Dredged Material Management Plan for the Port of New York and New Jersey

Progress Report

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Table of Contents

List of Figures

List of Tables

Abbreviations and Commonly Used Terms

AKA – Also Known As
CAD – Contained Aquatic Disposal (Subaqueous Pit)
CARP – Contaminant Assessment and Reduction Project
CCMP – Comprehensive Conservation and Management Plans
CD – Contract Disposal
CDF – Confined Disposal Facility
CEWES – Corps of Engineers Waterways Experiment Station
CI – Island Confined Disposal Facility (Containment Island)
COE – Corps of Engineers
CY – Cubic Yard
DMMIWG – Dredge Material Management Integration Work Group
DMMP – Dredged Material Management Plan for the Port of New York and New Jersey
DP – Decontamination Processes
DS – Decontamination Sites
EA – Environmental Assessment
EDC – Economic Development Corporation
EIS – Environmental Impact Statement
GIS – Geographic Information System
Harbor – New York/New Jersey Harbor Estuary region
HARS – Historic Area Remediation Site
HEP – Harbor Estuary Program
HMDC – Hackensack Meadowlands Development Commission
HR – Habitat Restoration
LR – Land Site Remediation
MOA – Memorandum of Agreement
N/A – Not Applicable
NEPA – National Environmental Policy Act
NJ – New Jersey
NJDEP – New Jersey Department of Environmental Protection
NJMR – New Jersey Office of Maritime Resources
NRHP – National Register of Historic Places
NS – Nearshore Containment Facility
NY – New York
NYCDEP – New York City Department of Environmental Protection
NYD – New York District Corps of Engineers
NYSDEC – New York State Department of Environmental Conservation
OR – Ocean Remediation
PA – Pennsylvania
PANY/NJ – Port Authority of New York and New Jersey
PEIS – Programmatic Environmental Impact Statement
Port – Port of New York and New Jersey
RFP – Request for Proposals
ROD – Record of Decision

SAV – Submerged Aquatic Vegetation
SCRWG – Sediment Contamination and Reduction Work Group
SEIS – Supplemental Environmental Impact Statement
SC – Sub-Channel Contained Aquatic Disposal (Subaqueous Pit)
SOW – Scope of Work
SP – Contained Aquatic Disposal (Subaqueous Pit)
S/S – Solidification/Stabilization
TBD – To Be Determined
UP – Upland Confined Disposal Facility
USACE – U.S. Army Corps of Engineers
USEPA – U.S. Environmental Protection Agency
WRDA – Water Resources Development Act

1. INTRODUCTION

Background

The purpose of the Dredged Material Management Plan (DMMP) for the Port of New York/New Jersey (the Port) (see Figure 1) is to produce a regionally supported, comprehensive plan to

Figure 1: Port of New York and New Jersey Location Map

economically meet all the dredged material management needs of the Port while also protecting and supporting the restoration of the estuary. This plan was initiated pursuant to U. S. Army Corps of Engineers (USACE) policy (EC -1165-2-200), which requires each USACE District to prepare a long-term plan for maintaining federal navigation channels. Toward that end, the USACE New York District (NYD) released an Interim Report on the DMMP (NYD, 1996) in October 1996. The Interim Report emphasized the economic imperative of dredging the naturally shallow areas of the Port, and the urgency of implementing environmentally suitable and cost-effective alternatives to the historical practice of ocean disposal at the Mud Dump. The Interim Report identified numerous alternatives for managing and disposing dredged material, including potential sites (Table 1). The report also laid out a process for selecting which alternatives/sites should proceed to the more detailed planning and design stage, for potential inclusion in the final DMMP.

Current Status

Since the release of the Interim Report, the NYD has held eight public information meetings in the NY/NJ study area, which resulted in numerous comments from the public on the alternatives and potential sites identified in the report. In October 1996 the states of New York and New Jersey issued a Joint Dredging Plan for the Port of New York & New Jersey (NJ/NY, 1996). This plan committed the two states to work with each other and the larger dredging community to keep the Port open and viable. The two states would develop a number of short-, mid-, and long-term alternatives that considered decontamination/treatment, contaminant/sediment reduction, and beneficial use as prominent objectives in any regional dredging plan. These objectives are consistent with the goals of the Harbor Estuary Program (HEP), as specified in the Comprehensive Conservation and Management Plan (CCMP). The Joint Dredging Plan also called for each state to set up a dredging task force to facilitate this cooperative effort, and report back to its respective governor with specific recommendations for alternatives. The joint plan built off the foundation already laid out earlier in a Port Dredging Plan prepared by the Port Authority of New York and New Jersey (PANY/NJ, 1996). Common elements to both plans, as well as the Interim Report include:

- Pollution prevention.
- Stronger enforcement of existing water quality and similar laws.
- Decontamination/Treatment Methods.
- Use of dredged material to remediate upland sites.
- Creation and restoration of aquatic and upland habitats.
- Remediation of the Mud Dump site (Historic Area Remediation Site (HARS)).
- Aquatic containment facilities.

Subsequent letters to the NYD from both governors and the PANY/NJ have helped reduce the number of alternatives/sites from those presented in the Interim Report (Table 1), as well as provide a commitment to continue to work with the NYD in finalizing the DMMP.

Table 1: Alternatives Summary Table from the Interim Report

Alternatives Summary

Alternative Type	Site Name	State	Suitable Material	Area (acre)	Volume (cy)	Year Available	Construction Cost	Yearly O&M Cost	Disposal Cost/cy
OD - 1	Ocean Disposal at the Mud Dump Site	US	P	1,864.5	25,000,000	1996	N/A	N/A	2.00
OD - 2	Ocean Disposal at the Mud Dump Site with capping	US	P w/cap	1,864.5	1,100,000	1996	NA	N/A	38.00
OD - 3	Ocean Remediation at Historic Area Remediation Site	US	P	TBD	100,000,000	1998	N/A	N/A	2.00
CI - 1a	Cont. Is. in Zone 1, NJ, Sheet Pile Cofferdam without pit	NJ	F	1,520.0	150,000,000	2004	573,785,222	11,500,000	5.33
CI - 1b	Cont. Is. in Zone 1, NJ, Sheet Pile Cofferdam with pit	NJ	F	880.0	150,000,000	2003	852,697,303	11,400,000	7.18
CI - 1c	Cont. Is. in Zone 1, NJ, Stone/Armor Embankment w/pit	NJ	F	820.0	150,000,000	2008	1,195,520,942	11,800,000	9.49
CI - 2a	Cont. Is. in Zone 2, NY/NJ, Sheet Pile Cofferdam wo/pit	NY/NJ	F	1,520.0	150,000,000	2004	1,195,520,942	11,500,000	5.33
CI - 2b	Cont. Is. in Zone 2, NY/NJ, Sheet Pile Cofferdam with pit	NY/NJ	F	880.0	150,000,000	2003	1,195,520,942	11,400,000	7.18
CI - 2c	Cont. Is. in Zone 2, NY/NJ, Stone/Armor Embankment w/pit	NY/NJ	F	820.0	150,000,000	2008	1,195,520,942	11,800,000	9.49
CI - 3a	Cont. Is. at Zone 3, US, Sheet Pile Cofferdam without pit	US	F	790.0	150,000,000	2002	1,607,078,507	12,500,000	12.51
CI - 3b	Cont. Is. in Zone 3, US, Concrete Caisson Embankment	US	F	660.0	150,000,000	2006	2,200,105,788	12,600,000	16.72
CA - 1	New Containment Area in Atlantic Basin, NY	NY	F	35.0	1,770,000	1999	65,000,000	N/A	37.00
SP - 1	New Subaqueous Pits at Zone 1, NJ	NJ	F	1,000.0	26,700,000	1998	N/A	N/A	9.85
SP - 2	New Subaqueous Pits at Zone 2, NY/NJ	NY/NJ	F	1,000.0	26,700,000	1998	N/A	N/A	9.85
SP - 3	New Subaqueous Pit at Bowery Bay, NY	NY	F	74.0	3,400,000	1999	51,000,000	N/A	30.00
SP - 4	New Subaqueous Pit at Bay Ridge Flats, NY	NY	F	375.0	7,100,000	1999	156,200,000	2,144,000	22.00
SP - 5	New Subaqueous Pit Off Constable Hook, NJ	NJ	F	300.0	3,300,000	1999	86,000,000	2,144,000	26.00
SP - 6	Newark Bay Subaqueous Pit, North A, NJ	NJ	F	N/A	1,700,000	1997	51,000,000	2,144,000	30.00
SP - 7	Newark Bay Subaqueous Pit, South, NJ	NJ	F	N/A	639,000	1997	19,170,000	2,144,000	30.00
SP - 8	Existing Large East Bank Subaqueous Pit, NY	NY	F	853.0	6,400,000	1996	N/A	2,144,000	2.45
SP - 9	Existing Small East Bank Subaqueous Pit, NY	NY	F	83.0	1,500,000	1996	N/A	2,144,000	2.45
SP - 10	Existing West Bank Subaqueous Pit, NY	NY	F	300.0	2,000,000	1996	N/A	2,144,000	2.45
SP - 11	Existing CAC Subaqueous Pit, NY	NY	F	165.0	1,100,000	1996	N/A	2,144,000	2.45
UD - 1	Upland Disposal at Site 159, Bergen County, NJ	NJ	F	109.0	1,400,000	2002	48,000,000	500,000	35.00
UD - 2	Upland Disposal at Site 161, Bergen County, NJ	NJ	F	167.0	2,200,000	2002	63,000,000	500,000	35.00
UD - 3	Upland Disposal at Site 172, Hudson County, NJ	NJ	F	209.0	2,700,000	2002	48,000,000	500,000	35.00
UD - 4	Upland Disposal at Site 184, Middlesex County, NJ	NJ	F	107.0	3,300,000	2002	48,000,000	500,000	35.00
UD - 5	Upland Disposal at Site 187, Middlesex County, NJ	NJ	F	112.0	1,500,000	2002	48,000,000	500,000	35.00
UD - 6	Upland Disposal at Site 190, Middlesec County, NJ	NJ	F	117.0	1,500,000	2002	48,000,000	500,000	35.00
UD - 7	Upland Disposal at Site 193, Monmouth County, NJ	NJ	F	160.0	2,100,000	2002	48,000,000	500,000	35.00
UD - 8	Upland Disposal at Site 214, Monmouth County, NJ	NJ	F	103.0	1,300,000	2002	48,000,000	500,000	35.00
UD - 9	Upland Disposal at Site 235, Richmond County, NY	NY	F	102.0	1,300,000	2002	48,000,000	500,000	35.00
UD - 10	Upland Disposal at Cold Spring Quarry, NY	NY	F	25.0	1,000,000	2000	45,000,000	500,000	25.00
UD - 11	Upland Disposal at Cedar Cliff Quarry, NY	NY	F	100.0	2,000,000	2000	45,000,000	500,000	25.00
UD - 12	Upland Disposal at Clinton Point Quarry, NY	NY	F	685.0	2,000,000	2000	45,000,000	500,000	25.00
UD - 13	Upland Disposal at Brigham Brickyard Quarry, NY	NY	F	185.0	1,800,000	1999	42,200,000	500,000	25.00
UD - 14	Upland Disposal at Cementon Quarry, NY	NY	F	630.0	8,000,000	2000	45,000,000	500,000	25.00
UD - 15	Upland Disposal at Ravena Quarry, NY	NY	F	235.0	3,000,000	2000	45,000,000	500,000	25.00
UD - 16	Upland Disposal at Orion Elizabeth, NJ	NJ	F	166.0	1,300,000	1996	20,000,000	500,000	50.00
DT - 1	Decontamination Tech. Production-Level Testing	TBD	F	TBD	55,000	2002	TBD	TBD	60.00
DT - 2	Decontamination Tech. Partial Implementation	TBD	F	TBD	(150,000)	2004	TBD	TBD	50.00
DT - 3	Decontamination Tech. Partial Implementation	TBD	F	TBD	(375,000)	2006	TBD	TBD	40.00
DT - 4	Decontamination Tech Full-Scale Implementation	TBD	F	TBD	(4,908,000)	2010	TBD	TBD	30.00
SR - 1	Sediment Reduction at Port Chester Harbor, NY	NY	NA	TBD	TBD (max=16,700)	1997	N/A	TBD	TBD
SR - 2	Sediment Reduction at Flushing Bay, NY	NY	NA	TBD	TBD (max=90,500)	1997	N/A	TBD	TBD
SR - 3	Sediment Reduction at Raritan River, NJ	NJ	NA	TBD	TBD (max=96,400)	1997	N/A	TBD	TBD
SR - 4	Sediment Redux at North Shooter's Is. Reach, AK, NJ	NY/NJ	F	TBD	100,000.0	1997	N/A	TBD	30.00
SR - 5	Sediment Redux at Port Newark/Port Elizabeth, NJ	NJ	F	TBD	100,000.0	1997	N/A	TBD	30.00
SR - 6	Sediment Redux at Bay Ridge/Red Hook Channels	NY	F	TBD	200,000.0	1997	N/A	TBD	30.00
SR - 7	Sediment Reduction at Port Newark/Port Elizabeth, NJ	NJ	F	N/A	(40,000.0)	2000	TBD	TBD	15.00
SR - 8	Sediment Reduction at MOTBY/Port Jersey, Bayonne, NJ	NJ	F	N/A	(24,200)	2000	4,700,000	0	15.00
SR - 9	Sediment Reduction at Claremont Terminal, NJ	NJ	F	N/A	(22,000)	2000	4,100,000	0	14.00
CD - 1	Contract Disposal via RFP	TBD	F	TBD	TBD	1997	N/A	N/A	120.00

Note: Numbers in Parenthesis indicate an Annual Volume Amount. Costs are relative to disposal only (i.e., does not include dredging costs).

Since the Interim Report, the NYD has continued or initiated studies to further investigate many of the alternatives/sites, and to evaluate their potential impacts. These studies include:

- Further development and application of models to evaluate and design aquatic containment facilities.
- Updating of aquatic siting data maps (e.g., fishery), and other screening criteria, to fine-tune the boundaries of the three zones of siting feasibility within which island confined disposal facilities (CDFs) and/or contained aquatic disposal (CAD) alternatives may be located.
- Development of a work plan for management and quality control of the field data collected for the assessment phase of the contaminant reduction plan.
- Completion of sediment characterization to serve as a basis for assessing contaminant pathways and distribution, and developing appropriate design parameters for the different types of disposal and management alternatives.
- Development of a sub-surface boring plan to aid in locating specific sites for subaqueous pits or containment islands within the larger zones of siting feasibility.
- Completion of a screening-level risk assessment to evaluate potential human and ecological risks of various types of alternatives, including the "no-action" alternative.
- Continued evaluation of decontamination and treatment technologies, and completion of small-scale pilot demonstrations of five technologies.

Based on feedback from the states and PANY/NJ, as well as the public, other agencies, the Dredging Forum of HEP, and the ongoing DMMP studies, a number of revisions were made to the options presented in the Interim Report. The boundaries of the aquatic zones of siting feasibility for islands and pits are in the process of being revised (in coordination with the states and other involved agencies), a number of sites have been eliminated, and several alternatives have been dropped from further consideration. These include:

Upland Confined Disposal Facilities (CDFs): There was substantial concern with several of the potential upland CDF sites in the Interim Report due to their proximity to residences and/or community facilities. Adverse effects to the quality of adjacent water bodies, tourism, and public health in general were also of concern. Given the limited disposal capacity of these sites and the difficulties in gaining state and local support, it is more reasonable to focus remaining efforts on developing site-specific plans for alternatives more likely to be supported by state or local authorities.

Containment Island in Raritan Bay: The potential siting of a containment island (island CDF) in Raritan Bay generated extensive concerns regarding use of Raritan Bay from many private citizens and local environmental groups. Since the state of New Jersey could not support this option, and since the Interim Report favored the use of a portion of Raritan Bay (zone 1) for confined aquatic disposal (subaqueous pits), no further detailed studies for locating an island CDF in zone 1 are planned.

Geotextile Bags: were evaluated in field and lab tests as a method of reducing contaminant loss during aquatic disposal. As deployment problems were encountered in all the field tests, and with the relatively high estimated cost of using this option, further tests on this option are

not currently planned, particularly since the primary aquatic disposal site, the Mud Dump, has been closed. Though disposal into subaqueous pits is still a feasible option, this use would be restricted to relatively shallow, protected waters of the harbor and Lower Bay where conditions do not result in the type of sediment loss that the bags are intended to control.

Several management alternatives identified in the Interim Report, along with other initiatives, are presently being pursued as part of state or local ventures, by private initiatives, or as public-private partnerships, in accordance with the Joint Dredging Plan. Those efforts implemented to date include the construction of a new subaqueous disposal pit in Newark Bay by the PANY/NJ and a private sector alternative using processed dredged material as fill for a large parking lot located in Elizabeth, NJ. In addition, other options are currently under development to use dredged material to remediate an industrial brownfield, a former municipal landfill, and an abandoned coal mine. The siting of a waterfront transfer facility is also being planned to offload, store, treat (if necessary) and transport dredged material to sites for beneficial use. As appropriate, these non-USACE initiatives will be included in the formulation of the DMMP, along with those alternatives being investigated by the NYD, to ensure that the DMMP will be a comprehensive plan for the region.

The following sections of this progress report contain updated information and the status on all of the alternatives currently under investigation, including any identified subsequent to the release of the Interim Report. Though the number of alternatives identified in the Interim Report has been reduced, many are still under consideration for implementation, consistent with the essential premise behind the plan. As a result, the final DMMP will likely consist of a system (or array) of alternatives, not a single solution, that will incorporate short, medium and long-term needs, and be implemented by a combination of federal, state, local and private interests.

Final DMMP

The DMMP will continue to be a collaborative effort that will promote pollution prevention, decontamination and treatment technologies, and beneficial uses as the primary means of managing dredged material, in accordance with the Joint Dredging Plan and the CCMP signed by both governors. However, the DMMP must accommodate Port maintenance dredging and new construction dredging well into the 21st century. Consistent with the Joint Dredging Plan and the CCMP, disposal alternatives also need to be considered.

The final plan must account for all the Ports anticipated dredging and identify specific management alternatives to handle each need on an annual basis. The plan must also include only those alternatives with a reasonable potential for implementation. Research, innovative technology or new ideas have a strong place in the DMMP. Those technologies or efforts that do reach the implementation stage can be folded into the plan to replace more costly or environmentally less favorable alternatives. These additions can provide many potential benefits:

- Reduce the size or quantity of disposal options that have to be built (such as fewer subaqueous pits or a smaller island CDF).
- Substitute a better or more efficient methodology.

- Foster increased competition.
- Provide suitable alternatives to meet unanticipated events during the implementation of the DMMP.

In this manner the DMMP becomes a living document whose flexibility allows for new and better ideas to continually improve it. The final DMMP will not be limited to those alternatives that will be implemented by the federal government, but will include all those efforts that are deemed both feasible and desirable. Only by including the full range of feasible alternatives will the DMMP be a truly comprehensive dredging plan that meets the Ports needs in an environmentally protective and economical manner. Toward that end, the DMMP will also incorporate the findings of various other Port planning studies that may affect the volumes and time frames for implementing selected alternatives. These studies include the PANY/NJ Port Investment Study, The NYS Economic Development Corporation (EDC) and the NYD Port Deepening Study, all of which could effect the volume and nature of dredged material that will have to be accounted for in the DMMP. As with the HEP CCMP, the Port Dredging Plan of the PANY/NJ and the Joint Dredging Plan of New York and New Jersey, close coordination will be key to ensure that the formulated solution of alternatives fit together into a unified, comprehensive plan for a healthy estuary and a thriving Port.

The final DMMP will also include an Environmental Impact Statement (EIS) to cover all the alternative types, including the No Action alternative. The EIS will evaluate all the main types of alternatives, including any that may not be included in the DMMP. In this manner the environmental consequences of selecting among the available alternatives will become apparent. To the extent that site-specific (or zone-specific) data is available they will be included in assessments of alternatives. However, the EIS is intended to serve as a basis for broad decision making, by helping decision-makers choose among the different alternatives available. The EIS may be supplemented by site-specific Environmental Assessments (EA) or supplemental EISs before implementing selected individual components of the plan.

It should be emphasized that the final DMMP report will not be the end of the process. For example, a number of the Port studies mentioned above will continue beyond the release of the final DMMP report. Each alternative being implemented will require detailed plans and designs, including engineering investigations, permit reviews and possibly additional environmental data and supplemental National Environmental Policy Act (NEPA) documents. In addition, initiatives by the private sector and the states continue to identify other alternatives for consideration as possible additives to the plan. These requirements will all be carefully laid out in the final plan so that decision-makers can implement and fund the components within the appropriate time frames. Through such a unified partnership of all Port interests with the HEP, the goal of a healthy estuary and thriving Port will be met.

2. HISTORIC AREA REMEDIATION SITE

On August 28, 1997, the U.S. Environmental Protection Agency (USEPA) promulgated a final rule that de-designated and terminated the New York Bight-Dredged Material Disposal Site (also known as the Mud Dump Site) and simultaneously designated the Historic Area Remediation Site (HARS) (see Figure 2).

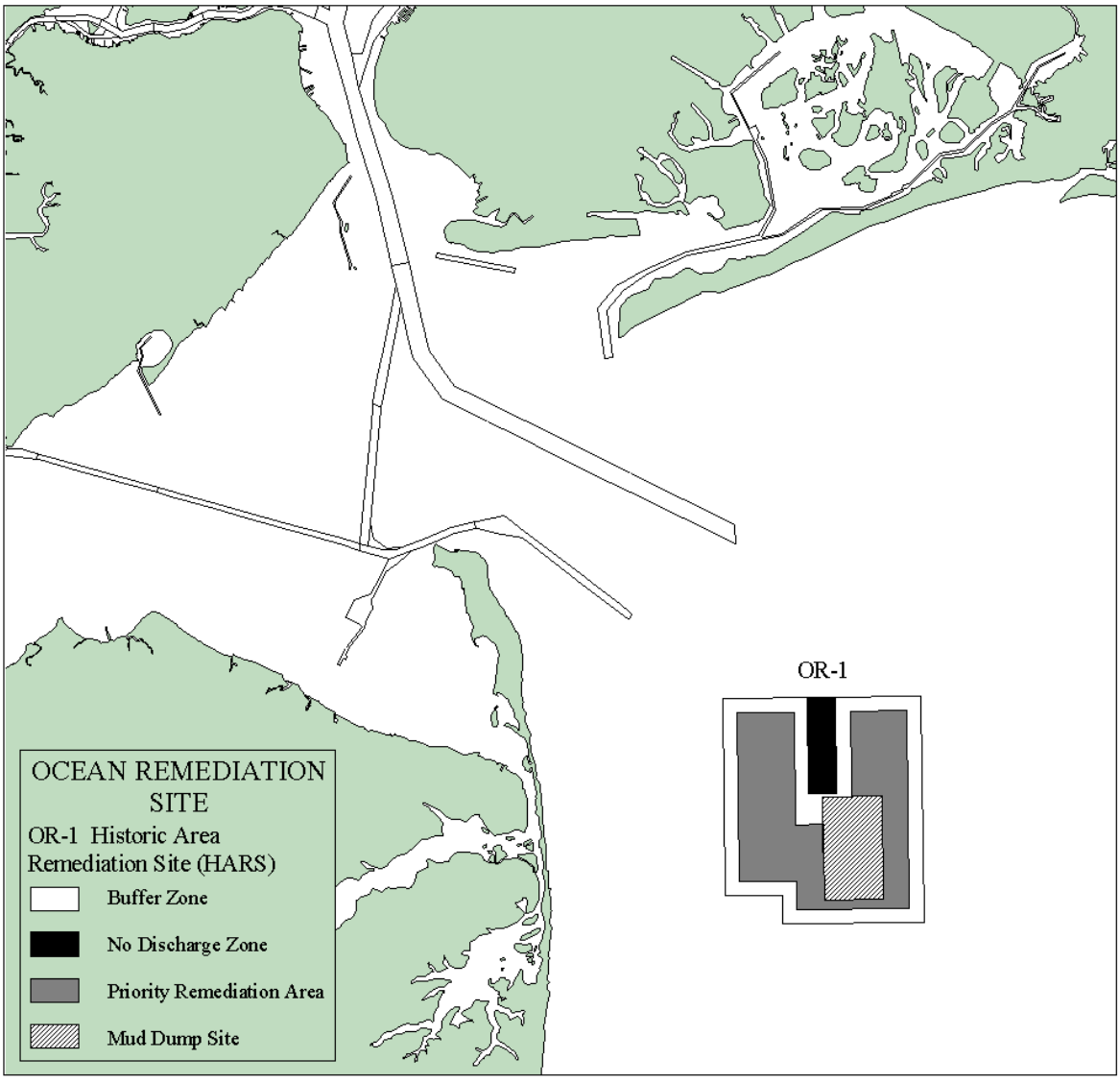


Figure 2: Historic Area Remediation Site Map

The HARS will be remediated with uncontaminated dredged materials (i.e., dredged material that meets current Category I standards and will not cause significant undesirable effects including effects resulting from bioaccumulation). This is the first time that dredged material is being used to remediate contaminated areas of the ocean floor. Based on current conditions, the HARS is expected to have sufficient capacity to use suitable material in this beneficial manner for approximately 25 years.

The HARS became effective on September 29, 1997. Currently, uncontaminated dredged material from two projects is being placed at the HARS, having been determined by USEPA as acceptable for use as remediation material. The two projects are described below.

The PANY/NJ has currently constructed a subaqueous pit for dredged material in Newark Bay. The deep, uncontaminated material dredged in the construction of the Newark Bay CDF was placed in the HARS at the northeast corner of the former Mud Dump Site on the existing muddy ocean floor.

The second project generating material for HARS placement is the dredging of sand from Ambrose Channel, the oceanic shipping channel leading into the Port. This sand is being placed at the HARS as a cover (cap) over a mound of Category II dredged material placed at the Mud Dump Site this past summer. The sand cap will provide at least one-meter cover over the mound. Completion of this project is scheduled for January 1998.

To improve management and monitoring of the HARS, electronic monitoring boxes are required on-board any vessel carrying uncontaminated dredged material to the HARS. These boxes record vessel position throughout the duration of each trip as well as when and where dredged material is placed. To improve communication reliability between tugs and dredged material scows, a prescribed formal communication procedure has been required.

As the dredged material from new dredging projects is found to be acceptable by USEPA and NYD for remediation material at the HARS, public notices will be issued soliciting comments before permit decisions are made.

3. REDUCING THE PROBLEM

3.1. Pollution Prevention/Contaminant Reduction

Background

Significant portions of Harbor sediments are contaminated as a result of a complex history of pollution events that have occurred over decades and continue to occur today. The distribution is dependent not only on the local contaminant sources, both past and present, but also on the natural and man-made processes, that redistribute the sediments (e.g., sediment mixing by organisms, sediment transport by tidal currents, storm events, propeller wash, etc.). If the pollutants of concern, entering into and resuspended within the estuary, are minimized, the volume of dredged material exceeding the testing criteria for use in ocean remediation or other beneficial use projects will over time be significantly reduced. As described in the Interim Report, if the implementation of pollution prevention initiatives could annually transform 1% of the dredged material from material classified as unacceptable for ocean remediation to acceptable material approximately 60 million cubic yards of material would be reclassified over the next 50 years. Similarly, a 5% annual reduction in unacceptable material would reclassify an additional 100 million cubic yards.

Though many agencies have a more direct role in solving this problem, the CCMP and the Interim Report did identify a potential role for the NYD in the pollution prevention effort (e.g., contaminant modeling and data management).

The CCMP, prepared as part of the HEP, identifies the groups and specific tasks, suggested to protect and restore the estuary. Formed under the HEP, the Dredged Material Management Forum has the long-term goal of making Harbor sediments cleaner so they meet the criteria for ocean remediation. To accomplish this goal, the Forum created a Sediment Contamination Reduction Work Group (SCRWG). The SCRWG is a partnering of government agencies (federal, state, city), nonprofit organizations and academic institutions. The SCRWG determined that a baseline assessment of the contaminated sediments in the region, as well as the determination of the ambient levels in the water column and biota are essential steps in implementing the CCMP. The SCRWG has developed a work plan outlining a Contaminant Assessment and Reduction Project (CARP) to collect and analyze this information.

Current Status

The Joint Dredging Plan, released in October 1996, highlighted pollution prevention and the increased enforcement of pollution abatement laws as major components of a comprehensive dredging plan. The CARP is the essential first step in that plan. The NJDEP recently proposed a parallel contaminant reduction effort with support from a NJ consortium called the Sediment and Dredged Material Technology Institute. The program, entitled the NJ Toxics Technical

Workplan, is presently in the planning review stage. The SCRWG members, including the NYD, are working to coordinate the two efforts.

The NYD has an opportunity and the technical ability to significantly contribute to the contaminant reduction efforts. A well-implemented pollution prevention program will help to reduce the long-term disposal needs, and meet the NYD's regional commitments, under the CCMP, to help restore the estuary. Areas of potential USACE involvement include: 1) data-management 2) historical contaminant database development 3) GIS data creation and mapping 4) contaminant visualization and volume prediction and 5) toxicant modeling. Towards that end, the NYD is developing a scope of work for the data management portion of the field effort outlined in the CARP.

Final DMMP

The above tasks define tools for contaminant assessment and pollution prevention. They are also useful in addressing the long-term dredging problem and identifying suitable dredged material disposal options. The information gained will help determine how toxicant concentrations already present in the sediments will respond to hydrologic modification, meteorological conditions, dredging, filling, and disposal activities. This will help determine whether existing contaminated sediments, within and adjacent to, navigation channels and berths should be removed (via dredging), isolated from the environment (via capping in place), or left in place untreated.

Most of the tools needed to fulfill the long-term goals of the contaminant reduction project are in the development stage and will not be completed prior to the final DMMP report. However, the contaminant reduction project continues to gather support and commitment from the many coordinating parties of the HEP. A defined USACE role, the products of the initial field effort and summaries of the toxics modeling, contaminant data base and data visualization programs will all be included within the final DMMP as part of the long-term pollution prevention plan. The NYD and the SCRWG are currently finalizing the scope of work for the CARP Data Management Project, and will, given sufficient funding, implement that part of the program in early 1998, with completion scheduled for late 1999. Also, workshops will be held in 1998 to define the goals of long-term toxics modeling and further develop the data visualizations and GIS mapping components. The contaminant databases will continue to incorporate new data, once it has been collected and confirmed.

3.2. Sediment Reduction

Background

The Interim Report examined the options for reducing the amount of sedimentation within the federal navigation channel system of the Port. The Sedimentation Reduction/Minimization Methods Draft Report (Moffatt & Nichol, 1996) developed ranking factors to identify channel areas best suited for structural sedimentation reduction/minimization measures. The following factors were considered: 1) sediment classification; 2) the volume of maintenance dredging; 3) commercial interests served by the channel component; 4) technical feasibility of developing a sedimentation reduction scheme at a particular site; 5) cost; and 6) potential environmental impacts.

The sedimentation/minimization strategies can be classified into three main types: 1) Channel Design Optimization, including realigning channels to decrease the sedimentation rate as well as examining the economic need to dredge the channel. Of the federal channels in the Port, three channels, Port Chester Harbor, Flushing Bay, and Raritan River, were specially identified for economic reevaluation in terms of their optimal channel design before further maintenance dredging is performed (an existing process which is required prior to any federal maintenance dredging is performed). 2) Advanced Maintenance Dredging has been used as a short-term means of reducing both dredging cost and frequency by dredging below the desired channel depth. A variation of Advanced Maintenance Dredging, over-dredging to create a Sub-Channel Placement site, was also discussed in the Interim Report. 3) Structural Modification involves keeping sediment moving through (instead of settling in) a channel area or keeping sediment from entering the channel area. Simplified numerical models of sedimentation were used in concert with the USACE Waterways Experiment Station tidal hydrodynamic and salinity modeling results to assess the sedimentation rates under existing and plan conditions. Specific sediment reduction/minimization plans were developed for the three areas identified in the Interim Report: North of Shooters Island, Port Newark/Port Elizabeth, and Port Jersey/MOTBY/Claremont Terminal.

Current Status

Since the Interim Report, one of the three channels in consideration for channel design optimization, Flushing Bay, has been dredged after being placed on the list of the top ten federal dredging priorities. The NYD will reevaluate the other two proposed channels to establish need, prior to any expenditures of limited federal funds as part of the existing USACE maintenance guidelines. The final Sedimentation Reduction/Minimization Methods Report included an economic evaluation of proposed structural modifications at the three areas. The report indicated that the estimated project costs exceed the range forecast for feasible long-term disposal options. However, structural alterations such as these will be investigated as part of the recently initiated NYD Port Deepening Study.

At this time, no future DMMP studies are planned for further evaluation or development of channel design optimization, or structural modification measures. The sub-channel placement alternative continues to be a viable option and is described as a subset of the contained aquatic disposal (subaqueous pits) section 6.2.1 of this report.

4. DECONTAMINATION TECHNOLOGIES AND TREATMENT METHODS

Background

Decontamination and treatment technologies work by reducing contaminant concentrations, contaminant mobility, and/or toxicity of the dredged material by means of mechanical, chemical, thermal, or biological processes, or any combination thereof. Though there is considerable overlap between "decontamination" and "treatment," decontamination is commonly interpreted as the removal or destruction of the bulk of contaminants from sediment. Treatment, on the other hand, is the broader of the two terms, and includes processes that immobilize the contaminants within the sediment matrix, thereby reducing contaminant mobility in the environment. Dredged material that has undergone treatment may be acceptable for various beneficial uses. For the Port, the formidable challenge posed for this management approach is to process, in a cost-effective and environmentally protective manner, relatively large volumes of contaminated dredged estuarine sediment. Most of these sediments contain a wide range of organic and inorganic contaminants at relatively low concentrations (though several sediment "hot spots" outside navigational areas contain significantly higher contaminant levels).

Section 405 of the Water Resources Development Act (WRDA) of 1992 authorized USEPA and USACE to jointly conduct an investigation and demonstration of decontamination and treatment technologies applied to contaminated NY/NJ Harbor dredged material. USEPA leads this effort with support from the USACE. U.S. Department of Energy Brookhaven National Laboratory has also provided technical support to the effort. The project includes ancillary studies, such as a Phase I Toxicity Identification Evaluation study, sediment visualization, treatment-train development, preliminary risk assessment, and a public-outreach program.

In addition, the USACE Waterways Experiment Station has been conducting an investigation of beneficial uses of treated dredged material, including identification of any national standards, end-use testing criteria to meet potential market standards, and potential markets for specific end products. It should be noted that the States, and not the federal government, have jurisdiction of upland management of dredged material, and it is the States that issue the end-use testing criteria and acceptable/beneficial-use determinations for the end product of any treatment process reaching full-scale operation. NJDEP recently issued its guidance manual on dredging activities and dredged material (NJDEP, 1997). NYSDEC is still in the process of finalizing its guidance manual.

Current Status

Under the Section 405 authorization, small-scale pilot demonstrations were recently completed on five technologies, each processing up to 25 cubic yards (CY). Draft reports on the pilot testing will be completed by December 1997; final pilot reports will be issued by spring 1998. Pilot testing is performed in the field using scaled-down but similar processing and support equipment as would be used in full-scale operation. Key objectives include providing design

information and better cost estimates for potential scale-up to production-level demonstration (defined to process at least several thousand cubic yards (CY) and full-scale operation (defined to process at least 500,000 CY per year)).

The five pilot demonstrations were as follows:

- Institute of Gas Technology tested a thermochemical process using a rotary kiln. The end product is a pozzolanic material that could be mixed with portland cement to make a marketable blended-cement product for use in the concrete and construction industries. Pilot testing was completed in November 1996.

- Metcalf & Eddy, Inc. tested two systems: 1) a solvent-extraction process followed by solidification/stabilization (S/S) using portland cement as the binding agent; and 2) stand-alone S/S using portland cement. Pilot testing was completed in November 1996. Potential beneficial uses for either process include construction fill, landfill cover, mine reclamation, and capping of brownfields and Superfund sites.

- Westinghouse Science and Technology Center tested a thermal vitrification process using a plasma melter. The end product is a glass-like material that could be used as construction aggregate or roadfill material. Alternatively, the vitrified product could undergo further processing to make glass-fiber or glass-tile products, which have higher market values. Pilot testing was completed in December 1996.

- USACE Waterways Experiment Station tested manufactured-soil production followed by phytoremediation (i.e., bioremediation using selected plant species to clean up or stabilize contaminants). Pilot testing was completed in August 1997, which allowed monitoring and data collection through two growing seasons. Potential beneficial use is serving as a topsoil layer to support vegetative cover for landfill closure, mine reclamation, and capping of brownfields and Superfund sites.

In addition, the USEPA and the NYD (with support from Brookhaven National Laboratory) have been working with other technology vendors, supplying them with test sediment and evaluating their processes. These include a cement manufacturer that is evaluating the feasibility of retrofitting an “off-line” cement-kiln facility to process dredged material for cement-related products.

In addition, several private-venture projects in the region have reached or are planned to reach full-scale operation using a S/S process to treat the dredged material for subsequent beneficial use. OENJ Corporation - Great Lakes Dredge & Dock Company has a S/S pugmill operation at Port Elizabeth, NJ, using different recipes of kiln dust, fly ash, portland cement, and quicklime. The treated material is trucked to the Jersey Gardens Mall site (formerly known as the OENJ/Metro Mall site) in Elizabeth, NJ for use as structural fill for a parking lot and road embankments.

ECDC Environmental, L.C., has a S/S processing facility at Port Newark, NJ using portland cement as the binding agent. Some of the treated material is trucked to the Jersey Gardens Mall site for use as structural fill. In December 1997, ECDC also began transporting treated material by barge and truck to the Seaboard site (also known as the Koppers Coke Site), which is an industrial brownfield in Kearny, NJ.

OENJ Corp. - Great Lakes Dredge & Dock Co. is planning a project at the OENJ-Bayonne site in Bayonne, NJ. The site encompasses a former municipal landfill and an industrial brownfield. They plan to use a S/S process to make fill material to cap the site.

NUI Environmental Ventures has preliminary plans to build and operate permanent sediment-processing facilities at two sites: 1) its Elizabethtown Gas Site (also known as the Erie Street Site) in Elizabeth, NJ; and 2) a confidential site in NJ along Arthur Kill. NUI's approach is to start with a facility employing S/S and/or manufactured-soil production, and ultimately add separate facilities employing "high-tech" processes to treat the more heavily contaminated sediment.

Final DMMP

Section 226 of WRDA of 1996 authorized USEPA and USACE to jointly develop "one or more sediment decontamination technologies on a pilot scale demonstrating a capacity of at least 500,000 CY per year." USEPA also leads this effort with support from the USACE. Technologies will be selected that have shown the most promise in treatment effectiveness, potential for scale-up, economic viability, corporate commitment and cost-share, beneficial use of end products, and public acceptability. These production-level demonstrations are planned for completion by December 1999, although they may take longer to complete and are contingent upon continued funding. Because it will likely be difficult to secure sufficient federal funding, public-private partnerships will have to be developed to finance and implement the production-level demonstrations.

Major activities leading to startup of each demonstration facility include procurement of contractors, site acquisition, NEPA documentation, permitting, design, site preparation, and construction. Potential sites are shown on Figure 3, and are in various stages of evaluation. In addition, several private vendors and developers have been evaluating and negotiating on a number of other potential sites; but due to non-disclosure agreements, these sites may not be disclosed pending completion of leasing or sale.

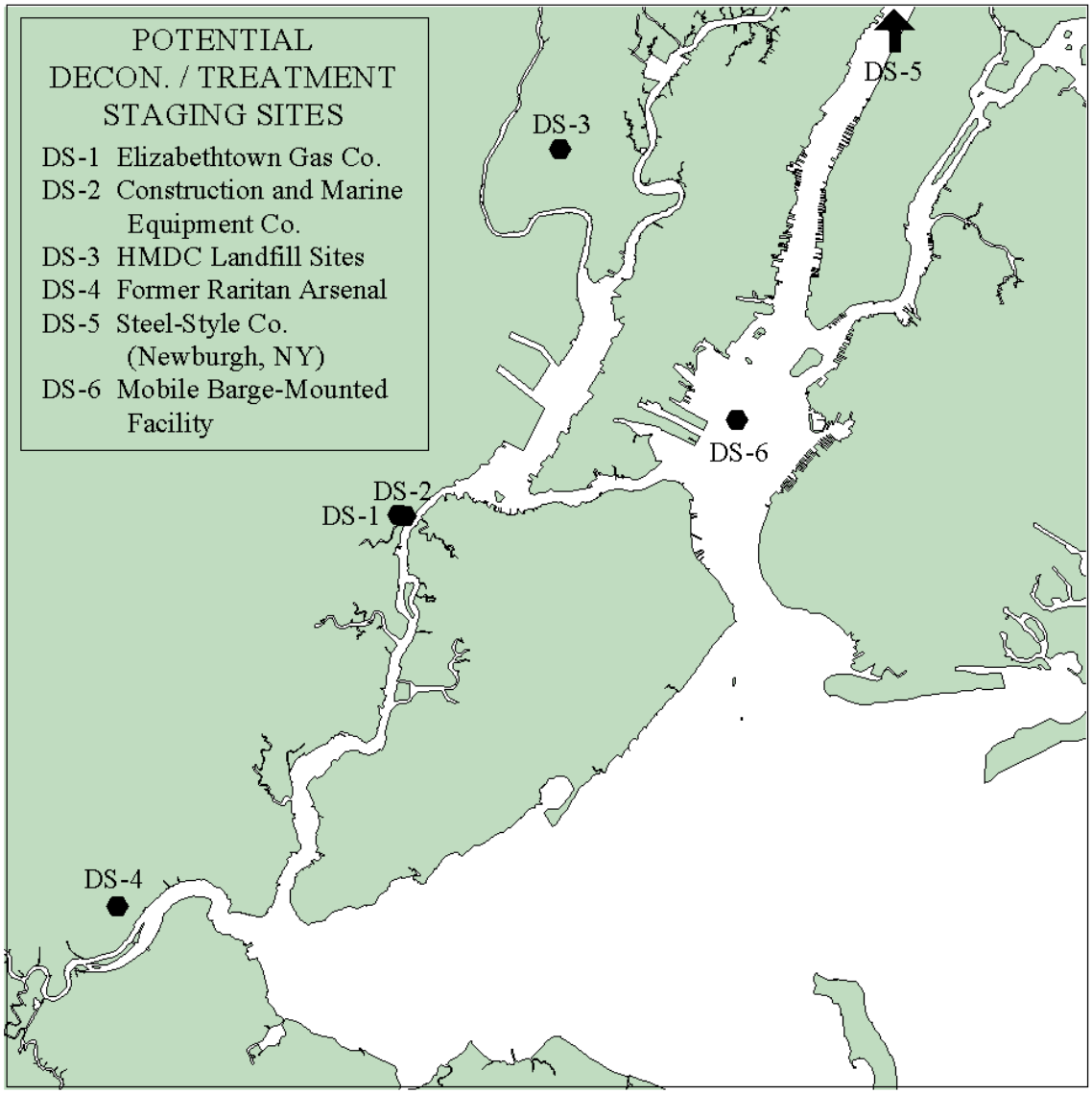


Figure 3: Potential Decon./Treatment Staging Sites for Production-Level Demonstrations

Successful demonstrations of selected treatment processes must be completed before this management alternative can be evaluated with other management and disposal alternatives under the DMMP. The NYD, in consultation with USEPA, will be developing criteria for delineating the specific role decontamination/treatment technologies should play in the long-term DMMP solution. The key factor will likely be assessing the benefit to the ecological and human health of the region in comparison to the overall treatment costs by using these methods. More reliable cost estimates will be developed for each technology being considered, taking into account the complete treatment train. Human-health and ecological risk assessments will also be performed.

These efforts will help determine the criteria for applying these methods in the long-term DMMP strategy (e.g., whether potential application of decontamination and treatment technologies should be used for selected navigational dredging projects or should be limited to hot-spot remediation).

In addition to the federal decontamination effort, the PANY/NJ and the New Jersey Office of Maritime Resources (NJMR) are each conducting their own sediment-treatment demonstration project. PANY/NJ recently evaluated 46 unsolicited proposals from various technology developers, and selected five of these for treatability studies: Fluor Daniel, IMCO MagnaCrete, INNOVATECH, LADS System, and Riefill Corporation. The end products being proposed are light-or-heavyweight aggregate and flowable fill. Treatability studies are planned to start in January 1998. Processes will be evaluated on treatment effectiveness, cost, end-product performance, and other criteria. For those processes found to be most successful, PANY/NJ may go forward to pilot demonstrations and potential full-scale operation, with the end products being considered for in-house construction projects.

NJMR is planning to issue in early 1998 a Request for Proposals to perform a full-scale decontamination demonstration project(s) for dredged material from the Port. The project will capitalize on much of the existing information and experience gained from the federal demonstration project. The ultimate goal of the NJMR project is to provide funds to prove the feasibility of technologies that can provide long-term decontamination services for the Port. In addition, NJMR is currently funding other projects that explore uses for dredged material in mine reclamation, landfill cover, and road construction.

The final DMMP report scheduled for next year will include an update of the federal demonstration project as well as updates of the parallel efforts conducted by PANY/NJ, NJMR, and the private sector. There will be a need to go beyond the final DMMP report to complete the planned federal production-level demonstrations and potential full-scale operation, both of which are contingent upon adequate funding from public and/or private sources. This will be fully laid out in the final DMMP report, along with the process for incorporating suitable alternatives into the overall plan for the Port.

5. BENEFICIAL USES OF DREDGED MATERIAL

5.1. Habitat Creation and Restoration

Background

The NYD is one of the primary entities responsible for the creation, enhancement and restoration of aquatic, wetland and upland habitat in the region (authorizations including Section 206 of WDRA, Section 1135 of WRDA and Section 404 of the Clean Water Act). Currently, the NYD has watershed-level ecosystem restoration projects underway for Jamaica and Flushing Bays within the Harbor area, as well as the lower Hudson River and the embayments along the south shore of Long Island. The DMMP provides an excellent opportunity to expand this restoration effort over the remainder of the Harbor. Likewise, implementation of the beneficial use of dredged material, carefully considered, can provide opportunities for habitat and water quality restoration in areas where restoration may not be possible without the use of dredged material. Use of both clean and contaminated (as appropriate) dredged material offers a unique opportunity to reuse a resource which has been historically treated as waste, and at the same time, restore and improve degraded habitats in estuaries, the ocean and adjacent uplands. Further, the beneficial use of dredged material is one of the primary goals of the HEP.

The Interim Report described several traditional beneficial habitat uses of dredged material for the Harbor area. Also described in the Interim Report were three non-traditional but common sense uses of dredged material that could be considered estuarine restoration under certain circumstances. A complete listing of the beneficial use options (all for non-treated dredged material) considered in the Interim Report is as follows:

TRADITIONAL (directly improving habitat)

1. Wetland creation and enhancement.
2. Mud flat creation and enhancement.
3. SAV bed creation and enhancement.
4. Oyster reef creation and enhancement.
5. Shellfish bed creation and enhancement.
6. Fish reef creation and enhancement.
7. Bird (primarily upland) habitat creation and enhancement.

NON-TRADITIONAL (indirectly improving habitat)

8. Filling of dead-end basins and other areas of poor water circulation to improve water quality.
9. Creating wetlands with dredged material in inter-pier or similar poorly flushed areas, not primarily to create habitat, but to act as a water purifier (particularly in close proximity to high organic load outfalls).
10. Filling of bathymetrically disturbed areas of the harbor bottom (such as existing borrow pits) to improve water circulation and to improve aquatic and wetland habitat quality.

Current Status

Several new habitat creation concepts have evolved since the publication of the Interim Report.

Since the release of the Interim Report, the concept of using dredged material to stabilize the shoreline and create wetlands around the waterside edge of the Pelham Bay landfill has received considerable interest as a means of using contaminated dredged material in a safely contained and beneficial manner. The landfill is leaching contaminants resulting in the degradation of water quality in Eastchester Creek and Bay. Under a present permit application being considered by the NYD, the shoreline of the landfill would be stabilized by placing dredged material behind wavebreaks, with wetland vegetation planted in the sediment to establish a marsh. The fill soil, in conjunction with the marsh vegetation, would trap and filter the leachate before it enters Eastchester Bay. This process has potential application at a number of other landfills and eroding shorelines in the region.

In addition, as a result of the ongoing habitat restoration project in Jamaica Bay, the concept of using dredged material to create and enhance upland habitat has also been examined. Several sites in the bay may benefit from use of dredged material to create seashore meadows, an upland habitat that has been all but extirpated from the metropolitan area but that supported many forms of plants and animals that are now rare or endangered in the region. Two sites in particular, an old abandoned landfill on White Island and an abandoned runway at Floyd Bennett field, are being considered for this option. Close coordination will be maintained with this, and indeed all NYD restoration studies, as individual features of studies could be extended to other areas in the harbor.

Final DMMP

For the final DMMP report the NYD intends to have identified the conceptual practicality and likely areas (in some cases actual sites) for the options described in the Interim Report, including identification of cost estimates and volume and type of dredged material required (if information is available). Several of those options, however, may not be pursued by the NYD, as their practicality and/or costs may not lend themselves to further NYD development or implementation. Also, based on technical considerations, further investigation of creation/restoration of oyster reefs, SAV beds and mud flats is not planned.

The overall objective of the final report is to quantify the benefits and costs of each of the remaining options in so far as practical, short of developing detailed designs for implementation, which would occur after the final DMMP is approved and construction is authorized and funded. A secondary objective is to recommend actual demonstration sites for the most promising options.

5.2. Land Site Remediation

Background

The NYD has studied the potential for beneficial uses of dredged material as a means of reducing the overall volume of material that may require contained disposal, thereby reducing the size or number of disposal sites and overall cost. One possibility, using dredged material for landfill cover, has been investigated extensively in the past as well as in the Interim Report. Using dredged material for landfill cover is desirable because the material is confined to a location that already is designated as a disposal site and monitored for water quality. Past studies have shown that this alternative can be feasible and cost effective.

Current Status

Informal discussions with landfill operators have revealed that landfills in the area have sufficient daily cover at this time and do not need dredged material for that purpose. Various types of cover, such as construction debris, are available to landfill operators. The operators are often paid to accept such material. Payment to the landfills for acceptance of dredged material may be necessary to create an economic incentive.

A large part of the expense of using dredged material on landfills comes from the process of de-watering the material. An alternative to de-watering may be to combine the dredged material with other materials such as yard clippings, wood chips and /or manure to help drying. This may prove to be less expensive, use less space in the process and save time. The NYD and others are exploring ways to utilize treated and untreated dredged material beneficially on landfills.

One opportunity for beneficial placement of dredged material would be to close abandoned landfills. Many abandoned landfills pose water quality problems. There are many such landfills in the New York/New Jersey area. Dredged material could be used for capping with more extensive investigation of the site, preparing the site for development, or possibly habitat creation after it is closed. The private sector leads investigations and implementation of landfill remediation. An abandoned landfill in Elizabeth New Jersey is being capped with dredged material, after which the site will become a parking lot for the Jersey Gardens Mall (see Figure 4). The site is permitted by New Jersey to accept up to 1.3 million CY of stabilized dredged material for use as structural fill under the mall's parking lot and for road embankments. Other potential landfill remediation sites are also shown on Figure 4.

Similar to remediation of landfills is remediation (by capping) contaminated land sites, known as brownfields. A significant potential exists for this use due to the historic industrial development in this region. Many sites in the area continue to contaminate the surrounding surface and ground water with no immediate means for containment, mostly due to economic constraints.

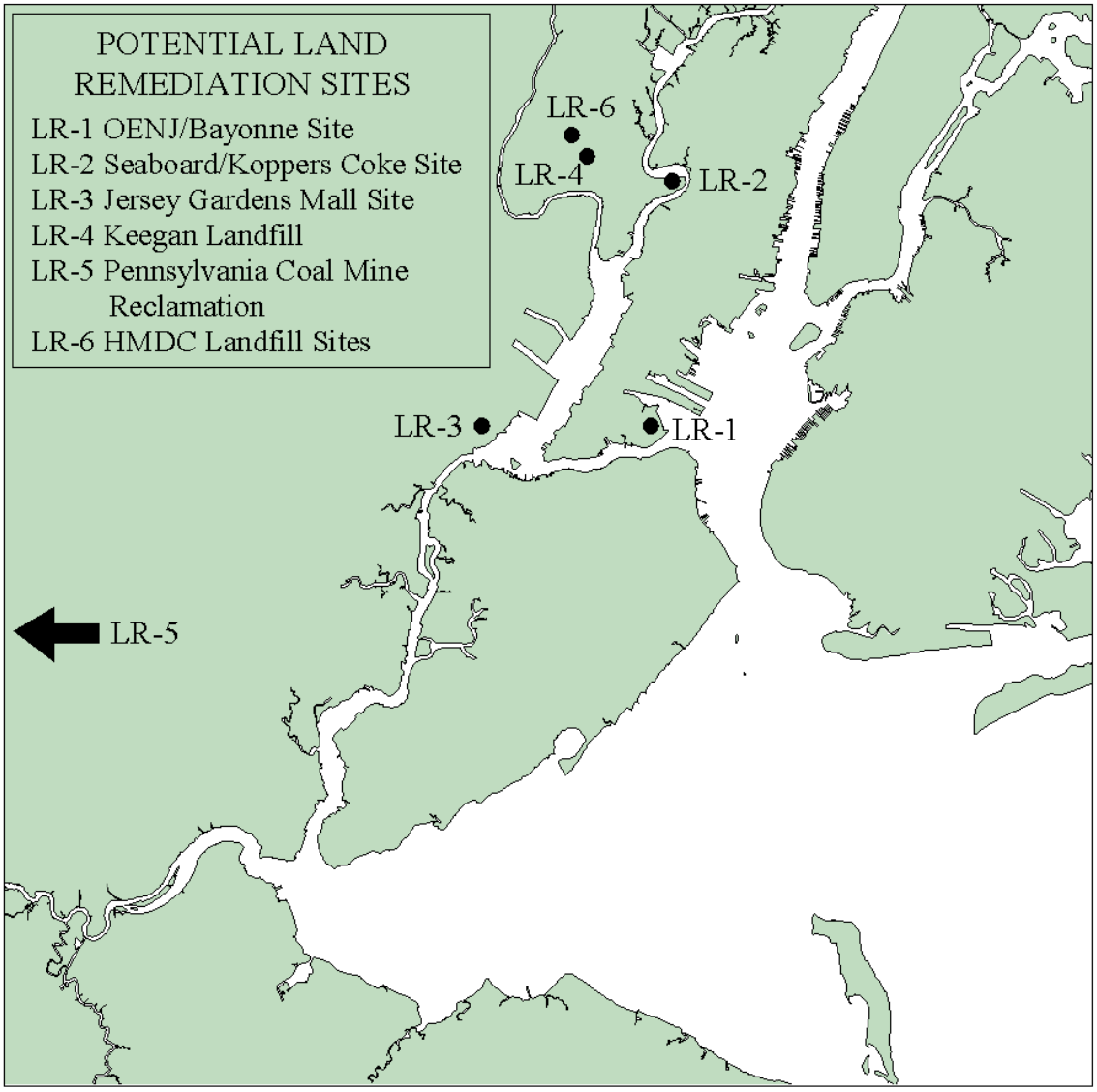


Figure 4: Potential Land Remediation Sites

The contaminant levels of these sites are significantly higher than that of the dredged material that would be used to cap the sites. Dredged material on its own, mixed with additives or decontaminated may be an economical and safe means to cap brownfields resulting in improved water quality and habitat value of surrounding waters and the harbor.

The private sector has also taken steps in remediation of brownfields. A project headed by ECDC at the Seaboard Site in Kearny, NJ had recently begun. The waterfront site is a 165-acre industrial brownfield. Dredged material will be stabilized at Port Newark to make structural fill for site remediation. The first phase of the project will allow up 1.3 million CY of treated

material to be placed in a 23 acre portion of the site. OENJ Corp. – Great Lakes Dredge & Dock Co. is planning another project at the OENJ-Bayonne site in Bayonne, NJ. This project is currently under permit review. The plan for the waterfront site is to cap a 69 acre abandoned landfill and an 87 acre industrial brownfield in the Constable Hook section of the city. Dredged material will be stabilized to make fill material to cap the site. Current plans are to build two golf courses on top of the cap.

Another opportunity, available since the release of the Interim Report, involves the use of dredged material in the reclamation of abandoned mines. Acid mine drainage, resulting from coal mine operations, has polluted hundreds of miles of streams throughout the region. The mines and spoil piles contain sulfur-bearing minerals, which react with water and air to form sulfuric acid. The highly acidic water coming from the mines dissolves and transports heavy metals, impacting surrounding water supplies and resources. Low pH and high heavy metal levels are toxic to vegetation, fish and wildlife.

In Pennsylvania alone, there are over 5,400 coal mines in need of reclamation with more than 900 located in eastern Pennsylvania. The New York and New Jersey, Clean Ocean and Shore Trust, in association with the Pennsylvania Department of Environmental Protection, has investigated the feasibility of using dredged material to reclaim the coal mines. At this time, the Pennsylvania Department of Environmental Protection has permitted Consolidated Technologies, Inc. to perform a demonstration project at the Bark Camp Mine Reclamation Center near Pennfield, PA using 500,000 cubic yards of material. The dredged material would be mixed with coal fly ash for fill and cow manure or a similar material for topsoil.

Final DMMP

In order to process material more economically and transfer large volumes of dredged material for use on sanitary landfills or in other beneficial ways, a regional transfer facility (or facilities) will be required for storage, de-watering or mixing. Transfer and handling are often a large part of the cost to implement the types of uses described above. A devoted facility for the region may help to reduce such costs for multiple small remediation sites making this alternative more feasible and cost-effective. In an addition to current efforts underway by private entities in the region, an investigation into the need for a transfer facility, locations for viable sites, and the preliminary design and cost of a typical facility will be included in the final DMMP.

At the present time, the private sector has taken the lead on remediation of brownfield sites amended with dredged material. The NYD will support ongoing efforts, maintain coordination with the lead agencies or firms proposing promising new uses, and facilitate the beneficial use of dredged material. Work will include helping to locate and evaluate sites requiring reclamation and investigating the potential for the use of dredged material, including recommendations on handling, transport and containment at a given site. If an appropriate site is located, an assessment will be made to determine the steps necessary for remediation. Consideration of sites brought to the attention of the NYD will be fully coordinated with state agencies and local officials before any site investigations take place.

6. CONTAINMENT FACILITIES

While the use of dredged material beneficially, at sites such as the HARS, is a favored option, volume limitations, sediment contamination and economic and environmental considerations necessitate evaluation of containment facilities for material that is unsuitable for beneficial use. A confined disposal facility (CDF) is a diked structure built on land and/or water which provides an isolated interior area suitable for filling with dredged material. Other than CDFs, contained aquatic disposal pits (also known as subaqueous pits) is another method of disposal that can be utilized in an aquatic environment. It involves the excavation of a pit in the seafloor which is then filled with dredged material and covered with a clean sediment cap layer (as appropriately engineered) isolating the material from the environment. With minor modifications, this option can be sited both inside and outside channel areas, allowing for both localized and large-scale facilities.

6.1. Upland CDFs

Background

Upland disposal involves constructing dikes or other retention structures on land to contain dredged material, and, as necessary, to test the effluent prior to discharge from the facility, and to monitor adjacent surface and ground water to ensure that the material is properly contained.

A basic consideration in determining the feasibility of this alternative within the Port region is the availability of suitable disposal sites. A preliminary screening of the region for potential upland sites was conducted and the results were presented in the Interim Report.

Current Status

Since the release of the Interim Report, the NYD has held a series of public information meetings where local citizens and public officials provided feedback regarding the full array of management alternatives. Based on the comments from those meetings and subsequent letters and feedback from the states indicating that there is a lack of support for many of the sites, the NYD will no further investigate the sites as described in the Interim Report for future use as traditional upland CDFs.

The only exception to this is the investigation and possible use of a portion of the upland site designated UD-7 in the Interim Report. UD-7 is a 160 acre site located in Belford, Monmouth County, New Jersey. A portion of this site, commonly referred to as N-61, was historically used for disposal of material dredged from the area (see Figure 5). At the request of State and County officials, the N-61 site will be investigated for disposal of material generated from commercial navigation projects located in the waters of Monmouth County (e.g., Shoal Harbor and Compton Creek, Keyport Harbor). N-61 covers a relatively small area and consequently would have only a

small volume capacity if implemented. However, since the volume of material needing dredging from the projects located in this area is also relatively small, a CDF designed and constructed on site N-61 may provide many years of maintenance capacity for those projects.

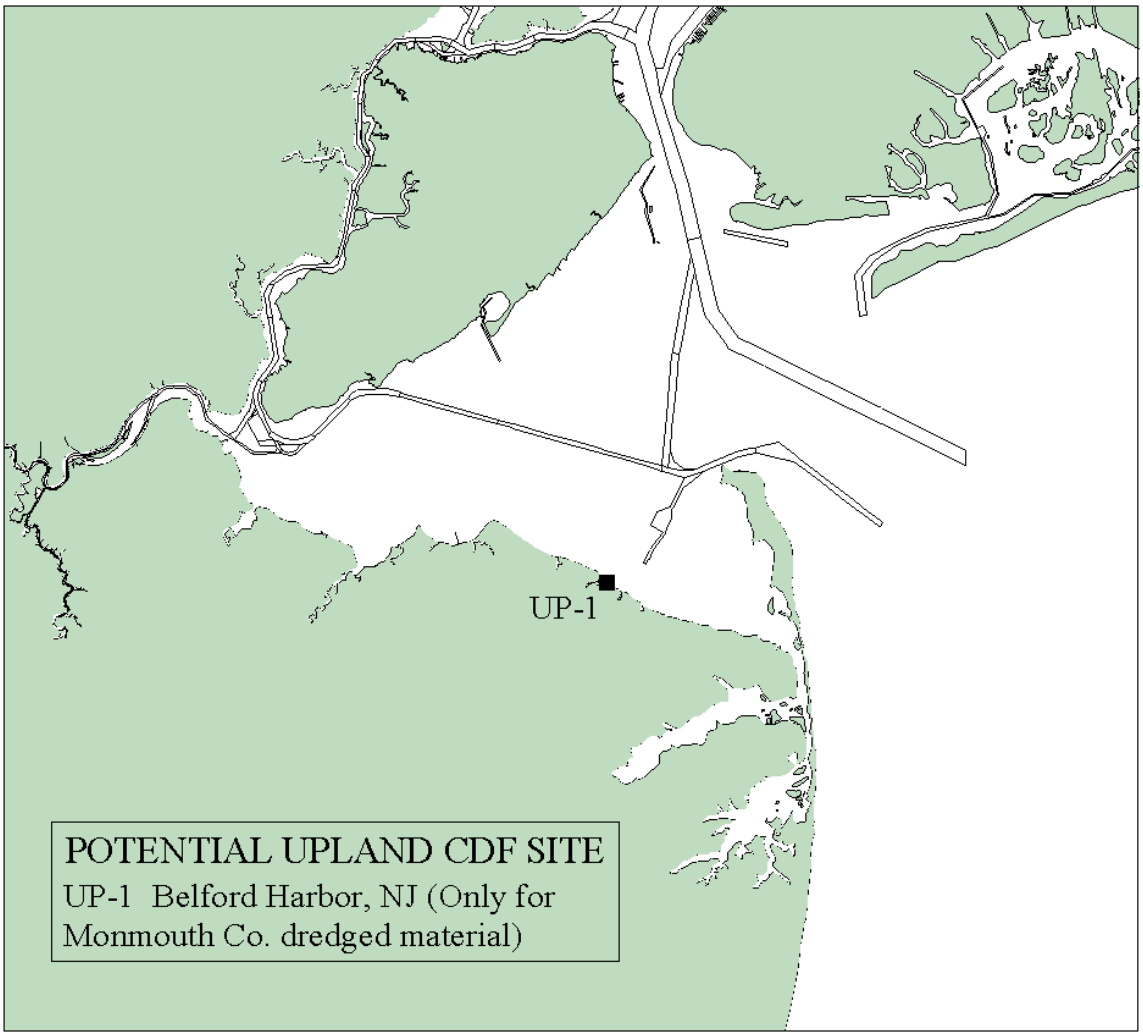


Figure 5: Potential Upland CDF Site

Final DMMP

Unless requested by the state or local municipality, the upland sites listed in the Interim Report, with the exception of the N-61 portion of site UD-7, will not be studied in more detail for use strictly as a CDF. However, since upland disposal is still considered a technically feasible method of containing dredged material, it will be included in the EIS evaluation of alternatives. The relatively limited capacity of the sites coupled with the concerns expressed by the public,

which would need to be resolved to implement each site, makes further expenditure of limited funds on unsupported sites unjustifiable. Specific sites, such as the N-61 site, that are supported by state and local officials are and will be included in the DMMP investigation, as funding allows. Instead of performing regional siting studies to identify potential sites for upland disposal, future DMMP work will be directed towards the identification of upland placement of dredged material that will stress beneficial use, as discussed in Section 5.

6.2. Aquatic

6.2.1. Contained Aquatic Disposal Pits (Subaqueous Pits)

Background

This alternative involves placing dredged material into a hole dug into the bottom of the bay or other body of water (including channels or berthing areas). Once placed into the hole, the disposed sediment could be left exposed to the surrounding water to be covered by natural sedimentation (especially in channel areas that currently experience sedimentation). It could also be capped with a layer of clean sediment to isolate it from the water or the organisms living in the water column or the upper portion of the sediments. If capped, the cap can be placed over the disposed material so that it extends above the natural bottom (forming a mound), is even with the bottom, or is below natural bottom depth (leaving a shallow pit). The need and type of cap placement would depend on the source of dredged material relative to the pit location, the geologic, hydrodynamic and sediment characteristics of the pit location, and the anticipated value of topographic relief to the resource (such as fish or shellfish) adjacent to the pit site.

The use of pits outside channels was thoroughly evaluated in a final Supplemental Environmental Impact Statement (SEIS) released in 1991, which recommended the use of capped pits which exist in the Lower Bay as the preferred alternative for containing contaminated dredged material (see Figure 6). In the Record of Decision that followed the SEIS, the NYD proposed the use of a specific existing pit along the East Bank of Lower New York Bay. This pit, dug to provide a source of sand for construction needs, was deemed a long-term option that could safely dispose all the category II and III material that might be dredged over a 20 - 25 year period. Subsequent to the ROD, revised testing protocols drastically changed the anticipated volume of category II and III material such that all four existing pits would not be able to meet the currently projected long-term need. The NYD applied for a Water Quality Certification from New York State to use the East Bank pit in 1992; to date the certificate has not been issued because of concerns with impacts to potential fishery resources using the pit. The option of digging pits within channels was later identified in the Interim Report.

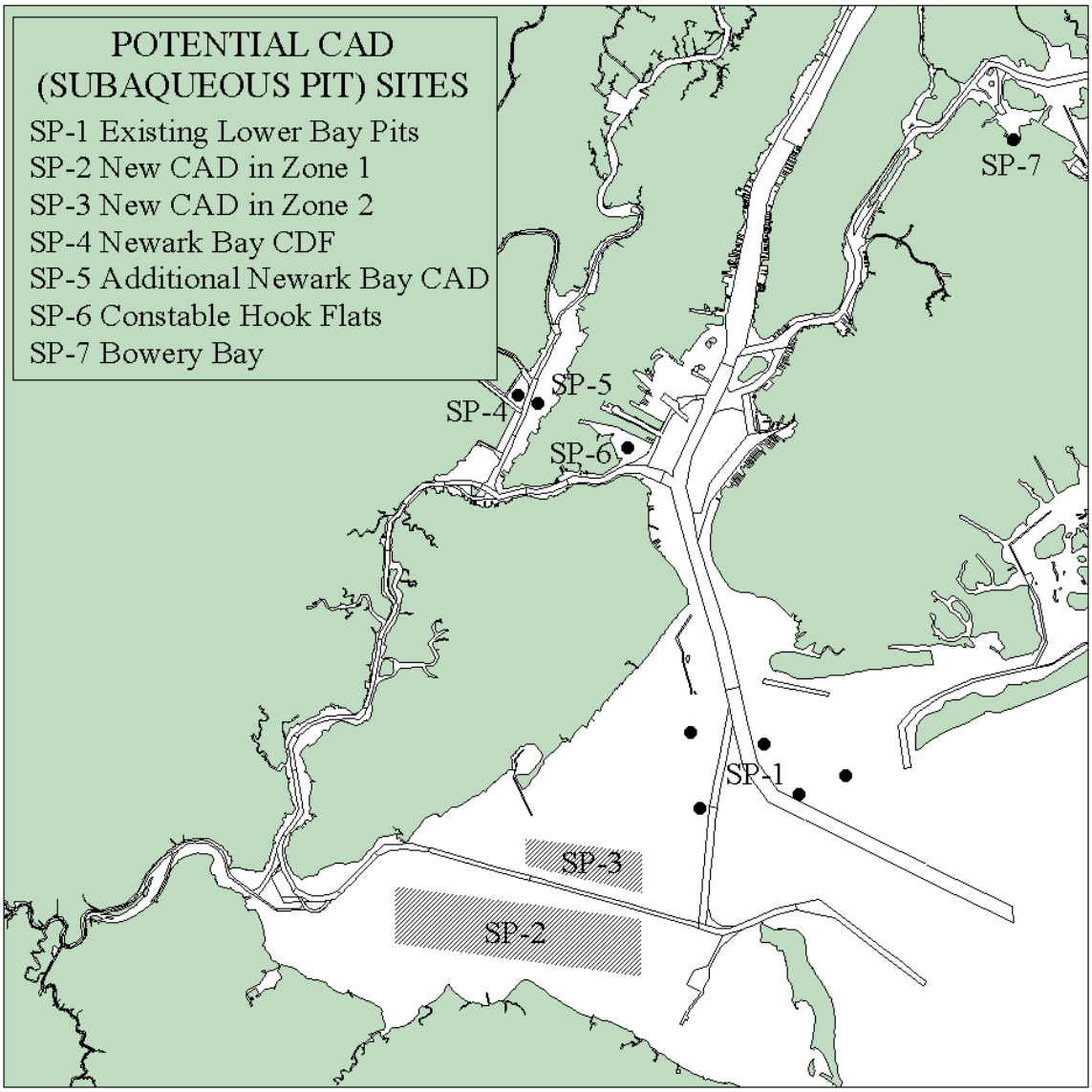


Figure 6: Potential Contained Aquatic Disposal Pit (Subaqueous Pit) Sites

Current Status

The Interim Report identified a zone in Raritan Bay (Zone 1) and another in Lower NY Bay (Zone 2) within which construction of a large pit or a series of smaller ones could ideally be sited. In addition, a number of sites for smaller pits were identified closer to shore, in the Upper bay and Bowery Bay. Studies and comments received subsequent to the Interim Report have lead to the District's current position that an area for new pits be designated within zones 1 or 2 for a defined amount of total material disposal. Pits within this area would then be dug, filled, and capped on a yearly basis to prevent loss of material and allow colonization by benthic

organisms and fish. The strategy would create, over time, a series of pits within either of the two zones, placing any contaminated surface sediment from a new pit into the previously dug pit, and then capping that older pit with clean material from the new pit. Material not needed for the cap would then be used beneficially, to remediate the old Mud Dump (i.e., HARS), nourish area beaches, create or restore habitat, construction material, or for other beneficial uses. In addition to safely containing the dredged material, and returning the area to its previous physical condition (with no long-term loss of habitat or benthic communities), these new pits, if dug in areas likely to have contaminated sediments in their upper layers (e.g., Zone 1), would also serve to remediate those areas, by replacing the existing contaminated surface sediments with a clean sediment cap.

Those pits nearer to shore, in the upper portion of the harbor, would also help to clean up contaminated sediments and could serve to contain contaminants (from pit construction and port dredging) within the geological confines from which they were removed, as is planned for the new pit in Newark Bay. However, due to the smaller extent of potentially suitable bottom present in the upper harbor, the greater likelihood for encountering shallow bedrock, and the greater possibility of encountering heavy contamination at depth (as also occurred in portions of Newark Bay), the potential life span of this option is limited when compared to the potential use of the lower bay for new pits.

Pits could also be dug within the confines of a channel or berthing area, below its authorized or maintained depth. This option would minimize the impact to undisturbed areas and the introduction of contaminated sediments to areas outside the channel being dredged. It could also optimize dredging operations and reduce costs by reducing the transport distances and by creating an advanced maintenance catch basin thereby extending the dredging cycle of that section of channel. However, if the channel bottom was already close to underlying bedrock the capacity could be low, and future deepening of the channels may be more costly if the disposed sediment had to be re-excavated and potentially resuspended. A preliminary evaluation identified the Port Jersey, Port Newark, Port Elizabeth, South Elizabeth, and Port Newark and Port Elizabeth Pierhead channels as potentially feasible for creation of sub-channel pits. In addition, channels in the areas of the Hudson River, Wards Point Bend Reach, Newark Bay, and Bay Ridge/Red Hook federal channels, as well as the Red Hook and Wards Point anchorage areas have been identified as other areas for potential sub-channel pit disposal (see Figure 7). Application of this alternative to multiple areas of the harbor would also allow for a more localized solution for each area of the Port.

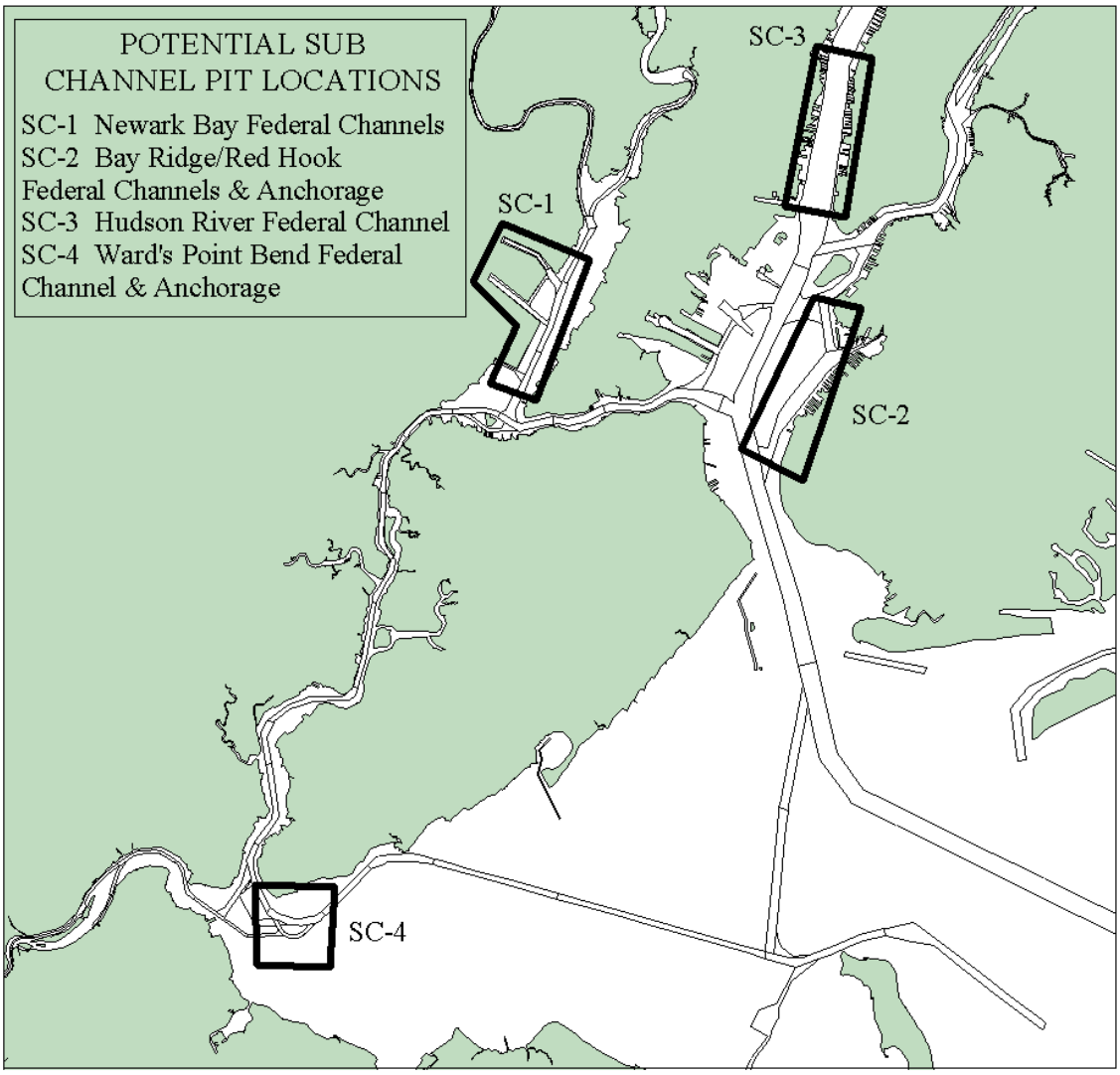


Figure 7: Potential Sub-Channel Pit Locations

As currently proposed, the sub-channel pits could provide short-term and more immediate disposal capacity for dredging channels with greatest need, while the lower bay zones could provide a mid- to long-term solution to the Port's dredging needs if a series of pits were constructed over time. This type of alternative also allows for the ability to respond to changes in sediment quality that may come about as a result of implementing contaminant reduction and/or decontamination measures. If these initiatives function well enough to markedly reduce the future volumes of contaminated dredged material, the construction of additional pits could be phased out with no loss of capital investment, as the pits would only be constructed yearly on an as needed basis.

Final DMMP

The PANY/NJ has completed construction of a small (1.7 million CY) pit in Newark Bay. The use of this pit will provide important information for planning and assessing future pits. It has already demonstrated the necessity for detailed sub-surface information, as the pit was scaled down from its much larger size due to the presence, in a large part of the site, of sediment contamination at a very deep depth. Currently, the NYD is finalizing the siting process that identified the two potential bay zones for pits, using updated biological, sediment, and other physical data. The NYD is also preparing a Scope of Work (SOW) to collect sediment borings this fall within the revised boundaries of Zones 1 and 2 to identify the substrata and to determine the physical and chemical characteristics of the sediment. Biological and physical studies in and around the existing pits will be completed to characterize the resource use and value of this and other types of topographical features. All this information will be used to plan the type and nature of cap placement, as well as the exact location of pits to maximize the number that could be built, and the areas of the two bays that might be remediated.

In addition, the USACE Waterways Experiment Station and the NYD are also working closely with the PANY/NJ to further develop the sub-channel alternative, and identify specific channel sections that might be appropriate. The USACE will also be preparing detailed designs and cost estimates for constructing pits within the selected sites, so that this option could be implemented quickly, if it becomes a part of the final DMMP.

6.2.2. Nearshore Containment Areas

Nearshore containment facilities have one side abutting land, which, when filled and covered, produce a "containment peninsula." This alternative was considered throughout the harbor region. Most potential sites were eventually rejected for various reasons such as size, location, environmental considerations, and degree of contamination. The Joint Dredging Plan issued by the States of New York and New Jersey identified the construction of containment areas as a promising short-term alternative if sited in environmentally acceptable areas, and encouraged further investigation and demonstration.

The Interim Report identified a possible site in the Atlantic Basin that passed the preliminary evaluation criteria, although concerns have been raised on the site's potential cultural significance (see Figure 8). The PANY/NJ has investigated the Atlantic Basin site as a possible expansion of a container terminal located north of the site. The PANY/NJ will continue to lead future investigation and potential implementation of this site.

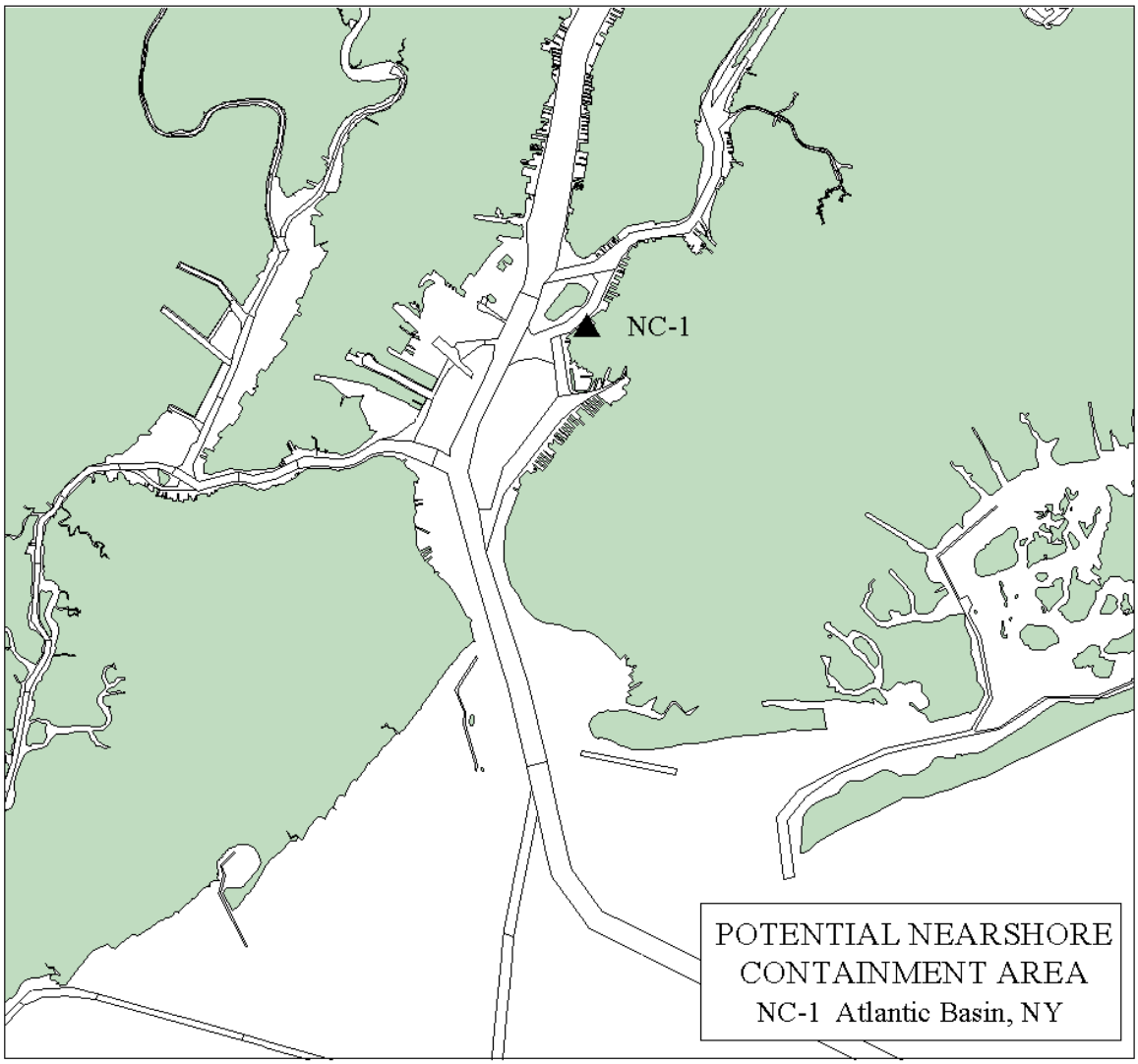


Figure 8: Potential Nearshore Containment Area

In addition to the Atlantic Basin site, the PANY/NJ is also coordinating with the two states in the potential investigation and implementation of additional sites in the region. While no other specific sites have been formally proposed, the sites under consideration are of special interest to Port facility expansion, and will be closely followed for potential inclusion into the overall DMMP.

6.2.3. Island CDFs (Containment Islands)

Background

Island Confined Disposal Facilities (CDFs) (also known as containment islands) are engineered structures that extend from the ocean floor to above the water surface, creating enclosed areas that are then filled with dredged material. Once filling is completed, the structure would be capped with clean fill material, resulting in newly created land that may be used for a variety of purposes, including commercial port development, siting decontamination facilities, or recreation and wildlife uses such as habitat mitigation.

During the early stages of the DMMP study, the USACE developed siting criteria to identify suitable locations in the New York Harbor and Bight for containment islands. These siting criteria included biological factors (bottom-dwelling organisms, fish distributions, and habitat types); geological conditions (surficial, subsurface, sediment transport, seismicity); cultural resources (historic features, aesthetics); chemical make-up (sediment chemistry, biological test results); and physical factors (bathymetry, baseline data, wave, current and storm characterizations). Based on the siting criteria, the NYD identified potential island CDF locations in three areas, or zones of siting feasibility, identified as Zone 1 (south-central part of Lower Bay including part of Raritan Bay), Zone 2 (central part of Lower New York Bay), and Zone 3 (north-central part of the New York Bight Apex, near Diamond Hill / Ambrose Light).

Within the Bay and ocean regions, the USACE prepared several conceptual designs for different construction methods that are feasible in these regions. The various designs were compared based on estimated dredged material capacity (volume); estimates of design, construction, operation and maintenance costs, and estimated unit cost per cubic yard of material.

Current Status

Preliminary evaluations of subsurface conditions, along with feedback from the States, environmental organizations, the fishing industry, and other stakeholder agencies, resulted in narrowing suitable areas for containment islands. Specifically, island CDFs were determined by the State of New Jersey to be unsupportable in Zone 1 due to actual and perceived impacts on the fisheries, bay bottom, recreation, and aesthetics in Raritan Bay. Thus, continuing efforts to site containment islands are focused on Zones 2 and 3 (see Figure 9).

With new proposals from public and private groups to construct island CDFs in the Pilot's area (the triangular area shown on Figure 9 in black) and Cholera bank, respectively, and with the identification of new geographical siting data (e.g., updated bathymetry), an updated, detailed GIS-based siting analysis is currently being performed to refine the island CDF zones. The NYD is currently coordinating the siting criteria and GIS-based data layers used in this siting effort with the involved federal, state and local agencies. With the addition of new data sets and the incorporation of comments received from other involved agencies, the locations of zones 2 and 3 may shift to reflect these improvements.

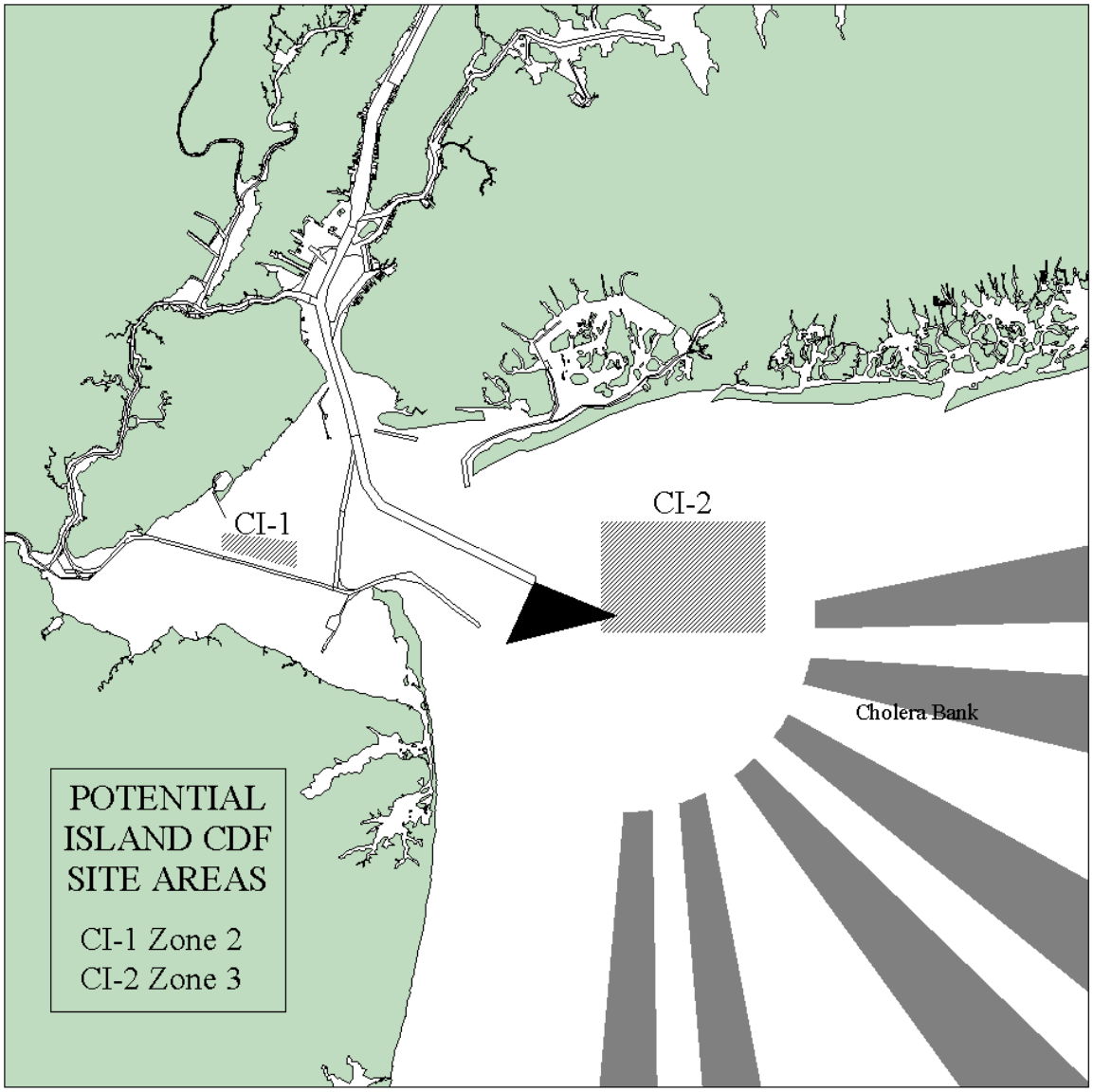


Figure 9: Potential Island CDF (Containment Island) Site Areas

The Joint Dredging Plan issued by the States of New York and New Jersey supports development of a long-term, large containment facility, although it does not specify whether such a facility should be aquatic or land-based. Also, the Chair of the Dredged Material Management Integration Work Group recently proposed that a containment island be part of the long-term solution to the harbor dredged material disposal problem.

Final DMMP

Detailed engineering, environmental, and cost analyses are necessary to determine whether an island CDF is an appropriate part of a total response to the port's dredged material management problem, and if so, what the optimum siting, size, shape, design, construction method, and final use for such a facility would be. Work on these studies has begun, and, if selected as part of the final DMMP, will take several years to fully complete. The following specific tasks are scheduled to be undertaken to address containment islands: subsurface investigations (borings); analysis of coastal processes; structural analysis and design; detailed cost estimates; economic analysis; biological analysis; and cultural/archaeological studies. In addition, the potential for constructing island CDFs in modular (or sequential) sections will be considered. Such an approach would shorten construction time for this alternative, would reduce the immediate impact of loss of bottom habitat, and would allow for more flexible long-term planning incorporating potential improvements in sediment treatment or contaminant reduction.

7. FRAMEWORK FOR ENVIRONMENTAL IMPACT STATEMENT

7.1. Environmental Resources

Background

NEPA contains provisions in Section 102 requiring an EIS to discuss the potential adverse environmental effects of alternatives being considered prior to recommending a plan of action.

One option for the DMMP is to develop a programmatic EIS (PEIS). A PEIS is used to address an umbrella program of alternative types to allow decision-makers to form rational judgments on the proposed action(s). A PEIS also provides an indication of gaps in data that need to be filled and plans to fill these gaps with site specific supplemental EISs which may be needed. The plan for the management of dredged material for the Port of New York/New Jersey has been under consideration for approximately 20 years. Over that time the USACE has promulgated several plans with reports and NEPA documents.

In September of 1996, the NYD produced a scoping document, the Interim Report, that provided a list of eight alternative types which combined to yield over 50 options to place dredged material from the Port of New York/New Jersey. The Notice of Intent to produce an EIS on this matter was published in the Federal Register on November 26, 1996.

Current Status

Subsequent to the distribution of the Interim Report, which included a preliminary scope for the EIS, the NYD held scoping meetings in the form of poster sessions soliciting comments from February through April 1997, at eight locations in the States of New York and New Jersey. Comments regarding the draft scope for the EIS included: a need to emphasize marine species, including their socio-economic value to commercial and recreational interests, the need to emphasize the potential adverse effects of upland placement, and the need for formal public meetings.

The distribution of the Interim Report and subsequent public meetings provided the public with an opportunity to comment on the merits of the options to NYD and the decision-making non-federal sponsors, the states of New York, and New Jersey, and the PANY/NJ. The comments of the public, as well as the review by the states and the PANY/NJ provided the basis for decision-makers to focus on alternatives that they could support. Though the process resulted in the reduction in the number of sites under consideration, the basic list of alternative types remains unchanged.

In discussions with other involved agencies regarding the preparation of a NEPA document to accompany the final DMMP report scheduled for completion in September 1998, the question of whether or not the EIS would be programmatic was brought up. Members of various agencies

agreed that if the alternatives and sites considered were in areas with essentially the same engineering, economic and environmental conditions, then the need for preparing a programmatic EIS may be obviated and a supplemental EIS may not be required to pinpoint the exact location to be selected within the site area. This issue is still under discussion with the other involved agencies. A decision on whether to develop an EIS or a PEIS will be made in early 1998.

Studies and documentation completed or currently underway for use in developing an EIS include:

- Human health and ecological risk assessment, to help compare the potential risk to humans and the environment by use of any given action.

- Sediment profile imagery of the surficial sediments and sediment-dwelling organisms to identify biological habitats of the Port with emphasis on Upper and Lower Harbor.

- System wide analysis of hydrodynamics (both regional and near-field), wave climatology, storm conditions, water quality, etc. to design and assess potential impacts from aquatic alternatives (island CDFs and CAD) on the environment.

- Hudson River plume mapping to determine its extent and flow pattern.

- Sediment coring to determine depths of sediment strata and sediment characteristics (physical, chemical and cultural) essential to alternative design and site placement.

- Coordination with National Marine Fisheries Service on resource mapping of important commercial and recreational fish and shellfish in the Lower Bay.

- Economic benefit analysis to determine benefits versus costs of the different types of alternatives.

- Information on fishery resources in the New York Bight apex.

Final DMMP

The EIS document will focus on alternative types and their environmental impacts. This assessment will be based upon the extensive data collected by NYD, and other involved agencies. The EIS will evaluate all the alternatives in the Interim Report including those that may not be supported by the non-federal sponsors.

The draft EIS will provide the public an opportunity to review and provide input on the alternatives under consideration so that the appropriate federal, state and local decision-making officials can make well-informed selections of the alternatives to be implemented. The major points of the assessment will include a characterization of existing site conditions (as known), descriptions of the alternative-types under consideration, and an assessment of their expected

impacts, including human-health and ecological risk assessment. Further, methods to avoid adverse effects will be discussed. Where loss is unavoidable, means by which losses can be reduced, or mitigated, will also be analyzed.

A Notice of Intent to prepare a draft EIS along with a revised scope will be published in the Federal Register by early 1998. Public meetings are anticipated for the summer of 1998 after the release of the draft EIS. The current schedule calls for the promulgation of a final EIS by September 1998. At that time, the final DMMP Report with the final PEIS will be sent to the public for review and comment. A Record of Decision process will be initiated during the final EIS review, and will be completed after the end of the review period and receipt of comments.

Aside from the pollution prevention and sediment reduction methods, eight types of alternatives are currently under consideration for implementation. They are: ocean remediation (e.g., HARS), decontamination technologies/treatment methods, beneficial uses (e.g., habitat restoration and land remediation with treated/stabilized material), upland CDFs, confined aquatic disposal facilities (also known as subaqueous pits) both inside and outside channel areas, nearshore containment facilities, island CDFs, and contract disposal/placement. Examination of these alternative types has led to over 40 potential options for placement, based upon site and size of the area to be used. Additionally, other methods proposed by non-federal entities will be discussed with respect to the role that they might play in addressing a portion of the anticipated future dredging and disposal needs. These will be investigated for the final set of options to be used for placement of dredged material. The "No Action" alternative will also be addressed in the EIS. A revised outline of the scope of work for the EIS will be mailed early in 1998.

Upon completion of the EIS, to implement various parts of the selected plan the NYD and the non-federal sponsors may need to perform additional detailed investigations for specific sites to finalize designs. As may be necessary, these options will have their own specific design reports and NEPA documents (EAs and/or EISs).

7.2. Cultural Resources

Background

As an agency of the federal government, the USACE has certain responsibilities concerning the protection and preservation of cultural resources within its jurisdiction. As part of project planning, federal statutes and regulations require the identification of significant cultural resources and mitigation of adverse impacts to such resources. Significant cultural resources are defined as any material remains of human activity eligible for inclusion on the National Register of Historic Places (NRHP).

A preliminary assessment of cultural resources was undertaken for the Interim Report, and an outline for future studies, by alternative type, was prepared (Rakos, 1996). Coordination with the

NY and NJ State Historic Preservation Offices and the New York City Landmarks Preservation Commission has been ongoing and will continue as the project proceeds. Other interested parties may also be consulted. If significant resources are identified within the study areas that cannot be avoided, a Memorandum of Agreement (MOA) will be prepared to define all further required cultural resources activities. The investigations outlined below address only the aquatic disposal options of island CDFs and confined aquatic disposal (i.e., subaqueous pits) both inside and outside channel areas. Cultural resource issues associated with upland disposal and upland beneficial uses will be addressed as geographic locations and proposed plans become more defined.

Prehistoric Resources

Present evidence suggests that 12,000 years ago the modern-day Lower New York Bay may have been a relatively dry coastal plain, dissected by the ancestral Hudson and Raritan Rivers and meltwater streams. These once dry landforms, now offshore, may have been inhabited by Native American populations (Ferguson, 1986). A geomorphological and archaeological investigation will be conducted to assess the potential for prehistoric resources within the revised zones of siting feasibility. The assessment will be based on, but not limited to, previous geological and cultural resource studies, seismic data recently acquired for the DMMP, the history of dredging activities in the areas, the review of existing and future boring logs obtained for the area and the DMMP. The report resulting from this work will include an assessment of any potentially significant cultural resources identified and recommendations for avoidance or mitigation of any such resources. This report will be incorporated in the draft EIS to serve as a primary basis for assessing cultural resources impacts from aquatic disposal alternatives.

Historic Resources

The historic resources potentially present in the NY/NJ Harbor and Bight consist of the numerous shipwrecks that occurred in Lower New York Bay as a result of the high volume of maritime traffic into and out of the Port. Recent remote sensing surveys in the project vicinity have identified hundreds of potential cultural resources (Nowak and Reiss, 1989; Miller and James 1992a, 1992b). Background research will be conducted on the presence of shipwrecks within, or nearby, the three zones of siting feasibility. This will be followed by a remote sensing survey to define the location, size and nature of any underwater objects, which will help to determine their potential as a significant cultural resource. Current project plans call for the avoidance of targets and anomalies within the project area. No underwater archaeological investigations are planned at this time. Remote sensing will not be conducted for the sub-channel pit disposal alternative, since historical dredging in the channels has likely removed any historic wrecks or debris. The report resulting from this work will include an assessment of any potentially significant cultural resources identified and recommendations for avoidance or mitigation of such resources. The draft EIS will incorporate this report, which will serve as a primary basis for assessing impacts from aquatic disposal alternatives.

8. CONCLUSIONS AND FUTURE STUDIES

Background

Since the release of the Interim Report in September 1996, several developments have occurred concerning dredged material management. These include the following:

- Issuance of the Joint Dredging Plan for the Port by the States of New Jersey and New York.
- Signing of the Harbor Estuary Program Comprehensive Conservation and Management Plan.
- Closure of the Mud Dump site.
- Designation of the Historic Area Remediation Site.
- Proposal for Port of NY/NJ Economic Revitalization and Hudson Estuary Environmental Restoration by the DMMIWG Chair.
- State/private sector proposals for treatment and/or beneficial uses of dredged material.
- Continued USEPA/USACE evaluations of decontamination and treatment technologies, including plans for production-level demonstration of selected processes.
- PANY/NJ evaluation and treatability studies of selected treatment/construction material proposals.
- PANY/NJ development of specifications for the beneficial use of dredged material as construction fill material.
- Preparation of an RFP by NJMR for large-scale demonstration of selected decontamination technologies.
- NYD's public information meetings on the Interim Report.
- Feedback from stakeholders and public on Interim Report.
- Funding and initiation of the Contaminant Assessment and Reduction Project as part of the Sediment Contaminant Reduction Workgroup.
- Development of generic ecological and human health risk assessment of select dredged material options.
- Refinement of aquatic CDF siting criteria in coordination with other federal, state and local agencies.

Current Status

Building upon the accomplishments of the last year, the NYD is actively involved in efforts to both reduce and manage the dredged material related problems (see Tables 2 and 3, respectively). Table 2 lists the NYD's ongoing support of pollution prevention and sediment reduction efforts. These efforts address many aspects related to the causes of sediment contamination, methods to help prevent further contamination of sediments, and methods to reduce the amount of sediments that require dredging.

Table 2 – Efforts to Reduce the Problem

Effort	Task	NY District Action	Time Frame
Pollution Prevention	Data management	Data management for HEP, CARP program.	To be completed in 1999
		Historical contaminant database development	To be completed in 1999
	GIS	GIS data creation and mapping	On going
		Contaminant visualization and volume prediction	On going
	Modeling	Toxics modeling workshops	To be completed in 1998
Sediment Reduction	Channel Design Optimization	Underway. Applied to each project (e.g. Flushing Bay) before maintenance dredging is performed.	On going
	Structural Modification	Will be investigated as part of recently initiated Port Navigation Feasibility Study.	N/A
	Sub-Channel Placement	Advanced maintenance benefits of Sub-Channel Placement investigated under section 6.2 (Confined Aquatic Disposal)	To be completed in 1999

The list of alternatives either in use or actively being investigated by the regional stakeholders has been narrowed, as shown in Table 3 below. Aside from other contract disposal options which may be available in other areas of the country, four of the alternatives (shown in italics) are currently permitted and in use.

In addition to the alternatives the NYD is investigating, the EIS under preparation will also address other alternatives being investigated by other agencies or private interests as well as technically feasible alternatives which have been removed from further investigation due to lack of support.

Table 3 – Alternatives *Currently Available* or Under Investigation

ID Code	Alternative Type / Alternative Name/Site	State	Area (acre)	Volume *	Cost **	Year Available	Lead Entity
	Ocean Remediation						
OR-1	*Historic Area Remediation Site*	US	13,306.0	Long-Term	Low	1997	USEPA
	Decontamination Technologies/ Treatment Methods						
	Candidate Processes for Production-Level Demonstration						
DP-1	"Cement-Lock Technology" – Institute of Gas Technology	N/A	N/A	TBD	High	1999	USEPA/ NYD
DP-2	Solvent Extraction – Metcalf & Eddy, Inc.	N/A	N/A	TBD	High	1999	USEPA/ NYD
DP-3	Solidification/Stabilization – CEWES	N/A	N/A	TBD	Medium -High	1999	USEPA/ NYD
DP-4	Plasma-Arc Vitrification – Westinghouse, Inc.	N/A	N/A	TBD	High	1999	USEPA/ NYD
DP-5	Manufactured Soil Production – CEWES	N/A	N/A	TBD	Medium -High	1999	USEPA/ NYD
DP-6	Sediment Washing – BioGenesis Enterprises, Inc.	N/A	N/A	TBD	High	1999	USEPA/ NYD
	Potential Sites for Staging Processes						
DS-1	Elizabethtown Gas Co. Site, Elizabeth, Union County	NJ	31.0	N/A	N/A	1999	USEPA/ NYD
DS-2	Construction & Marine Equipment Co. Site, Elizabeth, Union County	NJ	9.0	N/A	N/A	1999	USEPA/ NYD
DS-3	HMDC Landfill Sites, Kearny/Lyndhurst, Hudson/Bergen Counties	NJ	TBD	N/A	N/A	1999	USEPA/ NYD
DS-4	Former Raritan Arsenal, Edison/Woodbridge, Middlesex County	NJ	TBD	N/A	N/A	1999	USEPA/ NYD
DS-5	Steel-Style Co. Site, Newburgh, Orange County	NY	90.0	N/A	N/A	1999	USEPA/ NYD
DS-6	Barge-Mounted Facility, Port of NY/NJ	NY/NJ	<3.0	N/A	N/A	1999	USEPA/ NYD
	Beneficial Uses						
	Habitat Restoration						
HR-1	Fill Existing Degraded Pits	NY/NJ	TBD	TBD	TBD	1998	NYD
HR-2	Create/Enhance Wetlands	NY/NJ	TBD	TBD	TBD	1999	NYD
HR-3	Create/Enhance Shellfish Beds	NY/NJ	TBD	TBD	TBD	1998	NYD
HR-4	Create/Enhance Fish Reefs	NY/NJ	TBD	TBD	TBD	1999	NYD
HR-5	Create/Enhance Bird Habitat	NY/NJ	TBD	TBD	TBD	1999	NYD
HR-6	Construct Wetlands for Water Quality Improvement	NY/NJ	TBD	TBD	TBD	1999	NYD
HR-7	Fill Selected Areas to Improve Water Quality/Flushing	NY/NJ	TBD	TBD	TBD	1999	NYD
HR-8	Fill Bathymetrically Disturbed Areas to Alleviate Water Circulation Problems	NY/NJ	TBD	TBD	TBD	1999	NYD

* - Volume: Small = <3,000,000 cubic yards (cy), Medium = 3,000,000 – 10,000,000 cy, Large = 10,000,000 – 50,000,000 cy, Long-Term = > 50,000,000 cy

** - Cost: Low = < $20/cy, Medium = $20 - $40/cy, High = > $40/cy

ID Code	Alternative Type Alternative Name/Site	State	Area (acre)	Volume *	Cost **	Year Available	Lead Entity
	Land Remediation						
LR-1	OENJ/Bayonne Site, Bayonne, Hudson County	NJ	156.0	Medium	High	1998	Private
LR-2	*Seaboard/Koppers Coke Site, Kearny, Hudson County*	NJ	88.0-150.0	Small-Medium	High	1997	Private
LR-3	*Jersey Gardens Mall Site, Elizabeth, Union County*	NJ	69.0	Small	High	1996	Private
LR-4	Keegan Landfill, Kearny, Hudson County	NJ	209.0	Small	High	1999	Private
LR-5	Pennsylvania Coal Mine Reclamation	PA	TBD	Long-Term	TBD	1999	Private
LR-6	HMDC Landfill Sites	NJ	TBD	TBD	TBD	2000	HMDC
	Containment Facilities						
	Upland						
UP-1	Belford Harbor (a.k.a. N61), Belford, Monmouth County	NJ	TBD	Small	Medium	1999	NYD
	Aquatic						
	Confined Aquatic Disposal (a.k.a. subaqueous pits)						
	Inside Channels						
SC-1	Newark Bay Federal Channels	NJ	100.0	Large	Low	1999	PANYNJ
SC-2	Bay Ridge/Red Hook Federal Channels	NY	260.0	Large	Low	1999	NYD
SC-3	Hudson River Federal Channel	NY/NJ	250.0	Large	Low	1999	NYD
SC-4	Ward's Point Bend of NY/NJ Federal Channel	NY	90.0	Medium	Low	1999	NYD
	Outside Channels						
SP-1	Existing Lower Bay Pits	NY	1,401.0	Large	Low	1998	NYD
SP-2	New CAD Facilities in Updated Zone 1 of Lower Bay	NJ	TBD	Long-Term	Low	1999	NYD
SP-3	New CAD Facilities in Updated Zone 2 of Lower Bay	NY/NJ	TBD	Long-Term	Low	1999	NYD
SP-4	*Newark Bay CDF*	NJ	31.0	Small	Medium	1997	PANYNJ
SP-5	Additional Newark Bay CAD Facilities	NJ	TBD	TBD	TBD	1999	NYD
SP-6	Constable Hook Flats, Bayonne, Hudson County	NJ	TBD	TBD	TBD	1999	NYD
SP-7	Bowery Bay, Astoria, Queens County	NY	TBD	TBD	TBD	1999	NYD
	Nearshore Containment Facilities						
NS-1	Atlantic Basin, Red Hook, Kings County	NY	74.0	Medium	Medium	1999	PANYNJ
NS-2	Other Nearshore Sites (under development)	TBD	TBD	TBD	TBD	TBD	PANYNJ
	Island CDFs						
CI-1	Updated Zone 2 in Lower Bay	NY/NJ	TBD	Long-Term	Low	2002	NYD
CI-2	Updated Zone 3 in Bight Apex	US	TBD	Long-Term	Low	2005	NYD
	Contract Disposal						
CD-1	Contract Disposal	TBD	TBD	TBD	TBD (high)	1997	Private

* - Volume: Small = <3,000,000 cubic yards (cy), Medium = 3,000,000 – 10,000,000 cy, Large = 10,000,000 – 50,000,000 cy, Long-Term = > 50,000,000 cy

** - Cost: Low = < $20/cy, Medium = $20 - $40/cy, High = > $40/cy

For the DMMP to be successful, these alternatives will need to be matched with the anticipated short-, mid- and long-term needs of the region. Table 4 shows the annual volume projections for the Port for the years 1998 to 2002 matched with the alternatives which may be suitable and available to meet this projected need. The volume projections are based on information from the PANY/NJ "MUDONE" database combined with NYD projected volumes generated from currently planned federal deepening projects (e.g., Kill Van Kull).

As shown on Table 4, the yearly range for material needing dredging varies from approximately three million cubic yards in 2002 to over six million cubic yards each in 1998 and 2000. Total amount of material to be dredged over the next five years is projected at 24,722,477 cubic yards. Of this amount, 15,653,777 cubic yards (or 63.3% of the total amount) is estimated to be unacceptable for ocean remediation. Currently, only three alternatives that are already permitted and available for use (i.e., LR-2, LR-3, and SP-4) can accept this material. Also, since these three alternatives have an available capacity of approximately 25% of the five-year projected need, additional alternatives need to be implemented in 1998 to avoid a shortfall.

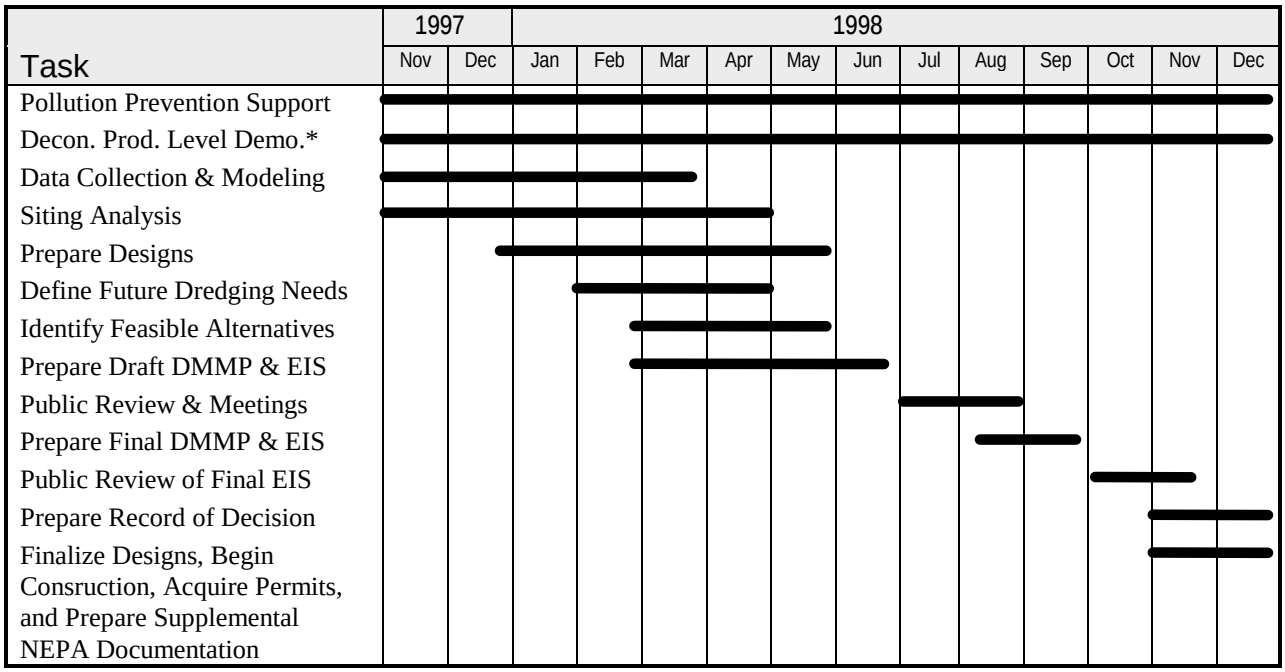
Among the alternatives, the only one with sufficient capacity and a relatively low estimated cost that can be implemented by year 1999 is confined aquatic disposal facilities (or subaqueous pits). The sub-channel pit option of CAD facilities may be especially suited to meet this need. Since they would be located in areas already impacted by navigation activities and may be implemented in many localized regions of the Port, environmental and social concerns, which can halt or delay implementation, may be less than for other alternatives. However, this alternative, as with all other alternatives, must be fully investigated and evaluated before any decisions on its possible implementation can be made.

Table 4 – Short-Term Needs and Alternatives

	1998	1999	2000	2001	2002
Material Acceptable for Ocean Remediation (category I)					
Projected Volume Needing Dredging (cy)					
New York District, COE – Maintenance Dredging	2,082,000	482,000	752,000	639,000	291,000
New York District, COE – Deepening (i.e., new work) Dredging	0	533,000	324,060	1,076,640	449,900
Port Authority of NY/NJ	40,000	75,000	0	75,000	0
Others	381,000	438,000	535,100	456,000	430,000
TOTAL	2,503,000	1,528,000	1,611,160	2,246,640	1,179,900
Suitable Available Alternatives: ID Code/Volume Code (S, M, L, & LT), Cost Code (L, M, H)	➢ OR-1/LT, L ➢ HR-1/TBD,TBD ➢ HR-3/TBD,TBD	➢ OR-1/LT, L ➢ HR-1-8, TBD, TBD	➢ OR-1/LT, L ➢ HR-1-8, TBD, TBD	➢ OR-1/LT, L ➢ HR-1-8, TBD, TBD	➢ OR-1/LT, L ➢ HR-1-8, TBD, TBD
Material Unacceptable for Ocean Remediation (category II & III)					
Projected Volume Needing Dredging (cy)					
New York District, COE – Maintenance Dredging	1,415,000	846,000	829,000	1,079,000	831,000
New York District, COE – Deepening (i.e., new work) Dredging	0	1,205,728	2,165,164	1,059,250	659,250
Port Authority of NY/NJ	160,000	180,000	235,000	160,000	160,000
Others	2,193,685	622,700	1,168,000	397,000	288,000
TOTAL	3,768,685	2,854,428	4,397,164	2,695,250	1,938,250
Suitable Available Alternatives: ID Code/Volume Code (S, M, L, & LT), Cost Code (L, M, H)	➢ LR-1-3/S-M, H ➢ SP-1/L, L ➢ SP-4/S, M ➢ CD-1/TBD, TBD	➢ DP-1-6/TBD, M-H ➢ LR-1-5/S-LT, TBD-H ➢ UP-1/S, M ➢ SC-1-4/M-L, L ➢ SP-1-7/S-LT, L-M ➢ NS-1/M, M	➢ DP-1-6/TBD, M-H ➢ LR-1-6/S-LT, TBD-H ➢ UP-1/S, M ➢ SC-1-4/M-L, L ➢ SP-1-7/S-LT, L-M ➢ NS-1/M, M	➢ DP-1-6/TBD, M-H ➢ LR-1-6/S-LT, TBD-H ➢ UP-1/S, M ➢ SC-1-4/M-L, L ➢ SP-1-7/S-LT, L-M ➢ NS-1/M, M	➢ DP-1-6/TBD, M-H ➢ LR-1-6/S-LT, TBD-H ➢ UP-1/S, M ➢ SC-1-4/M-L, L ➢ SP-1-7/S-LT, L-M ➢ NS-1/M, M ➢ CI-1/LT, L

For the alternatives being developed by the NYD, Table 5 below outlines the schedule for preparing the final DMMP report, accompanying EIS, and subsequent tasks.

Table 5: Schedule for Completion of the DMMP



* USEPA lead with NYD support

In developing the regionally supported final DMMP Report, many alternatives and opportunities are potentially available to meet the Port's short-, mid-, and long-term dredging needs and environmental restoration goals. In cooperation with other stakeholders, the USACE is committed in playing an active role in the following efforts:

- Conduct Data Management for the Contaminant Assessment and Reduction Project.
- Assist USEPA in the investigation and production-level demonstration of decontamination and treatment technologies.
- Identify and develop upland and aquatic beneficial uses of dredged material (with and without prior treatment, as applicable).
- Refine site locations and designs of upland and aquatic CDFs.
- Prepare a comprehensive Environmental Impact Statement.
- Develop with the regional stakeholders the final DMMP Report.

With the preparation of the EIS, the public will be afforded several opportunities for involvement and input to the process of developing a regionally supported DMMP. This effort will also be closely coordinated with other involved federal, state and local agencies. Development of the final DMMP with the regional stakeholders has the goal of identifying the alternatives or methods, which, upon implementation, federal and non-federal navigation in the Port can be developed and maintained for at least the next twenty years. Not all efforts (e.g., preparation of final designs) may be completed by the issuance of the final DMMP. However, the final DMMP and accompanying EIS will have sufficient information to evaluate and determine which alternatives and sites are technically feasible and supported by the stakeholders of the region.