Region 10

US Army Corps of Engineers ®
Portland District

FINAL

Site Management/Monitoring Plan

Mouth of the Columbia River (MCR)

Shallow Water Site (SWS) and Deep Water Site (DWS)

USEPA Section 102

Ocean Dredge Material Disposal Sites (ODMDS)

2005

ABSTRACT

This Site Management/Monitoring Plan (SMMP) has been prepared jointly by USEPA, Region 10, and USACE, Portland District, and describes management and monitoring requirements for USEPA-designated Shallow Water Site and Deep Water Site located off the mouth of the Columbia River and coasts of the States of Oregon and Washington. This SMMP supersedes all previous monitoring and management plans for this location. Periodic review and updating of the SMMP will occur on at least a 10-year schedule.

MCR ODMDS
Site Management/Monitoring Plan

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Introduction

This Site Management/Monitoring Plan (SMMP) was prepared jointly by the U.S. Environmental Protection Agency, Region 10 (USEPA), and U.S. Army Corps of Engineers, Portland District (USACE), and describes management and monitoring requirements for USEPA-designated sites located off the mouth of the Columbia River and coasts of the States of Oregon and Washington (figure 1). The SMMP becomes effective with the completion of site designation. This final SMMP supersedes and replaces the more generic Management/Monitoring Plan contained in Appendix H of the Final *Integrated Feasibility Report and Environmental Impact Statement for Channel Improvements, Columbia and Lower Willamette River Federal Navigation Channel* (IFR/EIS), dated August 1999.

This SMMP meets all statutory and regulatory criteria set forth in 40 CFR Part 228, *Criteria for the Management of Disposal Sites for Ocean Dumping*, and has been reviewed by the public. These regulations were promulgated in accordance with criteria set forth in Sections 102 and 103 of the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 (33 U.S.C. §1412 and §1413), as amended.

Section 102(c)(3) of the MPRSA, as amended, sets forth a number of requirements regarding the content and development of site management plans, as follows:

> In the case of ODMDSs the USEPA, in conjunction with the USACE, shall develop a site management plan for each site designated pursuant to MPRSA Section 102(c)(3). Plans shall include, but not be limited to:
>
> (A) a baseline assessment of conditions at the site;
> (B) a program for monitoring the site;
> (C) special management conditions or practices to be implemented at each site that are necessary for protection of the environment;
> (D) consideration of the quantity of the material to be disposed of at the site, and the presence, nature, and bioavailability of the contaminants in the material;
> (E) consideration of the anticipated use of the site over the long term, including the anticipated closure date for the site, if applicable, and any need for management of the site after the closure of the site; and
> (F) a schedule for review and revision of the plan (which shall not be reviewed and revised less frequently than 10 years after adoption of the plan, and every 10 years thereafter).

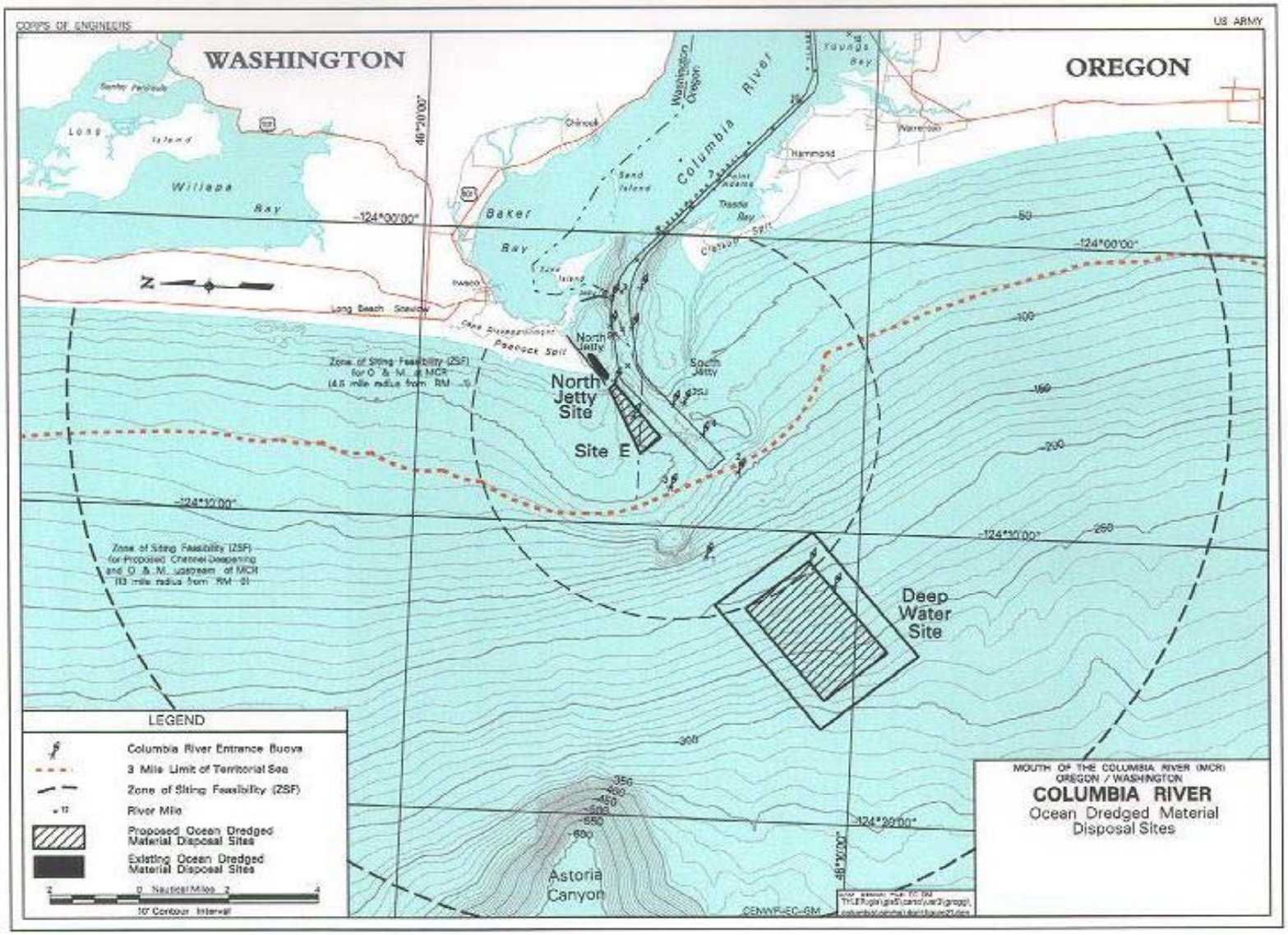


Figure 1: General Site Vicinity Map – Mouth of the Columbia River Note: Site E is renamed "Shallow Water Site."

Guidance for the preparation of ODMDS SMMPs is provided in the joint USEPA/USACE Guidance Document for *Development of Site Management Plans for Ocean Dredged Material Disposal Sites* (USACE/USEPA 1996).

Overall management of ODMDS is a continuum that begins with site designation. At the site designation stage, the emphasis is on selecting a site where disposal will not significantly conflict with other uses of the ocean environment or various amenities such as fisheries, coral reefs, historic sites (e.g., shipwrecks), or endangered species. Using the general and specific criteria at 40 CFR 228, candidate ODMDSs are assessed, selected, and designated so as to minimize the risk of potentially adverse effects to human health and the marine environment. Use of the designated site is subject to any restrictions included in USEPA's designation rule.

Designation of an ODMDS in itself does not result in a disposal of dredged material. Following site designation, "permitting" of disposal actions involves further, specific assessments by the federal government, principally focusing on the characteristics of the dredged material and the "need" for ocean disposal by the project at that time. Typically this involves evaluation of the specific disposal activity under the criteria, circulation of a Public Notice (which can stipulate multiple years of use), and coordination with regulatory agencies. [Note: The USACE, who is often the principle user of ODMDS, does not issue itself a "permit" for use of an ODMDS, but follows an internal, documented process that is substantively the same as the permitting process.] The USEPA must independently evaluate the proposed disposal and concur or non-concur with the action in writing, whether the action is a USACE project or regulatory permit. Other federal and state agencies which have federal regulatory responsibilities include: the U.S. Coast Guard (USCG), National Oceanic and Atmospheric Administration-Fisheries (NOAA-Fisheries), U.S. Fish and Wildlife Service (USFWS), Oregon Department of Land Conservation and Development (OLCDC), Oregon Department of Environmental Quality (ODEQ) and, Washington Department of Ecology (Ecology).

Specific management of designated ODMDSs involves regulating the times of use, the quantity and the physical/chemical characteristics of dredged material that is dumped at the site (typically addressed during permitting); and establishing disposal controls, conditions, and requirements to avoid and minimize potential impacts to the marine environment. Appropriate management of ODMDSs is aimed at assuring that disposal activities comply with permit requirements, site management objectives and conditions, and do not unreasonably degrade or endanger human health, welfare, the marine environment or economic potentialities. Monitoring the site and adjacent environs is a critical component of management to verify compliance with site requirements, objectives, and conditions, permit terms and conditions are met, and that unanticipated or significantly adverse effects are not occurring.

Site Management Roles and Responsibilities

Ocean disposal is a federal, non-delegable program. Site designations and management are a federal responsibility. The primary goal of site management and monitoring is to ensure that use of the sites complies with the requirements of the MPRSA. USEPA intends to give great weight to the recommendations of the USACE and USCG concerning site management decisions. Site management will also be coordinated with US NOAA-Fisheries, US Fish and Wildlife Service, and the States of Oregon and Washington.

The USEPA administers and enforces the overall program for ocean disposal. The USEPA has the responsibility for site designation under MPRSA. Authority to designate and administer those designated sites is delegated to the USEPA Regions. The USEPA may condition, terminate or restrict site use with cause. Region 10 is responsible for ocean disposal in ocean waters off the States of Alaska, Washington, and Oregon, which includes the Shallow Water and Deep Water Sites addressed in this SMMP.

The USACE is expected to be the primary user of the ocean sites at the mouth of the Columbia River for dredged material from existing federal navigation projects. The USACE also issues the permits for transportation of dredged material for the purpose of ocean disposal, after consultation with and concurrence from the USEPA in compliance with these criteria.

USEPA has the ultimate responsibility for site management. However, owing to the interactive nature of regulating ocean disposal of dredged material, the USEPA and USACE Portland District work collaboratively to manage ocean dredged material disposal sites (ODMDS) along the coast of Oregon. The USEPA and USACE will routinely consult on all decisions regarding site use and management. The primary mechanism for pre-disposal consultation will be the Annual Use Plan (AUP) (see Annual Use Plan Requirement).

Site Management Decision Strategy

Making a decision involves identifying and evaluating a set of alternative actions and choosing those actions that will best achieve specific goals or objectives. Decisions made to designate a site are often based on the best available, yet incomplete and imperfect, scientific data, information, and understanding. Competing interests and constraints on time and resources can further complicate the process. Designation of a site does not mandate its use. Nevertheless, when a site is designated, it is done with an initial conceptual model of how use of the site should occur, i.e., how the site is to be managed. The initial model establishes the management objectives and identifies the major risks associated from the action (e.g., disposal at the site). As the site is used and monitored, priorities or activities can be adjusted to increase the effectiveness or confidence in achieving the desired or specified management result or to avoid an unacceptable result/risk. That result can be a precisely defined condition or a range of acceptable conditions, processes, or other metric. Figure 2 illustrates a general framework.

The purpose of this SMMP is to ensure that the necessary disposal of dredged material into the ocean will not result in unreasonable degradation to the marine environment. This SMMP sets

out the strategy that the USEPA, in consultation with the USACE, will utilize to make management decisions concerning use of the two ODMDS (and North Jetty Site) for the mouth of the Columbia River. It provides a process that can adjust management actions on the basis of newly acquired science and monitored responses of performance measures in relation

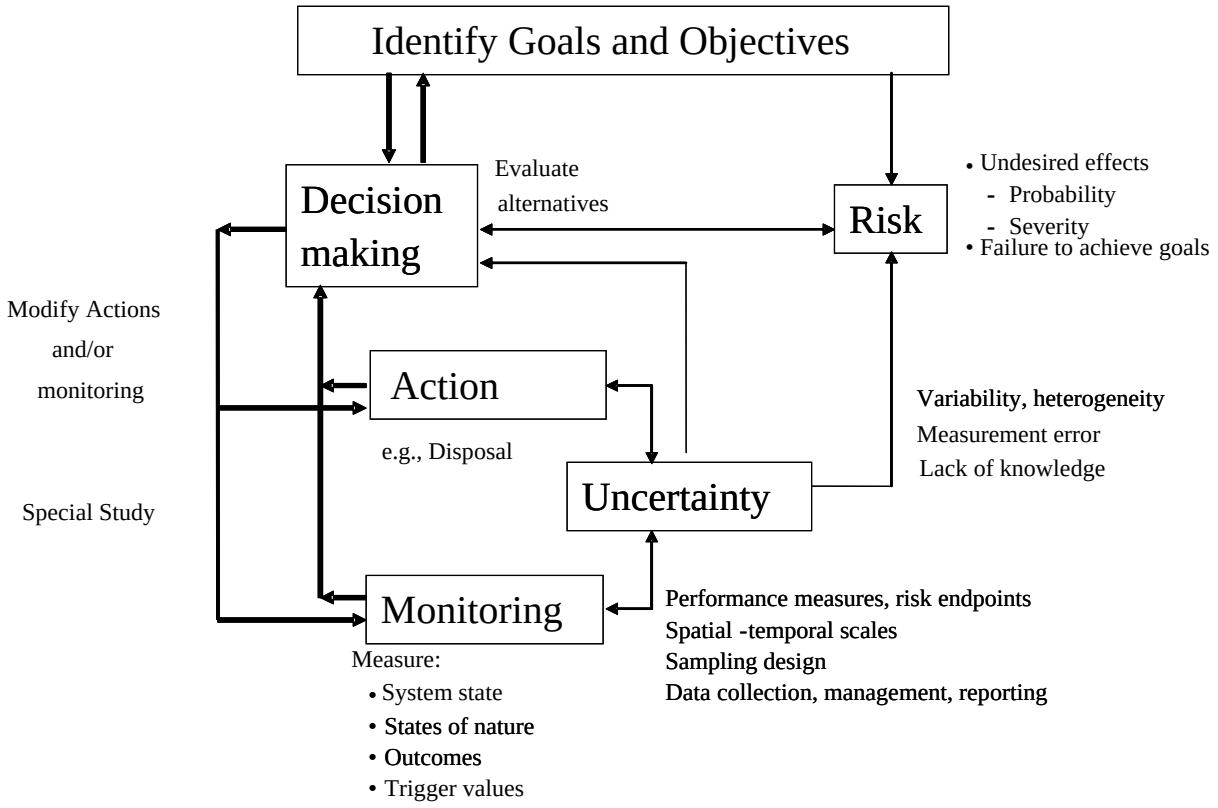


Figure 2. General framework for site management using risk-based decision making under uncertainty.

to previous decisions. This iterative process can increase the likelihood that site management objectives will be achieved.

In subsequent sections, the two new designated ODMDS are described and components of each ODMDS, including baseline, are defined. The initial conceptual site model is described in the section titled, Anticipated Site Use. General and specific Site Management Objectives are identified and routine site monitoring and utility of Special Studies are described, including specific triggers. USEPA recognizes that how a disposal site could be used in any specific year will depend on the volume of material to be dredged, movement of material (e.g., Shallow Water Site which is dispersive), on the depth of water, and the equipment used for placement, and other factors. Year-to-year usage will be controlled and documented through the required preparation and adherence to the Annual Use Plans (AUP).

Site monitoring events and Special Studies (see Site Monitoring and Special Studies), as well as

research conducted by others, are anticipated to add to future understanding of system processes and specific resources at and in the vicinity of the site. This evolving knowledge may require adjustments to the existing baseline, this decision strategy, or specific disposal operations. Potential decision outcomes resulting from routine monitoring of disposal at one or both of the ODMDS include the following:

No Change:
No Change *Required* (e.g., routine monitoring reveals no cause for concern; disposal and monitoring continue as planned)
No Change *Possible* (e.g., one-time event or accident; while there may be no change in disposal operations, other actions may be appropriate)

Additional Information Required:
Adjust routine monitoring (e.g., go to a higher intensity tier)
Special Study

Operational Change Required:
Scheduling (e.g., adjust time periods or rates of disposal)
Adjust Placement of Material Within Site (e.g., place material in a different Drop Zone or in a different manner)
Restrict Type or Quantity of Material Placed

Change Sites:
Relocate disposal activities from one site to another (e.g., days to weeks); follow-up with monitoring to determine if additional attention warranted).

Discontinue Disposal Site Use:
Cease Disposal--Short-Term (e.g., 1 season) (A known temporary condition; follow-up with monitoring to determine if additional attention warranted).
Cease Disposal--Long-Term. Typically this would occur when routine monitoring or a Special Study confirms an unacceptable condition persists.
This would require site modification or identification and designation of a new site(s).

Site Definitions and Description

Disposal Site Definitions

For the purposes of management and monitoring of designated ODMDS at the mouth of the Columbia River the following definitions are applicable:

Disposal Site: The sea bottom and overlying water column that is described in the *Federal Register* Final Rule designating the Shallow Water and Deep Water sites. The disposal site consists of a placement area, appropriate drop zones(s), and a buffer (if applicable).

Placement Area (also can be called disposal area): The area of the sea bottom that will be immediately occupied by disposed dredged material released at the water surface (1) on an annual use basis, and/or (2) over the anticipated life of the disposal site. Generally, the placement area for dispersive sites is designated and managed on a seasonal or annual cycle (e.g. at the Shallow Water Site). Material discharged and accumulating in the placement area during the active disposal season is expected to be transported out of the site and redistributed by natural forces (e.g., tides, currents, waves) leaving the placement area with near its original capacity. The placement area for non-dispersive sites is designed and managed for an ultimate accumulated volume capacity or for a specific number of years. Material discharged and accumulating in non-dispersive placement areas is not expected to be transported outside the boundaries of the disposal site, although natural forces may redistribute placed material on-site immediately or over several years.

Drop Zone (also can be called target zone or release zone): A drop zone is a defined area at the water surface within the placement area and within which dredged material discharge may occur. Drop zones are a management tool with the purpose of controlling where material discharged at the surface will impact and accumulate on the bottom. Drop zones are typically smaller than the placement area or are offset within the placement area to account for the spread of material as it descends through the water column and impacts on the bottom. The Drop Zone may be further subdivided into "cells" for more specific placement control.

Buffer: A buffer is that area of the sea bottom between the defined limit of the placement area and the disposal site boundary. Establishment of a buffer is a site management decision. Not all sites require a buffer. Buffers may be established for a variety of reasons at any site, but are most appropriate for non-dispersive situations. Generally, a buffer area is to provide appropriate reference location(s) in the vicinity of the disposal, but not directly affected by the placement of dredged material for future site monitoring events. Direct disposal into the buffer is prohibited and such discharges will be treated as a violation; although natural redistribution of placed sediments, and sloughing of placed sediments by the discharge overtime, may result in some intrusion of dredged material into the immediate inner margins of the buffer.

Disposal Site Descriptions

Two ODMDSs, the Shallow Water Site and the Deep Water Site, are located offshore of the mouth of the Columbia River (figure 1 and Table 1). These sites are intended primarily to receive suitable dredged material from the USACE's Mouth of the Columbia River (MCR), Columbia River Federal navigation channels (see Final IFR/EIS, 1999), other local USACE projects, and appropriately permitted dredged material from non-USACE projects. [Note: (1) Dredged material to be disposed of in the ocean under Corps permit is subject to USEPA site management requirements in this SMMP. (2) Since designation of the original ODMDS sites in 1986, only one ocean dumping permit for non-USACE dredged material has been applied for and issued.]

Another disposal site, the North Jetty Site, exists (figure 1 and Table 1) and is used in

conjunction with the Shallow and Deep Water ODMDS. The North Jetty Site is included in this SMMP because it is integral to the management of the MCR project and the two ODMDS. The site is entirely within Inland Waters and accordingly is authorized under the Clean Water Act (CWA) rather than the MPRSA. The North Jetty Site was first used in 1999, and is located inside the estuary, north of the entrance channel and on the south side of the North Jetty, near the head of the jetty (figure 1). The site covers approximately 115 acres and is located in water 40 to 70 feet deep. However, the capacity of the site is difficult to fully utilize due to the site's small size and shallowness, its proximity to the North Jetty, and the limited water depth on the site's east/south side. It is difficult to maneuver a ship the size of a medium-class hopper dredge through the entire site with safety. The capacity of the site to handle larger volumes of dredged material is limited and uncertain. In recent years, the site has received approximately 500,000 cubic yards annually. Much of the dredged material placed at the site has abated a potentially destabilizing scour along the southern toe of the MCR North Jetty. This was a primary purpose for creating the North Jetty Site. Use of the North Jetty Site will be reviewed as part of the AUP process.

A portion of the Deep Water Site was used by the USACE in 2004 under Section 103 authority. Approximately 1.0 million cubic yards from the MCR project was placed. The majority of the site has no history of dredged material disposal. Dredged material disposal in parts of the Shallow Water Site dates to 1973 when disposal in Site E started (see Appendix H, Exhibit B of the 1999 Final IFR/EIS). The North Jetty Site was first used in 1999.

Table 1. Coordinates (NAD 1983) and Dimensions of the Sites

Shallow Water Placement Area and Disposal Site

Corner Coordinates:	*Dimensions*:
46° 15’ 31.64” N, 124° 05’ 09.72” W	3,100’ to 5,600’ width
46° 14’ 17.66” N, 124° 07’ 14.54” W	by 11,500’ long
46° 15’ 02.87” N, 124° 08’ 11.47” W	Azimuth (long axis): 229° T
46° 15’ 52.77” N, 124° 05’ 42.92” W	Depth: 45’-75’
	No Buffer

Shallow Water Drop Zone

Corner Coordinates:	*Dimensions*:
46° 15’ 35.36” N, 124° 05’ 15.55” W	1,054’ to 3,600’ width
46° 14’ 31.07” N, 124° 07’ 03.25” W	by 10,000’ long
46° 14’ 58.83” N, 124° 07’ 36.89” W	Azimuth (long axis): 229° T
46° 15’ 42.38” N, 124° 05’ 26.65” W	Depth: 45’-75’

Deep Water Disposal Site (including Buffer)

Corner Coordinates:	*Dimensions*:
46° 11’ 03.03” N, 124° 10’ 01.30” W	17,000’ wide
46° 13’ 09.78” N, 124° 12’ 39.67” W	by 23,000’ long
46° 10’ 40.88” N, 124° 16’ 46.48” W	Depth 190’-300’
46° 08’ 34.22” N, 124° 14’ 08.07” W	Buffer 3,000 feet

Deep Water Placement Area

Corner Coordinates:	*Dimensions*:
46° 11’ 06.00” N, 124° 11’ 05.99” W	11,000’ wide
46° 12’ 28.01” N, 124° 12’ 48.48” W	by 17,000’ long
46° 10’ 37.96” N, 124° 15’ 50.91” W	Depth 190’-300’
46° 09’ 15.99” N, 124° 14’ 08.40” W	

North Jetty Site

Corner Coordinates:	*Dimensions*:
46° 15’ 45.67” N, 124° 05’ 11.99” W	1,000’ wide
46° 16’ 17.18” N, 124° 04’ 17.99” W	by 5,000’ long
46° 16’ 10.31” N, 124° 04’ 08.72” W	Depth 40’-70’
46° 15’ 38.18” N, 124° 05’ 02.73” W	No buffer

Shallow Water Site: The Shallow Water Site is located off the end of the North Jetty and would be 11,500 feet long and from about 3,100 feet to over 5,600 feet wide, occupying an area of approximately 531 acres (see figure 1 and figure 3). Water depths in the site range from 45 to 75 feet. Coordinates are presented in Table 1.

Components of the Disposal Site: The dimensions and area of the Disposal Site are identical to those of the Placement Area; no Buffer is established for this site. A Drop Zone is identified which is further subdivided into sub-zones or cells in a grid pattern of 500 by 500 feet. (See figure 2).

Disposal Capacity: The site is "dispersive", that is, material placed there is transported away from the Shallow Water Site, redistributing primarily north and northwest toward and onto Peacock Spit. Modeling studies indicate that approximately 25 percent of each hopper load of dredged material is immediately dispersed out of the site. Natural forces acting on material placed from June through October continue the dispersion so that approximately 45 percent of the dredged material discharged to the placement area is dispersed out of the site by the end of each dredging and disposal season. Following the end of active disposal, the stronger and more direct natural forces coming out of the west, southwest and south, further transport and redistribute most, and in some years, all of the remaining material out of the site. Because of this, site capacity over the long-term is unlimited. On an annual basis, determination of site capacity is more complex and will depend on how much material was transported out of the site during the previous winter. Using the 1997 bathymetric baseline, the Shallow Water Site has the capacity to accept an annual placement of 6 million cubic yards. Conservatively assuming that only the immediate 25 percent dispersion occurs, this would result in a single dredge year accumulation within the footprint of the placement area of approximately 4.5 million cubic yards during the June to September disposal season. This volume of material has not been placed at the Shallow Water Site recently. Actual site capacity will need to be reviewed and confirmed annually through routine monitoring.

Specific Management Issues/Considerations/Objectives: (1) Only material determined to be suitable for unconfined in-water disposal through application of the then-current Evaluation Framework for the Pacific Northwest region may be discharged to this site. (2) Material placement at the site will be managed to achieve a relatively uniform distribution throughout the placement area. Specific locations within the placement area (e.g., the eastern third) appear to be more rapidly dispersive than the rest of the site. Preferential loading of those locations will be evaluated and specified, if appropriate, for each AUP. The primary mechanism for evaluating site capacity will be the AUP for that dredging and disposal season. (3) All disposals will occur *only* in the Drop Zone. The Drop Zone is subdivided into a grid of 83 cells 500 by 500 feet (figure 2). Individual disposals by the hopper dredge(s) will be rotated to each cell over the dredging and disposal season. (4) Material placed in the site during June through September of any year is expected to be transported out of the site by June of the following year. This redistribution of material has the potential to augment the eroding Peacock Spit, i.e. a beneficial use. Residual material not transported away reduces the specific annual capacity of the Shallow Water Site.

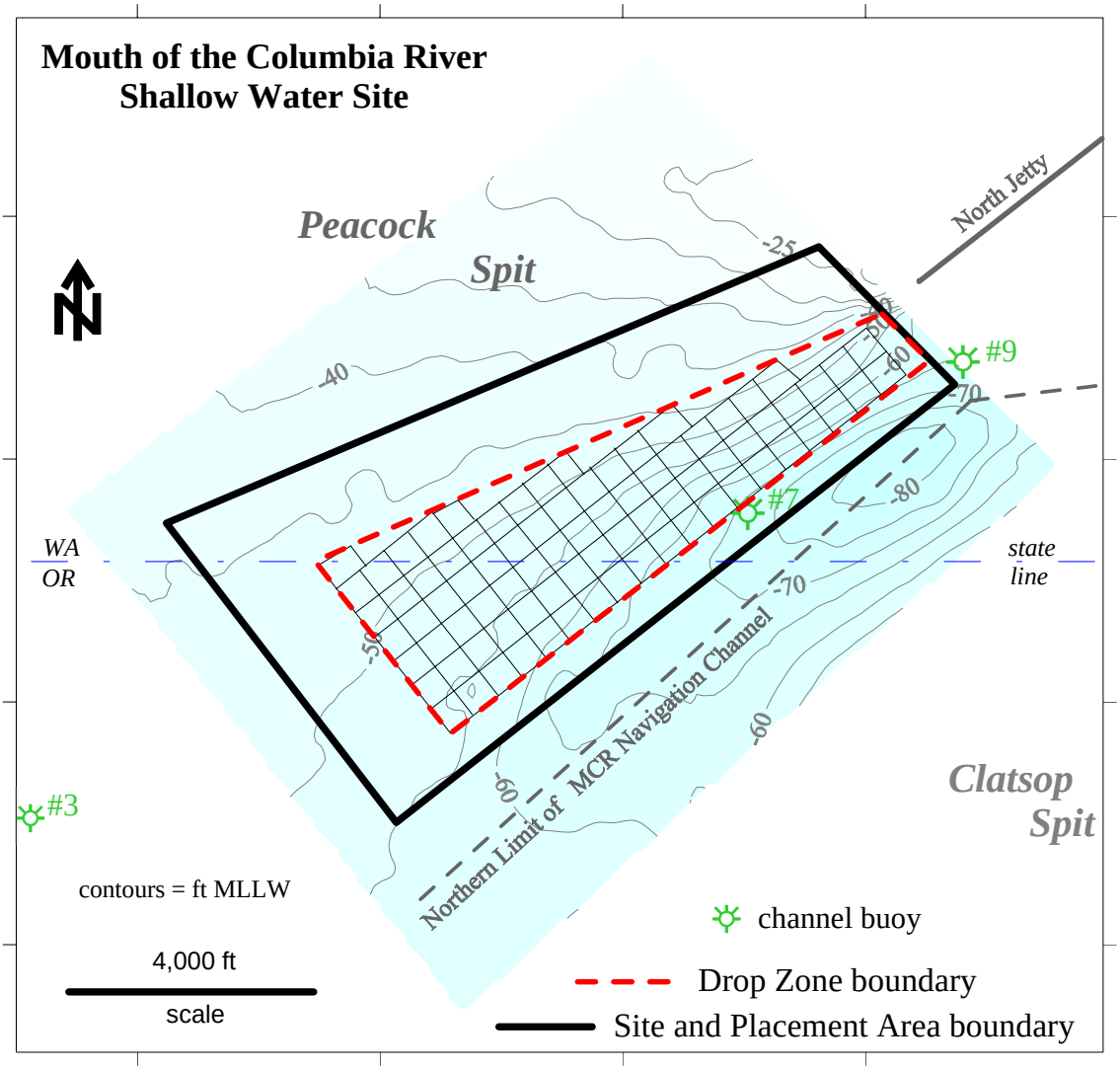


Figure 3: Shallow Water Site

Deep Water Site: The Deep Water Site is located approximately 4.5 miles offshore of the entrance jetties and occupies approximately 8,980 acres (see figure 1 and figure 4). Water depths in the site range from 190 to 300 feet. Capacity is estimated at 225 mcy total, with an ultimate mound height of approximately 40 feet. Coordinates are presented in Table 1.

Components of the Disposal Site: Placement/Disposal Area (4,296 acres), Drop Zones (2,000 by 2,000 feet) throughout Placement Area, Buffer (3,000–feet on all sides) (see figure 3).

Disposal Capacity: The Deep Water Site is "non-dispersive" or "depositional'; material placed at the site is expected to remain on-site. The placement area was sized to contain a static disposal capacity of 225 mcy in a mounded configuration with a maximum height of 40 feet. Actual

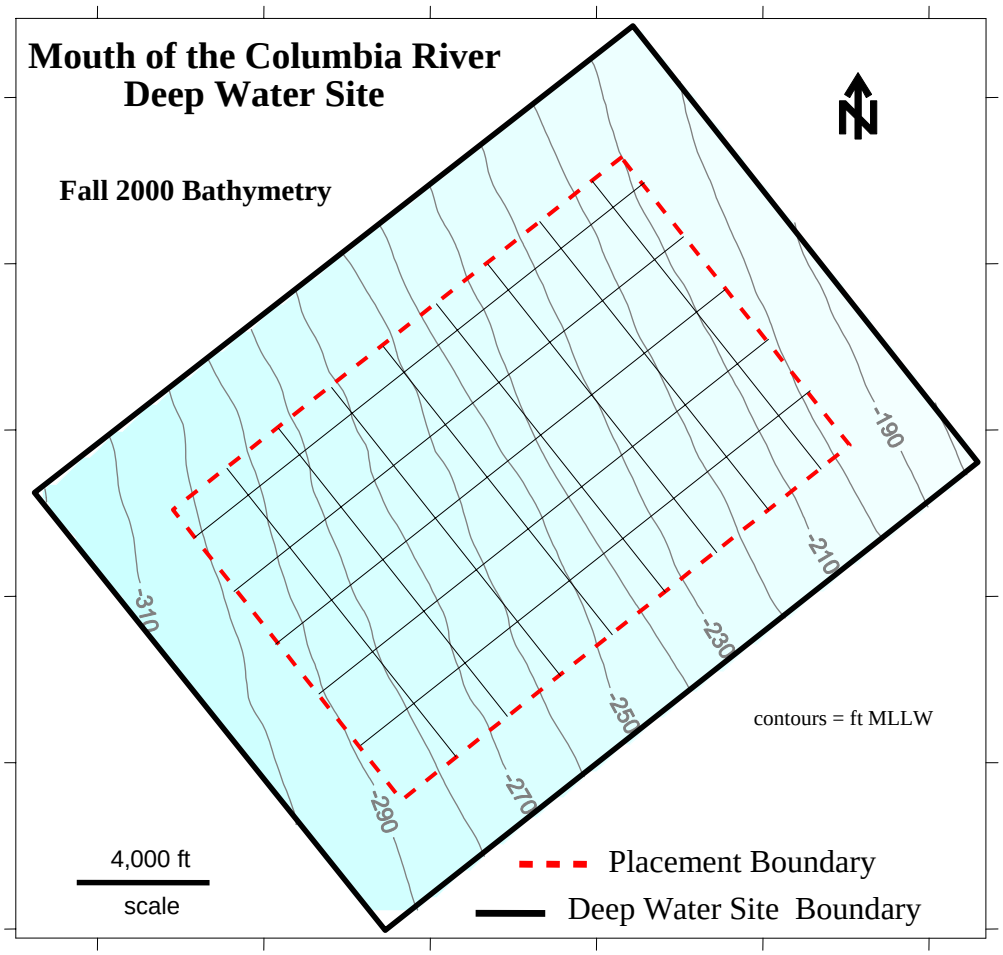


Figure 4: Deep Water Site

capacity is likely larger as specific allowance for consolidation and compression was not made. Annual disposal capacity is not limited. However, because USEPA's and USACE's preference is to fully utilize other disposal options to the maximum extent practicable prior to using the Deep Water Site during some years it is probable that no maternal will be placed at the site.

Specific Management Issues/Considerations/Objectives: (1) Only material determined to be suitable for unconfined in-water disposal through application of the then-current Evaluation Framework for the Pacific Northwest region may be discharged to this site. (2) It is the USACE's and USEPA's intention to use beneficial use sites, the North Jetty Site, or the Shallow Water Site prior to using the Deep Water Site. The site is a depositional site; material placed in the site will remain in the site and cannot be further managed (i.e. removed or relocated) once placed. (3) Public and agency input during the selection process strongly endorsed point-dumping of material rather than wide-spread placement. The site will be managed *over the 50+ year life of the site* to achieve a relatively uniform distribution throughout the placement area. On an annual use basis, all disposals will occur *only* in specified Drop Zone(s) or as directed by

the USEPA after consultation with the USACE. Accordingly, material annually will be point-dumped and Drop Zones rotated over the life of the site to achieve uniform distribution. (4) No direct disposal of dredged material is allowed anywhere in the buffer zone; however, dredged material sloughing off the developing mound may extend into the inner margins of the buffer zone. (5) The site is located in existing tow lanes and navigation approach for ocean-going vessels. Also, the site is seaward of the general area where Columbia River Bar Pilots board ocean vessels to take them across the bar and into the Columbia River navigation channel. The AUP will specify coordination and any other safety procedures necessary to avoid or minimize navigation conflicts in this location. (6) Once placed in the Deep Water Site, no significant volume of material would be transported away from the Placement Area. If 225 mcy of material were placed in the site over the next 50 years, a mound approximately 40 feet high would be created. USEPA requires that mounding at the site not exceed 40 feet in height. However, that height was arrived at through conservative modeling in 1998 to determine the potential for the site to have *any* effect on waves. A specific re-evaluation of site capacity is required as part of the site designation to be undertaken once the site is used and an average mound height of 30 feet is achieved throughout the Placement Zone. This evaluation will either confirm the original 40-foot height restriction, or recommend a more technically appropriate one. Once the Deep Water Site has reached its disposal height limit, further use must be terminated and/or a new site would have to be designated.

Baseline Definition

MPRSA 102(c)(3)(A) requires that the SMMP include a baseline assessment of conditions at the site. The purpose of the baseline condition is to provide a synoptic point in time, prior to being influenced by the disposal of dredged material, against which monitoring results can be compared to assess the on-site effects of the disposals, assess trends, and perform site management. Whenever possible, it is usually expedient to accomplish a complete baseline assessment concurrent with site designation studies. This is most typical with new candidate sites with little historic information. That was not the situation for the mouth of the Columbia River and estuary. Dredging at the mouth of the Columbia River and disposal into ocean waters has occurred for nearly a century. In addition, the scientific record for the Pacific Ocean off the mouth of the Columbia River includes over thirty years of studies and surveys, which are directly pertinent to ocean dumping and dredged material management.

The ocean offshore of the Columbia River is a biologically highly-productive environment that is influenced by complex physical processes. The studies and surveys over the years indicate that the biological assemblages of the two sites, the Shallow Water Site and the Deep Water Site are similar but can be broadly recognized as two community types. The inshore community (i.e., at and near the Shallow Water Site) is adapted to the high energy wave and current conditions and tends to consist of rapid colonizers and mobile opportunists. Substrate is somewhat coarser and constantly being eroded or reworked by ocean and river dynamics. Diversity and densities of benthic infauna are typically lower in this community. The offshore community (typically in water deeper than 200 feet) is less subject to the high wave and currents directly. Substrate includes finer particles distributed through the Columbia River plume and dropping out of

suspension onto the sea floor creating a generally more stable environment. This offshore environment generally displays a consistently higher benthic diversity with greater densities than the inshore environments. However, both communities exhibit high year-to-year variations in diversity and species composition.

Extensive studies were conducted off the mouth of the Columbia River in the 1970's under the Dredged Material Research Program (USACE, 1977) providing detailed biological information on the offshore environment that was used for the original ODMDS (A, B, E, and F) designation. Those studies identified five major benthic assemblages of the area offshore of the Columbia River, of which assemblage D corresponds to the Shallow Water Site and assemblage A corresponds to the Deep Water Site. Assemblage D was characterized by low densities of 196 to 780 individual organisms per square meter with the higher values in the deeper waters. Assemblage A was characterized by much higher densities of 2000 to 12,000 individuals per square meter. Polycheates, mollusks and crustaceans were dominant taxa for both assemblages. Since these studies, there has been additional physical and benthic information collected through monitoring of the original ODMDS since their designation in the 1980s and various research activities of academia and other federal agencies, particularly the National Oceanic and Atmospheric Administration (NOAA). This historic information was re-evaluated by USEPA and the USACE in developing the site designation surveys conducted for selection of candidate sites and found to still be applicable. Benthic surveys were conducted in July 1992, and seasonally (late-spring and fall) in 1993, 1994, 1995 and 1996 by the NOAA Fisheries research station at Hammond, OR, through interagency agreements with the USACE and USEPA. Overall densities varied between seasons and years as did taxa diversity. Polycheates were typically the dominant taxa identified, followed by molluscs and crustaceans. These studies indicated that the offshore area (deeper waters) closely resembled the nearshore area (shallower and closer to land) sand bottom community typical of the Oregon and southern Washington coast similar to what the historic scientific record described. The communities are characterized by species (e.g., *Owenia fusiformis, Tellina* spp.) adapted to high energy, shifting environments either because they are rapid colonizers, high-energy tube-dwellers, or rapid burrowers. In general, invertebrate densities increased with distance from shore throughout the area. Demersal fish and epibenthic macrofauna (e.g., Dungeness crab) populations exhibited similar population and density fluctuations. This information was consistent with the historic information collected in the 1970s for the mouth of the Columbia River oceanic area. The results of the newer surveys were included in the 1999 IFR/EIS to supplement the existing historic information record. While there were many deep water stations (<20) that had been sampled for the general deep water ocean area offshore of the Columbia River over the years, there were only two stations in the immediate area of the then-proposed Deep Water Site. The 1999 assessment concluded that additional physical and biological surveys were needed for the Deep Water Site (see 1999 IFR/EIS, Appendix H, Exhibit H).

It was decided and agreed by USEPA and the USACE that the additional baseline studies at the Deep Water Site be conducted in two phases. First a physical baseline data collection program was conducted to determine if any unique physical or geological features were present in the Deep Water Site. This would be followed by the biological baseline study. Physical baseline studies were conducted and completed at the Deep Water Site and are presented as Attachments

A, B and C of Exhibit N of the January 2003, Columbia River Channel Improvement Project, *Final Supplemental Integrated Feasibility Report and Environmental Impact Statement IFR/EIS* (USACE, 2003). These include a Sediment Trend Analysis (STA®), sidescan survey, an acoustic bottom characterization survey, and physical/chemical sediment analyses survey. These studies validated the assumption that no unique physical features were present in the Deep Water Site. This conclusion was used to refine the scope of the biological baseline studies. The scope of the biological baseline studies was reviewed by the Ocean Dumping Taskforce core group consisting of the regulatory agencies: Oregon Department of Land Conservation and Development, Oregon Department of Environmental Quality, and Washington Department of Ecology, in addition to the USACE and USEPA. Comments were incorporated and a contract for the biological baseline was let in 2002.

The biological baseline studies included sediment profile imaging, sediment infauna analysis, sediment physical characterization, and crab and fish population studies. Field surveys were conducted over a four month period between July and October 2002 with a final report completed in June 2003 (MEC/SAIC, 2003). This study was designed to evaluate the benthic invertebrate populations as well as marcoinvertebrate and fish populations. Although the focus of the study was on the Deep Water Site, characterization of demersal fish and crab communities at the Shallow Water Site was also included. To ensure that adequate collection of biological resources was gathered by the study a variety of sampling methodologies were used for each group. Benthic invertebrates were sampled with sediment profiling imaging, which can cover a larger area such as the Deep Water Site most efficiently. This imaging data was verified as representative of populations in the site by also taking physical surface samples which were analyzed for species present to confirm that the imaging was correct and representative. Dungeness crab populations were also sampled with multiple methods. Both otter trawls and crab pots were used to cover as much variability in the population structure as possible. Other benthic invertebrates and fish were sampled primarily with otter trawls in 2002 but fish and macroinvertebrate sampling was expanded in 2003 to include both beam trawls and commercial sized otter trawls. Sampling a given population with multiple methods is done to ensure that an adequate assessment of a population structure and composition has been completed. In this case the results obtained indicated that the Deep Water Site was typical of most inner to middle continental shelf communities found off Oregon and Washington and that it was not unique habitat nor did it have unique species or species of concern. The study also identified a seasonal depositional pattern of finer grained material attributable to the Columbia River plume for the inner third of the Deep Water Site which strongly influences benthic community composition and densities. Comparing the results of the 2003 work with the 20 plus years of historic data (see USACE/USEPA, 1999, Appendix H) further confirmed that the habitat and community structure of the Deep Water Site is typical of sand-dominated inner shelf environments offshore of the States of Oregon and Washington and similar to assemblages and populations reported in previous studies. This recent data, combined with the historic data, provides a more than adequate baseline assessment to compare to current and future routine monitoring efforts to verify what level of impact occurs at the site and to manage anticipated dredged material disposals.

Questions were raised by members of the public concerning the compatibility of the different trawl methods employed during the previously described study (MEC/SAIC 2003). In summer, 2003, a comparative study of beam and otter trawls was undertaken in order to clarify the inter-comparability and suitability of each of these research trawl nets, particularly for monitoring surveys at the mouth of the Columbia River. Catch results were also compared for commercial trawl gear routinely used in local fishery. The primary objectives of this study were to: 1) compare the demersal fish and invertebrate assemblages characterized by the two research trawls; 2) compare sampling efficiencies of the research trawl nets and commercial trawls; 3) determine differences between the size of organisms sampled by commercial nets, otter trawls, and beams trawls; 4) determine representative sampling profiles of each gear type and examine any preferential assessment of the various benthic fish and invertebrate taxa; and 5) examine subregions within the DWS as determined by the different trawl types. In order to directly compare the sampling efficiency of three different gear types, stations were surveyed using a Willis, or SCCWRP, research otter trawl (otter trawl), a Plumb-staff beam trawl (beam trawl), and a commercial otter trawl (commercial trawl). All fish and invertebrates were identified, counted, weighed, and measured for each trawl event. In order to assure proper deployment for each gear type, regional experts for each type of trawl gear were on board to provide oversight and ensure optimum use of each gear type. A total of 51 trawls were conducted in the DWS in August and September 2003. A final report, *Comparison of the Sampling Effiiency of Three Benthic Trawls at the Deep Water Site off the Mouth of the Columbia River*, was completed in April 2004. Briefly, the report findings are summarized in the following bullets:

- Comparison of Beam and Otter Trawls. This study found differences in the fish assemblage sampled by the beam and otter trawls, with the beam trawl proving effective for sampling smaller species that were closely associated with the bottom or with debris. As with the fish assemblage, there were differences in some invertebrate assemblages sampled by the two research trawls. However, for Dungeness crab and Pandalid shrimp abundance, there was no significant difference between the beam and otter trawls.
- Comparison with the Commercial Trawl. The fish and invertebrate assemblage characterized by the commercial trawls differed dramatically from the beam trawls, as a consequence of the larger mesh of the commercial trawl selecting for the larger species. There were some similarities to the catch observed in the otter trawls, such as with English sole and Arrowtooth flounder. The commercial trawl proved to be more efficient at catching Sablefish, Pacific hake, Petrale Sole, Spiny dogfish and Lingcod than either the beam trawl or otter trawl. The commercial trawl also was more effective for sampling Dungeness crab, especially during the September sampling event. For both months there was a statistical difference between the commercial and beam trawls for relative total catch of Dungeness crabs. The otter trawls appeared to bridge the gap between the commercial and beam trawls in August and the otter trawl crab abundance was not statistically different from either of the other two trawl methods. However, this was not the case in September where the commercial gear was much more proficient than the other two trawl types.

- Size Selection by Gear Type. For many of the fish species observed at the Deep Water Site, there were differences between the size classes sampled by the three different nets.

For Dungeness crab, the commercial trawl consistently caught larger crab than either the otter or beam trawls. There did not appear to be differences in the size classes sampled for the otter and beam trawl.

- Sampling Profiles by Gear. Each trawl net was more effective at capturing a sector of the fish and invertebrate community at the Deep Water Site. The cluster analysis of the relative abundance of species in the trawls helped to define the sampling profiles for each gear type. Despite differences in organisms collected in each of these sampler types, the Deep Water Site was characterized in essentially the same way with each of the sampler types.

- Comparison to Previous Surveys. The demersal fish community collected with the otter trawl during this survey was similar to the assemblage that was observed in 2002 (MEC/SAIC 2003). Flatfish were the dominant species, both in summer and fall. Abundance was much higher in 2003, with mean total abundance typically exceeding 1,000 fish/ha, as opposed to 294 to 353 fish/ha in 2002. Flatfish, the dominant demersal fish taxa in the Deep Water Site, are a dominant inner shelf species along the entire west coast. The demersal invertebrate assemblage, excluding Dungeness crab, observed in the 2002 otter trawls was more similar to that of the beam trawl in 2003. The otter trawl in 2002 successfully sampled many of the small species, such as *C. ventricosa*, Pagurids, and *Crangon* shrimp. It is unclear why the otter trawl did not collect those species as well in 2003. The epifaunal invertebrate community of the Deep Water Site is similar to that observed in the inner continental shelf of Oregon and Washington.

- Dungeness crab. The three trawl methods used in 2003 showed a population structure similar to that of the 2002 otter trawl and crab pot survey (MEC/SAIC. 2003). Although there was a greater difference between sampling periods 2002 (July to September/October) than in 2003 (August to September), female crabs were more abundant than males in the earlier sampling periods. The majority of the crabs in both years were Class IV crabs. However, the 2002 survey caught more Dungeness crabs <100 mm in both the otter trawls and crab pots utilized for that survey than the three trawl methods utilized in 2003. General differences in Dungeness crab abundance were also consistent between the 2002-2003 surveys.

These findings will be valuable in design of future studies and surveys for the Mouth of the Columbia River sites. The quantitative data collected by this effort is consistent with previous studies and surveys and is considered additive to the scientific record for the area.

Since the Deep Water Site had not been used previously, the year 2003 represents the base condition for the purposes of MPRSA. A portion of the Deep Water Site received approximately 1.0 million cubic yards of maintenance dredged material from the MCR project in 2004 as the result of 103 authority and concurrence.

The Shallow Water Site is a high-energy erosive area and experiences high fluctuations in

biological use. It has been previously used for dredged material placement. Therefore, no pre-disposal biological baseline is possible, although the previously cited studies conducted in the 1970's and monitoring events of disposal activities at Site E and Expanded Site E also function as part of the baseline assessment record. The May 1997 bathymetric survey of the Shallow Water Site and the surrounding area is used as the baseline for monitoring erosion and accumulation of dredged material as well as predicting potential changes in the wave climate. Additional biological surveys were conducted in 2002 at and in the vicinity of the Shallow Water Site at the same time biological baseline work was conducted for the Deep Water Site. Detailed physical monitoring undertaken since 1997, and improved modeling capability, allowed the USACE to further evaluate site capacity. That evaluation was provided to USEPA as a technical report: *Supplemental Evaluation of Optimized Site Utilization and Assessment of Potential Wave-Related Impacts Study for the Mouth of the Columbia River* (USACE 2003).

Anticipated Site Use

MPRSA 102(c)(3)(E) requires that the management plan include consideration of the anticipated use of the site.

The Shallow Water Site and the North Jetty Site are expected to be used to their annual capacities each year. While annual capacities will vary, the long-term capacity of both sites appears to be essentially unlimited and neither site is expected to be closed. USEPA and USACE anticipate that the MCR project will supply most of the annual loading to the Shallow Water Site and North Jetty Site (approximately 4.5 million cubic yards) via hopper dredges. The Deep Water Site will be used as needed, typically as backup to other disposal options, including beneficial use of dredged material. The Deep Water Site was sized to accommodate a maximum potential quantity (225 million cubic yards) over the next 50 years, although it is expected that less will be placed there (see also Quantity, Seasonal and Weather Restrictions). Placement at the Shallow Water and Deep Water Sites will utilize specified Drop Zones to ensure uniform placement over each site as described elsewhere in this SMMP (see Special Management Conditions or Practices). Material placed at all three sites is anticipated to be fine- to coarse-sand and by government or private hopper dredges.

In the Deep Water Site there is little material movement and over the life of the site a disposal mound approximately 40 feet in height will be deliberately created. However, due to the depth of water, even if material is concentrated at a single Drop Zone, it might require multiple years of discharge before wave heights would be affected. The specification of Drop Zones and uniform placement strategy will provide an extended period of time between disposals in order to allow marine resources to recover. Additionally, the preference for use of the Shallow Water Site should greatly extend the effective life of the site.

Disposal at the Shallow Water Site would be managed during the dredging season to achieve uniform placement and to enhance material dispersion. To the extent that waves and currents transport material away between dredging seasons the site could be used to a greater or lesser extent than the previous year. Unmanaged long-term disposal could result in the gradual accumulation of material in and around the Shallow Water Site, which could reduce the site's

future disposal capacity. The same consideration would apply at the North Jetty Site. Both USEPA and the USACE see this condition as undesirable.

Placement priorities will include controlling mounding to avoid potentially hazardous increases in wave heights; minimize impacts to marine resources; safe use of hopper dredges; minimize interference with other uses such as commercial fishing, recreational fishing, and commercial navigation; and the beneficial use of dredged material. Beneficial uses being currently considered include protecting the North Jetty from undermining, and keeping dredged material within the littoral system through the maximum use of the Shallow Water Site and the North Jetty Site where it can potentially contribute to beach nourishment. Quantities beyond what is needed for these beneficial uses or that cannot be placed into the Shallow Water Site will be placed in the Deep Water Site.

The ODMDSs could also be used in the future for placement of material dredged during other actions authorized in accordance with Section 103 of the MPRSA. These actions would require a Section 103 permit from the USACE, and coordinated through the public notice process. For the North Jetty Site a CWA 404 permit would be required.

Because only clean dredged material can be placed into the ocean under current statutes and regulations (see Quantity of Material and Presence of Contamination), no need for special management of either site following "closure" is anticipated. This prediction will be re-evaluated based on routine monitoring and any special study results during scheduled review and revision of the SMMP.

Specific assumptions critical to how USEPA intends to manage these ocean sites are:

- The Shallow Water Site and the North Jetty Site are dispersive. Dredged material placed in these sites will naturally disperse with wave action and currents such that long-term mounding within the site will not occur.
- Unacceptable mounding, both on an annual and long-term basis, can be avoided through proper dredged material disposal management (i.e., uniform placement).
- Dredged material is similar to existing substrates and/or is overwhelmed by the dynamics of the Columbia River and ocean. No significant substrate change is anticipated.
- The Deep Water Site is not dispersive. Material placed there will remain in the site and will change the seafloor configuration (mound).
- Areas outside the designated Placement Area at the Deep Water Site will not be directly affected by any disposal event.

For the immediate future, it is anticipated that virtually all dredged material disposed at either ODMDS will come from one or both of the federal navigation projects. A brief description of each is provided:

MCR Navigation Project

The bulk of the material to be placed in the ODMDSs will come from the authorized MCR project, which provides for a 2,640-foot wide channel across the Columbia River bar ranging in depth from 55 feet to 48 feet. The project has two main shoaling areas. The outer shoal extends from approximately river mile (RM) -1.6 to RM 1.0. The inner shoal, Clatsop Shoal, extends from approximately RM 0.0 to RM 2.6, beginning on the south side and crossing the channel near RM 1.0. Maintenance dredging is forecast to average 4.5 mcy per year.

Columbia River and Lower Willamette River Navigation Project (Includes Channel Improvements)

The Columbia River and Lower Willamette Rivers federal navigation channel was authorized to a depth of 40 feet and width of 600 feet from RM 3.0 to 106.5. As estuarine disposal sites reach capacity material from this project will most likely be transported and placed in the ocean. Long-term plans have identified material as far upstream as RM 29.0 as potentially being placed in the ocean. Annual maintenance quantities that would go to the ocean were estimated to average 400,000 cubic yards per year for the next 20 to 50 years.

In December 1999, Congress authorized the deepening of the Columbia River segment of the Columbia and Lower Willamette Rivers federal navigation channel to 43 feet [Section 101(b)(13) of the Water Resource development Act of 1999]. The Willamette River segment remains unchanged. The existing 600-foot-wide, 40-foot-deep navigation channel would be deepened to -43 feet Columbia River datum (CRD), from Columbia River mile (CRM) 3 to CRM 106.5, including advanced maintenance dredging for overwidth and overdepth in the reaches where this practice is currently performed in the present maintenance program. During the construction phase an estimated 6 mcy (4 mcy new work; 2 mcy 40-foot O&M) from CRM 3-29 would go to the ocean. Similar to long-term planning conducted for the 40-foot project (see above), future maintenance material from CRM 3-29 is expected to go to the ocean, when disposal sites in the estuary reach capacity.

Site Management Objectives

The fundamental objective of this SMMP is to provide for the safe and efficient disposal of dredged material at each ODMDS while minimizing effects to coastal resources. General objectives for accomplishing this are to:

1. Control mounding,
2. Minimize impacts to marine resources to the extent practicable,
3. Minimize interference with other uses of the ocean,
4. Beneficially use dredged material when practical, and
5. Safe and efficient dredge operations.

These general site management objectives apply to both the Shallow Water Site and the Deep Water Site; however, owing to the different characteristics of each site, the specific management requirement to meet those objectives will be different. Additionally, individual objectives

specific to each site are imposed (see discussions on each site below). Specific individual site objectives will be periodically reassessed and/or revised in the future.

Individual Site Objectives

Shallow Water Site:

- Placement of material to allow the maximum dispersal out of the site into the active littoral zone.
- Placement of material to allow the maximum capacity of material to be placed into the site.

Deep Water Site:

- Discharge of material so as to not deposit material beyond the boundaries of the Placement Area.
- Discharges of material (individually or cumulatively) so as to not encourage movement of material beyond the boundaries of the Disposal Site.

Site Monitoring and Special Studies

MPRSA 102(c)(3)(B) requires that management plans include a program for monitoring the site.

Site monitoring is a key component of site management. The main purpose of this monitoring program is to determine compliance with site use restrictions or conditions and whether dredged material site management practices, including disposal operations, at the site need to be changed to avoid unreasonable degradation or endangerment of human health or welfare or the marine environment. These activities are collectively referred to as "Routine Monitoring" throughout the SMMP. Routine monitoring events may be triggered annually or some other time period (e.g., five years), when a set volume of material has been placed, or a combination of volume and chronology. Special Studies (see section on Special Studies) will be undertaken as necessary to address specific questions or issues that are not covered by routine monitoring events. The results of these Special Studies are intended to refine future management objectives and practices, modify routine monitoring requirements or reset Baseline conditions. Collectively, routine monitoring and special studies will provide the information for USEPA to assess the impact of disposal on the marine environment (40 CFR 228.9(a)).

Routine Monitoring

Routine monitoring is not a stand-alone activity, but is based on information developed during the site designation process and in response to site management objectives *and site use* (emphasis added). The joint USEPA/USACE Guidance Document for *Development of Site Management Plans for Ocean Dredged Material Disposal Sites* (USACE/USEPA 1996) for

developing management plans states that continuous monitoring of all physical, chemical, and biological parameters and resources in and around a typical disposal site is not necessary. Effective monitoring programs should be designed as a tiered series of investigations. The most effective monitoring programs should:

- be integral components of site management;
- evaluate the fate and effect of dredged material disposal;
- use a tiered monitoring approach;
- link specific measured effects (action levels) with predetermined management actions; and
- support decision making.

Routine monitoring typically follows a tiered framework: simple techniques for monitoring of activities or their consequences occupies the lowest tier while more complex monitoring techniques occupy higher tiers. Only the level of monitoring needed to address specific management questions would be undertaken. An example of typical monitoring questions is provided below:

- What is the distribution pattern of the dredged material? Is the material behaving as anticipated?
- Can the dredged material be identified as different from the existing substrate?
- Is mounding occurring? To what extent?
- How have the depth contours been affected?
- Do the depth contours change over time?
- Is erosion occurring? At what rate?
- Has the character of the site been significantly altered so as to cause alteration of adjoining habitat?
- Has the material moved and now affects conditions (sediment type or depths) outside the site?
- If material has redistributed, what is the nature of changes to the benthic community?

Figure 5 shows a generalized, tiered monitoring plan. This tiered approach is used as the basis for disposal site monitoring throughout the nation. Each AUP will address whether a tiered approach is appropriate for an issue or how it is to be employed, including specification of triggers if reasonable to do so. Because the main user of the sites is expected to be the USACE, typically USEPA and USACE jointly will evaluate the monitoring data between each tier to determine whether there is any need for change, or whether more data, the next tier, will be required before determining a need for change.

The following Specific Monitoring Objectives are identified for the MCR ODMDS:

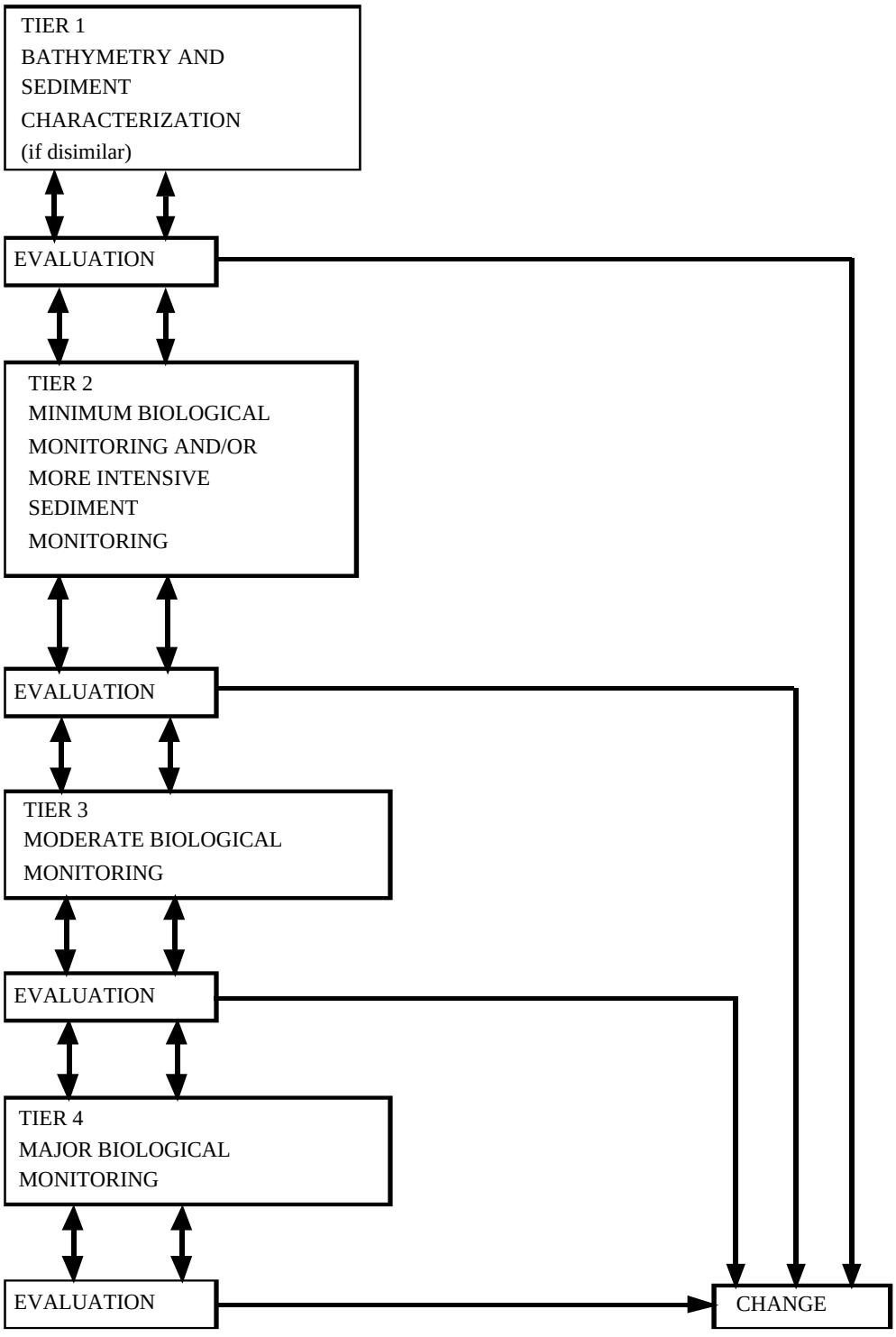
- Ensure that dredged material is being placed as required by the then-operative AUP.
- Ensure that the dredged material is behaving as predicted during placement (e.g., monitoring v. modeling).
- Placement of dredged material does not create unacceptable mounds (principally Shallow

Water Site concern).

- Assess the significance of potential impacts of disposal operations on the public safety and resources or resource use.
- Verify that material is moving out of the dispersive sites (Shallow Water Site and the North Jetty Site) over time, as predicted, providing long-term capacity without adverse effects.
- Verify that material is remaining in the Deep Water Site Placement Area.

Special studies required for the MCR ODMDS contain biological assessments. Based on the results of those special studies, biological objectives may be developed and added to this section.

Figure-5. Generalized, Tiered Approach to Monitoring ODMDSs



Shallow Water Site Routine Monitoring.

Bathymetric surveys are scheduled annually for the Shallow Water Site. Future bathymetric surveys will evaluate cumulative changes based upon comparison of the oldest and most complete surveys available with the then-current survey results. For the Shallow Water Site, that baseline is the 1997 bathymetric condition. Because of the concern for small boat navigation safety in transiting the Shallow Water Site and the North Jetty Site, bathymetric surveys will be conducted periodically during the dredging season to verify uniform placement of the material is occurring. Initially, daily logs of discharges into the Drop Zone cells will be monitored. Bathymetric surveys will be conducted as identified in the AUP and modified throughout the dredging season as necessary. This frequency will increase if necessary to ensure the uniform placement during the dredging season.

The rate of efficient transport of placed sediments out of the Shallow Water Site is expected to vary annually. The area adjacent to but outside of the Shallow Water Site and the North Jetty Site will be surveyed each spring and fall to see if depths outside of the sites are being affected and to refine sediment transport modeling capability. The extent of coverage will be determined by USEPA and the USACE. The frequency of surveys as well as extent of coverage may be reduced in the future as the USEPA and USACE gain more experience with the behavior and dispersive capacity of the sites. (See also Special Studies.)

Periodic reassessment of the use of the site and surrounding area by important biological resources will occur on a 5-7 year schedule throughout the life of the site (emphasis added). Typically the USEPA and USACE will cooperate in the development and conduct of this reassessment. The level of effort for this reassessment is expected to be similar to the MEC/SAIC 2003 (or Pacific Northwest National Laboratory 2004, if appropriate) survey. Survey plans will be drafted by the USACE and reviewed for concurrence by the USEPA.

Deep Water Site Routine Monitoring.

Bathymetric surveys (pre- and post-disposal) will be conducted for those portions of the Deep Water Site proposed to be used (as determined in the AUP). In addition, bathymetric surveys will also include those portions of the site used the previous year (if appropriate). Future bathymetric surveys will evaluate cumulative changes based upon comparison of the oldest and most complete surveys available with the then-current survey results. Since the Deep Water Site has not been used, the bathymetric surveys performed for site designation collectively provide the baseline condition (USACE, 2003).

A physical characterization of grain-sizes and sediment distribution will be conducted following any disposal event of greater than 500,000 cubic yards in any single year. Such characterization will be conducted after five years of active disposals which do not exceed 500,000 cubic yards of material in any single year. In any case, such characterization will be conducted for the entire site not less than every 10 years regardless of any site use. If no disposals have occurred, the intensity of investigation need only be sufficient to verify the seasonally shifting sediment

pattern identified in baseline surveys.

Periodic reassessment of the use of the site by important biological resources (e.g., groundfish, macroinvertebrates and benthos) will occur throughout the life of the site: Specific scope and frequency to be determined; see Special Studies. Typically the USEPA and USACE will cooperate in the development and conduct of this reassessment. Survey plans will be drafted by the USACE and reviewed for concurrence by the USEPA.

Special Studies

Special Studies are non-routine studies of specified duration that are intended to address specific questions or issues that are not covered by routine monitoring events or that arise from questions or issues identified through routine monitoring. Such situations could include follow-up after an accident or spill of a material, or in advance of use of a new type of equipment, or a different type of material (e.g., rocks). Under such circumstances, the USEPA and USACE would mutually scope and conduct appropriate study(ies) to determine the effect of the incident on the site(s) and whether specific contingency or even enforcement action would be necessary. Consultation with other federal agencies with expertise and the states is encouraged. Typically, the results of any Special Studies would be used to refine future management objectives and practices, modify or augment routine monitoring requirements or reset baseline conditions. Based on review of the present information base and comments received during public review of the Proposed Rule and Draft SMMP, USEPA and USACE have concluded that the following Special Studies will be conducted in association with use of the newly designated Shallow Water and Deep Water Sites[1]. Specific survey plans will be developed that will provide such details as sampling stations and frequencies by the USACE and submitted to USEPA for review and approval concurrent with the AUP process. Timing to accomplish the initial studies described below, especially regarding the Deep Water Site, will vary due to volume and frequency of disposal, as well as being affected by budgetary considerations (USACE/USEPA 1996).

Shallow Water Site

1. Sediment Transport and Fate.

   Waves and current have dispersed 90 percent of the material which has been placed in the Shallow Water Site since May 1997. The direction of dispersion, based upon bathymetric measurements, has primarily been in a northwesterly direction onto Peacock Spit. Opportunities may exist to enhance or better manage this augmentation. A sediment transport and fate special study would involve the assessment of transport rates and fate of material placed in the Shallow Water Site. Various methods are available to further assess sediment transport and fate including detailed bathymetry, seabed drifters, sand

1 Special Studies for disposal of different material types (i.e., not predominantly sand) and/or disposals that proposed to use non-routine equipment (i.e., hopper dredges) will be automatically triggered by the proposal. If the request comes via a regulatory permit application, the USEPA will be specifically consulted for development and approval of the assessment work, and any resulting permit will include condition(s) for during and post-placement monitoring.

tracers, various acoustic methodologies, and modeling. The goals of this special study would be to quantify movement out of the site, define (perhaps quantify) factors affecting movement, assess potential benefits of continued site use, and refine management strategies in the site.

2. Disposal of Different Material Types and/or Disposal using Non-Routine Equipment.

   Typically material going to the Shallow Water Site will be clean sand from the MCR or Columbia River federal navigation projects placed by hopper dredges. Extensive evaluation already has been conducted (USACE, 2003) to optimize site use and separate studies are included (see previous Sediment Fate and Transport) to further refine placement strategy and methods in the future. USEPA recognizes that the small size and configuration of the Shallow Water Site and the dynamic sea and weather conditions at that location make use of equipment other than hopper dredges potentially unsafe and, therefore, unlikely. Other material types are not restricted from the site, nor is use of equipment other than hopper dredges; however, USEPA expects that use of non-routine equipment and disposal of significant volumes (>250,000 cy) of other material types will likely be directed preferentially to the Deep Water Site. Either situation, if proposed for the Shallow Water Site, will trigger a Special Study. In addition to navigation safety, anticipated mound configuration, disposal pattern, and fate and transport (if a different material) will need to be specifically evaluated prior to disposal and, if approved, results verified in the field following placement.

Deep Water Site

1. Mound Test/Placement Verification.

   Material is to be placed into the Deep Water Site such that it does not deposit outside of the Placement Area. Current placement models do not incorporate the effects of sediment placement (primarily spread) on a (developing) mound. Routine monitoring by bathymetric surveys are not sufficiently sensitive to define the outer limits of the mound created by a disposal event. A mound test and placement verification special study would involve the investigation of mound development and configuration along with sediment and benthic infauna succession. Sediment profiling cameras (SPI) can be used to verify the spread of the outer flank (thin layer) of the mound. This information can be used for model verification. In addition information can be gathered regarding sediment characterization and when preformed over several years biological succession. The goal of this special study includes verification of placement of the dredged material as planned inside the Placement Area and specific Drop Zones, documentation of the extent and changes in sediment characteristics, document changes over time in sediment characteristics and benthic community, and to reassess the existing point-dump verses thin-layer placement strategy at the DeepWater Site. It is expected that two field surveys would be required, one after the disposal event and one the following year.

2. Macroinvertebrate/Groundfish.

Studies on aquatic resources at the Deep Water Site will be done to monitor the level of effects from disposal, including recolonization and infaunal succession. This study will primarily use the SPI technique used to assess the mound characteristics for benthic invertebrate assessment and most likely will be coordinated with the previously described special study. Trawling will also be done to assess macroinvertebrate and groundfish species population characteristics. Any abnormalities (i.e., fish tumors) found to occur in these groups will also be noted and reported. The results of this initial effort will be used by the USEPA and USACE to identify and (if necessary) scope biological measures to be added to the routine monitoring component of future AUPs for the site to insure that periodic reassessment of biological resources is conducted.

3. Disposal of Different Material Types and/or Disposal using Non-Routine Equipment.

Typically material going to the Deep Water Site will be clean sand from the MCR or Columbia River federal navigation projects placed by hopper dredges. Other material types are not, however, restricted from the site, nor is use of equipment other than hopper dredges. Size and characteristics of the Deep Water Site make it an initially preferable location for placing non-standard material and use of non-routine equipment over the Shallow Water Site. Deposition patterns from either situation are expected to differ from the typical and will need to be specifically evaluated prior to disposal and results verified in the field following placement. Different material types may include fine-grained material similar to that dredged in 1989 from Tongue Point and placed in Site F (USACE/NMFS 1993) or highly-compacted substrate. Non-routine equipment could include any project dredged with equipment other than a hopper dredge. Tongue Point was dredged using two large clamshell dredges (15 cy and 24 cy) and four 3,000 cy bottom-dump transport barges. The monitoring program for that dredging project involved 4 years of field sampling. This included one sampling event prior to disposal and three annual sampling events following disposal. Monitoring parameters included bathymetry, sediment physical characterization, sediment chemical characterization, benthic infauna characterization, and macroinvertebrate and ground fish trawls. Special studies triggered under this category will have to be designed relative to the proposed disposal event. Typically this will involve predisposal modeling (and perhaps field surveys) and specific monitoring surveys during and post-disposal.

Restrictions and Requirements

Annual Use Planning Requirement

The operational mechanism for use and monitoring of sites on an annual basis as well as management decision-making will be the Annual Use Plan (AUP). The AUP for a given dredging year is expected to be based on the results of the previous year's monitoring, the pre-dredging/disposal hydrographic surveys (typically conducted in the spring), and hopper dredge operating parameters. The AUP will focus on any operational adjustments which should be implemented. It is expected that the primary user of the ODMDS will be the USACE for material dredged from federal projects. The North Jetty Site, used and managed under the Clean Water Act Section 404 authority, will be included in the AUP for any ocean disposal action. The AUP will identify the capacities of the ODMDS, expected volumes to be discharged, dredging and disposal techniques, timings and locations, routine monitoring or special studies, and other considerations drawing on the then-current site use conditions and SMMP. The AUP will identify any necessary coordination requirements (i.e., notice to mariners, local fishermen associations for gear removal). The USACE, either as user of the site or as permitting authority, will take the lead to draft the AUP and provide it to USEPA. Following USEPA review and resolution of comments, the AUP may be posted for public review and comment. The agencies will jointly respond to any comments. USEPA will concur or non-concur with the final AUP. Once approved by USEPA, the AUP will constitute the template for that year's disposal. USEPA recognizes that the AUP cannot anticipate every operational situation and that day-to-day flexibility in dredging and disposal decisions will be necessary. However, the user will make every effort to consult with USEPA and seek their concurrence before changes to the AUP are initiated, for example, decisions to increase the spacing between the dumping positions, to shift disposal operations to other portions of the site, to redistribute material at a site or to an alternate site, or to make other significant changes in site use or management.

Record-Keeping and Reporting Requirements

Daily records are required of dredgers indicating where material was dredged and where and how material was placed. Also required to be recorded are start and endpoint coordinates for each load placed. An annual summary report of quantities dredged and placed at each site will be prepared and provided to USEPA (Note: This requirement can be met by submitting a separate report or through inclusion of the information into the AUP).

Data from any routine monitoring or special studies will be compiled and submitted to the USEPA (ATTN: Region 10 Ocean Dumping Coordinator). These results will be evaluated by USEPA and the USACE and these agencies will attempt to make consensus decisions concerning the need for management changes regarding the site (see Site Management and Monitoring).

Inspection and Surveillance Provisions

Contract dredges have 24-hour inspection by USACE personnel to ensure dredging and disposal in the correct locations. USACE dredges are responsible for ensuring their proper positioning. USCG has surveillance role under MPRSA. USEPA will typically utilize the inspection and surveillance capabilities of these other agencies; however, USEPA may choose to implement its own inspection and surveillance requirements using USEPA personnel or contractors. It is expected that USEPA will cooperate with the USACE on any special studies.

Special Management Conditions or Practices

MPRSA 102(c)(3)(C) requires that management plans include special management conditions or practices to be implemented at the site that are necessary for the protection of the environment. The following Special Management Conditions will be implemented at both the Shallow Water and Deep Water Sites.

Placement Strategy

The placement strategy has a large influence on the consequences of disposal in any site. Placement strategies vary, ranging from individual dumps to the long-term distribution of material. Over the course of an average dredging disposal season at the MCR there could be 1,200 to 1,400 individual dumps. Both USEPA and USACE policy establishes a preference for beneficial use of dredged material. Of the two MCR sites, use of the Shallow Water Site is judged to have greater potential for beneficial use. Accordingly, any material going to the ocean will preferentially use the Shallow Water Site. Exceptions to this requirement include: (1) material or equipment incompatibility; (2) weather or navigation safety (e.g., use of multiple dredges) conflicts; (3) expected volumes exceed annual capacity in any year; (4) conflict with other applicable federal laws, regulations, or conditions; and/or (5) specific restriction or direction by USEPA.

A Uniform Placement Strategy is applied to both the Shallow Water and Deep Water Sites; however, the specific manner in which this strategy is applied at each site differs due to the dispersive or non-dispersive characteristics. As specified in the "Specific Management Issues/Considerations/Objectives" section of the Shallow Water Site, the application of "uniform placement" is most critical to each annual disposal. As specified in the "Specific Management Issues/Considerations/Objectives" section of the Deep Water Site, the application of "uniform placement" is most critical over the long-term and multiple-year disposals.

Equipment Considerations

The type of dredge used influences the dimensions of the individual and cumulative dump mound. For the hopper dredges that commonly work in the Columbia River or MCR, the USACE's multiple bottom-door hopper dredge ESSAYONS for each load would produce a thinner deposit than the split-hull contract hopper dredges at any given water depth. As an example, in 50 feet of water with a one-foot per second (fps) current, a single load for the ESSAYONS would produce a disposal mound that would have a maximum height of less than 8

inches and cover an area of about 20 acres. A single load placed by the contract dredge NEWPORT would produce a mound with a maximum height of over 10 inches and an area of around 10 acres. The use of clamshell dredges placing material into ocean-going barges has not occurred in this location in the past, but is used at other coastal projects elsewhere along the Pacific coast. Material discharged from a barge is typically more consolidated than material discharged from a hopper dredge.

Hopper dredges are anticipated to be the dredge type normally deployed at MCR ODMDS. Both the Shallow Water and Deep Water Sites were configured under the assumption that hopper dredges would be used. The Deep Water Site is large enough that barge-disposal of material would not be a problem. At the Shallow Water Site, such material would likely not erode and disperse as readily as hopper dredged material. *Before any non-hopper dredged material may be discharged at the Shallow Water Site, a specific evaluation (potentially including sophisticated modeling) must be completed and submitted for approval by the USEPA.* (Emphasis added.)

Equipment and Discharge Requirements

Hopper dredges or clamshell and barge operations could include USACE and private contract dredges. All such operations are required to meet all US Coast Guard requirements for safety. They are also required to use modern global positioning equipment capable of fixing their location within plus or minus 3 feet to ensure they place material within the designated disposal sites. The Annual Use Plan will specify Drop Zones/cells for each discharge. Clamshell and barge operations will need to be modeled prior to any disposal Shallow Water Site and may require Special Study.

Quantity, Seasonal and Weather Restrictions

Quantities placed at the Shallow Water Site and the North Jetty Site will likely vary year-to-year based on dispersal and will be monitored. Capacity at the Shallow Water Site is estimated at 6.0 million cubic yards (mcy). This is more volume than has been placed at the site in any prior year. The maximum volume of record is approximately 5 mcy, which was placed into the 1986 USEPA designated Site E (a smaller site). USEPA expects placements at the Shallow Water Site normally will be less than the 6.0 mcy capacity. Disposal volumes and placement will be closely monitored, especially late in the season, to verify uniform placement, and to assess dispersive capability. In general, excess material that cannot be placed at the North Jetty or Shallow Water Sites or other acceptable and appropriate beneficial use locations will be placed in the Deep Water Site, with no quantity restriction (subject to exceptions noted under Placement Strategy). Adverse sea and weather conditions limit dredging and disposal at MCR to a period typically from June through October. No other seasonal restrictions are considered necessary at this time. It may be possible to cross the bar for ocean disposal at other times of the year, but this is considered unlikely. Even during the dredging season, storm events can restrict disposal events, especially at the Shallow Water Site and North Jetty Site.

Debris Removal Provisions

Debris is material that could cause interference with particular uses of the ocean. Floatable debris comprises material such as logs that could cause navigation hazards or solids, such as plastic or wood chunks that could foul beaches. Non-floatable debris comprises material that could reasonably be expected to cause conflicts with bottom-net or trawl fishing. As a general rule, non-floatable, non-sediment materials that would pass through a 24-inch x 24-inch mesh is not considered debris if it is dredged as part of the sediment matrix.

The USACE or USEPA may make dredging or disposal area inspections to ensure that the contractor is in compliance with the approved operating plans, and that debris is removed prior to discharge at ODMDSs. The need for such a requirement will be assessed during the planning or permitting process. Floatable debris must be either removed at the dredging area or picked out of the water at the disposal area. Sediments, which contain debris that is not easily removed, may require screening through a 24-inch x 24-inch mesh. The mesh must be periodically cleaned and the debris disposed of according to the approved dredging and disposal plan. Hopper and pipeline dredges are incapable of picking up large debris.

Dumping of debris at ODMDSs is prohibited unless specifically allowed. Typically the planning or permitting process assesses the potential risks of any debris that could be encountered during dredging. Dredging contractors and USACE dredge captains are required to maintain a record of the handling of debris encountered during dredging and disposal. Compliance inspectors may review these records. Copies of these records may be required as part of annual reporting.

Quantity of Material and Presence of Contamination

MPRSA 102(c)(3)(D) requires that management plans include consideration of the quantity of the material to be disposed of at the site, and the presence, nature, and bioavailability of the contaminants in the material.

For dispersive sites like the Shallow Water Site, the material is not expected to remain within the boundaries of the ODMDS after disposal. The rate and direction of movement across the ODMDS boundaries is determined by physical transport mechanisms. Depending on these transport mechanisms and the nature of the material, transport may be rapid and continuous, or may occur only during episodic events, such as storms or seasonal changes in transport mechanisms. The potential annual capacity of the Shallow Water Site is estimated to 6.0 mcy, however, this volume of material has never been placed in this location previously. Over the long-term, the capacity of the Shallow Water Site is essentially unlimited. (See also Quantity, Seasonal and Weather Restrictions.) The Deep Water Site is non-dispersive and was sized to accommodate a maximum potential quantity (225 million cubic yards) over the next 50 years, although it is expected that less will be placed there. Accordingly, the site life is expected to be much greater than the “designed” 50 years.

All sediments to be placed at the MCR ODMDS will be evaluated according to then-current requirements of the MPRSA, national guidance, and local manual and determined to be suitable for that purpose. At this time, the *Dredged Material Evaluation Framework* (DMEF) (USACE et al., 1998) is the local manual. Representatives of the USACE Portland District, USEPA Region 10, other federal agencies and the States of Oregon and Washington comprise the Regional Sediment Evaluation Team (RSET), which has been tasked to develop a comprehensive Sediment Evaluation Framework for the Pacific Northwest by the Northwestern Regional Dredging Team (RDT). When the regional manual is completed, it will replace the existing DMEF. It is expected that the interagency RSET will be used to evaluate the suitability of all sediments in the future. The current and future RSET evaluation procedures are designed to be consistent with the MPRSA and the CWA.

Site Management Plan Review and Revision

MPRSA 102(c)(3)(F) requires that the management plan include a schedule for review and revision of the plan. This SMMP is now in effect. SMMP revisions will be made as determined necessary by USEPA. While minor refinements to SMMP elements are expected during the first 10 years, no substantive revision of the SMMP is anticipated before 2014. This is in part based on the uncertain frequency of anticipated use of the Deep Water Site during that period. At least every 10 years thereafter throughout the life of the sites, USEPA conduct a substantive review of the SMMP. These reviews will likely involve coordination with other agencies, technical experts, and stakeholders.

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