Columbia River channel). While it is anticipated that a long-term solution would include permanent expansion of some or all of the existing sites and/or designation of one or more new disposal sites, the input by other federal and state agencies, the primary users (i.e., port districts), and the public in scoping necessary studies and development of a long-term management plan is a necessary and appropriate measure. Accordingly, the proposed action was selected as the preferred alternative by EPA and the Corps.”

At that time, it was anticipated that Site F would receive the majority of MCR material, thus its substantial expansion. EPA published a proposed rule in the Federal Register (September 21, 1992) intended to confirm the temporary expansions and intent to reevaluate all sites at MCR as part of site designation for the Columbia Deepening Study which would coordinate and key needed studies and evaluations. Three developments occurred which delayed finalization of the rule. First, Congress delayed the start of the Deepening study by about a year. Secondly, the Corps and EPA were contacted by the Columbia River Bar Pilots regarding potential vessel traffic conflicts. The expanded Site F occupies the same seas used by the pilots for staging of incoming and exiting vessels while the pilots transfer. Immediate traffic conflicts between these ocean vessels and government and contractor dredges were recognized. The third development was significantly increased mound/wave modeling capability at Portland District. Initially used at Coos Bay, the utility of the new programs to the MCR situation was immediately recognized and implemented. This resulted in the joint Corps/EPA December 1996 draft report, *Utilization of Existing MCR ODMDSs and Proposed Expansion of Sites "B" and "E"* (Corps, 1996) which also concluded that the capacity of Site F was much less than the Corps and EPA had anticipated without generating significant waves and compromising vessel safety. Accordingly, the 1992 plan which relied very heavily on use of Site F during the interim had to be reconsidered.

While some additional studies have been conducted, not all data were in and evaluations were incomplete regarding designation of new sites, a situation similar to that faced in 1992. Formation of an interagency site designation workgroup, as part of the Columbia River Channel Deepening Study, to evaluate designations of new sites is scheduled to begin this summer. The

outcome of that process will be a long-term management plan for the mouth of the Columbia River and estuary which will likely include formal designation of new ODMDS. Immediate new site designations by the Corps and EPA without the involvement of interested stakeholders and without the completed data is not considered a viable alternative at this time. It is hoped that the workgroup will proceed rapidly and that a long-term solution can be implemented within the next 2-4 years. Alternatives considered by the Corps and EPA for this situation and Environmental Assessment include:

- 1) interim expansion of all sites;
- 2) interim expansion of selected sites; and
- 3) no action.

Interim expansion of all sites was initially considered but does not seem to be merited. The use of Site F by commercial shipping and bar pilot transfer and its relatively small disposal capacity--even with thin-layer placement--reduces its utility. Further expansion would not reduce the potential for navigation conflicts. Also, further evaluation of biological information in the vicinity of Sites F and A is necessary to demonstrate compliance with the ocean dumping criteria (Site F was expanded as much as considered reasonable in 1992). Further, disposal at these sites would not put sediments into the north-trending littoral system (a consideration expressly requested by the State of Washington for the past several years). Expansion (as well as relocation) of these sites will still be considered as part of long-term site designation efforts.

The no action alternative would require continued disposal at the existing sites (including those as expanded in 1992). Actions taken by the Corps and EPA since 1992 had prevented additional mounding at MCR, and while the mounds had stabilized, they have not disappeared. Any further disposal in the original sites A or B would exacerbate the navigation safety hazards, especially to smaller craft such as fishing boats. The western half of site B (the area covered by the 1992 expansion) has some remaining capacity (estimated 1-2 million cubic yards), but careful monitoring would be required to avoid adverse wave conditions.

AFFECTED ENVIRONMENT

Previous environmental documents (1983 EIS, 1992 EA) have described the physical and biological environment of the mouth of the Columbia River and existing ocean disposal sites. Conditions have not changed to warrant revision of those documents. This EA Supplement focuses discussion on those areas affected by the proposed action of expansion and use of Sites B and E. The principal sources of information for the discussion are a series of benthic infaunal, fisheries and sediment studies conducted from 1975 through 1977 and 1989 through 1996 by the National Marine Fisheries Service for the Corps of Engineers Portland District and a bathymetry and wave generation report on Sites B and E prepared by Portland District, dated December 1996. These studies are referenced where appropriate.

Physical. Expanded Site E is characterized as having a high energy environment subject to continual influence from ocean, tidal and river currents and wave action. As a result, bottom sediments are in a

continual state of movement and are primarily sand containing very low levels of silt or organic material. The site is located on the submerged southern flank of Peacock Spit with depth ranging from a minimum of 45 feet inshore to a maximum of 70 feet offshore.

Longshore currents vary seasonally, flowing from the north from July through September and from the south from October through June. Wave direction, frequency and intensity also vary with northwest trending wave patterns occurring from April to November and southwest trending, higher waves occurring typically from December to March. As discussed in the introduction, mounding at sites B and A has increased wave heights at these locations. Modelling indicates that wave heights increase a minimum of 20% for short period waves to a maximum of 80% for long period waves (Corps, 1996).

Expanded Site B extends from the northern tip of the submerged Peacock Spit formation at an average depth of 55 feet for a distance of 4 nautical miles to its most westward boundary at an average depth of 225 feet. Generally, sediments vary from fine-grained sand (.15mm) in the inshore portion to very fine-grained sand (.11mm) in the deeper offshore portion. This reflects the general trend along coastlines which one would expect moving from a shallower, higher energy environment to a deeper, lower energy environment where only finer sediments are transported by the combination of currents and gravity. A portion of expanded Site B, however, does not conform to this general condition. This is due to the combination of Columbia River outflow and ocean currents which form a large eddy in the vicinity of Site B. The eddy effect allows finer sediments to fall out of suspension and settle on the bottom. Sediment sampling studies (Hinton, et al, 1992; Hinton and Emmett, 1996) have located this area of finer sediments to the north of existing Site B and partly within the proposed expanded site. This silty depositional zone seems to shift widely to the northwest, probably depending on outflow volume.

Biological

Benthic Invertebrates. The MCR area exhibits a considerable seasonal and yearly variation in benthic community structure and species composition. Seasonal variability is due primarily to changes in sediment type by deposition from the Columbia River and winter storms (Richardson, et al, 1977). Yearly variation is thought to be more significantly influenced by upwelling patterns and changes in Columbia River flows (Hinton, et al, 1992).

In general, benthic invertebrate density at the MCR increases offshore and to the north. This is likely a result of the increased stability of sediments offshore due to a lack of disturbance at depth during winter storm events and the presence of tube-dwelling polychaete worms that help stabilize the sediment. These areas are also outside of an area of major deposition of Columbia River sand and receive the fine-grained silts and organics which can increase overall productivity. The outer portion of expanded Site B is within an area of higher invertebrate density. The high energy area inshore, such as at expanded Site E, is less productive and generally has lower density and diversity. This is likely due to the instability of the sediment and lack of input of silt and organics.

Fisheries. A variety of anadromous and resident fish species occur as both adults and juvenile stages within the oceanic area offshore of the Columbia River and estuary. Anadromous species such as salmon, steelhead, shad, lamprey, smelt, herring and sturgeon are present in the area as adults prior to migrating to spawning grounds in the estuary or upstream in the Columbia River. Occurrence of adult migratory species off the Columbia River is correlated primarily with their spawning period. Although some species such as coho salmon may spend large portions of their lives in the area, the actual residence time has not been determined. Juveniles of these species are present following their migration out of the river or estuary into the ocean. Some remain in the near shore area for various periods of time feeding and rearing, while others move directly offshore. Juvenile flatfish in particular rear in the inshore area.

Resident species occur throughout the year with many using the estuary as a rearing and nursery area. Species present include various species of flatfish, rock fish and other demersal species.

Durkin and Lipovsky (1977) performed a detailed analysis of the demersal fish species present in the offshore area and Bottom, et al. (1984) completed an assessment of the fish within the estuary. Fifty-one species of fish were collected of which 11 represented 95 percent of the total catch.

In general there are two species assemblages: one north of the river mouth and one south. The northern assemblage included anchovy, white bait smelt, longfin smelt, Pacific tomcod, pricklebreast poacher, and showy snailfish. The southern assemblage includes the shiner perch, Pacific staghorn sculpin, Pacific sanddab, butter sole and sand sole. Fish species captured by trawling north of the mouth in 1992 (Hinton and Emmett, 1994) were similar to those found in the previous surveys.

Almost all of the Columbia River offshore area is used for some type of commercial fishing activity. The major fisheries are for crab, bottom fish, salmon, and shellfish. Crab fishing is done by pots and occurs predominantly from winter to late summer for the Dungeness crab (*Cancer magister*). Over ninety percent of the catch occurs during the first two weeks of December. Most crab fishing occurs north of the Columbia River mouth at depths of 25 to 250 feet which includes all of Site B. Crabs typically molt in the MCR vicinity from July through September. Individual crabs molt for a period of 48 hours from shedding of the old shell to development of the new hard shell. Based on Washington Dept. of Fish and Wildlife catch data provided by Washington Dept. of Ecology letter dated April 25, 1997, crabs are found in varying stages of soft-and hard-shell condition at depths generally less than 100 feet extending from Peacock Spit north to Klipsan Beach on the Long Beach Peninsula. Data on exact locations, individual pot counts, and information from other locations have not been provided.

Bottom fishing by trawling occurs year-round. The fishery is predominantly for flatfish and rockfish species as well as pink shrimp. Trawling also occurs throughout the area except in established shipping lanes. Commercial and recreational salmon fishing also occurs over much of the offshore area. Species include, chinook, coho, and to a lesser extent pink salmon. The season varies yearly and depends upon the catch quota set by the Pacific Fisheries Management Council.

Marine Mammals. Green et al. (1991) recorded 14 species of cetaceans off the Oregon and Washington coastline in their 1989-1990 survey effort. Six species, e.g., Risso's dolphin, Pacific white-sided dolphin, northern right whale dolphin, harbor porpoise, Dall's porpoise and gray whales comprised 97 percent of the cetaceans observed by Green et al. (1991). Potentially 30 cetacean species can occur along the Oregon coast (Green et al. 1989), although their numbers are generally limited. Most cetacean species observed by Green et al. (1991) occurred in continental slope (e.g. 200m-2000m depth) or offshore waters (>2000m depth). Harbor porpoises and gray whales were prevalent in shelf (e.g. <200m depth) waters.

Five species of pinnipeds are known to occur off Oregon and Washington: northern sea lion, California sea lion, harbor seal, northern elephant seal and northern fur seal (Bonnell et al. 1991). Harbor seals, California sea lions and northern sea lions are the species most frequently associated with the mouth of the Columbia River.

California sea lions are also present at the mouth of the Columbia River and in the estuary. This species occupies haulouts at the Columbia River South Jetty and the Astoria East End Boat Basin. They typically occur in fall and spring months. The continental shelf and Columbia River estuary represent foraging areas for this species (Bonnell et al. 1991). No rookeries are associated with the Columbia River mouth.

No rookeries of northern sea lions are associated with the mouth of the Columbia River. A historic rookery occurred at Three Arch Rocks south of the Columbia River near Tillamook, Oregon. This species is known to frequent the mouth of the Columbia River in winter (Brown 1988, Bonnell et al. 1991). The Columbia River South Jetty represents the haulout location for northern sea lions in the MCR.

Birds. Pelagic birds are extremely numerous off the Columbia River. Briggs et al. (1991) reported that seabird populations were most densely concentrated over the continental shelf. Shearwaters, storm-petrels, gulls, common murre and Cassin's auklets numerically dominated the pelagic bird fauna from late spring through late summer (Briggs et al. 1991). Phalaropes, fulmars and California gulls are important constituents of the fall pelagic bird flocks (Briggs et al. 1991). The principal species or species groups in the winter pelagic bird population are phalaropes, California gulls, fulmars, other gulls, murre, auklets, and kittiwakes (Briggs et al. 1991).

Reptiles. Four species of marine turtles, e.g. loggerhead, green, Pacific ridley, and Pacific leatherback, have been recorded from strandings along the Oregon and Washington coastline since 1982 (J. Scordino, NMFS, pers. Comm. Cited by Green et al. 1991). Green et al. (1991) recorded 16 Pacific leatherbacks during their survey of Oregon and Washington coastal waters. They were associated with warmer waters that occurred over the Pacific slope waters during summer (Green et al. 1991).

Threatened and Endangered Species. Information on currently known endangered, threatened or candidate species is described in the following paragraphs and is based upon biological assessments

previously prepared for designation of ocean dumping sites at the mouth of the Columbia River and other offshore locations along the Oregon Coast.

The USFWS has listed the bald eagle, peregrine falcon, brown pelican, marbled murrelet and western snowy plover as potentially occurring in the vicinity of the disposal sites. For most listed species, any use that does occur in the vicinity of MCR appears transient in nature; no nesting pairs are located nearby and there is limited use by migrants. Nesting pairs of bald eagles are located at the Columbia River mouth but their foraging territories are associated with the estuaries. Brown pelicans and marbled murrelets can be expected to forage at or in the vicinity of the MCR disposal sites on occasion. Western snowy plovers occur on the ocean beaches in northern Oregon and southwestern Washington and thus are distant from the proposed sites.

The gray, humpback, blue, fin, sei, right, and sperm whales are also listed as occurring in the vicinity of the disposal sites. Coastal waters off Oregon serve as a migrational corridor for gray whales moving to and from their breeding, calving and assembly areas off mainland Mexico-Baja California, and their primary foraging areas in the Arctic. Gray whales summer along the Oregon coast with most sightings occurring within 500 meters off shore. Near shore areas with silty sediments appear to be foraging areas for this species. The humpback, right, fin, blue, sei, and sperm whales may occur in the project area, but information on numbers, distribution and feeding habits is lacking other than in a general sense. Blue whales occur off the Oregon coast primarily in May-June and August-October. Humpbacks occur primarily between April and October with peak numbers occurring June, July, August. Sperm whales occur as migrants and some may summer off the Oregon coast. Fin whales range well off the coast during summer. Right whales may occur off the Oregon coast during winter; sei whales winter south of Oregon.

The occurrence of Federally listed sea turtles (e.g., loggerhead, green, Pacific ridley, and Pacific leatherback) off the Oregon coast is associated with the appearance of albacore which, in turn, is strongly associated with warm waters of the Japanese current. These warm waters generally approach the Oregon coast in late summer, but typically occur 30 to 60+ miles offshore. It is expected that sea turtles would only be casual visitors to the project area which lies well inshore from their normal range.

Snake River sockeye and chinook salmon stocks have been listed as threatened or endangered; Lower Columbia River coho salmon is a candidate species for listing; and coho salmon (Oregon coast) and steelhead (Oregon coast) have been proposed for listing. The area off Columbia River mouth is not considered critical habitat for these species.

ENVIRONMENTAL CONSEQUENCES

Previous environmental documents (1983 EIS, 1992 EA) generally discussed impacts of ocean disposal at all sites at the mouth of the Columbia River. The following discussion reviews those impacts applicable to Sites B and E and utilizes information from studies conducted since preparation of the last EA.

Physical Impacts. The areas proposed for the expansion of Sites B and E have not previously been used for the direct disposal of dredged material (dredged material may have been placed at these sites prior to restricting to specific sites in 1977). Some of the sediments disposed at the sites, however, are transported into the expanded areas as a result of littoral drift and downslope movement. The effects of previous disposal at the existing sites were discussed in the earlier referenced documents.

In summary, material deposited at Site E would tend to either move onshore or slowly move along the coast with the littoral drift system. Disposal at Site B would tend to remain within the site with some dispersal northward from the inshore portion of the site and primarily downslope movement from the offshore portion.

No mounding is expected at Site E (with frequent monitoring to determine capacity) as the site is highly dispersive (Corps, 1996). Sediment characteristics at the site would not be modified by disposal.

Distributing material over a much larger Site B would minimize mounding and not change bottom topography to any great extent from any single disposal action. Total mound accumulation will be limited to a maximum allowable standard of generating wave height increase to 10% or less over existing conditions (Corps, 1996). Sediment characteristics would be modified by adding fine- to medium-grained sand (.26mm) to fine- to very-fine grained sand (.15mm) over a portion of the expanded site for a short time following disposal. Prevailing conditions will redeposit finer-grained sediments within an estimated 6 months based on Site F and Experimental Site G monitoring data (Siipola, Hinton and Emmett, 1993).

Biological Impacts. In general, dredged material disposal presents four potential problems to aquatic organisms: (1) temporary increases in turbidity, (2) direct burial, (3) changes in physical and chemical characteristics of sediments (habitat), and (4) the possible introduction of pollutants. It is difficult to distinguish significant effects caused by sediment disposal from changes due to natural variability in species abundances.

Releases of dredged material at MCR do not produce a persistent turbidity plume (Boone et al., 1978), thus decreased light transmission with a concomitant decrease in phytoplankton primary productivity is not expected to occur. In addition, no detectable changes in dissolved nutrient or trace metal concentrations accompany disposal; therefore, no significant adverse impacts on phytoplankton productivity are expected from pollutants or turbidity. Likewise, demersal finfish within the MCR disposal sites are not subjected to increased turbidity, contaminants, or burial by released dredged materials. Dredged sediments sink rapidly without significantly increasing suspended particulate concentrations, and therefore suffocation of finfish by gill-clogging is not expected. Because of their mobility, demersal finfish can prevent burial by moving away from released dredged materials. Durkin and Lipovsky (1977, p. 141) state "sediment removal from the navigation channel annually exceeds 4,000,000 cubic meters, but deposition at Sites B and F in prior years revealed no apparent lasting effect on the diversity and number of finfish."

Benthic organisms at expanded sites B and E would be subjected to burial and, in portions of Site B, slight changes in sediment texture. The larger disposal areas can reduce burial effects by spreading placement in thinner layers. Larger disposal areas would also reduce frequency of disposal at a given location allowing longer recovery periods between disposal events. As previously discussed, the outer portion of Site B contains somewhat finer-grained sand. Disposal of MCR dredged material would introduce slightly coarser-grained sand which would have a short term impact on benthic organisms. Food sources for demersal fish and shellfish would also be affected, however, organic matter in the dredged material are also a food source for these organisms.

In general, dredged material disposal sites are repopulated by benthic organisms which either burrow up through the substrate or migrate into the site from adjacent areas. Benthic sampling following disposal at Site B has shown little change occurring in overall species abundance or diversity, (Hinton et al., 1992; and Hinton and Emmett, 1994, 1996). This is similar to what has been observed at other North Pacific ocean disposal sites.

The effects of disposal on demersal fish and shellfish were evaluated by Durkin and Lipovsky (1977). Conclusions drawn from this study were affected by limited predisposal data and by seasonal variabilities in the abundances of natural populations in the MCR area. Nevertheless, the authors suggest that disposal results in a 3- to 6-month decrease in the numbers of finfish species and individuals. In addition, food sources changed from benthic invertebrates to fish and shrimp following disposal until the benthic population recovers.

Direct burial effects on shellfish, particularly Dungeness crabs, has been evaluated (Durkin and Lipovsky, 1977), although no significant impact was evident. Natural seasonal variations in shellfish abundance appear to be greater than pre-disposal to post-disposal changes identified. Chang and Levings (1978), who evaluated the effects of burial on Dungeness crab in the laboratory, claim that "exposed crabs are able to avoid burial except during extremely rapid deposition" and can escape from sudden burial of up to 10 cm (4 inches) of sediments. Some crabs directly beneath the path of the hopper dredge, where sediment deposition is maximum may suffocate, however, this depth would occur over a limited part of the affected area with thin layer disposal and more gradual deposition (5-10 minutes depending on depth) from the dredge. Bottom accumulation resulting from any single disposal in 60 ft water depth, assuming a current of 1 ft/sec, is predicted to reach a maximum height of 24 cm (9.6 inches). However, 90% of the covered area is less than 10cm (4inches). Bottom accumulation from a single disposal in 160 ft of water depth is predicted to reach a maximum height of 12 cm (4.8 inches). 98% of the area covered at that depth is less than 10 cm (Corps, 1996). Consequently, burial impacts would be greatly reduced. Although no evaluation of disposal on softshell crabs has been conducted, it is likely that mortality would be somewhat higher for crabs in softshell stage than for those in hardshell stage.

Crab presence and numbers are extremely variable in the vicinity of the MCR. Because of this variability, any attempts at defining impacts from any disposal event or cumulative events may be unachievable. The MCR entrance channel has been dredged since the late 1850's and disposal at

current rates have been occurring in the MCR offshore area for nearly 50 years and overall crab abundance at MCR remains high. This indicates that disposal impacts have not been significant.

Because no detectable amounts of trace contaminants are present in the dredged sediments subsequent to dumping, impacts on the benthos due to the introduction of pollutants are not expected (Richardson et al., 1977).

Dredged material disposal involves negligible risk to marine mammals. Marine mammals tend to avoid human activities, therefore the probability of an animal colliding with a hopper dredge or released dredged sediments is small. In addition, dumping will not likely cause injury. Pinnipeds (seals and sea lions) and cetaceans (whales, dolphins, and porpoises) are strong swimmers and can escape the sediment release zone.

Impacts of disposal operations over a wider area on pelagic birds are expected to be minor with potential short-term effects on some of their food sources. No impacts to sea turtles are expected since their normal range is several miles offshore from the disposal sites.

Northern sea lions feed and migrate in the vicinity of the MCR (Everitt et al., 1980). Disposal at the MCR sites will neither significantly alter their haulout areas nor disturb the food supply for northern sea lions. Gray whales do not generally migrate through the MCR area during the dredging season; humpback and finback whales occur within 100 miles of the coast during summer, but their appearance nearshore is rare. Dredged materials from MCR do not contain significant quantities of toxic substances that could possibly bioaccumulate in the food sources of migratory cetaceans.

Threatened and Endangered Species. Biological Assessments will be prepared to formally address impacts to all listed species. Preliminarily, Portland District biologists have determined that the proposed site expansion and use would have no effect or not likely adversely affect these species or their habitats.

Cultural Resources Shipwrecks are the most probable (and recoverable) cultural resources expected to exist in the study area. The potential resource base includes a wide variety of sail as well as mechanically powered vessels. Vessels may include those engaged in early exploration of the coast and the fur trade (1790's - 1850); those limited to the coastal trade supplying pioneer settlements (1820's to early 1900's); and vessels engaged in the development of international trade.

Shipwrecks are considered the most likely cultural resource present at MCR for the following reasons: (1) documentary evidence indicates numerous vessels that wrecked over time; (2) given the size of these cultural resources and the project's depositional environment, preservation of some shipwrecks is likely in portions of the MCR; and (3) records of shipwreck sites are sufficiently accurate that the likely distribution of this resource can be determined.

Although it is unlikely that wrecked vessels are present within the disposal sites, records indicate that some of the vessels damaged at interior bar locations jettisoned cargo and in one instance, cannons, in

an attempt to lighten vessels and pass over shoals (Gibbs, 1964). These abandoned items may still be present along former shoals. In general, areas beyond the 60 foot contour have a low probability of occurrence for these items since most vessels wrecked on beaches, surf lines or shoals.

Prehistoric cultural resources are unlikely to be found in the project area. The assumption that Native Americans could have been present in the project area is based on the fact that 15,000 years ago ocean levels were considerably lower than present levels. However, any prehistoric sites present on former shorelines are now inundated by present ocean levels and buried under substantial amounts of sand deposited during recent geological times.

COORDINATION

A Public Notice, Draft Environmental Assessment and Draft Section 103 Evaluation (CENPP-PE-E-96-09) addressing the proposed action was issued for 30-day review on 26 December 1996. The following agencies received a copy of the Public Notice:

- U.S. Environmental Protection Agency Region 10
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- Oregon Dept. of Environmental Quality
- Oregon Dept. of Land Conservation and Development
- Oregon Dept. of Fish and Wildlife
- Washington Dept. of Ecology
- Washington Dept. of Fish and Wildlife
- Washington Dept. of Natural Resources
- Columbia River Estuary Study Taskforce
- Clatsop County, Oregon
- Pacific County, Washington

Comments were received from most of these agencies as well as from the Columbia River Crab Fishermen Association. See attached letters. Most comments were directed at expansion and use of Site B and potential impacts on the crab fishery. The following summarizes these comments with our response as appropriate.

U.S. Fish and Wildlife Service

Comment. A comprehensive monitoring plan be developed to test not only for dredged material disbursement from Sites B and E but also for the effectiveness of disposing more material in area E to encourage the movement of sand within the littoral drift zone along the Washington shore.

Response. All MCR disposal actions will include bathymetric monitoring to determine if mounding occurs along with establishing a wave height criteria, based on modelling predictions, of no more than 10% increase over existing wave conditions. We will make every attempt to maximize disposal at Site E while considering potential for mounding and disposal timing to avoid return of

sediments to the entrance channel. We are exploring early season disposal to utilize the dispersive effect of the Columbia River freshet as well as disposal during ebb tides to maximize dispersion and movement to the north.

Comment. The Corps limit disposal of materials in the nearshore expanded area of Site B to periods of low level benthic productivity. Monitoring of disposal activities would be necessary to assure that there was no long-term impact to benthic and epibenthic invertebrates.

Response. For the 1997 dredging season, no material will be placed in the nearshore portion of Site B. Future disposals may be placed in this area to test the dispersiveness of the material and potential input to the littoral system which has been a requirement of the State of Washington in the past. Should such placements occur, the design of the operation would be coordinated with the State of Washington and other stakeholders (e.g., U.S. Coast Guard, commercial fishermen). Monitoring would be a necessary part of this operation. Previous studies (Richardson et al, 1977 Durkin and Lipovsky, 1977 and Siipola, Emmett and Hinton, 1993) have evaluated the recolonization rate of benthic invertebrates, shellfish and fish after dredge material disposal at disposal sites offshore of the Columbia River. The studies indicated that the sites recovered to their pre-disposal productivity levels within about 6 months of disposal. Food habitats of fin fish did change following disposal. Prior to disposal fish fed primarily on benthic invertebrates, while after disposal they fed primarily on shrimp and fish. Their diet however returned to being similar to the diet of other fish caught in the area within the 6-7 months following disposal. This change in diet is likely the result of the benthic invertebrates being buried and shrimp and fish moving into the disposal area following disposal. These evaluations were done after a number of disposals in the same area until a mound had developed. The level of impact to the existing habitat from this type of operation would likely be greater than the thin layer disposal proposed. Consequently, the recovery rate should be more rapid for thin layer disposal than the 6 months determined by the earlier studies.

Oregon Dept. of Fish and Wildlife

Comment. The Corps should coordinate with both Oregon and Washington crab fisheries groups... During and just prior to the crab fishing season, disposal in Area B should occur only in areas mutually agreed upon by crab fishermen and the Corps.

Response. Several meetings and discussions have occurred with the crab fishermen. We are making every every effort to minimize impacts on crabs and the fishery through disposal timing, reducing conflicts by restricting contractors to specific transit routes, minimizing disposal in Site B and coordinating with crabbers as to locations prior to disposal. We are also in the process of forming a long-term site designation work group as part of the Columbia River Channel Deepening Study which would include representation from the States of Oregon and Washington and the Columbia River Crab Fishing Association.

Oregon Dept. of Land Conservation and Development (DLCD)

Coastal Zone Management Consistency concurrence was received from this agency with conditions for use of the expanded sites. A copy of their letter and Portland District letter of response is attached.

Comment. Disposal monitoring designed to more fully determine the short- and long-term effects of the broad dispersal of dredged material on ocean resources and uses, particularly on crabs, benthic habitat, and crab fishing operations, shall occur with results provided to the state.

Response. (See response to USFWS letter above.)

Comment. Once a year or as otherwise mutually agreed to by the CE and DLCD, the CE shall provide the state with documentation showing exact disposal sites and volumes for each dredging season.

Response. The Corps will consult with DLCD as to a timeframe for providing this documentation.

Comment. ODMD disposal at Site B shall not occur at this time.

Response. Discussions with DLCD and other agencies since this letter was written have demonstrated that disposal in expanded Site B cannot be avoided if mounding is to be eliminated and/or the entrance channel fully maintained. As described in our response to USFWS and ODFW comments, we will attempt to minimize disposal in Site B, will coordinate with crab fishermen as to disposal locations and conduct disposal operations to minimize direct impacts to crab populations.

Comment. The CE shall coordinate with Oregon as well as Washington fishing groups prior to disposal events.

Response. All affected groups will be informed of the dredging/disposal plan prior to each year's dredging season and will be given opportunity for comment.

Washington Dept. of Ecology

Water Quality Certification and CZM Consistency concurrence were issued by this agency for expansion of Sites B and E. However, conditions for use of the sites, particularly Site B, were included with their determination. A copy of their letter outlining these conditions and the Portland District response letter are attached.

Washington Dept. of Fish and Wildlife

Comment. ...we recommend that a program to identify a suitable, safe, and cost effective disposal site in the littoral system be instituted immediately.

Response. This program has been initiated through the long-term ocean disposal site designation efforts. A site designation working group is being formed with representation from the States of Oregon and Washington and the commercial fishing industry as part of the Columbia River Channel Deepening study. Because of previous concerns expressed by the State of Washington to place as much material as possible within the littoral system, our recent sampling efforts have focused on nearshore areas to the north of the entrance channel. Also, please refer to EA revisions.

Comment. A study of bed elevation trends over the years, similar to that recently conducted by the Seattle Corps, should be conducted to identify erosive areas.

Response. Portland District is addressing bed elevation trends through bathymetric monitoring and with the assistance of the Waterways Experiment Station through a multi-year study of MCR disposal sites. The studies involve wave and current data collection and detailed analyses of all recent MCR disposal site surveys (1981 to present) for analysis of dredged material behavior when placed in open water.

Comment. The beam trawl, using standard protocol as utilized by the Seattle Corps, should then be used to characterize the productivity of the area. Promising areas should be identified and presented for review.

Response. A beam trawl is generally not considered to be very effective in capturing crabs at an offshore area. In addition, since crab distribution is so variable, trawl information in general would not be very useful in determining areas of crab abundance or in selecting or evaluating a disposal site. It is our opinion that the best information on crab distribution and abundance off the Columbia River is available from the crab fisherman. Mr. Dale Beasley of the Columbia River Crab Fisherman's Association has offered to work with us and your agency to help gather this information from local fisherman so that it can be used in evaluating or selecting long-term disposal sites. We are also aware of crab catch information which your agency has provided to Dept. of Ecology and would be interested in receiving all information which may be useful in our future determinations.

Comment. In the interim, the expanded Site E should be used to full capacity, up to 4 million cubic yards, which should take care of most of the material until these new littoral sites can be identified and approved.

Response. It is our intention to increase use of Site E; however, neither EPA or the Corps believes it is prudent to use Site E to this extent immediately until further information on dispersion rates and direction are determined. The timing of dredging and disposal for much of the MCR material is during unfavorable (north to south) coastal currents. Our initial assumption for managing the expanded Site E is that we can place material during, or just prior to ebb tide when estuarine currents are strongest in the oceanward direction; and/or during the spring and early summer Columbia River freshet. This should prevent dredged material from migrating back into the navigation channel from the north-south coastal current. Using the expanded Site E only during ebb tide or high river flows will limit the volume placed in the site to approximately half of the quantity dredged, with the remainder going to Sites B and F. Site E will be surveyed frequently to evaluate our management assumptions. We will endeavor to maximize use of the expanded Site E in the future should our assumptions regarding ebb current/freshet flows prove to be correct.

Columbia River Estuary Study Taskforce (CREST)

Comment. Firstly, in Area E, sediment dispersal patterns and the effects of disposal on onshore currents and surface conditions affecting small vessel navigation and safety are unclear. CREST's

position is that a formal monitoring methodology examining these effects should be devised and implemented.

Response. The Corps and EPA will manage existing and expanded disposal sites so that mounding would be kept to a minimum and limit any wave height increase, based on model predictions, to no more than 10% over pre-disposal conditions. Any "mounds" formed should be of such low relief that currents would not be affected. Such minimal changes in wave and current activity in the disposal sites would have no measurable effect on small vessel safety. Regular bathymetric monitoring will be conducted.

Comment. Secondly, in Area B, the impact of disposal on shellfish resources is unclear... CREST's position is that a formal monitoring methodology examining biological effects of disposal in Area B should be devised and implemented.

Response. Impacts to shellfish are expected to be less using thin layer disposal over a number of sites rather than continuous disposal at a single location (see previous responses and revised discussion in EA Environmental Consequences). Shellfish have the capability of recovering from sand deposition. Earlier studies as referenced in the EA have indicated that crabs can dig out of sudden deposition of up to 10cm of sand. Since most of the disposal will not produce sand accumulation over this depth it is not anticipated that there will be any significant mortality to crabs in the area. All available crab data indicate that crab presence and numbers in the MCR vicinity is highly variable. Attempts to define impacts from any single disposal event or cumulative events is being reviewed. We will continue evaluation of available data and discussions with the resource agencies in an effort to avoid or minimize impacts to the extent possible.

Comment. CREST also sees the need for a formal framework enabling coordination between Corps disposal activities and local commercial fishers, in particular the Columbia River Crab Fishing Association.

Response. See above response to ODFW.

Columbia River Crab Fishing Association (CRCFA)

Comment. Conditional acceptance (of Site E) is extended, if a good site management plan is designed and continually evaluated to guard against any shoaling which would further hinder navigation.

Response. Site E will be monitored for bathymetric effects during 1997. Pre-disposal modeling will be conducted before disposal to predict dredged material behavior in relation to disposal site bathymetry, waves and currents and disposal quantities. The combination of monitoring and modeling provide an effective method for adjusting disposal operations and evaluating disposal plans for the ensuing dredging season.

Comment. CRCFA is absolutely opposed to any further dumping in the proposed B site period... This area is without a doubt, the most environmentally sensitive area available to ocean dumping.

Response. We agree that Site B is within an area of high biological productivity and acknowledge that most of Site B is also a heavily utilized crab fishery. We also understand that Site B is but a small part of the Columbia River offshore area which provides productive conditions for a wide variety of organisms, including crabs. In the context of the Oregon-Washington coast, MCR is less diverse and productive than areas off the Tillamook and Grays Harbor estuaries. We also acknowledge that disposal in Site B will have both direct and indirect effects on crabs and benthic organisms. However, the data which has been gathered over the years in the Columbia River offshore area (see EA references), including monitoring of disposal effects, indicate that disposal impacts are short term, recovery is rapid, and in some cases, productivity has actually increased within a year after disposal. We are convinced, based on the results of past data, that disposal impacts within Site B would primarily be short term and that any long term effects on crabs as well as overall productivity would not be significant.

Comment. Dump site B is critical nursery habitat for dungeness crab and bottom fish. Crab are especially susceptible when in the soft shell condition. The EPA and the Corps have not taken into account mortality associated with crabs in the soft shell condition.

Response. The potential impact to softshell crabs are discussed in the EA. It is acknowledged in the EA that impacts to softshell crabs may be greater than to hard shell crabs, however, thin layer disposal may help to reduce the impact. The area offshore of the Columbia River is not known to be a nursery area for crabs. Larval crabs are planktonic (living in the water column) for 128 to 158 days after hatching in the early winter. They generally drift offshore until the spring when they move back inshore and settle out of the water column into shallow areas near the coast and in estuaries (Shenker, 1988). Large numbers of young of the year (YOY) crabs were collected in the MCR entrance channel from May through July (Larson, 1993). The channels in Baker Bay are known to be important rearing areas for one to two year old crabs in the winter (McCabe and McConnell, 1989). Few, if any, YOY have been collected in the offshore area of the Columbia River (see references given in the EA). Consequently, it appears that most of the crabs are rearing in the entrance to the estuary or the estuary rather than the offshore area around Site B.

Comment. CRCFA recommends an alternative disposal site south and west of the proposed expanded Site B.

Response. The proposed CRCFA site poses conflicts with marine navigation uses as it lies directly in the path of a designated shipping lane. Biologically, although it appears to be less productive for crabs, is highly productive for a variety of benthic invertebrates which serve as a food source for many higher organisms. In addition, expansion of sites beyond existing sites B and F is well beyond the 4 mile ZSF for feasibility of hopper dredge transit (See Alternatives discussion). All of these factors will be considered as part of the long-term site designation working group on which your association will be a participant.

Comment. It is recommended that Site E be abandoned as a dredge disposal site to bring the Benson Beach starvation problem back to natural equilibrium...

Response. Placing additional material at Site E may reduce erosion of the southside toe of the north jetty. This could prevent future slope failure of the north jetty and reduce the volume of sand

which now appears to be migrating through the north jetty from Benson beach and into the MCR entrance channel. As noted in previous comments, expansion and greater use of Site E is the expressed desire of many other stakeholders.

CONSULTATION REQUIREMENTS

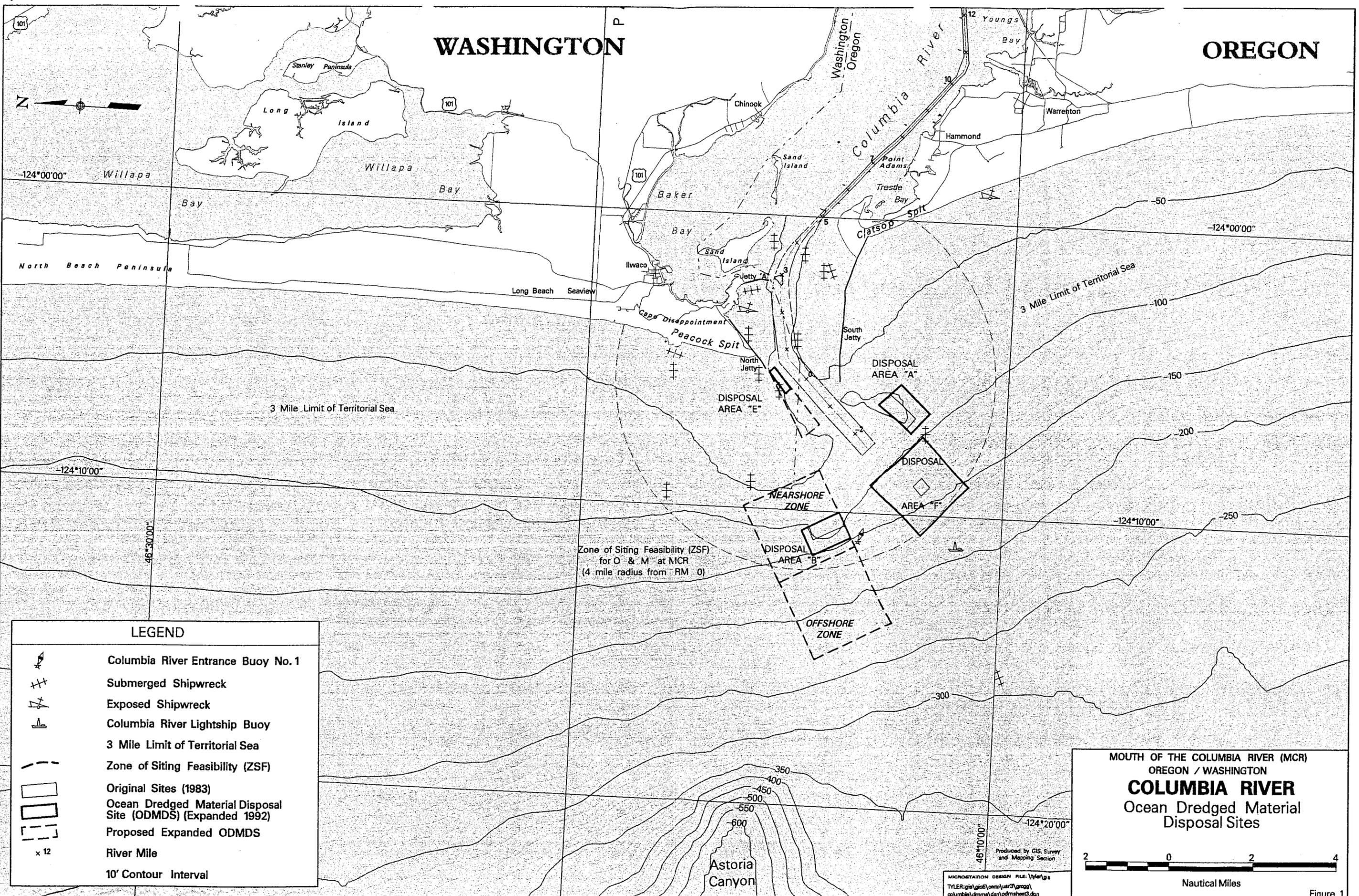
The status of administrative actions to comply with applicable environmental consultation requirements is summarized below:

- a. Cultural Resources Acts A review of the latest version of the National Register of Historic Places and Addenda shows that the expanded disposal area does not contain any registered properties or properties determine to be eligible for nomination to the National Register.
- b. Clean Water Act of 1977 (33 USC 1344). Section 401 Water Quality Certifications have been received from the States of Oregon and Washington. Water Quality Certification is approved for expansion of Sites B and E. Placement of dredged material in Site B was not approved except under conditions outlined in their attached letters. Portland District response to those conditions is also provided in the attached letters.
- c. Coastal Zone Management Act of 1973, as amended. A coastal zone consistency determination has been prepared for the site expansion. The States of Oregon and Washington have concurred in this determination for expansion of Sites B and E. Conditions have been placed on use of the sites as outlined in their attached letters. Portland District letters responding to these conditions are also attached.
- d. Endangered Species Act of 1973, as amended. A formal species listing has been obtained from the U.S. Fish and Wildlife Service(See attached). Biological Assessments will be prepared to formally address effects on these species. Portland District biologists have preliminarily concluded that the proposed site expansions would have no effect or would not likely adversely affect listed species or their habitat.
- e. Fish and Wildlife Coordination Act. The proposed expansions have been coordinated with the appropriate Federal and state fish and wildlife agencies through the circulation of this EA and public notice. A formal fish and Wildlife Coordination Act report is not required for this project because the act does not apply specifically to O&M activities or to ocean disposal.
- f. Marine Protection, Research and Sanctuaries Act. A Section 103 Evaluation has been prepared for selection and use of expanded Sites B and E and is attached to this EA. EPA Region 10 is expected to concur with our determination for site expansion and use.
- g. Executive Orders 11988 and 11990. No floodplain or wetlands would be affected by the site expansion.

h. Analysis of Prime or Unique Farmlands. No farmlands would be affected by the proposed action.

WASHINGTON

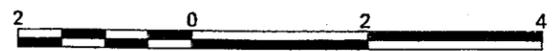
OREGON



LEGEND

-  Columbia River Entrance Buoy No. 1
-  Submerged Shipwreck
-  Exposed Shipwreck
-  Columbia River Lightship Buoy
-  3 Mile Limit of Territorial Sea
-  Zone of Siting Feasibility (ZSF)
-  Original Sites (1983)
-  Ocean Dredged Material Disposal Site (ODMDS) (Expanded 1992)
-  Proposed Expanded ODMDS
-  River Mile
-  10' Contour Interval

MOUTH OF THE COLUMBIA RIVER (MCR)
 OREGON / WASHINGTON
COLUMBIA RIVER
 Ocean Dredged Material
 Disposal Sites



Produced by GIS, Survey
 and Mapping Section
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Figure 1

**SECTION 103 EVALUATION
OCEAN DREDGED MATERIAL DISPOSAL SITES B AND E
MOUTH OF THE COLUMBIA RIVER (MCR)
OREGON AND WASHINGTON**

INTRODUCTION

This evaluation addresses the temporary expansion of disposal Sites B and E as provided for by Environmental Protection Agency (EPA) regulations (40 CFR 228.4(e)(2)). This designation is a temporary measure to allow the use of the sites by the Corps of Engineers until necessary site designation studies can be conducted by the Corps and EPA to develop a long-term plan for future use. EPA would complete the site designation process on the long-term plan. For the reasons discussed in this evaluation and the attached environmental assessment (EA), it is not considered prudent to continue to use the existing sites with present dimensions. Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (MPRSA) requires that all actions involving the transportation of dredged material with the intent to dispose of the material in ocean waters be evaluated for environmental effects prior to making the disposal. This evaluation assesses the effects of the discharge using the criteria set forth by the EPA under the authority of Section 102(a) of the Act.

The four presently designated ODMDs (A, B, E and F) were designated by EPA in a final rule published in the **Federal Register** (FR29923-29927) on August 21, 1986 and the designation became effective September 22, 1986. Sites A, B and F were expanded under joint EPA-Corps Section 103 authority in 1992 to alleviate persistent mounding at Sites A and B. An Environmental Assessment and Section 103 Evaluation were prepared to address the effects of that action.

Although not considered "dispersive" sites, in that large percentages of the discharged sediments were predicted to remain within the sites, erosion and redistribution were expected to occur that would prevent the development of mounds. Dispersal rates have continued at lower rates than anticipated and Corps bathymetric surveys have shown significant mounding at sites A and B. Expanded Site F, located furthest offshore, has not mounded significantly since it is a larger site and less material is placed there. Site E, located adjacent to the entrance channel, is also not mounding since limited quantities are placed there and it is more dispersive. The existing mounding at Site A and increased mounding at Site B potentially

threaten to create a hazardous condition for large and small craft due to waves refracting from and breaking over the mounds. Commercial shippers, crabbers, and the U.S. Coast Guard have expressed concern over this situation. While the current situation does not constitute an imminent hazard to life and property which would warrant an emergency response, EPA and the Corps are in agreement that prudent management action is required now in order to prevent such a situation from developing.

PROPOSED ACTION

The proposed action is the temporary expansion of the existing, EPA-designated ODMDs B and E and changed site management at these sites which will more specifically direct the disposal of dredged material at the expanded sites (figure 1). A critical condition of this temporary measure will be the completion of the long-term dredged material management study by EPA and the Corps. The temporary expansion will allow needed maintenance dredging of the MCR project to continue without exacerbating the mounding problem while studies are conducted to develop the long-term plan for disposal of material from the mouth of the Columbia River and the estuary. An Environmental Assessment and this section 103 evaluation have been prepared to support the following actions related to the proposed action:

- (a) Corps of Engineers Public Notice CENPP-PE-E-96-09, dated 26 December 1996, to identify the expanded ODMDs B and E under the provisions of Section 103 of the MPRSA and in accordance with Corps regulations 33 CFR Parts 335-338 for Corps use to place maintenance dredged material from the Mouth of the Columbia River (MCR) federal navigation project.
- (b) Concurrence or non-concurrence of this Section 103 Evaluation by EPA.

Between 3 and 5 million cubic yards of dredged material is removed annually from maintenance of the five mile Federal entrance channel at the Mouth of the Columbia River (MCR). The dredging removes restrictive shoals of sedimentary material which is principally clean sand. Dredging is necessary to maintain the Federal entrance channel to the authorized depth. The work is accomplished by hopper dredge.

LOCATION OF THE DISPOSAL SITES

The existing disposal sites are located offshore and north of the entrance to The Columbia River at depths of 17 to 46 meters (55 to 150 feet). See Figure 1 for the location and configuration of the expanded sites.

DISPOSAL PLAN

The Corps and EPA have concluded that, in addition to site expansion, disposal practices must be changed as well. Accordingly, an updated disposal plan is being developed which, among other practices, will prepare dredging contract specifications requiring dredgers to more broadly disperse the sediment. This change will minimize the thickness of deposition on the bottom, although it will necessarily increase the area of deposition. Additionally, discharge locations will be varied throughout the sites to further minimize accumulation. For example, expanded Site B is divided into two disposal areas, a nearshore zone and an offshore zone and disposal will be managed to minimize impacts on the crab fishery. Material would be placed in thin layers, minimizing sediment accumulation in any one area; and within rotated quadrants and monitored for mounding and sediment distribution. As discussed in the Environmental Assessment (EA), disposal in Site B will be kept to a minimum in response to issues raised by the crab fishing industry. Actual disposal quantities and locations will be determined on a year to year basis and will be coordinated with agencies and users such as the crab fishing association prior to the dredging season. Each season's disposal will be analyzed to prepare for the next dredging season.

As currently proposed, expanded Site E will be utilized to the maximum extent possible. Disposal would be distributed throughout the site and would be monitored for mounding effects and sediment dispersion. If monitoring indicates dispersion northward and mounding is minimized, the disposal volume likely would be increased. We will also be investigating disposal techniques to determine the effects of tidal and freshet flows on sediment dispersion. Currently, the site capacity is limited by bottom topography and proximity of the navigation channel. In addition, disposal timing is presently limited to the fall and winter during north trending current flow to avoid movement of sediments back into the channel.

EVALUATION OF DISPOSAL SITES

EPA regulations require the evaluation of ocean disposal sites based on the 11 specific criteria and five general criteria contained at 40 CFR 228.5 and 228.6. The following evaluation addresses these criteria. This evaluation is based on information established in the MCR Ocean Disposal EA and EIS, and information from monitoring activities since formal site designation.

Specific Criteria (40 CFR 228.6)

1. Geographic Location. Figure 1 indicates the location of the currently designated disposal sites and indicates their expanded boundaries. The expanded sites lie in 45 to 225 feet of water offshore and north of the entrance to the Columbia River. The geographic coordinates (NAD 1983) of the expanded sites are as follows:

Site B

SE:46°, 14', 23" N;	124°, 08', 40" W
SW:46°, 15', 31" N;	124°, 13', 46" W
NW:46°, 14', 18" N	124°, 15', 07" W
NE:46°, 16', 10" N	124°, 10', 01" W

Site E

SE:46°, 15', 35" N;	124°, 05', 15" W
SW:46°, 14', 31" N;	124°, 07', 03" W
NW:46°, 14', 58" N;	124°, 07', 37" W
NE:46°, 15', 42" N;	124°, 05', 26" W

2. Distance from Important Living Resources. The biological resources of the area offshore of the Columbia River are described in the EA and in other documents, including the 1983 EIS. In summary, seasonal variability of benthic species in the vicinity of the proposed expanded sites is high. The most abundant epibenthic species collected during trawl sampling of the area in 1986 and 1990 include the English sole, butter sole, northern crangon, Pacific sanddab, and whitebait smelt. Threatened and endangered species in the vicinity of the proposed disposal sites include the gray whale, bald eagle,

marbled murrelet, peregrine falcon, brown pelican, and Columbia and Snake River salmonids. A detailed discussion of the listed species in the area can be found in the biological assessments prepared for those species and in the EA. Expansion of Sites B and E is not expected to significantly effect important biological resources.

3. Distance from Beaches and Other Amenities. Site B is located within five miles of the Long Beach peninsula. Site E is located within 1 mile of Peacock Spit. A small percentage of material placed at Site B would remain within the littoral zone. Most, if not all of material placed in Site E would remain within the littoral zone with some depositing on local beaches. The general consensus among resource agencies and local governments is to retain as much material as possible within the littoral zone to replenish beach sand.

4. Types and Quantities of Material to be Disposed. Sediments to be dredged from the entrance channel are principally clean sands of marine origin from the MCR project. Median grain size is relatively constant at 0.1 - 0.2 mm and volatile solid content varies between 0.3 and 1.0 percent. The material has been judged by the Corps and EPA to meet the exclusion criteria specified at 40 CFR 227.13. Between 3 and 5 million cy of this material are dredged annually.

In recent years, coastal dredging projects have increasingly turned to ocean dumping as alternative disposal sites and options have been discouraged. The Corps and EPA anticipate that this trend will continue and future dredged material volumes disposed at the sites will exceed present volumes. This is especially pertinent if the proposed Columbia River channel deepening project is authorized by Congress. Because of the potentially great need for ocean dumping sites, a joint Corps/EPA study has been initiated. The proposed temporary expansions and changed site use conditions are intended to allow continued maintenance of the MCR project and prevent exacerbation of the mounding problem until a long-term plan can be developed. Any materials disposed in the ocean must comply with EPA criteria in Part 227.13 subpart B of the Ocean Dumping Regulations (40 CFR 220 to 229) and be managed to encourage dispersal. Monitoring studies will be conducted, as necessary, to evaluate sediment accumulation or movement and this information will be used to develop a permanent solution to the disposal issue.

5. Feasibility of Surveillance and Monitoring. Surveillance of the disposal sites can be made from shore facilities or vessels. Approaches to the entrance, including the ocean disposal sites, are currently surveyed annually by the Corps. Surveillance during heavy weather conditions is expected to be unnecessary since heavy weather curtails ocean disposal operations.

6. Dispersion, Horizontal Transport, and Vertical Mixing Characteristics of the Area. Average currents in the region generally flow parallel to bathymetric contours. Local current strength and direction, however, reflect the variability of local winds. Sediments are expected to settle rapidly with no persistent turbidity plumes. Resuspension of material will be at a maximum during winter storms. Disposal practices will be adjusted to encourage material dispersion.

7. Effects of Previous Disposal. The areas proposed for expansion have not previously received direct discharges of dredged material. However, all of the areas proposed for expansion have been influenced by downslope movement and/or redistribution of sediments directly discharged into the existing designated sites. The effects of previous disposal at the existing sites were discussed in the 1992 and present Environmental Assessments and the 1983 EIS. Primary movement of materials is to the north and slightly offshore. Short-term turbidities occur, but such impacts are minor. No significant biological impacts have been associated with disposal at these sites.

8. Interference with Other Uses of the Ocean. Commercial and recreational uses occurring in the vicinity of the disposal site include marine navigation and commercial and recreational fishing. Disposal practices would be conducted to minimize effects on these uses. Commercial crab fishing occurs within and adjacent to Site B, but significant conflicts with this activity would be minimized through coordination of disposal timing and location. Most recreational fishing occurs south of the expanded sites and significant impacts to this activity would not be expected. Expansion of the disposal sites would reduce mounding effects and improve conditions for commercial navigation.

9. Existing Water Quality and Ecology. Water quality and other ecological parameters are discussed in the current and 1992 Environmental Assessments and 1983 EIS. No significant degradation of water quality or ecological conditions have been noted in the monitoring of the existing sites.

10. Potential for Recruitment of Nuisance Species. Organic material is the major component of dredged material which might attract nuisance species. The clean sand to be disposed at the sites would include an insignificant amount of silt.

11. Existence of Significant Natural or Cultural Features. No known significant natural or cultural features exist within the disposal sites. Submerged shipwrecks may be located in the vicinity of the disposal sites but would not likely be affected by the disposal activity.

General Criteria (40 CFR 228.5)

1. Minimal Interference with Other Activities. The location of existing disposal sites was based upon reasonable distance from the entrance, depth of water, biological conditions, historical use, estimate amount and type of dredged material, and the desire to keep the sand from reentering the channel. Disposal activities in the expanded portion of the sites are not expected to result in more than minimal interference with activities in the marine environment.

2. Minimizes Changes in Water Quality. The nature of material to be disposed is primarily clean sand which meets the exclusion criteria, therefore no contaminants or suspended solids are expected to be released. Periodic testing and evaluation of material proposed for dumping would occur as necessary to insure acceptability.

3. Interim Sites Which Do Not Meet Criteria. There are no interim sites in the vicinity. The proposed disposal site expansions have been selected to allow the distribution of dredged material over a larger area, thereby alleviating mounding problems and resulting navigation safety at existing sites.

4. Size of Sites. The size of the existing disposal sites was originally thought to be adequate to handle annual dredging activities. Sediments disposed at the sites were expected to be rapidly reworked by strong tidal and surface-wave generated currents. Winter reworking was expected to be especially intense, resulting in the erasure of any mounding. Bathymetric surveys conducted as part of routine monitoring

have shown that this has not been the case, however, as much of the material disposed annually has not been dispersed. Increasing the size of the sites and imposing a different management disposal scheme are expected to be adequate to handle dredged material from the MCR project. It is hoped that these actions will allow the existing mounds to further erode and dissipate. Annual bathymetric surveys are being conducted as part of the site monitoring and the results will be used by EPA and the Corps to develop a long-term management plan.

5. Sites Off the Continental Shelf. Such sites were eliminated from further consideration during evaluation and promulgation of the existing disposal sites. Conditions have not changed to offer any environmental advantage to the use of a site off the continental shelf. This option will be re-evaluated as part of Corps and EPA studies to address future disposal needs.

DETERMINATION OF ENVIRONMENTAL ACCEPTABILITY OF DREDGED MATERIAL FOR OCEAN DISPOSAL

The material to be dredged is principally clean sand with a median grain size of 0.1 to 0.2mm. The sediments contain no contaminants in excess of regional levels of concern, and have been judged to meet the exclusion criteria at 40 CFR 227.13(b). The sediments are similar to bottom materials at the disposal sites. For the interim period, all disposal will be restricted to maintenance material from the MCR project. Additional sediment characterization will occur as needed.

Alternatives to ocean dumping were evaluated in the original designation EIS and were reconsidered in the EA for this action. Ocean disposal is essential to the maintenance of the MCR navigation channel as other disposal options are essentially unavailable. Resource agencies are currently opposed to large scale disposal within the estuary due to the potential for adverse impacts to productive and other resources. Existing or potential new upland disposal sites are very limited and could not accommodate the quantities of materials dredged on an annual basis. Disposal options are further constrained since dredging at MCR can only be conducted by hopper dredges due to the rough sea conditions which occur even during the summer months.

IMPACT OF THE PROPOSED DISPOSAL ON ESTHETICS, RECREATIONAL AND ECONOMIC VALUES

The proposed ocean disposal would not have significant impacts on esthetics, recreational or economic values of the area. Short-term increases in turbidity would occur; however, because the dredged material consists primarily of sand and is free from chemical contaminants, the proposed action is not expected to adversely affect water quality or related recreation or economic values.

IMPACT OF THE PROPOSED DISPOSAL ON OTHER USES OF THE OCEAN

No significant impacts on other known uses of the ocean such as commercial and recreational fishing or navigation; actual or anticipated exploitation of living marine resources; actual or anticipated exploitation of non-living resources, including sand and gravel or other mineral deposits, oil and gas explorations, or structural development; and scientific research and study are anticipated. The Corps/EPA study to address future disposal needs is expected to result in new and/or expanded sites and improved disposal techniques which should alleviate mounding at existing sites and remove potential hazards to navigation.

FINDINGS

The material to be dredged from the MCR has been evaluated according to the criteria in 40 CFR 227 and determined to be suitable for ocean disposal. The interim solution to expand Sites B and E, alter disposal management, and restriction of site use to MCR maintenance material has been evaluated using the criteria specified in 40 CFR 228.5 and 228.6. Significant coordination has occurred with EPA, Region 10, and it is the joint finding of the Portland District and Region 10 that the proposed action meets the criteria.

On the basis of this evaluation, I find the proposed action acceptable under the provisions of Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972.

Date: 6/14/97


Robert T. Slusar
Colonel, EN
Commanding