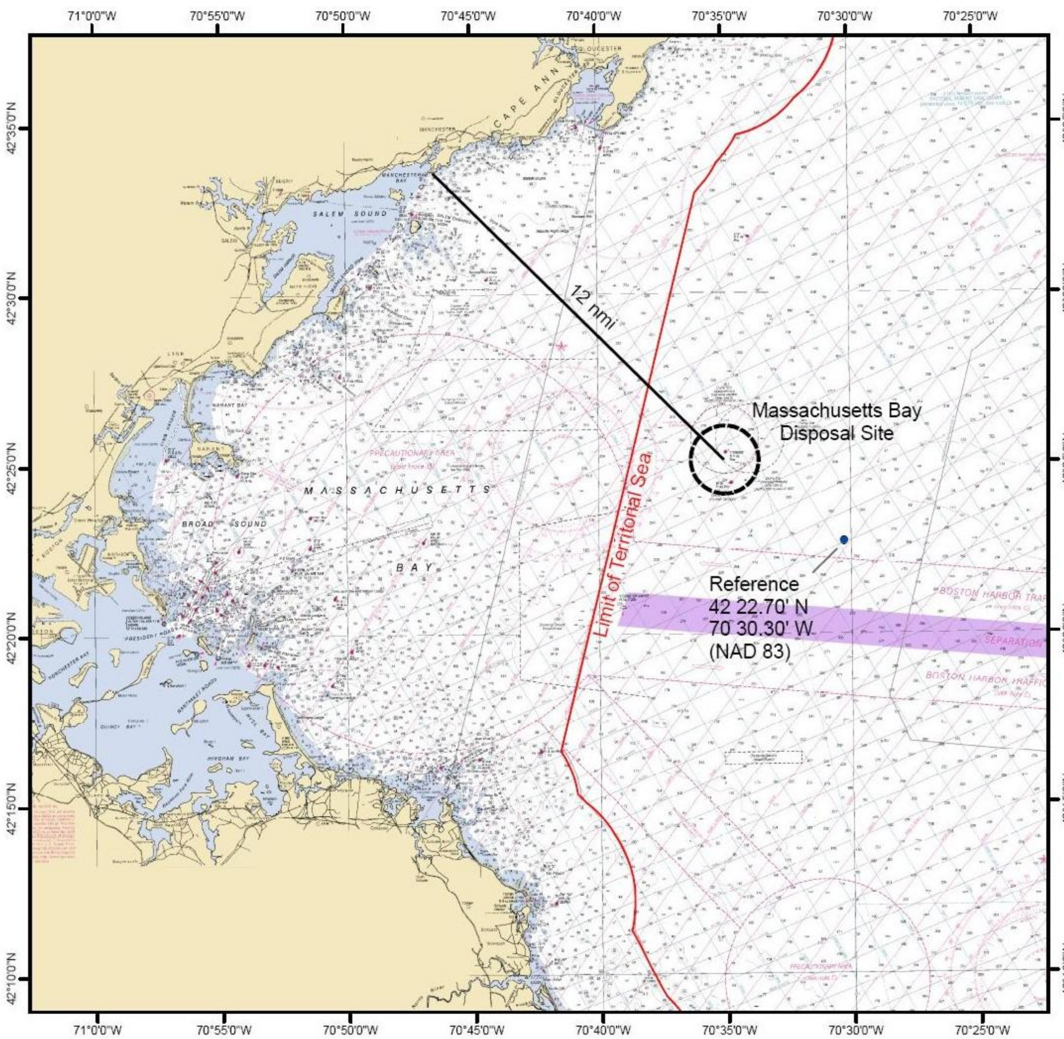
MASSACHUSETTS BAY DISPOSAL SITE

SITE MANAGEMENT AND MONITORING PLAN

FINAL NOVEMBER 2 2009



EPA United States Environmental Protection Agency New England

US ARMY CORPS OF ENGINEERS
New England District

TABLE OF CONTENTS

ACRONYMS AND KEYWORDS

AIS	Automatic Identification System
ANOVA	Analysis of Variance
CAD	Confined Aquatic Disposal
CFR	Code of Federal Regulations
CPUE	Catch per Unit Effort
CWA	Clean Water Act (Federal Water Pollution Control Act)
CY	cubic yards
CZM	Coastal Zone Management
DAMOS	Disposal Area Monitoring System
DDT	1, 1, 1-trichloro-2, 2-bis (p-chlorophenyl)ethane
DEIS	Draft Environmental Impact Statement
DMMP	Dredged Material Management Plan
DMSMART	Dredged Material Spatial Management Record Tool
DO	dissolved oxygen
EIS	Environmental Impact Statement
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
EPA NE	U.S. Environmental Protection Agency New England
EPA Region 1	U.S. Environmental Protection Agency Region 1
ESA	Endangered Species Act
IWS	Industrial Waste Site
LNG	Liquefied Natural Gas
MA DEP	Massachusetts Department of Environmental Protection
MA DMF	Massachusetts Division of Marine Fisheries
MA CZM	Massachusetts Coastal Zone Management Office
MBDS	Massachusetts Bay Disposal Site
MCY	million cubic yards
mg/L	milligrams per liter
mg/kg	milligrams per kilogram
MPRSA	Marine Protection, Research, and Sanctuaries Act of 1972
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NAD83	North American Datum 1983
NAE	US Army Corps of Engineers New England District
nm	Nautical Mile
NMFS	National Marine Fisheries Service (aka NOAA Fisheries Service)

NE RDT	New England Regional Dredging Team (Sudbury Group)
NEG	Northeast Gateway
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council
OSI	Organism Sediment Index
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
ppb	parts per billion (= ug/g)
ppt	parts per thousand
pptr	parts per trillion
psu	Practical Salinity Unit
RDT	Regional Dredging Team
QA	Quality Assurance
RHA	Rivers and Harbors Act
RIM	Regional Implementation Manual
RPD	Redox Potential Discontinuity
SAIC	Science Applications International Corporation
SBNMS	Stellwagen Bank National Marine Sanctuary
SMMP	Site Management and Monitoring Plan
SPI	Sediment profile imaging
TBP	Theoretical Bioaccumulation Potential
TOC	Total Organic Carbon
TOY	Time of Year
TSS	Total Suspended Solids
USACE	U.S. Army Corps of Engineers
USACE-NAE	U.S. Army Corps of Engineers New England District
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service (Department of the Interior)
WRDA	Water Resources Development Act
wt	weight

1. INTRODUCTION

1.1 PURPOSE

The U.S. Environmental Protection Agency Region 1 (aka EPA New England) designated the Massachusetts Bay Disposal Site (MBDS) in 1993 (EPA Region 1, 1992; EPA Region 1, 1993), to meet the long-term needs of dredged material disposal in the Massachusetts Bay area. To ensure that ocean dredged material disposal sites are managed to minimize adverse effects of disposal on the marine environment, the Marine Protection, Research, and Sanctuaries Act (MPRSA) §102(c) as amended by §506(a) of the Water Resources Development Act (WRDA) of 1992 requires the completion of Site Management and Monitoring Plans (SMMPs).

This plan updates the SMMP completed in 1996 by EPA Region 1 (US EPA Region 1, 1996) in partnership with the U.S. Army Corps of Engineers New England District (USACE-NAE, or NAE). As part of this update, this document evaluates the site monitoring results and disposal activities from the previous twelve years, and outlines a management plan and monitoring program that complies with the requirements of the MPRSA. The SMMP serves as a framework to guide the development of future project-specific sampling and survey plans created under the monitoring program. The data gathered from the monitoring program will be routinely evaluated by EPA, NAE, and other agencies such as the National Marine Fisheries Service (NMFS) and state regulatory agencies (see sections 8 and 10) to determine whether modifications in site usage, management, testing protocols, or additional monitoring are warranted.

Only dredged material from Federal and private projects that satisfy the requirements of the MPRSA may be disposed of at the site. Each project must receive a permit issued by NAE under Section 103 of the MPRSA [33 USC 1413] with concurrence by EPA New England. In accordance with MPRSA §103(a) disposal activities at the site "will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities."

1.2 OBJECTIVES

As discussed in the Ocean Dumping Regulations at 40 CFR §228.3 and the guidance for development of site management plans issued by EPA and USACE[1], management of the site involves regulating the times, quantity, and physical/chemical characteristics of dredged material that is dumped at the site; establishing disposal controls, conditions and requirements; and monitoring the site environment to verify that unanticipated or significant adverse (or unacceptable) impacts are not occurring from past or continued use of the disposal site and that permit terms and conditions are met.

[1] EPA/USACE, 1996. Guidance Document for Development of Site Management Plans for Ocean Dredged Material Disposal Sites.

Thus, this SMMP has two overarching objectives:

- Management of disposal activities to ensure compliance with the MPRSA; and
- Monitoring of the disposal site to determine whether significant adverse (or unacceptable) impacts have occurred or are occurring.

If monitoring of the site detects significant adverse (unacceptable) impacts, changes in dredged material and/or disposal site management will be considered by NAE and EPA New England.

1.3 ORGANIZATION OF THE SMMP

The organization of this plan includes the six requirements for ocean disposal site management plans discussed in §102(c)(3) of the MPRSA, as amended. These are:

1) a baseline assessment of conditions at the site (Section 4);

2) consideration of the quantity of the material to be disposed of at the site, and the presence, nature and bioavailability of the contaminants in the material (sections 3 and 6);

3) special management conditions or practices to be implemented at each site that are necessary for protection of the environment (Section 7);

4) a program for monitoring the site (sections 5 and 8);

5) consideration of the anticipated use of the site over the long term, including the anticipated closure date for the site, if applicable, and any need for management of the site after closure (Section 6); and

6) a schedule for review and revision of the plan (which shall not be reviewed and revised less frequently than 10 years after adoption of the plan, and every 10 years thereafter) (Section 9).

1.4 STATE-WIDE DREDGED MATERIAL AND OCEAN PLANNING

The Commonwealth of Massachusetts recognizes the importance of water-dependent activities such as commercial fisheries, shipping, and energy infrastructure at developed port and harbor areas. Recreational industries (e.g. marinas) also rely on the utility of such areas. To ensure continued use, economic viability and safety of the region's navigational channels and navigation-dependent facilities, periodic dredging must be performed to remove accumulated sediment, or deepen existing channels to accommodate the next generation of deeper draft vessels. New England's largest port, Boston Harbor, is the hub for shipping in New England; over 15 million tons of containerized cargo was handled at the Port of Boston in both 2006 and 2007 (MassPort, 2008). Because of recent dredging in Boston Harbor, the MBDS has been the most active disposal site in New England averaging over 600,000 cubic yards per year in the last 15 years (Table 1).

Boston is not the only harbor area that is expected to utilize the MBDS. With funding from the Seaport Bond bill and in coordination with the USACE-NAE, the Massachusetts Coastal Zone Management office (MA CZM) recently developed dredged material management plans (DMMPs) for two important ports – Gloucester and New Bedford. These DMMPs focused on identifying upland or in-harbor disposal sites for dredged material deemed unsuitable for disposal at an ocean disposal site. In the Gloucester DMMP for example, the total volume of sediment to be dredged from Gloucester Harbor over the next 20 years was estimated at 514,440 CY. MA CZM estimated that about half of these sediments would be considered suitable for disposal at the MBDS (MA CZM, 2000). Because of the need to communicate technical issues regarding dredging projects among many state agencies, in 2005 the Commonwealth established the Massachusetts Dredging Team to coordinate dredging activities within the Commonwealth, and with the New England Regional Dredging Team (see below).

Further recognizing the need for coordinated and appropriate management of ocean resources, the Commonwealth established an Ocean Management Task Force in 2004 to develop recommendations for a comprehensive approach to managing ocean resources. The recommendations released in 2004 formed the foundation for the Oceans Act of 2008, which requires the Commonwealth to develop a stakeholder-driven ecosystem-based Ocean Management Plan that addresses the siting of energy infrastructure, identification of marine protected areas, and other conflicting uses of the coastal ocean. Although the jurisdiction of the Ocean Management Plan is in state waters only, it is possible that the implementation of this plan may have influence on dredged material disposal at the Massachusetts Bay Disposal Site, which is in Federal waters.

1.5 REVIEW AND CONSULTATION WITH OTHER FEDERAL AGENCIES

The New England Regional Dredging Team (NE RDT) is one of eleven national Regional Dredging Teams (RDTs) established to improve dredged material management by fostering communication and planning, and providing a forum for issue resolution, technical transfer, and community involvement. The Massachusetts Dredging Team coordinates directly with the NE RDT. We have requested that the Massachusetts Dredging Team review this plan.

In addition, we have submitted this plan to MA CZM for advice on whether the plan needs Consistency review. The Federal Coastal Zone Management Act of 1972 and 1976 amendments enabled states to develop comprehensive management plans for their coastal regions (subject to Federal approval). For all projects located in Massachusetts' coastal zone that involve Federal action such as funding, permitting, or licensing, a Massachusetts Coastal Zone Management Consistency Review is required to ensure that actions proposed within the coastal zone are consistent with state coastal policies.

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires the identification of Essential Fish Habitat (EFH) for federally managed fishery species and the implementation of measures to conserve and enhance this habitat. The MSA requires Federal agencies to consult with the NMFS on federal actions that may adversely affect EFH. We have submitted this plan to NMFS to determine whether this plan needs EFH consultation.

EPA has also requested that NMFS review this plan to determine whether an Endangered Species Act Section 7 consultation is necessary. NMFS routinely conducts ESA and ESF consultation on a project-by-project basis, not for management plans.

In addition, because the actions recommended in this plan are in the vicinity of the Stellwagen Bank National Sanctuary, this plan must comply with Section 304(e) of the MPRSA as amended, requiring consultation with the Stellwagen Bank National Marine Sanctuary office. This plan has been submitted to the SBNMS for review.

2. ROLES, RESPONSIBILITIES AND AUTHORITIES

The primary Federal environmental statute governing transportation of dredged material for the purpose of dumping it into ocean waters (seaward of the baseline of the territorial sea) is the Marine Protection, Research, and Sanctuaries Act (MPRSA, also called the Ocean Dumping Act, 33 USC 1401 et seq.). The MPRSA assigns authority to both EPA and USACE in managing disposal sites and issuing permits for ocean disposal.

2.1 FEDERAL REGULATORY/STATUTORY RESPONSIBILITIES

Under Section 103 (33 USC 1413) of the MPRSA, USACE is responsible for issuing permits for disposal of dredged material, subject to EPA review and concurrence. The EPA, however, is charged with developing ocean dumping criteria to be used in evaluating permit applications [MPRSA §102(a)]. Disposal must not "unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities". The ocean dumping regulations in 40 CFR Parts 227 and 228 provide a testing framework to apply these criteria and determine whether dredged material is environmentally acceptable (or suitable) for open ocean disposal. USACE is required to use EPA designated open-water disposal sites for dredged material disposal to the maximum extent feasible[2]. Proposed ocean disposal of dredged material also must comply with USACE permitting and dredging regulations in 33 CFR Parts 320 to 330 and 335 to 338.

Other primary authorities that apply to the disposal of dredged material in the United States are the Rivers and Harbors Act of 1899 (RHA), and the Water Resources Development Act (WRDA) of 1992 (and subsequent legislation). The RHA regulates dredging and discharge of material in navigable waters and WRDA addresses research and funding in support of specific water resource projects for various needs (i.e., transportation, recreation). WRDA also modifies other Acts, as necessary (e.g., MPRSA).

[2] If a designated disposal site is not feasible, the USACE can "select" an alternative ocean disposal site under Section 103 of the MPRSA for two successive five year periods.

2.2 SURVEILLANCE AND ENFORCEMENT

All dredging, dredged material transport, and disposal must be conducted in compliance with USACE permits issued for these activities. Under the MPRSA§105 (33 USC 1415), the EPA takes the lead in surveillance and enforcement responsibilities at the disposal site with assistance from the USACE and the U.S. Coast Guard (see 33 USC Sec 1417[c]). The permittee is responsible for ensuring compliance with all project conditions including placement of material at the correct location and within applicable site use restrictions. An example of permit conditions is included in Section 7.2.

Disposal locations are marked with a taut-wire buoy or specified coordinates to ensure that disposal locations are known and that post-disposal monitoring is effective. The USACE-NAE Disposal Area Monitoring System (DAMOS) Manager determines the specific location for disposal of dredged material at the site (see Section 7.3).

2.2.1 SILENT INSPECTOR

Certified and trained on-board inspectors have traditionally been used by the USACE-NAE for all disposal activities at ocean disposal sites. Beginning in 2009, however, an automated inspector system will replace human inspectors. This system, called Silent Inspector, is run by the USACE from the Mobile Alabama District office. SI is an automated disposal vessel monitoring system comprised of both hardware and software developed by the USACE. It consists of 1) government-furnished software developed through the U.S. Army Engineer Research and Development Center (ERDC), 2) on-dredge hardware owned or leased and operated by dredging contractors, 3) a centralized SI database, and 4) desktop SI software developed by ERDC. In 2008 SI was required on USACE Civil Works dredging projects using hopper dredges and scows for disposal operations. Beginning January 1, 2009, Silent Inspector was required for all dredging permits.

As deployed in New England, Silent Inspector will automatically monitor dredging parameters such as the location and tracking of the position of a scow as it heads to the disposal site, and the location at which dredged material is discharged – in real-time on a 24 hours/7 days a week basis in a standard format. This information is recorded onto an on-board computer where it is then available for download and review by the USACE for automatic transmittal to the appropriate USACE District office during permitted dredging and disposal operations. Desktop computer tools are available to examine the data and monitor compliance with the terms and conditions of USACE permits.

In addition, some of the larger dredging vessels will be equipped with the AIS (Automatic Identification System), which allow shipboard radar or electronic navigation charts to display identification and course of vessels in real time. Some shore-based facilities, such as the Stellwagen Bank National Marine Sanctuary Office in Scituate, MA can monitor AIS equipped vessels.

Because of the proximity of the MBDS to Stellwagen Bank, however, marine mammal observers will still be required on all disposal activities between February 1 and May 30 (See permit conditions in Section 7.2).

2.2.2 MONITORING

The USACE and EPA share responsibility for monitoring of the site and will use the SMMP to guide the monitoring at the site. Monitoring data from other agencies will be utilized as appropriate to maximize the availability of information at the site. Under MPRSA, EPA has the responsibility for determining if an unacceptable impact has occurred as a result of dredged material disposal at the site and for determining any modification to site use or de-designation. Such determinations, however, will be made in consultation with other agencies. The USACE and EPA share responsibility for developing any necessary mitigation plan.

Monitoring surveys at and near the site will be conducted periodically as available funding permits. The monitoring objective for each survey will be based on the SMMP, prior monitoring results and, if appropriate, recommendations of the New England Regional Dredging Team or Massachusetts Dredging Team.

3. BACKGROUND

3.1 LOCATION

The MBDS is a circular area 2 nautical miles (nm) in diameter and centered at 42° 25.1'N and 70° 35.0'W (all coordinates are in NAD83). It is located approximately 10 nm south-southeast of Eastern Point in Gloucester (MA), 12 nm southeast from Gales Point (Manchester, MA) and 18 nm from the entrance to Boston Harbor (Figure 1). It is located in 90 to 100 meters of water in a deep basin called Stellwagen Basin, directly west of Stellwagen Bank, an underwater glacial moraine that rises to 50 meters of the surface within 3 nm of the disposal site. Because of its importance to fish and marine mammal habitat, Stellwagen Bank was designated a National Marine Sanctuary in 1992. The reference area for the disposal site is located at 42° 22.70'N and 70° 30.30'W, about 4 nm southeast in a relatively undisturbed area of Stellwagen Basin. This reference area was selected in 1993 when the disposal site was designated because sediments were determined to reflect similar grain size to the disposal site and sediment chemistry reflected unimpacted conditions (EPA Region 1, 1996). Sediments from the reference area are used to evaluate dredged material for disposal at the disposal site and as a point of comparison to identify potential effects of contaminants in the dredged material.

3.2 BRIEF HISTORY OF DISPOSAL AT THIS SITE

The MBDS overlaps with two other historical disposal sites: the Industrial Waste Site, or IWS, which was employed from the 1940s until 1977 and the interim MBDS, which was used from

1977 to 1992 (Figure 2). The IWS is a 2 nautical mile (nm) diameter circle centered at 42° 25.7'N, 70° 35.0'W and the interim MBDS is a two nm diameter center circle centered about 0.75 nm east, at 42° 25.7'N, 70° 34.0'W.

In 1977, the EPA's ocean dumping regulations (40 CFR §228.12) established the interim dredged material disposal site (interim MBDS). In 1993, the EPA officially designated the MBDS, reconfiguring the boundaries to overlap with both the IWS and the interim MBDS, avoiding part of the IWS with a high concentration of industrial waste barrels (see below) and the newly designated Stellwagen Bank National Marine Sanctuary, or SBNMS (EPA Region 1, 1992 and 1993). In the Final Record of Decision, EPA specified that this location was the best alternative because of its historical use, its avoidance of the SBNMS, and it is in an area of sediment accumulation, so disposal mounds are not expected to suffer erosion. Since 1977, only dredged material has been disposed at the interim MBDS and the MBDS.

The history of disposal at the IWS and the interim MBDS is outlined in more detail in Site Evaluation studies (Hubbard *et al.*, 1988), the Draft EIS for Designation of the Site (EPA, 1989), baseline monitoring surveys (SAIC, 1994a and b), studies of the IWS (Wiley *et al.*, 1992; NOAA, 1996), and the 1996 SMMP (EPA Region 1, 1996). Briefly, the IWS was routinely called the "Foul Area", because the material on the bottom "fouls" or damages commercial fishing nets. From the 1940s to 1977 dredged material, construction debris, barreled industrial and medical waste, encapsulated low-level radioactive waste, munitions, and intentionally sunken derelict vessels were dumped in the general area of the IWS. Most of the wastes appear to be in 55, 30 or 5 gallon drums, currently located in the northwest quadrant of the IWS (in an area around the coordinates 42° 26.4'N, 70° 35.4'W), or dispersed around the northern perimeter up to 0.5 nm outside the IWS (Wiley *et al.*, 1992). Few drums are found away from the IWS[3]. Dumping of industrial waste was terminated in 1976 and the IWS was formally de-designated on February 2, 1990.

Because of this area's past use as a dumping ground, NMFS closed the IWS to harvesting surf clam and ocean quahogs in 1980. In 1992, the Food and Drug Administration (FDA) and NMFS reissued this advisory, recommending a note be put on nautical charts, and advising all commercial and recreational fishermen to avoid harvesting bottom dwelling species from the area, including the MBDS (NOAA, 1996). There is, however, some evidence of trawling activity within the site (Valentine *et al.*, 1996).

3.3 BUOY LOCATIONS

Disposal of dredged material prior to 1977 was generally at the northern edge of the IWS and corresponding to the general area of most of the waste drums identified on the bottom. From 1975 to 1985 disposal was centered in the middle of the IWS, now the northern part of the MBDS. During this period, disposal buoys were moored typically with a long scope which contributed to disposal of dredged material over a wide area. This old disposal mound, formed at

[3] Several studies using side scan sonar and sediment profile imaging (e.g. Keith et al., 1992; SAIC, 1994c) have been conducted to determine whether containers were disposed more inshore of the IWS, but none of these surveys have documented presence of containers.

the location of the old “BFG” buoy from 1975 to 1985 (see the 1996 SMMP for locations and names of former buoys) is slightly visible in Figure 2.

In November 1985, a taut-wired disposal buoy called MDA, maintained by NAE, was deployed near 42° 25.1'N, 70° 34.45'W in the southwestern quadrant of the interim MBDS (Hubbard *et al.*, 1988). Although the new MBDS was reconfigured in 1993, the buoy was not moved at that time. This buoy and all subsequent taut wire buoys have provided greater precision in disposal, and defined mounds on the bottom have resulted.

Mound A was formed from dredged material disposal through 1994 at the MDA buoy and is clearly seen (Figure 3) in an acoustic survey of the sea floor in 1996. This figure is based on composite images in which backscatter and sun-illuminated images have been combined to show the composition of the sea bed and the topographic relief. Sun-illumination is from the north. Blue represents low backscatter mud of Stellwagen Basin, and orange represents high backscatter gravelly sand and cobbles and boulders of Stellwagen Bank. Green represents moderate backscatter deposits of dredged material and similarly reflective materials on many of the higher geologic pinnacles. The green mound in the middle of the image is located at the disposal point being used during that time period. Red represents very high backscatter deposits of rock debris from the excavation of the Ted Williams Tunnel beneath Boston Harbor.

In addition to a sediment dredged material disposal buoy, a Rock Reef Site (called the Rock Disposal Location in the 1996 SMMP) was established in 1991 specifically for disposal of rocks generated from downtown Boston's "Central Artery/Third Harbor Tunnel" and two other smaller projects. The purpose of this disposal was to provide habitat diversity over a homogeneous silty sand substrate at the western edge of Stellwagen Bank (SAIC, 2004). This location (which was marked only by coordinates, and not by a buoy) was in the northeast quadrant of the interim MBDS (about 500 meters outside of the new MBDS), on the slope of Stellwagen Bank at the coordinates 42° 26.5'N, 70° 34.0'W at 50 m depth (Figures 2 and 3). This location is now outside the current boundary of the MBDS and will not be used for future disposal.

Since 1994 the buoy, renamed as the MBDA buoy, has been moved to create a ring of defined disposal mounds surrounding a shallow depression in the northeast quadrant of the site. The purpose of this strategy is to construct a boundary of a “containment cell” that would potentially limit the lateral spread of future dredged material (ENSR, 2005). Six mounds have been created, Mounds A to F and CHCP (Cohasset Harbor Capping Project), revealed in Figures 4 and 5 based on bathymetry collected in 2004.

3.4 ESTIMATED QUANTITY OF DREDGED MATERIAL DISPOSED IN LAST 15 YEARS

Because of the recent navigation improvement dredging in Boston Harbor, MBDS has been the most active disposal site in New England. From 1994 to 2008, over 700,000 cubic yards have been disposed at the MBDS on an annual basis (over 10.5 million cubic yards in total; Table 1). In addition to Boston Harbor, the dredged material has come from a number of harbors, rivers and channels from Cape Ann to Plymouth, MA some of which are industrialized, such as Salem and Weymouth, MA. By far the most dredged material disposed at MBDS comes from Boston

Harbor and this trend is expected to continue. Below is a recent history of major dredging projects in Boston Harbor.

1992 to 1993: About 1.5 million cubic yards of sediment (primarily Boston Blue Clay) and blasted rocks from the Central Artery/Third Harbor Tunnel (now called the Ted Williams Tunnel) project were disposed at the MDA buoy and the Rock Reef Site.

1997 to 2001: Over 300,000 cubic yards of soft surface sediment material and bottom clays from Fort Point Channel in downtown Boston was dredged for the Central Artery/THT project. Unsuitable material was disposed at Spectacle Island, and the remaining clean material (mostly clays from parent material) was disposed at the MBDS (SAIC, 2002).

1997 to 2000: Over 2 million cubic yards of sediment and clean parent material ("Boston Blue Clay") from the inner harbor was dredged as part of the Boston Harbor Navigation Improvement Project (BHNIP) and disposed at the MBDS. Confined Aquatic Disposal (CAD) cells were constructed within the Mystic and Chelsea rivers and inner harbor to contain approximately one million cubic yards of unsuitable material contaminated with metals and organic compounds (ENSR, 2007).

1998 to 2000: The US Army Corps of Engineers New England District conducted a demonstration project to evaluate the feasibility of capping a discrete mound of sediment on the seafloor of the MBDS. Two distinct types of dredged material, one from Cohasset Harbor, and "capping material" from the Chelsea River, were dredged and sequentially disposed at a location within the MBDS in an area removed from the ongoing mounds in the center of the disposal site. The Cohasset Harbor Capping Project (CHCP) mound was centered at about 42° 24.45'N and 70° 34.73'W in the southern part of the MBDS and received about 74,250 cubic yards of sandy silt and clay material from Cohasset Harbor, and about 201,900 cubic yards of acceptable material, mostly clumps of Boston Blue Clay and sand and gravel, from the Chelsea River as part of the BHNIP. Results of several surveys using side scan sonar, bathymetry and sediment cores determined that the capped material appeared to sufficiently cover the "unsuitable" material (SAIC, 2003)[4].

2004 and 2005: Approximately 1.1 million cubic yards of maintenance material was removed from the Broad Sound North Channel, President Roads Channel and Anchorage and portions of the Main Ship Channel in the outer harbor (USACE/MassPort, 2006).

2008: Over 1,700,000 cubic yards of material were dredged in the inner harbor as part of the Boston Harbor Navigation Improvement Program. About 900,000 cubic yards were disposed at Mound F and about 800,000 cubic yards were disposed at the demonstration site in the western part of the MBDS (see section 6.1).

[4] Unsuitable material is prohibited from disposal at the MBDS. See section 6.3.

Table 1. Estimated volume and sources of dredged material for disposal mounds at MBDS since 1994. Sources: SAIC, 2002; SAIC, 2003; Tom Fredette, NAE, on October 7, 2008 (NAE, 2008) and October 19, 2009.

Mound formed	Disposal Years	Estimated Volume (cubic yards)	Dredged material locations	Type of dredging and sediment classification	Source of data
B	1994 to 1998	1,110,871	BHNIP, marine terminals and surrounding communities	Boston Blue Clay	SAIC, 2002
C	1998 to 1999	1,802,230	BHNIP, marine terminals and Central Artery/Third Harbor Tunnel (e.g. Fort Point Channel)	Boston Blue Clay	SAIC, 2002
Capping Demo Project (CHCP)	1998 to 2000	257,350	Cohasset Harbor Chelsea River parent material	Parent material	SAIC, 2003
D	1999	504,860	BHNIP, marine terminals and CA/THT	Boston Blue Clay	SAIC, 2002
E	1999	981,150	BHNIP, marine terminals and CA/THT	Boston Blue Clay	SAIC, 2002
F	2000	674,075	BHNIP Hull Harbor Winthrop Harbor Saugus River Hingham Bay	Excludes disposal at Cohasset Harbor Capping Demo site	NAE, 2008
F	2001	127,125	Hull Harbor Quincy Bay Chelsea River		NAE, 2008
F	2002	333,800	Scituate Harbor	Maintenance dredging	NAE, 2008
F	2003	35,050	Port Norfolk Yacht Club, Neponset River		NAE, 2008
F	2004	767,900	Boston Harbor	Maintenance dredging in outer harbor	NAE, 2008
F	2005	1,379,585	Boston Harbor	Maintenance dredging in outer harbor	NAE, 2008
F	2006	408,149	Salem Harbor Weymouth Fore River		NAE, 2008
F	2007	355,999	Weymouth Fore River Salem Harbor		NAE, 2008
F and demo site	2008	1,780,586	Boston Inner Harbor Danvers Harbor		NAE, 2008, 2009
Totals		10,518,730			

Figure 1. General Location of the Massachusetts Bay Disposal Site (MBDS), about 12 nm southeast of Gales Point (Manchester), MA. Reprinted with permission from USACE-NAE. The reference area is also displayed.

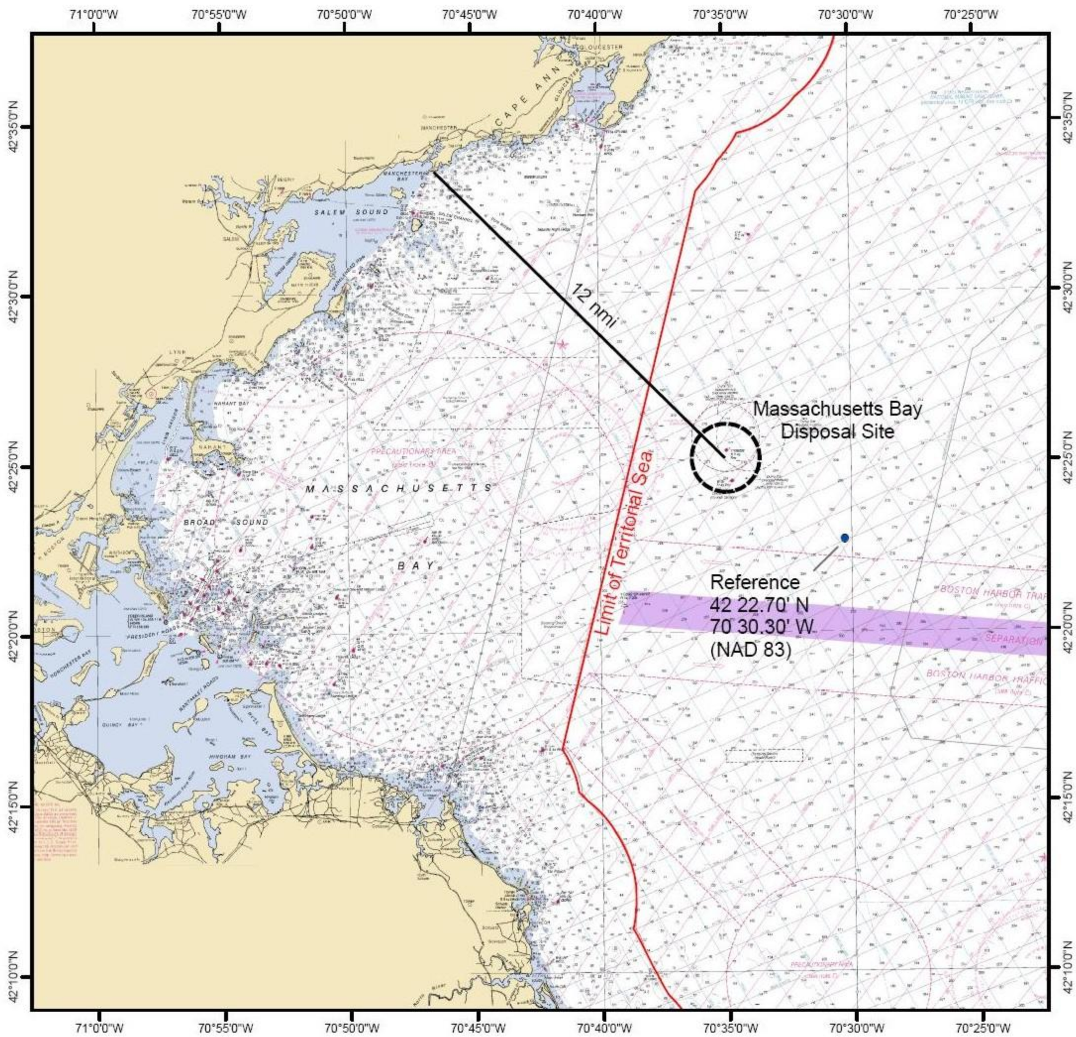


Figure 2. Location of Massachusetts Bay Disposal Site (Black circle) in relation to the Interim Massachusetts Bay Disposal Site (Blue circle) and Industrial Waste Site (Red circle). Base map source: Sun-illuminated backscatter topography of Massachusetts Bay Disposal Site, with Industrial Waste Site and interim MBDS identified, Butman and Lindsay, 1999.

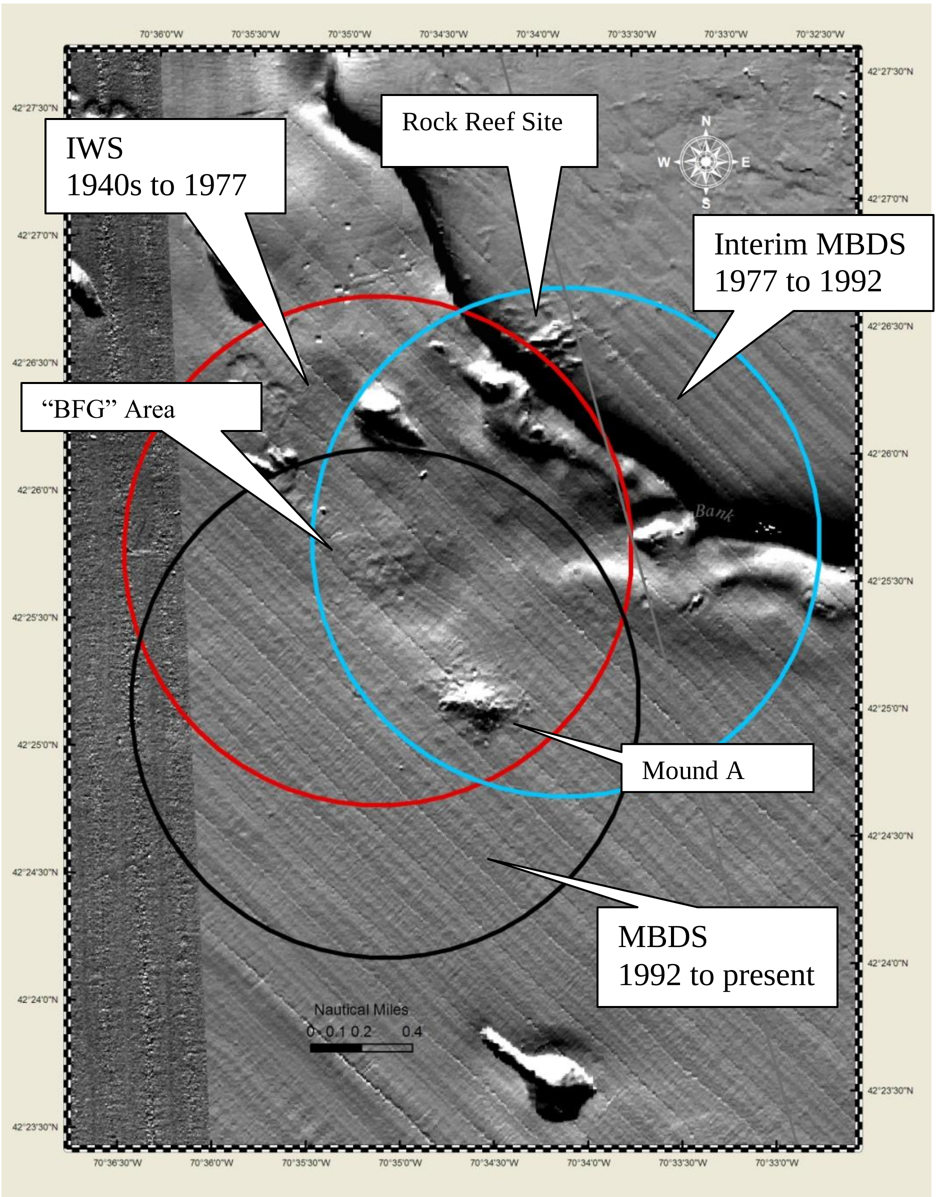


Figure 3. Backscatter image of Massachusetts Bay Disposal Site created from multibeam bathymetric data in 1996. Note that in this image, the "mound at the active disposal point" is Mound A formed from 1985 to 1996 and the "mound at the old disposal site" is the old "BFG" area. These mounds are also visible in some of the images generated by USGS (see Figure 2). This is the location for disposal from 1975 to 1985. Source: Valentine *et al.* (1998). The *approximate* boundary of the current MBDS has been placed on this image.

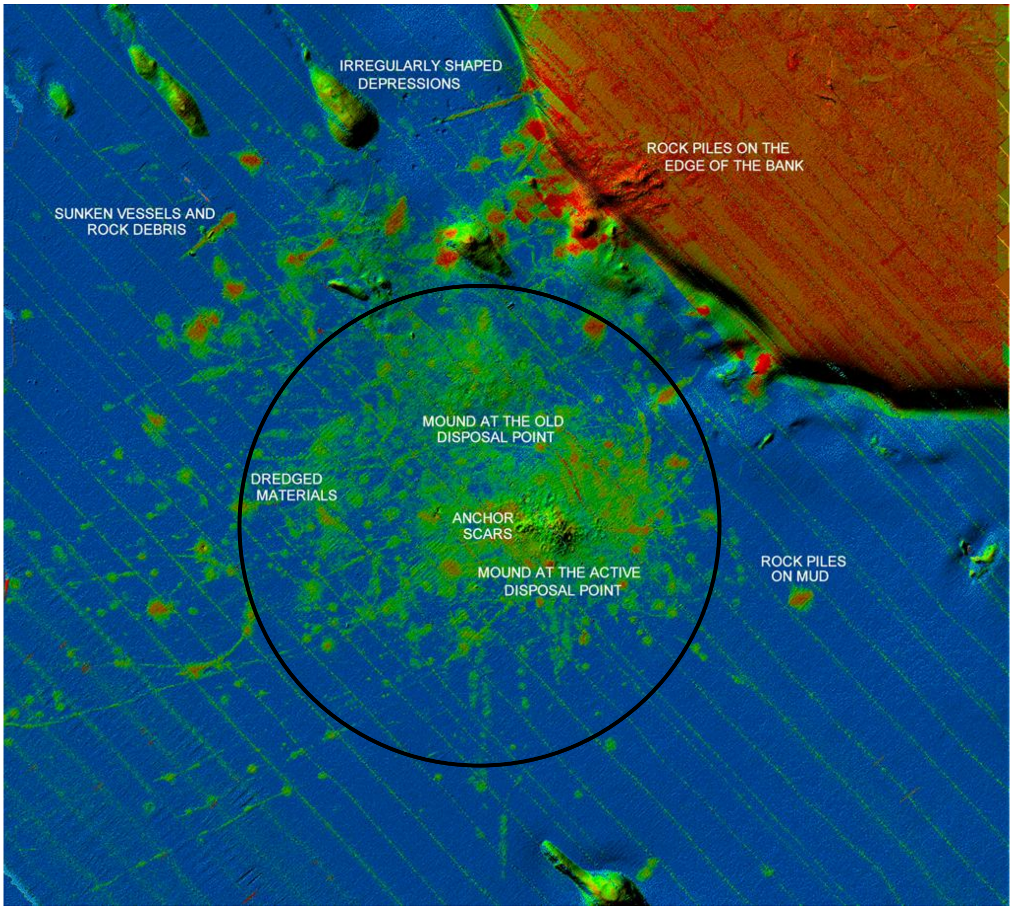


Figure 4. Bathymetric contour map of MBDS survey area, September 2004 (2-m contour interval) showing disposal buoy positions between 1993 and 2004 and resulting disposal mounds formed on the MBDS seafloor. Source: ENSR, 2005. Reprinted with permission.

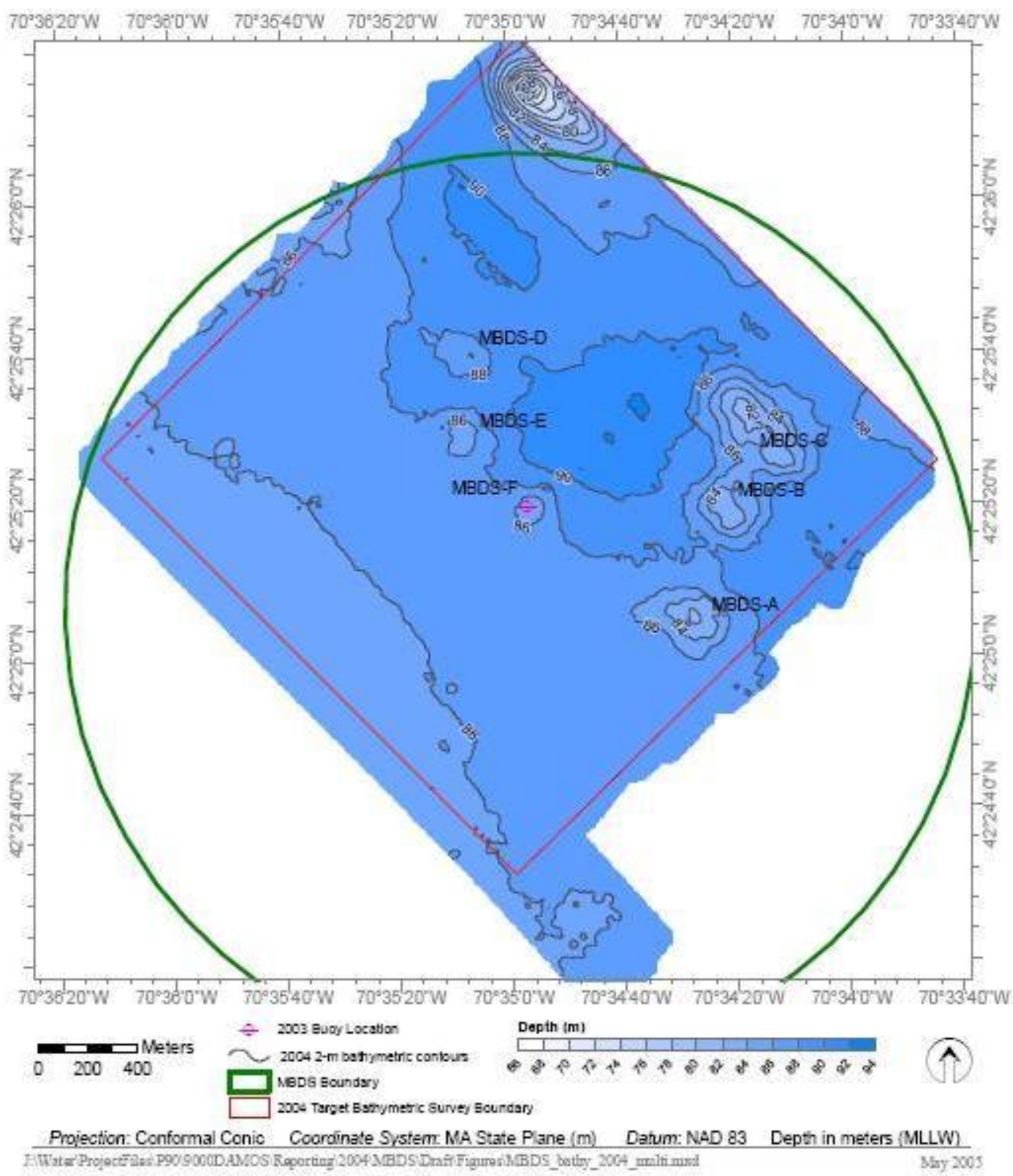
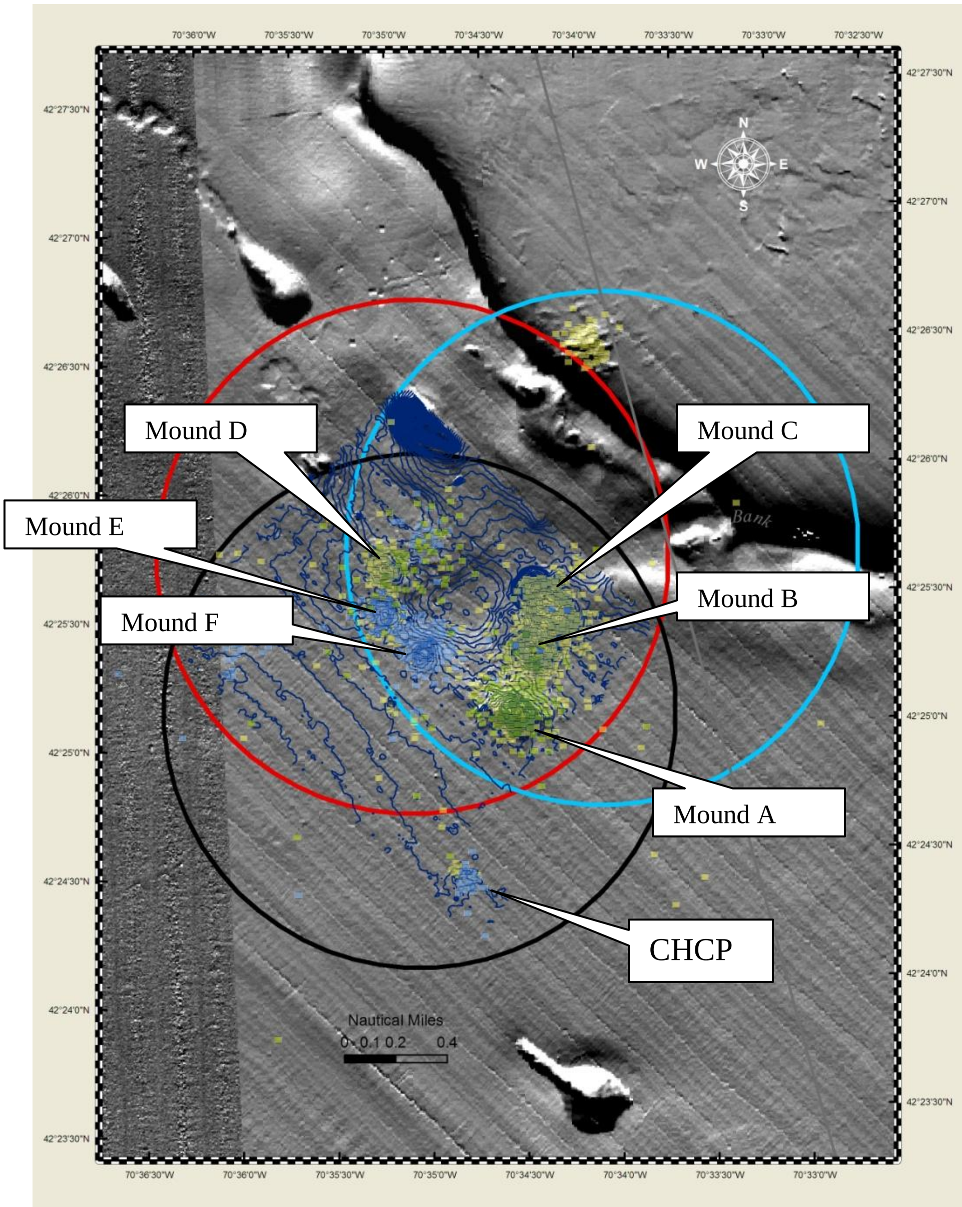


Figure 5. Locations of disposal events in MBDS from 1984 to 2007 (shown as green dots) overlain on bathymetry of MBDS determined in 2004 using a narrow beam echosounder (shown by the blue contours at 0.5 meter intervals). The solid blue area near the northern intersection of black and blue circles is a natural topographic high (drumlin) shown in Figure 2. Source of data: personal communication from Stephanie Wilson, ENSR based on coordinates from NAE scow logs and bathymetry from ENSR, 2005.



4. BASELINE ASSESSMENT

4. 1 GENERAL PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERISTICS

Much of the basic physical, chemical, and biological characteristics of the MBDS have been evaluated and described in previous documents, such as Hubbard *et al.* (1988), EPA Region 1 (1989) and Butman *et al.* (1992) and summarized in the 1996 SMMP (EPA Region 1, 1996). Recent studies by the MWRA, USGS, NOAA and EPA (respectively Hunt *et al.*, 2006, Bothner and Butman 2005 and 2007; NOAA NCCOS, 2006; Liebman and Brochi, 2008) corroborate many of these observations, and provide additional information.

4.1.1 PHYSICAL SETTING AND CIRCULATION

The Massachusetts Bay Disposal Site lies in 90 to 100 meters of water in the northwest corner of Stellwagen Basin -- a large depression within Massachusetts Bay separated from the Gulf of Maine by Stellwagen Bank, a sand and gravel underwater shelf which rises to the east to within 50 meters of the surface (Figure 6). From side scan sonar and bathymetry images, the bottom is generally flat with a small circular depression in the northeast quadrant of the site and a glacial knoll at the northern boundary. Within 1,000 meters of the northeast edge are the steep flanks of Stellwagen Bank. Because of the topography of the bank, nutrient rich deep water mixes with shallower bank water resulting in heightened seasonal productivity and a rich fishing area. Stellwagen Bank is habitat, feeding ground, and a nursery area for 22 species of marine mammals, 34 species of seabirds, and over 80 fish species (NOAA NMSP, 2008).

Because of the semi-enclosed geometry of Massachusetts Bay caused by Stellwagen Bank and Cape Cod, local bottom currents are relatively slow, averaging about four to seven cm/second. Modeling and measurements of bottom circulation in Stellwagen Basin during storm events from the northeast suggest that bottom currents would increase to 30 cm/sec over a short period of time (i.e. one to two days once every four years or so). These flows are not high enough to cause significant resuspension of dredged material; only a small portion of the non-cohesive silty sediments are expected to be resuspended under these conditions. MBDS is located in an area of Massachusetts Bay most buffered from the effects of winter storms (Butman *et al.*, 2004). Based on hydrodynamic and sediment transport modeling of Massachusetts Bay, the MBDS is in a depositional area (Figure 7). Fine-grained sediments accumulate after transport by storm-driven wind and circulation patterns (Bothner and Butman, 2007). Based on vertical profiles, sediments accumulate at about 0.1 to 0.2 cm/year (Wade, 1989).

Figure 6. Topography of Massachusetts Bay, in shaded relief view, colored by water depth, based on multibeam surveys and the NOAA Coastal Relief Model. The image accentuates small features that could not be effectively shown by contours alone at this scale. From Bothner and Butman, 2007. Reprinted with permission.

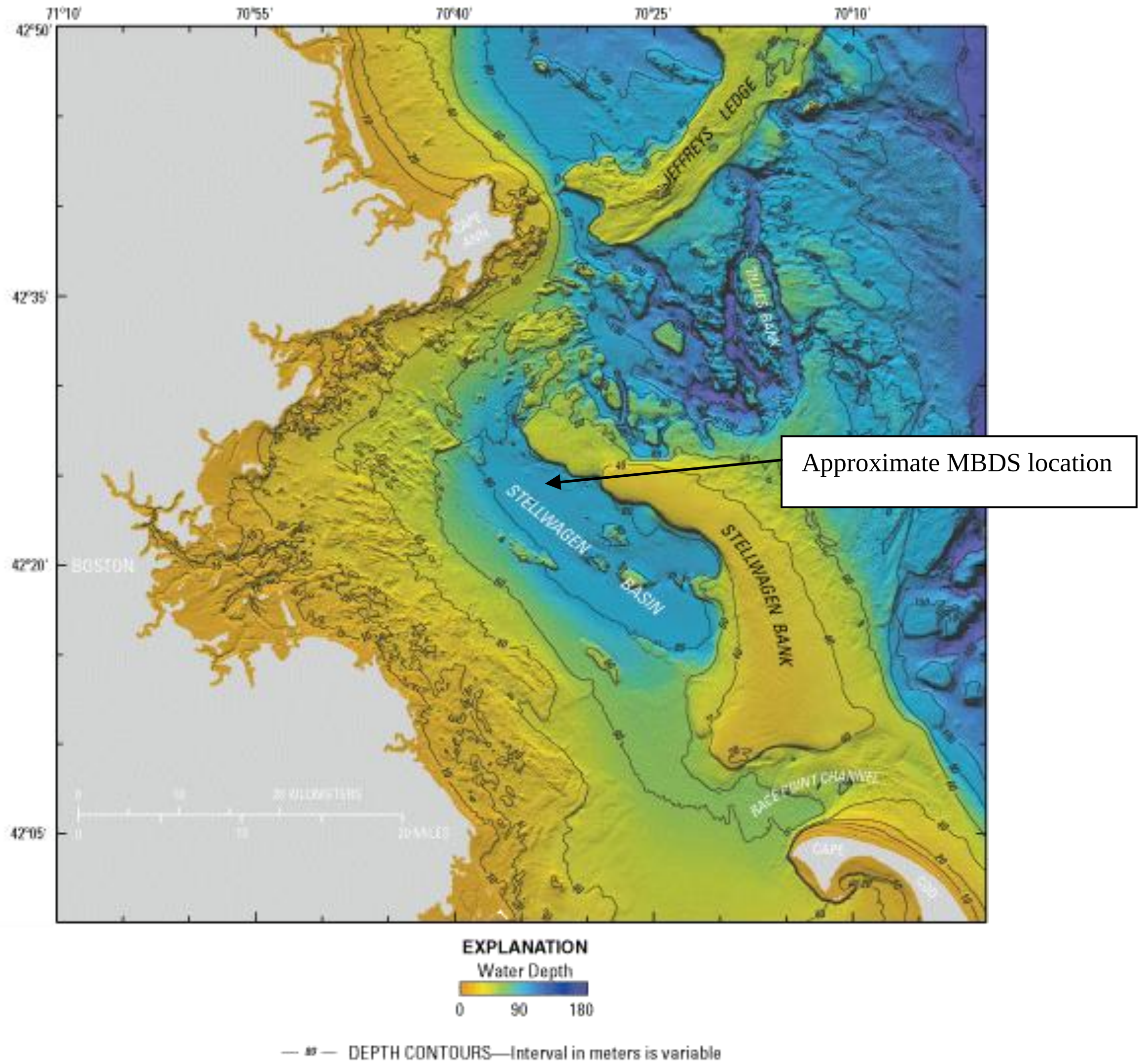
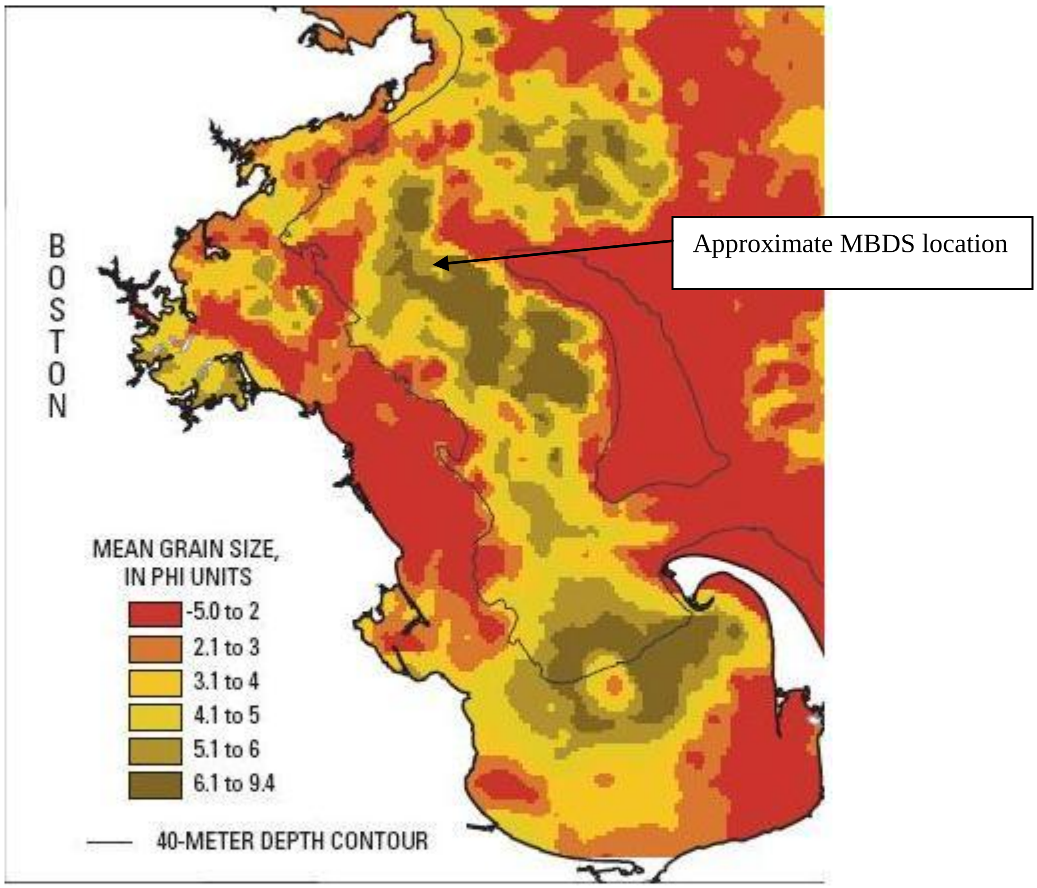


Figure 7. Observed surficial sediment grain size distribution in Massachusetts Bay. The MBDS is in an area of 5 to 6 phi units, which is considered medium silts (larger phi units are associated with finer sediments). From Figure 6.5 in Bothner and Butman, 2007, based on Poppe, 2003. Reprinted with permission.



4.1.2 SEDIMENT CHARACTERISTICS

The most common grain size at the MBDS and surrounding area is silty-sand, with a mean phi size of 4 to 5 but ranging from 3 to 7. Recent observations of the sediments in the disposal mound and reference areas undisturbed by dredged material disposal ranged from about 75 to 90% silt-clay (Liebman and Brochi, 2008).

Marine sediments in general are characterized by an oxidized surface later that transitions to a redox potential discontinuity (RPD) to the underlying anoxic sediments. The RPD denotes the depth where chemical reduction/oxidation (redox) potentials decrease rapidly, in some areas to negative values. The aerobic sediments above this zone are generally supportive of diverse benthic organisms, while the anaerobic sediments below are generally less diverse. For sediment unaffected by dredged material at the MBDS, apparent RPD depths (measured using the sediment profile camera) range from two to seven cm with a majority in the four to six cm range. Areas with freshly disposed dredged material typically exhibit shallower apparent RPD depths (0.5 to 2 cm) than fully recolonized mounds or reference areas (SAIC, 1990b, SAIC, 1994a). Measurements of total organic carbon (TOC; a measure of organic matter content) in reference areas range from 2.5 to 3.2%, but on dredged material mounds with the presence of cohesive clumps of clay material, TOC ranges from 0.5% to 2.5%, with a mean of about 1.0% (Hubbard *et al.*, 1988, SAIC, 1990b, SAIC, 1994a, Liebman and Brochi, 2008).

Benthic nutrient and sediment oxygen measurements at a station in Stellwagen Basin exhibit “highly oxic conditions” and have not changed significantly in the last ten years (Tucker *et al.*, 2006). Compared to sediments collected in shallower waters in Massachusetts Bay which experienced a coarsening of grain size and decreases in organic matter, sediments collected from Stellwagen Basin showed little effects of the two significant storms in May 2005.

4.1.3 SEDIMENT CHEMISTRY

Because the MBDS is located in a settling basin, suspended sediments and associated (adsorbed) contaminants transported from regional sources can accumulate there (Bothner and Butman, 2005 and 2007). Vertical sediment profiles from cores in Stellwagen Basin reflect the long-term history of contamination in Massachusetts Bay (Wade *et al.*, 1989). Sediment contamination at the MBDS, however, is likely attributed to historic disposal of dredged material.

Monitoring prior to 1996 reveals the history of disposal at the MBDS and the IWS. Historical use of the old “BFG” buoy area and the IWS resulted in 1) slightly elevated toxicant levels and bioaccumulation in sediments west of the old "BFG" buoy (Station 12-3 in SAIC, 1997) and in the IWS (EPA Region 1, 1996), and 2) elevated polycyclic aromatic hydrocarbon (PAH) and polychlorinated biphenyl (PCB) levels in lobster tomalley collected from the IWS and MBDS area (Hubbard et al., 1988; NOAA, 1996). Tissue burdens in edible fish, however, were low and do not appear to pose a human health risk. Levels of radionuclides in sediments and biota are not above background (NOAA, 1996).

Levels of trace metals, polycyclic aromatic hydrocarbons (PAHs), PCB congeners and pesticides were recently measured at the MBDS reference area, disposal mounds A, C and F, and the historically contaminated areas within the site near the old “BFG” buoy (also known as Station 12-3; Liebman and Brochi, 2008). Results from that survey indicated that contaminant levels at the reference areas are generally low but detectable (Figure 8). The values for trace metals and PAHs are generally at or below the level expected to cause a 25% probability of a toxic response according to the logistic regression model of Field *et al.* (1999, 2002). Sediment contamination levels were generally higher near the old “BFG” buoy or the adjacent depression, reflecting the influence of past disposal, but some samples at mounds C and F exhibited elevated levels (Table 2). The levels, however, are typically below the 50% probability of a toxic response according to the logistic regression model of Field *et al.* (1999, 2002). Levels of some pesticides (e.g. DDTs) and PCB congeners on the disposal mounds and historically disposed areas were also elevated compared to the reference areas, but generally at or below the 25% probability level of a toxic response (Liebman and Brochi, 2008).

Although some sediments exhibited elevated contaminant levels, sediments collected from historically contaminated areas within the disposal site, as well as from active disposal mounds, were not acutely toxic to amphipods as measured by the standard 10 day *Ampelisca abdita* acute toxicity test (Liebman and Brochi, 2008).

Figure 8. Box plot of sum of PAHs from sediments of three to five samples from each station type, including sediments collected from the Boston Harbor maintenance project (President Roads East and West). PR-reference is collected from the same reference area as the reference station in the 2006 survey (Ref). Source: Liebman and Brochi, 2008. Note that the term “Hotspot” refers to the old BFG area.

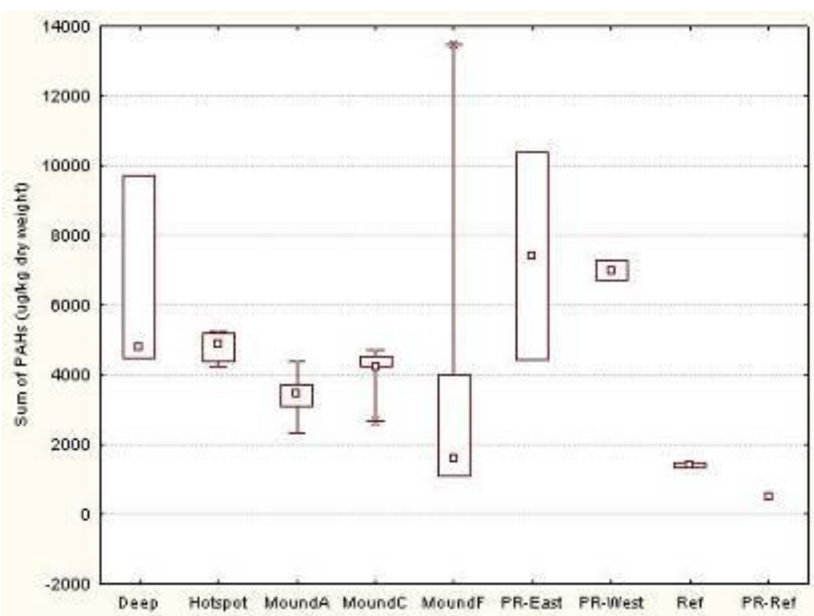


Table 2. Highest observed levels of metals (ug/g) and sum PCBs (ug/g) compared to sediment screening levels applied in US EPA, 2004. P25% and P50% are the concentrations that would give a 25% or 50% probability of a toxic response according to the logistic regression model of Field *et al.* (1999, 2002).

Analyte	Highest observed value (ug/g dry weight)	Mound or area	Highest observed median value (ug/g dry weight)	Mound or area	P25% (ug/g dry weight)	P50% (ug/g dry weight)
Arsenic	14	Ref	13	C	11.29	32.61
Cadmium	1.9	C	1.65	BFG	0.65	2.49
Chromium	170	C	150	Deep	76.00	233.27
Copper	87	C	75	Deep	49.98	157.13
Lead	75	C	66	Deep	47.82	161.06
Mercury	0.63	Deep	0.43	Deep	0.23	0.87
Nickel	34	F	30	F	23.77	80.07
Zinc	240	F	140	Deep	140.48	383.81
Sum PCBs	0.336	F	0.207	F	0.09	1.12
Sum PAHs	13.469	F	4.884	Deep	n/a	n/a
DDT	0.0057	F	0.002	BFG	0.004	0.03

4.1.4 BIOLOGICAL CHARACTERISTICS OF BENTHIC COMMUNITIES

Stellwagen Basin sediments are dominated by benthic infauna characterized by polychaetes and mollusks (EPA Region 1, 1996). At disposal sites in New England, benthic infauna generally recolonize new sediment and fresh dredged material in a relatively predictable sequence, characterized by three stages of succession (Rhoads and Germano, 1986). The first stage (or “sere”; Stage I) is dominated by small, opportunistic, tube-forming, capitellid, spionid, and paraonid polychaetes or oligochaetes which rapidly (i.e., within 1 to 2 weeks) colonize new disposal mounds and which do not penetrate into the sediments very deeply. These organisms are thought to be recruited to the new habitat from off the disposal mound. Stage II is dominated by deeper penetrating species, which include tubicolous amphipods (e.g., *Ampelisca abdita*), and mollusks, typically occurring 3-6 months after disposal has ceased. These taxa represent a more transitional stage, and they may or may not hold permanent positions in the long term benthic community structure. Stage III animals represent an "equilibrium" level, typified by deeper-dwelling, head-down deposit feeding species [e.g., maldanid (*Clymenella zonalis*) and pectinid polychaetes, holothurians, and nuculid bivalves (*Yoldia* spp.), and predatory polychaetes, such as *Nephtys incisa*]. This stage can also occur during the first year after dumping, but additional time for larval recruitment from off-site locations may be required. Some head-down deposit feeders are thought to be capable of migrating up through the fresh dredged material after a disposal event to maintain position in the sediment. It is common to find more than one successional stage present at any one location (e.g., a Stage I community coexisting above a Stage III community). Repeated disposal at one location in the site may keep the benthic community in a Stage I or II community; less frequent disposal may allow a Stage III community to develop. These communities can be "remotely" observed with a sediment profile imaging camera (see Section 5.3), but more accurate community analysis requires sieving, sorting and identification of all taxa in a grab sample.

4.1.5 WATER COLUMN CHARACTERISTICS

From May to October, the water column is typically stratified, with the pycnocline located at approximately 15 to 20 meters. Bottom water temperatures vary from about 3 to 5 °C. There is little exchange of water between the bottom waters of Stellwagen Basin and the surface waters of adjacent Stellwagen Bank, especially during the summer stratified period.

Recent studies conducted by the Massachusetts Water Resources Authority (MWRA) and the USGS have confirmed and supplemented many of the observations made in the early 1990s (Werme and Hunt, 2006; Bothner and Butman, 2005 and 2007). The MWRA has collected water quality and benthic samples near (about 2.5 and 3 nm respectively) the MBDS. These samples indicate that since monitoring began in 1992, average dissolved oxygen levels in the bottom waters of Stellwagen Basin rarely go below 6.5 mg/liter indicating excellent water quality (Libby *et al.*, 2006). Levels of nutrients (specifically nitrate) in surface waters of offshore Massachusetts Bay, however, have increased slightly over the last 12 years (Libby *et al.*, 2006). This increase has been seen regionally, and is not attributed to the discharge of the MWRA outfall in western Massachusetts Bay (or disposal of dredged material). Although these increases in nutrients are not associated with increases in annual chlorophyll levels in the Bay, there has been an increase in the incidence or duration of harmful algal blooms – specifically *Alexandrium*, and *Phaeocystis* -- in the last decade (Werme and Hunt, 2006; Libby *et al.*, 2006). The *Alexandrium* blooms in Massachusetts Bay have been strongly influenced by several “Nor’easters”, storms which brought significant amounts of cells into Massachusetts Bay in May 2005, and then again in May 2008. The causes of increased frequency and duration of the regional *Phaeocystis* blooms are not well understood.

4.1.6 EPIFAUNA AND FISHERIES

The 1996 SMMP (EPA Region 1, 1996) describes in detail important epifauna and fisheries at the MBDS. Dominant epifauna include brittle stars, and flatfish, such as the American plaice, plus commercially and recreationally important winter flounder, cod and spiny dogfish. Hard bottom species include bryozoans, sponges and tunicates (SAIC, 2004).

Based on recent spring and fall bottom trawls conducted by the Massachusetts Division of Marine Fisheries (MA DMF) in Massachusetts Bay, the most dominant (by weight and abundance) demersal fishery species observed in Massachusetts Bay near the MBDS are

American plaice, Atlantic cod, ocean pout, yellowtail flounder, spiny dogfish, red hake, haddock, American lobster, winter flounder, longhorn sculpin, silver hake, white hake, Atlantic herring, witch flounder, goosefish, and butterfish (King *et al.*, 2007).

Similarly, the bottom trawl surveys performed by NMFS (aka NOAA Fisheries Service) near the MBDS in Stellwagen Basin in the fall of 2005 and 2006 yielded similar demersal species dominated by spiny dogfish and American plaice (NOAA Fisheries Service, 2005, 2006). An additional species not observed in the MA DMF surveys was the Acadian redfish (*Sebastes fasciatus*) which is often observed among the barrels at the IWS (NOAA, 1996).

In recent years, researchers at NMFS and MA DMF began to observe a number of flounder with blind surface ulcers (surficial lesions) beginning in 2002 and 2003 (Moore *et al.*, 2005). These ulcers were observed only rarely prior to 2001. Surveys by the MWRA, in association with other agencies, and partly funded by the EPA New England, found continued prevalence of the ulcers in the spring, with the severity and incidence decreasing into the summer. The highest prevalence of ulcers was found in flounders collected in western Massachusetts Bay, but flounders collected in Stellwagen Basin also exhibited high prevalence (ranging from 10 to 40%). In-depth microbiological studies of the ulcer lesions to attempt to correlate specific organisms with the lesions suggest that bacteria, fungi or viral particles are not the primary agents in this syndrome (Moore *et al.*, 2005). It is hypothesized that prior insult to the dermis of the fish likely allowed the opportunistic and normal (indigenous) bacteria flora isolated from the ulcers to infect tissues but further studies are currently being conducted (Hunt *et al.*, 2006).

Although not caught commercially in high quantities, the semi-demersal northern sand lance (*Ammodytes dubius*) is important as food for marine mammals, such as the humpback and fin whales (NOAA NCCOS, 2006). Adult sand lance occur primarily in sandier sediments, preferring the sloping, gravel bottom edges of Stellwagen Bank, but larval and adult fish have been observed by submersible vehicles near the soft sediments of the MBDS (Hubbard *et al.*, 1988; NMFS, 1991).

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires the identification of Essential Fish Habitat (EFH) for federally managed fishery species and the implementation of measures to conserve and enhance this habitat. The list of species in essential fish habitat in Massachusetts Bay within which the MBDS lies is listed in Table 3.

4.1.7 MARINE MAMMALS AND SEA TURTLES

Several species of marine mammals regularly frequent the deeper open waters of Massachusetts and Cape Cod Bays as well as Stellwagen Bank, and there are rare sightings of sea turtles. Stellwagen Bank serves as a critical feeding ground for numerous whales. Of these species, NMFS believes the endangered Fin, Sei, Humpback, and Right whales, and the Leatherback sea turtle (endangered), Kemp’s Ridley (endangered) and loggerhead (threatened) turtles deserve special attention because they occur in the Stellwagen Bank area. The Endangered Species Act (ESA) requires the Federal government to designate "critical habitat" for any species it lists under the ESA. Northern right whales were listed in 1970. This species was relisted in March 6, 2008 to distinguish between North Atlantic right whales and North Pacific right whales. In 1994, critical habitat, including Cape Cod Bay, was designated for this species and NMFS is currently in the process of designating critical habitat for North Atlantic right whales. More information on marine mammals and sea turtles in this area is available at NOAA NCCOS, 2006.

Table 3. List of species with essential fish habitat in Massachusetts Bay within which the MBDS lies. This area is defined by a 10 minute by 10 minute square with a northeast corner located at 42° 30.0' N/70° 30.0' W and the southwest corner located at 42° 20.0' N/70° 40.0' W. Source: NMFS http://www.nero.noaa.gov/hcd/webintro.html accessed on September 16, 2008. EFH is listed for various life stages of each species. (X indicates EFH has been designated for that life stage, n/a indicates no data available or lifestage not present.)

Species	Eggs	Larvae	Juveniles	Adults
American plaice (*Hippoglossoides platessoides*)	X	X	X	X
Atlantic butterfish (*Peprilus triacanthus*)	X	X	X	X
Atlantic cod (*Gadus morhua*)	X	X	X	X
Atlantic halibut (*Hippoglossus hippoglossus*)	X	X	X	X
Atlantic mackerel (*Scomber scombrus*)	X	X	X	X
Atlantic sea herring (*Clupea harengus*)		X	X	X
Atlantic sea scallop (*Placopecten magellanicus*)	X	X	X	X
bluefin tuna (*Thunnus thynnus*)			X	X
haddock (*Melanogrammus aeglefinus*)	X		X	
long finned squid (*Loligo pealei*)	n/a	n/a	X	X
monkfish (*Lophius americanus*)	X	X	X	X
ocean pout (*Macrozoarces americanus*)	X	X	X	X
ocean quahog (*Artica islandica*)	n/a	n/a		
red hake (*Urophycis chuss*)	X	X	X	X
redfish (*Sebastes fasciatus*)	n/a	X	X	X
scup (*Stenotomus chrysops*)	n/a	n/a		
short finned squid (*Illex illecebrosus*)	n/a	n/a	X	X
spiny dogfish (*Squalus acanthias*)	n/a	n/a		
surf clam (*Spisula solidissima*)	n/a	n/a		
white hake (*Urophycis tenuis*)	X	X	X	X
whiting (*Merluccius bilinearis*)	X	X	X	X
windowpane flounder (*Scopthalmus aquosus*)	X	X		
winter flounder (*Pleuronectes americanus*)	X	X	X	X
witch flounder (*Glyptocephalus cynoglossus*)	X	X	X	X
yellowtail flounder (*Pleuronectes ferruginea*)	X	X	X	X

4.1.8 CULTURAL RESOURCES

A number of shipwrecks, some of potential significance, are located within the site or in adjacent waters in the Basin. Location of these wrecks was determined using side scan sonar by US EPA in July 2006. Disposal activities and siting of disposal mounds are accomplished in a manner that avoids disposal on these areas.

4.2 SIGNIFICANT PROJECTS WHICH MAY INFLUENCE MANAGEMENT OF THE MBDS

Two companies -- Northeast Gateway Energy Bridge, LLC (NEG) and Neptune LNG, LLC -- recently received licenses in December 2006 from the U.S. Coast Guard to construct and operate a deepwater port for the regasification of liquefied natural gas (LNG) at sites adjacent to the MBDS. The Northeast Gateway project has finished construction and began operation in 2008. The pipeline was commissioned in February and the first delivery of cargo was conducted in May 2008.[5] The pipeline route is as close as 400 meters from the MBDS boundary, and two NEG port sites are planned for about 200 meters at the southern boundary of the MBDS (USCG, 2006). The two NEG ports include a deepwater port terminal that receives and regasifies LNG on specially designed Energy Bridge Regasification Vessels, and sends the natural gas to the shore via a new 24-inch pipeline lateral approximately 16.5 miles in length constructed, owned, and operated by Algonquin Gas Transmission, LLC (Algonquin). This pipeline lateral (which is buried to at least 1.5 feet) connects to the existing HubLine Pipeline System that traverses Massachusetts Bay and integrates with the New England natural gas grid. The Neptune port site is less than one nautical mile from the northern boundary of the Industrial Waste Site, and is under construction as of June, 2009.

Each NEG port consists of a subsea Submerged Turret Loading™ buoy (STL Buoy), a flexible riser, a subsea manifold, and a subsea flowline to connect to Algonquin's pipeline lateral. The STL Buoy connects to a LNG tanker for delivery of LNG and then connects to the subsea manifold using the flexible riser assembly. The subsea manifold will then be tied into the subsea flowline, subsequently connecting to Algonquin pipeline lateral. The STL buoy will be anchored by a radial system of eight suction type anchors, and connected to the anchors by an eight inch thick cable. Each anchor is estimated to disturb approximately 100 square meters of the ocean floor. Installation of the anchors involved temporarily laying mooring chains ranging in length up to 750 meters in length. A total of approximately 5 acres (or 20,000 square meters) of seabed was estimated to have been disturbed temporarily. After final installation the 16 chain segments occupy about 1 acre of the seabed (4,000 square meters). The diameter of each anchor spread is 0.91 miles (or about 1.5 km). Thus, the footprint of the permanent structures on the seabed and the floating lines in the water column are significant, and may require occasional changes in transport routes to the MBDS. The USCG has authorized safety zones of about 800 meters around the STL buoy and a No Anchor Area (NAA) of about 1000 meters radius from the buoy.

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[5] Letters from Tetra Tech EC, Inc to US EPA dated March 18, 2008 and June 16, 2008 as required by Northeast Gateway Deepwater Port National Pollution Discharge Elimination System Permit Number MA0040266 Discharge Monitoring Report May 2008 and January/February 2008.

Speed and access (e.g. bottom trawling, lobstering) restrictions are also applied. An "Area to be avoided" would be about 1250 meters radius around each buoy.

5. EVALUATION OF USACE AND EPA MONITORING RESULTS SINCE 1996

5.1 CONCEPTUAL MODEL OF IMPACTS OF DISPOSAL AT THE MBDS

The 1996 SMMP reviewed the expected impacts of disposal at the MBDS. When dumped, most dredged material hits the bottom, but up to 5% of fine-grained sediments can persist in the water column and be transported away from the disposal site. Dumps of dredged material create small craters on the bottom, and temporary re-suspension of sediment. Fine-grained sediments can resuspend into the water column and be transported several meters away, before deposition onto the ocean floor.

It is expected that proper and continuous disposal of dredged material at a defined mound will result in a disturbed habitat which is constantly recolonized by opportunistic Stage I benthic infauna and epifauna with relatively shallow penetration of oxygen into the sediments (Rhoads and Germano, 1986; Germano *et al.*, 1994). Monitoring at disposal mounds appears to have confirmed these expectations, with impacts primarily restricted to the disposal mounds. As described in Section 3, levels of sediment contamination are elevated beyond historic disposal mounds, reflecting less stringent testing requirements prior to 1977, and placement beyond intended disposal locations. Historic impacts, however, are primarily within the disposal site boundaries.

Although the ocean dumping criteria regulate unconfined disposal of unsuitable dredged material, the disposal site is potentially the locus for the accumulation of contaminants in a relatively confined area, i.e. at the buoy location. Because of the recolonization of benthic infauna on disposal mounds at the site and the constant disposal of dredged material, biota may accumulate contaminants. Continuous disposal of dredged material appears to maintain habitat for small flatfishes by maintaining a disturbed condition and increasing the abundance of small infauna in surface sediments.

The major monitoring concern at the MBDS is that benthic organisms, from polychaetes to groundfish, will be exposed to contaminants at and within 400 to 500 meters of the mound from the surge of sediments re-suspended and settling during a disposal event. Direct bioaccumulation of particle-attached toxicants into bivalve mollusks, such as the filter-feeding ocean quahog and the deposit-feeding *Yoldia* is possible. The most likely food chain effect is accumulation (and possible biomagnification) of contaminants from sediments to benthic infauna (e.g. polychaetes) and epifauna (e.g. pandalid shrimp) to groundfish (e.g. American plaice), spiny dogfish, or Acadian redfish. Another species at risk is the American lobster, an omnivorous feeder of bottom-dwelling fauna. A less likely, but important from a resource protection perspective (NOAA NCCOS, 2006) scenario is the transfer of contaminants from suspended particles to Northern sand lance (*Ammodytes dubius*) and then to humpback or finback whales.

5.2 ENVIRONMENTAL MONITORING OBJECTIVES

The objectives of the SMMP are to manage disposal activities to ensure compliance with the MPRSA and to determine whether significant adverse (or unacceptable) impacts have occurred or are occurring.

Environmental monitoring is used to meet both of those objectives. The Ocean Dumping Regulations (40 CFR §228.9, §228.10 and §228.13) provides guidance on conducting disposal site monitoring and trend assessments and evaluating impacts. Specifically 40 CFR §228.10 requires that the impact of disposal at a designated site be a) evaluated periodically and b) consider the following types of potential:

- Movement of materials into sanctuaries or onto beaches or shorelines, or towards productive fishery of shellfishery areas;
- Absence from the disposal site of pollutant-sensitive biota characteristic of the general area;
- Progressive, non-seasonal changes in water quality or sediment composition at the disposal site when these changes are attributable to materials disposed of at the site;
- Progressive, non-seasonal changes in composition or numbers of pelagic, demersal, or benthic biota at or near the disposal site when these changes can be attributed to the effects of materials disposed at the site; and
- Accumulation of material constituents (including without limitation, human pathogens) in marine biota at or near the site (i.e., bioaccumulation).

Many of these issues have been incorporated into the DAMOS Integrated Tiered Monitoring Approach for monitoring capped and uncapped dredged material disposal mounds in New England (Germano *et al.*, 1994) and in the 1996 SMMP[6]. Conceptually, this tiered approach is prospective, in that it attempts to identify early warning indicators of adverse effects, as described in the conceptual model, and is based on hypothesis testing using sampling technologies with rapid data return.

5.3 KEY SAMPLING TECHNOLOGIES AND EVALUATION APPROACHES

The key sampling technologies that have been utilized include high resolution (multibeam) bathymetry, side scan sonar, sediment profile imaging (SPI), and sediment collection to measure chemistry or toxicity. These technologies are discussed in more detail in Germano *et al.* (1994) and other DAMOS or EPA documents (e.g. ENSR, 2005; Liebman and Brochi, 2008).

High resolution bathymetry, supplemented with side scan sonar or subbottom profiles detect the presence, height and location of disposal mounds. With an experienced operator and analyst, the sediment profile camera also detects the presence of dredged material extending in thinner layers around the disposal mound. Side scan sonar supplements this information with detail of sediment characteristics and anomalies such as shipwrecks or debris.

[6] The DAMOS program, which has been in operation for 30 years, was developed and is funded primarily by NAE.

To evaluate bathymetric information, depth measurements will be gridded into small cells using contouring software programs (e.g. Surfer®) and depth differences from a previous survey will be calculated and displayed in a geographic information system (GIS). For new mounds, depth differences will be compared to estimated height and diameter based on the volume of dredged material disposed at the buoy. For existing mounds, height of the mound is expected to decrease over time due to consolidation, but the footprint shouldn't change dramatically. SPI images can determine whether lag deposits have formed on the top of the mound, indicating a winnowing of fine particles with subsequent armoring of surface.

Analysis of sediment profile images can determine whether benthic organisms have recolonized disposal mounds. It is assumed that expected, progressive benthic recolonization indicates no adverse effects from the dredged material disposal (see Section 5.1). The sediment profile imaging camera is a screening tool; large numbers of sampling locations can be evaluated with a quicker data-turnaround and at lower cost than other sampling techniques (e.g., sediment chemistry analyses, conventional benthic community analyses, diver surveys). If the sediment profile imaging camera documents slower than predicted recolonization rates, a more intensive evaluation and sampling effort would be triggered.

The sediment profile imaging camera can be used to evaluate several sediment property measures: sediment grain-size, relative sediment water content, sediment surface boundary roughness, seafloor disturbance, apparent redox potential discontinuity (RPD) depth, sediment methane, and infaunal successional stage (Germano *et al.*, 1994). The DAMOS program has standardized interpretation of these parameters through calculation of the Organism-Sediment Index (OSI), a measure of the overall quality of the benthic environment for each station. Photo-interpreted results from the sediment profile imaging camera can also provide information on biological processes such as bioturbation and biogenic irrigation. The SPI technology complements, but does not replace traditional benthic community surveys (Wilson *et al.*, 2009). In addition, sediment profile imaging cannot determine whether bioaccumulation of tissue contaminants is occurring.

Statistical evaluation of SPI data typically involves comparison to reference stations, and to stations unimpacted by disposal of dredged material. Statistical tests have traditionally been based on point-null hypothesis tests, which postulate the null hypothesis that there is no difference in benthic conditions between the mean values of the disposal mound and the mean values of the reference area (called point-null hypothesis testing). Additional statistical testing involves "equivalence tests", where the true difference between means is postulated to lie within, or beyond, a prescribed equivalence interval. This allows for evaluation of both proof of hazard, and proof of safety (ENSR, 2005).

Other technologies that will be employed are bottom grabs to collect sediments for measurements of sediment chemistry and texture; and bioassays, such as toxicity and bioaccumulation tests to assess responses of benthic organisms to toxicants and bioavailability of toxicants, respectively. In addition, video observations, using plan view cameras or remote operating vehicles can be employed in some cases to make direct observations of physical texture of the sediment, or biological features on both hard and soft sediments.

Surface grab samples of the sediments are collected and analyzed for grain size, total organic carbon, and selected contaminants such as trace metals (e.g., mercury, lead, zinc, arsenic, iron, cadmium, copper), PCB congeners, individual PAHs, and pesticides (e.g. DDT). The methods of collection and analysis are described in EPA/USACE, 1995, EPA, 2001 and EPA/USACE, 2004. The locations and number of stations and QC samples will be defined during survey planning and will be designed to characterize within and among station variability. Randomly selected stations, complemented with historical SPI stations will be sampled. If necessary, sediment cores will be collected to evaluate historical deposition of contamination. Levels of contaminants in dredged material mounds will be visually and statistically compared to levels in reference areas and to historical results. Statistical tests will include standard null hypothesis testing using parametric (e.g. ANOVA) and non-parametric tests (e.g. Kruskal-Wallis).

Sediments will also be collected to test for toxicity and bioaccumulation in the laboratory. The specific test will be selected from among approved tests used to evaluate dredged material proposed for disposal published in the Regional Implementation Manual (see Section 6.3 for description of the RIM; EPA/USACE, 2004). The locations and number of stations and quality control (QC) samples will be defined during survey planning and will be designed to characterize within and among station variability.

If necessary, measures of bioaccumulation of benthic infauna may be conducted. Sufficient biomass to enable quantifications of contaminants that bioaccumulate in filter feeders and sediment feeders will be obtained from grab samples (or other appropriate sample collections device) and genus level species aggregated into field replicates. Tissue will be prepared and analyzed using methods consistent with EPA/USACE (2004). Alternative field bioaccumulation methods (Valente *et al.*, 2006) will also be evaluated.

5.4 MONITORING SURVEYS IN PAST 15 YEARS

Several monitoring surveys were conducted in the past fifteen years to meet the objectives of the 1996 SMMP. These surveys, and the type of monitoring conducted, are listed in Table 4.

Table 4. Monitoring conducted in surveys since 1993.

Survey	*Reference*	*Bathymetry*	*Side scan sonar*	*Video Camera*	*Sediment Chemistry*	*Biological sampling*	*Sediment Profile Imaging*	*Comments*
1993	SAIC, 1997b	X	X		X			
1994	SAIC, 1997a						X	**Mound A**
1994	EPA, 1996				X	Tissue Chemistry/ Bioaccumu-lation		
1998 to 2000	SAIC, 2003	X	X		Grain size and tracers only		X	**Capping Demo site**
2000	SAIC, 2002	X					X	**Mounds B and C**
2002 Rock Reef Site	SAIC, 2004	X	X	X at Rock Reef Site				
2004	ENSR, 2005	X					X	**Mounds C and D**
2006	EPA, 2008[7]		X		X	Toxicity		**Mounds A, C and F**
2008	**In prep**	**X**	**X**					**Demo for IWS Capping**

The five monitoring objectives from the 1996 SMMP and results of surveys designed to meet these objectives are summarized below, with recommendations for future monitoring. These recommendations are incorporated into the plan outlined in Chapter 6.

1) Dredged material remains within a confined mound

Sediment profile imaging, bathymetric and side scan sonar surveys have confirmed that defined mounds were formed at locations intended for disposal. All mounds have formed at locations expected by buoy locations (Figures 4 and 5; Figure 1-4 in SAIC, 2002). The height of the mounds appears to be stable, with some consolidation over time (Table 5). There appears to be little change in mound height and shape in the four years between surveys, indicating that dredged material is persistent (SAIC, 2004). Although no SPI camera measurements are typically performed beyond the mound, based on the resolution of the bathymetric measurements, the apron of the dredged material mound typically extended about 200 meters beyond the 0.25 meter contour interval detected by bathymetry (See Figure 4-3 in SAIC, 2002).

[7] EPA, 2008 is Liebman and Brochi, 2008.

In addition, the Rock Reef Site was clearly formed at the intended location. Some material, however, was deposited away from the intended location, but still within the disposal site boundaries (Valentine *et al.*, 1996).

Table 5. Approximate height (meters) of disposal mound above ambient area, or baseline measurement, after last disposal event. Based on bathymetric measurements performed in 2000 and 2004 (SAIC, 2002; ENSR, 2005).

Mound	***Year of last disposal event***	***Mound Width***	***Mound Height (m) Years after last disposal event***				
			0 to 1	***2***	***4 to 5***	***6***	***10***
A	1994	400 to 500 meters	6 to 7			6	5
B	1998	350 to 500 meters	--	6		6	
C	1999	600 to 750 meters	9		8		
D	1999	250 to 300 meters	3.5		3		
E	1999	250 to 300 meters	5		3		
F	2005	450	4				

2a) Benthic infauna recolonize disposal mounds
2b) The benthic community beyond the mound is not altered

Based on sediment profile imaging camera observations of mounds B, C and D taken in 2000 and 2004 benthic recolonization is occurring as expected (SAIC, 2002 and ENSR, 2005). At Mound C one year after the last disposal event, dense populations of Stage I opportunistic polychaetes were typically observed at the sediment surface. Stage III head down deposit-feeding infauna were only observed at some outlying stations less influenced by the cohesive Boston Blue Clay clumps. RPD depths were about 2 to 4 cm. SPI camera observations from Mound C four years later in 2004 indicate little change in apparent RPD depths (values ranged from 2 to 3.5 cm), but an increase in prevalence of Stage III infauna. It appears that the cohesive Boston Blue Clay clumps are refractory to deeper colonization by Stage III infauna.

Five years after the last disposal event, Mound D appears to have fully recovered. Mean RPD depths ranged from 3.5 to 4.9 cm, which is similar to reference sediments. There was no Boston Blue Clay disposed at this mound. Both Stage I and Stage III communities were observed.

SPI camera observations were not collected from areas beyond the mounds in 2000 or 2004. SPI camera measurements from reference areas, however, indicate normal (or expected) benthic communities, with RPD depths of about 3 to 5 cm with Stage I and III communities and no evidence of dredged material.

3a) Contaminants are not accumulating in sediments at the disposal site and the reference areas
3b) Contaminants are not accumulating in biological resources beyond the mound

Based on a comparison to sediment quality guidelines (Field *et al.*, 1999, 2002), levels of contaminants collected from historically contaminated areas and recently disposed mounds do not appear to be causing adverse impacts to the marine environment (see Section 4.1.3 and Liebman and Brochi, 2008). In fact, sediments collected from the depression appear to be declining for several individual PAHs and lead, although not for most other trace metals. At Mound A, however, it appears that levels of chromium, copper, and some individual PAHs have increased slightly since 1989, and there are no obvious decreases in sediment contamination (Liebman and Brochi, 2008).

Dredged material at the disposal sites (Mounds A, C and F) and sediment at the reference areas were not toxic to marine organisms, as measured by the *Ampelisca abdita* 10 day toxicity test. This is consistent with the results of sediment contaminant levels, compared to sediment quality guidelines.

No measurements of contaminants in bottom fish or lobsters from the MBDS or IWS have been performed since 1992 (NOAA, 1996).

4) The benthic community at the old "BFG" buoy area is recovering from historical dredged material disposal

The 2006 EPA survey found that many of the individual PAHs exhibited significant declines at this site and no evidence of toxicity, but that most metals showed no significant downward trend in contaminant levels (Liebman and Brochi, 2008).

5) The Rock Reef Site, and nearby rock debris, are colonized by a diverse hard rock epifaunal and fish community

The Rock Reef site exhibits a relatively diverse community of colonizing sponges, anemones and other epifauna (SAIC, 2004).

6. QUANTITY AND QUALITY OF MATERIAL TO BE DISPOSED

MPRSA 102(c)(3)(D) and (E) requires that the SMMP include consideration of the quantity of the material to be placed in the site, and the presence, nature, and bioavailability of the contaminants in the material as well as the anticipated use of the site over the long term.

6.1 RECENT AND UPCOMING PROJECTS

The primary future use of the MBDS is from the Boston Harbor Inner Harbor Maintenance Project and the proposed Deep Draft Navigation Improvement Project. The USACE began dredging Boston Inner Harbor in April 2008 with completion in November 2008. About 900,000 cubic yards were disposed at Mound F and about 800,000 CY were disposed at a demonstration site in the western part of the MBDS to evaluate whether dredged material can effectively isolate historically disposed waste containers in the IWS. This material came from shoal material and underlying parent material dredged to create CAD cells in the Mystic River and the main shipping channel. Unsuitable material was disposed in the CAD cells (Michael Keegan, NAE personal communication October 10, 2008; USACE/MassPort, 2006).

The U.S. Army USACE New England District in partnership with MassPort are also proposing a project (Boston Harbor Federal Deep Draft Navigation Improvement Project) to deepen the main channels in the Port of Boston, the Conley Container Terminal and other marine terminals to at least -45 feet to -50 feet depth to accommodate the next generation of deep draft vessels (USACE 2008). Based on the draft Feasibility Report (USACE/MassPort, 2008), the recommended plan would result in about 1 million cubic yards of rock and 11.1 million cubic yards of ordinary material, which has been determined to be suitable for ocean disposal in Massachusetts Bay. If no upland use for this material is found, the rock and other hard material are suitable for beneficial use to create hard bottom habitat. This project would likely be constructed no earlier than 2012 and take about four years to complete.

NAE has suggested, and EPA has concurred, that some of this material be disposed at the old IWS to cover up the containers and sediments exposed to contaminants from historic disposal at the IWS. Disposal at the IWS, however, is outside of the current boundaries of the MBDS. To dispose dredged material at the IWS areas would require a site selection process under the MPRSA, or an expansion of the disposal site boundaries.

NAE is currently conducting a demonstration project in the western portion of the MBDS to evaluate whether dredged material disposal in a sequential approach can cover up the containers, without extensive impact to the in-place contaminated sediments, or barrel fragments. This demonstration project is an integral component of the monitoring program.

6.2 CAPACITY

Although Boston Harbor is the primary harbor expected to utilize the MBDS in the next decade, other harbors are expected to utilize the site. Thus, for planning purposes, it is expected that the MBDS will receive more dredged material in the next decade than in the previous decade. A specific closure date for the MBDS has not been considered. Because of its depth (300 feet) and size (2,662 acres), the potential capacity of the MBDS is far in excess of the potential site use over the next 20 years, and does not pose a hazard to navigation.

6.3 DREDGED MATERIAL QUALITY: EVALUATION AND TESTING REQUIREMENTS

As is the case for all EPA designated ocean disposal sites, the MBDS is designated to only receive suitable dredged material. All dredged material projects proposed for disposal at the MBDS must meet the ocean dumping criteria under the MPRSA and deemed suitable for unconfined disposal. The projects will be evaluated on a project-specific basis under the rigorous chemical and biological testing framework outlined in the Ocean Dumping Regulations (40 CFR Parts 227 and 228) and guidance developed by EPA and the USACE (EPA/USACE, 1991; "the Green Book"). This guidance is further implemented in New England under the EPA and USACE Regional Implementation Manual (EPA and USACE, 2004[8]). The RIM provides New England-specific guidance on: permit application and coordination requirements; sampling methodologies; updated reference site locations; contaminants of concern and analytical reporting limits; and species and test conditions for biological testing.

The national guidance document is currently being updated by EPA and the USACE and the final version is expected to be completed in 2010. Although this updated guidance will describe modified approaches for interpretation of test results, it is unlikely that both the methods of testing and the quality of dredged material acceptable for disposal will change significantly.

7. MANAGEMENT APPROACH

Dredged material disposal will be managed by the EPA and the USACE to meet the overall objectives:

- Management of disposal activities to ensure compliance with the MPRSA; and
- Monitoring of the disposal site to determine whether significant adverse (or unacceptable) impacts have occurred or are occurring.

[8] The RIM is available at: http://www.nae.usace.army.mil/reg/rim.htm and http://www.epa.gov/region1/topics/water/dredging.html

To meet these objectives, the following specific management practices will be implemented:

- All dredged material disposed at the MBDS must meet the ocean dumping criteria;
- All general and specific permit conditions are implemented and enforced;
- Disposal locations are specified to minimize environmental impact from sediments placed at the site including establishing a containment cell of dredged material;
- Disposal locations are also specified to avoid impact of sediments on identified cultural resources (wrecks) in the site;
- Disposal technologies are conducted to minimize loss of sediment from the disposal site;
- Timing of disposal minimizes conflicts with other uses of the area;
- Dredged material disposal information is recorded in an information management system;
- Environmental and compliance monitoring is designed to recognize and correct conditions before unacceptable impact occurs; and
- Modifications to disposal practices and the site if necessary.

7.1 ALL DREDGED MATERIAL DISPOSED AT THE MBDS MUST MEET THE OCEAN DUMPING CRITERIA

As described in Section 6.3, the MBDS is designated to only receive suitable dredged material. All dredged material projects proposed for disposal at the MBDS must meet the ocean dumping criteria under the MPRSA.

7.2 IMPLEMENTATION AND ENFORCEMENT OF ALL GENERAL AND SPECIFIC PERMIT CONDITIONS

The following general conditions will be applied to all projects using the MBDS for disposal[9]. These conditions may be modified on a project-by-project basis, based on factual changes (e.g., administrative changes in phone numbers, points of contact) or when deemed necessary as part of the individual permit review process.

The following general permit conditions apply to all open water disposal in Massachusetts, Maine, New Hampshire, Rhode Island and Vermont.

1. Periodic maintenance dredging to the area and depth limits described herein is authorized for ten years from the date of issuance of this permit, **provided disposal of the dredged material is at an upland site**. However, the permittee must notify this office, in writing, 60 days before the intended date of any such dredging and shall not begin such dredging until written authorization has been obtained. This 60-day notification is not required for the initial new and/or maintenance dredging authorized by this permit. A separate authorization

[9] These are the standard general conditions for dredging permits issued by NAE (Gregory Penta, Regulatory Division, personal communication). Conditions related to protection of marine mammals are based on conservation recommendations issued by NMFS in 1999 (Knowles, 1999) and modified by Julie Crocker, NMFS Northeast Regional Office Protected Resources Division, 2009.

shall be required for such dredging if the material to be dredged is to be deposited in open or ocean waters and/or wetlands.

2. At least ten working days in advance of the start date, the First Coast Guard District, Aids to Navigation Office, (617) 223-8355, shall be notified of the location and estimated duration of the dredging and disposal operations.

3. For the initiation of disposal activity and any time disposal operations resume after having ceased for one month or more, the permittee or the permittee's representative must notify the Corps (see Special Condition 7 below) at least ten working days before the date disposal operations are expected to begin or resume. The information to be provided in this notification is: permit number, permittee name, address and phone number, dredging contractor name, address and phone number, towing contractor name, address and phone number**,** estimated dates dredging is expected to begin and end, name of all disposal vessels to be employed in the work and copies of their certification documents, name of the disposal site, and estimated volume of material to be dredged. **Disposal operations shall not begin or resume until the Corps issues a letter authorizing the initiation or continuation of open-water disposal.** The letter will include disposal point coordinates to use for this specific project at that time. These coordinates may differ from those specified for other projects using the same disposal site or even from those specified earlier for this project. It is not necessary to wait ten days before starting disposal operations. They may start as soon as this letter is issued. For each dredging season during which work is performed, the permittee must notify the Corps upon completion of dredging for the season by completing and submitting the form that the Corps will supply for this purpose when disposal-point coordinates are specified.

4. Except when directed otherwise by the Corps for site management purposes, all disposal of dredged material shall adhere to the following. These requirements must be followed except when doing so will create unsafe conditions because of weather or sea state, in which case disposal with the scow moving only fast enough to maintain safe control (generally less than one knot) is permitted. Disposal is not permitted if these requirements cannot be met due to weather or sea conditions. In that regard, special attention needs to be given to predicted conditions prior to departing for the disposal site.

a. The permittee shall release the dredged material at a specified set of coordinates within the disposal site with the scow at a complete halt.

b. When a disposal buoy is present at the specified coordinates, disposal shall occur with the side of the scow at least 100 feet and no greater than 200 feet from the buoy to minimize collisions with the buoy.

5. Silent Inspector System Requirements

a. Every discharge of dredged material at the disposal site requires monitoring by the contractor. This disposal monitoring of dredging projects must be performed using the Silent Inspector (SI) software and hardware system developed by the Corps. The SI system must have been certified by the Corps within a year of the disposal activity. See the National SI Support Center site https://si.usace.army.mil for additional SI information. Questions regarding certification should be addressed to the SI Point of Contact at the Corps New England District (Norm Farris, (978) 318-8336).

b. The permittee is responsible for ensuring that the system is operational throughout the project and that project data are submitted to the National SI Support Center in accordance with the specifications provided at the aforementioned website. If any component of the system is inoperable, disposal may not take place unless otherwise authorized by the Corps New England District SI Point of Contact.

c. The SI system used by the permittee must be capable of providing the information necessary for the Scow Monitoring Profile Specification. The permittee is also responsible to provide the Corps (see Special Condition 7 below) with a record of estimated barge volume for each trip. If barge volume information is not provided through the SI system utilized, the permittee must submit a weekly report to Corps that provides estimated volume (cubic yards), date and disposal time for each trip. The data collected by the SI system shall, upon request, be made available to the Corps (see Special Condition 7 below).

d. For the initiation of disposal activity and any time disposal operations resume after having ceased for one month or more, the permittee or the permittee's representative must notify the Corps (see Special Condition 7 below) at least ten working days before the date disposal operations are expected to begin or resume. The information to be provided in this notification is: permit number, permittee name, address and phone number, phone number of the dredging contractor, name, address and phone number of towing contractor**,** estimated dates dredging is expected to begin and end, name of all disposal vessels to be employed in the work and copies of their certification documents, name of the disposal site, and estimated volume of material to be dredged. **Disposal operations shall not begin or resume until the Corps issues a letter authorizing the initiation or continuation of open-water disposal.** The letter will include disposal point coordinates to use for this specific project at that time. These coordinates may differ from those specified for other projects using the same disposal site or even from those specified earlier for this project. It is not necessary to wait ten days before starting disposal operations. They may start as soon as this letter is issued.

6. If any material is released beyond the limits specified in this permit, the Captain or the permittee must notify the Corps immediately by phone (see Special Condition 7 below). Information provided shall include disposal coordinates, permit number, volume disposed, date and time of disposal, circumstances of incident, disposal vessel name, name of caller, and phone number of caller. If no person is reached at the number above, a voice message with the relevant information should be provided. In addition, a detailed written report must be provided to the Corps within 48 hours following any such incident.

7. Unless otherwise stated (e.g., as in Special Condition 5b above), all submittals and coordination related to these special conditions shall go to the Corps, New England District. ADDRESS: Policy, Analysis and Technical Support Branch, Regulatory Division, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, MA 01742-2751; Phone: (978) 318-8292 or (978) 318-8338; Fax: (978) 318-8303.

The following additional permit conditions apply specifically to MBDS disposal permits.

1. The U.S. Coast Guard, Sector Boston, Waterways Management Division, (617) 223-5750, shall be notified prior to the start of this project.

2. From February 1 through May 30 of any year, disposal vessels including tugs, barges, and scows transiting between the dredge site and the Massachusetts Bay Disposal Site shall operate at speeds not to exceed 5 knots after sunset, before sunrise, or in daylight conditions where visibility is less than one nautical mile. Disposal shall not be permitted if these requirements cannot be met due to weather or sea conditions. In that regard, the permittee and contractor should be aware of predicted conditions before departing for the disposal site. The intent of this condition is to reduce the potential for vessel collisions with endangered species, including right whales.

3. From February 1 through May 30 of any year, a marine mammal observer [i.e. meeting the attached National Marine Fisheries Service (NMFS) criteria on observer qualifications, including the specified skill sets for sea turtles and whales, ***and in receipt of written approval from NMFS***] must be present aboard disposal vessels transiting between the dredge site and the Massachusetts Bay Disposal Site during daylight hours. The permittee shall submit to the Corps of Engineers for approval a statement of qualifications for each observer. The observer(s) shall be contracted and paid for by the permittee.

4. When threatened or endangered species are observed to be present, the vessel captain shall, except when precluded by safety considerations, avoid harassment of or direct impact to individual animals in consultation with the marine mammal observer.

5. The permittee (or designee) shall report any interactions with listed species to NMFS within 24-hours at (978) 281-9328 and immediately report any injured or dead marine mammals or sea turtles to NMFS Stranding Hotline at (978) 281-9351.

6. The permittee shall ensure that a separate NMFS Marine Mammal Observation Report is fully completed by the observer for every sighting and that this report is received by the Corps, (978) 318-8303 fax, within one week of the trip date. The permittee shall require the observer to maintain contact with NMFS, Habitat and Protected Resources Division, (978) 281-9328 and other recognized experts to provide and receive information regarding the presence and distribution of threatened and endangered species in Massachusetts Bay. The intent of this condition is to reduce the potential for vessel collisions with threatened and endangered species, including right whales, and to minimize potential impacts of dredged material disposal on threatened and endangered species.

7. Marine mammal observers shall use the following guidelines to minimize conflicts with threatened or endangered species:

a. A marine mammal observer shall be posted on lookout at all times during daylight hours when disposal vessels have left the harbor and are traveling to, at or returning from the disposal site.

b. Disposal vessels shall not approach threatened or endangered species closer than 100 feet (see additional condition below for approaching right whales).

c. Disposal vessels shall adhere to the attached NMFS regulations for approaching right whales, 50 CFR Part 222.32, which restrict approaches within 500 yards of a right whale and specify avoidance measures for vessels that encounter right whales.

d. If threatened or endangered species are sighted within 500 feet from the disposal point, dredged material shall not be released. In this case, the vessel captain may elect to wait until the animals move away from the disposal point prior to disposal, or subject to consultation with the observer, may dispose at a Corps-authorized alternative disposal location under the same restrictions noted herein for disposal at the primary disposal location.

e. If threatened or endangered species are sighted between 500 feet and 1500 feet from the disposal point, the observer shall note the animals' behavior, relative position, and direction and speed of movement to assess if release of dredged material is likely to harass or endanger the animals. For example, whales actively feeding at or near the disposal point are more likely than resting whales to interact with released sediments. If the observer assesses that disposal is likely to harass or endanger the animals, the observer shall consult with the vessel captain and disposal shall be delayed until the animals change their behavior or move away such that the observer assesses that no danger to the animals will likely result from disposal.

Other special management practices may exist at the site for individual projects to improve site management, anticipate future disposal requirements, or improve the conditions at the site.

7.3 DISPOSAL LOCATIONS AND COORDINATES

The USACE deploys a taut wire buoy at the specific coordinates for the disposal location. If a buoy is not available, specified coordinates are provided to the permittee. Disposal locations are specified to minimize environmental and cultural resource impacts from sediments placed at the site. The MBDS is currently being managed to develop a containment cell around which dredged material is disposed in a ring of mounds. The containment cell is located in a natural depression near the northeast quadrant of the disposal site. The depression is expected to accumulate contaminants from the disposal mound, and from natural sediment deposition in Stellwagen Basin[10]. It is expected that this depression will eventually be contained with additional dredged material.

In 2008, coordinates were provided for disposal in the western portion of the MBDS to evaluate whether dredged material disposal in a sequential approach can cover up the containers, without an unacceptable disturbance of in-place contaminated sediments, or barrel fragments (See Section 6.3). This demonstration project is an integral component of the monitoring program.

7.4 ALLOWABLE DISPOSAL TECHNOLOGIES AND METHODS

Dredging and dredged material disposal in Massachusetts Bay has historically been accomplished using a bucket dredge to fill split hull or pocket scows for transport to the disposal site. Typically, 1,000 to 6,000 CY vessels are used for disposal. The volume of material allowed

[10] Unsuitable dredged material cannot be disposed at MBDS.

in a barge may be restricted depending upon the results of the USACE water quality model[11] used during evaluation of dredged material for any given dredging project (see Section 6.3).

7.5 TIMING OF DISPOSAL MINIMIZES CONFLICTS WITH OTHER USES OF THE AREA

At this time, there are no seasonal restrictions on disposal of dredged material at the site. After consultation with NMFS and MA DMF time of year (TOY) windows are typically established, however, to protect sensitive fish species at the dredge site. As described in Section 4, a LNG port has been constructed (NEG) adjacent to the disposal site and another port (Neptune) is currently under construction. Although the presence of a LNG tanker in the area may require occasional changes in transport routes to the MBDS there are no restrictions on disposal when an LNG tanker is on station at either of the offshore terminals.

7.6 DREDGED MATERIAL DISPOSAL COMPLIANCE INFORMATION IS RECORDED IN AN INFORMATION MANAGEMENT SYSTEM

See Section 8.1.

7.7 ENVIRONMENTAL AND COMPLIANCE MONITORING ARE DESIGNED TO RECOGNIZE AND CORRECT CONDITIONS BEFORE UNACCEPTABLE (SIGNIFICANT ADVERSE) IMPACT OCCURS

See Sections 8.1 and 8. 2.

7.8 MODIFICATIONS TO DISPOSAL PRACTICES AND THE SITE

Based on the findings of the monitoring program, no modifications to the site use are contemplated. Corrective measures such as those listed below, however, may be developed by EPA New England and the USACE-NAE if necessary. These measures may include:

- Stricter definition and enforcement of disposal permit conditions;
- Implementation of more protective judgments on whether sediments proposed for dredging are suitable for open-water disposal;
- Implementation of special management practices to prevent any additional loss of sediments to the surrounding area;
- Closure of the site as an available dredged material disposal site (i.e., to prevent any additional disposal at the site).

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11 NAE evaluates all disposal projects with potential to violate water quality standards at the MBDS using the STFATE model, which is described in the RIM and is available at: http://el.erdc.usace.army.mil/products.cfm?Topic=model&Type=drgmat

In addition, other management considerations may be determined on a project-by-project basis through consultation with the NMFS, USFWS and MA DMF, and coordination with other state and Federal agencies. These may include the following:

- Use of marine mammal observers during disposal operations outside of the February 1 to May 30 time period;
- Establishment of dredging windows;
- Compliance with Essential Fish Habitat (EFH) recommendations; and
- Endangered Species Act (ESA) concerns.

Any changes to special permit conditions may be discussed at the Regional Dredging Team or Massachusetts Dredging Team meetings.

As described in Section 6.1 some of the future Boston Harbor dredged material is proposed for disposal at the old IWS. Disposal at the IWS, however, is outside of the current boundaries of the MBDS and would necessitate an expansion (perhaps temporary) of the disposal site boundaries or a specific time-limited site selection.

8. MONITORING PROGRAM

The monitoring program is organized into two complementary parts: compliance monitoring and environmental monitoring.

8.1 COMPLIANCE MONITORING

Compliance monitoring includes evaluation of information and data relevant to the conditions in permits and authorizations and will be gathered separately from the environmental data. Disposal operations will be routinely reviewed to determine whether the requirements of the issued permits and authorizations have been met. This includes review of the Silent Inspector logs, and any observations by the USACE project managers on a project-specific basis to determine the potential magnitude of effect and the appropriate action.

All dredged material disposal compliance information is recorded in an electronic database called Dredged Material Spatial Management and Resolution Tool [DMSMART]). DMSMART is designed to incorporate results from the dredged material sediment analyses and scow logs. DMSMART includes the following fields for each disposal record: permit number, disposal load volume, and disposal location. The database assists the USACE to evaluate projects from the same or nearby areas, and compliance with conditions in disposal permits and authorizations.

It is assumed that testing information from projects authorized to use the site for dredged material disposal and from the reference area can provide key information about the expected quality of material that has been placed in the site.

8.2 ENVIRONMENTAL MONITORING OBJECTIVES

As described in Section 5.2, the monitoring program is prospective, in that it attempts to identify early warning indicators of adverse effects, as described in the conceptual model, and is based on hypothesis testing using sampling technologies with rapid data return. The monitoring described below is typically Tier 1 monitoring in the Tiered Monitoring Protocol recommended by Germano *et al.* (1994) and generally followed by the DAMOS program for many years. If results of the first tier hypothesis indicate an adverse effect or unacceptable impact, then a second tier monitoring test is triggered.

The timing of monitoring surveys and other activities will be governed by funding resources, the frequency of disposal at the site, and the results of previous monitoring data. Measurement of certain conditions in the site can be performed at a lower frequency (e.g., sediment chemistry) or only in response to major environmental disturbances such as the passage of major storms.

The specific objectives of the monitoring plan proposed here are slightly modified from the original objectives in 1996 and incorporate the demonstration project to evaluate in-place sediment capping and continuation of the development of a containment cell and the potential continued disturbance by operation of the nearby LNG ports. In addition, we added another objective to evaluate the suitability of the reference area. These objectives are posed as testable hypotheses.

1) Dredged material remains within a confined mound

Tier 1 monitoring: This will be accomplished by periodic high resolution multibeam bathymetry, side scan sonar or sediment acoustic characterization, supplemented with sediment profile imaging. SPI measurements will be collected from transects radially away from the disposal mound up to 1,000 meters from the center. Because mounds are being formed at distinct locations in the disposal site to create a containment cell, it is recommended that these surveys be conducted about six months to one year after the end of disposal at each mound, and a follow-up three to five years later.

Response: A confined mound is defined as a mound located at the disposal buoy with no significant change in height or shape. Mounds are expected to consolidate (lose height) over time, but to not change shape significantly. Changes in height and shape can be detected by comparison of bathymetric observations from previous surveys, within the resolution of the equipment. Height and diameter of newly formed mounds can be estimated based on the volume of material disposed. If these measurements indicate that a disposal mound is confined within an expected area, no management action is required. If these measurements indicate that a disposal mound is not confined within an expected area, a review of disposal permits and silent inspector records will be conducted. Additional SPI camera measurements will be performed to determine the magnitude and spatial extent of movement of material.

2a) Benthic infauna recolonize disposal mounds
2b) The benthic community beyond the mound is not adversely impacted

Tier 1 monitoring: This will be accomplished by sediment profile imaging performed six months to about one year after the cessation of mound formation, and a follow up three to five years later. SPI camera measurements should be conducted to the edge of each mound to ensure that biological observations are consistent with the bathymetric surveys. Samples will be collected routinely from recently formed mounds; transects radially away from the disposal mound up to 1,000 meters from the center, and randomly selected stations from the disposal mound and the MBDS reference area. Sampling using radial transects are employed to measure a gradient of impact from disposal mounds. Following completion of disposal, a SPI camera survey should be performed over the new Mounds E and F and the demonstration mounds to confirm that the expected pattern of benthic recolonization is occurring. Evaluation of recolonization and adverse impacts will be made based on statistical evaluation of the parameters measured by SPI cameras.

Response: If the results of these tests indicate that recolonization on the disposal mounds is occurring, no management action is required. If the results of these tests indicate that recolonization is not occurring, then SPI camera measurements from off the disposal mound will be examined to determine whether this biological response is widespread or is not related to disposal. If SPI camera measurements determine that Stage III fauna are absent away from the disposal mounds after three to five years, the SPI camera photographs should be evaluated to determine whether grain size or other sediment properties may be hindering recolonization or the expected succession sequence. If neither of these hypotheses explains the pattern observed, sediment toxicity tests should be conducted as soon as feasible.

3a) Contaminants are not accumulating in sediments at the disposal site and the reference areas

Tier 1 monitoring: Sediments should be collected and measured for contaminants once every five to ten years, or whenever benthic community appears to be altered based on results of sediment profile imaging. Samples will be collected from recently formed mounds at randomly selected stations on the mounds and at the MBDS reference area, but may include stations with historical SPI observations. Statistical approaches to compare mounds to reference areas are described in Section 5. Levels of contaminants in disposal site sediments will be compared to reference area sediments and to previously measured disposal site sediment contaminant levels.

Response: If levels of many (e.g. >5) contaminants are not significantly greater than (as determined by an ANOVA or non-parametric test) recently disposed sediments, reference sediments, unimpacted sites within the disposal site, or previous measurements in the same area, then no management action is required. If levels of many contaminants are significantly greater than recently disposed sediments, then results of dredged material suitability determinations should be re-examined for possible explanations. If statistically significant increases in sediment chemistry above permitted dredged material project data are found, then theoretical bioaccumulation potential (TBP) calculations will be performed. If TBP calculations suggest significant potential for bioaccumulation, direct bioaccumulation tests should be performed (see hypothesis 3b).

3b) Contaminants are not accumulating in biological resources beyond the mound

Tier 2 monitoring: Based on the sediment chemistry monitoring and application of the theoretical bioaccumulation potential model (using highest replicates), levels of contaminants in fish can be predicted.

Response: If the bioaccumulation model results in concentrations above acceptable levels for ecological and human health, sampling of tissue from resident species such as the ocean quahog, lobster and American plaice (and if feasible, the Acadian redfish) should be conducted. To relate contaminant levels to biological effects a baseline study of histopathology of American plaice, or the dominant benthic fish or shellfish, may be considered.

4) The benthic community at the old "BFG" buoy area is recovering from historical dredged material disposal

Tier 1 monitoring: This should be accomplished by periodic sediment profile imaging, bottom grabs with benthic community analysis, and toxicity testing at the old "BFG" buoy area conducted with transects radially up to 1,000 meters away from the center of the area. Sampling using radial transects are employed to measure a gradient of impact from the former disposal area. Because SPI camera measurements have not been conducted at this site since 1994, it is recommended that SPI camera measurements be performed at this site if funding is available. Results of these surveys will assist in verifying assumptions of the conceptual model of benthic impacts of dredged material disposal. The EPA survey in 2006 demonstrated elevated, but moderate levels of contaminants at this site, and that the sediments were not toxic to amphipods.

Response: If the measurements indicate an unexpected benthic community based on our understanding of impacts of dredged material disposal to the biological community (see section 4) then sampling of tissue from resident species such as the ocean quahog, lobster and American plaice (and if feasible, the Acadian redfish) should be conducted to determine the extent of the effects. If ecological and potential human health effects are observed, further capping of these sediments should be contemplated[12].

5) The Rock Reef Site, and nearby rock debris, are colonized by a diverse hard rock epifaunal and fish community

Tier 1 monitoring: Although this site appears to exhibit a relatively unaltered community of colonizing sponges, anemones and other epifauna periodic (e.g. every five to ten years) video observations of the benthic community should be conducted. This should be performed in association with the Stellwagen Bank National Marine Sanctuary program.

Response: if video observations indicate an altered or unexpected benthic community, a more intense research and monitoring effort should be contemplated to determine the potential cause. The expected benthic community will be based on observations from other areas in Stellwagen Bank.

[12] Based on the EPA survey results in 2006 (Liebman and Brochi, 2008), this action is not likely.

6) Evaluation of re-suspension of bottom sediments from disposal of dredged material

Special study: At the time this plan was under revision, NAE was conducting a demonstration project in the western portion of the MBDS to evaluate whether dredged material disposal in a sequential approach can cover up the historically disposed waste containers, without unacceptably impacting the in-place sediments or barrel fragments. This study was investigating the feasibility of using the large volume of sediments that will be available when Boston Harbor is deepened in the coming years (see Section 6.1) to cap portions of Massachusetts Bay that received industrial wastes from the 1940s to 1970s (see Section 3.2). The sediments used in the study were from creation of confined aquatic disposal cells in the harbor; sediments similar to those expected from the deepening. Barge loads of the sediment were directed to a series of placement lines and points in a simulation of capping. The investigation focused on methods to minimize disposal impacts on the in-place sediments. Surveys were being conducted to map the distribution of the disposed sediment and assess its disturbance of the in-place sediments. Survey tools included high resolution bathymetry, sediment profile and plan view camera photographs, side scan sonar, sub-bottom profiling, and sediment coring.

Response: If results of this study suggest that in-place sediments were not significantly disturbed, this approach would be utilized to cap the containers.

7) Evaluation of suitability of reference area

Mapping the location of the reference area onto a base map of the topography of Massachusetts Bay prepared by the USGS (Butman *et al.*, 2004) indicated that the reference area may be located on and around a drumlin. The drumlin is a topographic high and may influence grain size and other sediment properties. In comparing sediment collected from the reference area in 2006 to previous years Liebman and Brochi (2008) identified significant variability in grain size and TOC content of the sediments from the reference area. A review of reference area data will be conducted and a survey will be performed to better map the seafloor in the area and determine whether a more suitable reference area can be selected to reduce this variability.

8.3 EVALUATION OF DATA AND MANAGEMENT RESPONSES

The identification of unacceptable impacts from dredged material disposal at the site will be accomplished in part through comparisons of the monitoring results to historical (baseline) and previous conditions, and to unimpacted nearby reference locations measured concurrently with site measurements. If site monitoring data demonstrates that the disposal activities are causing unacceptable impacts to the marine environment as defined under 40 CFR §228.10(b), EPA and the USACE may place appropriate limitations on site usage to reduce the impacts to acceptable levels. Such responses may include: limitations on the amounts and types of dredged material permitted to be disposed; limitations on the specific disposal methods, locations, or timing; isolation of sediments with elevated contaminants or de-designating the site for unconfined ocean disposal of dredged material.

8.4 MONITORING TECHNOLOGIES AND TECHNIQUES

The technologies used for this monitoring plan have already been described in Section 5; these technologies and approaches are typically used to evaluate dredged material disposal sites in the northeast United States. Use of consistent techniques increases comparability with future and historic data; monitoring methods used at the MBDS, however, are not limited to these technologies. New technology and approaches may be used as appropriate to address questions that arise in the future. For example, 40 CFR §228.9(b) states that surveys may be supplemented, "where feasible and useful, by data collected from the use of automatic sampling buoys, satellites or in situ platforms, and from experimental programs."

8.5 QUALITY ASSURANCE

An important part of any monitoring program is a quality assurance (QA) regime to ensure that the monitoring data are reliable. Quality assurance has been described as consisting of two elements:

1. Quality Control - activities taken to ensure that the data collected are of adequate quality given the study objectives and the specific hypothesis to be tested, and include standardized sample collection and processing protocols and technician training (National Research Council [NRC], 1990).

2. Quality Assessment - activities implemented to quantify the effectiveness of the quality control procedures, and include repetitive measurements, interchange of technicians and equipment, use of independent methods to verify findings, exchange of samples among laboratories and use of standard reference materials, among others (NRC, 1990).

All EPA organizations that collect, evaluate, or use environmental data or design, construct, or operate environmental technology are covered by the EPA Quality System. Data collected by EPA must meet the requirements in the EPA Directive CIO 2105-P-01-0 (Quality Manual for Environmental Programs) and develop an approved Quality Assurance Project Plan[13]. All USACE monitoring must meet QA requirements as specified in contract award documents. This usually involves the contractor providing a QA plan for the various types of work requested.

8.6 COORDINATION WITH COMPLEMENTARY OR REGIONAL MONITORING PROGRAMS

The regulation 40 CFR §228.10(c) requires that a disposal site be periodically assessed based on the entire available body of pertinent data and that any identified impacts be categorized according to the overall condition of the environment of the disposal site and adjacent areas. Some aspects of the impact evaluation required under MPRSA §102(c)(3) can be accomplished using data from regional monitoring programs (e.g., fisheries impact).

[13] EPA QA guidance documents are found at <http://www.epa.gov/quality/qs-docs/g5-final.pdf>.

Thus, EPA and the USACE will review ongoing regional monitoring programs that can provide additional data to inform the periodic assessment of impact, such as the MWRA outfall monitoring program, the Stellwagen Bank National Marine Sanctuary programs, NMFS or MA DMF trawl surveys for fisheries resources (See Section 3 Baseline Assessment), and monitoring associated with the LNG ports.

9. REVIEW AND REVISION OF THIS PLAN

The MPRSA requires that the SMMP include a schedule for review and revision of the SMMP, which shall not be reviewed and revised less frequently than ten years after adoption of the plan, and every ten years thereafter. The next revision of this SMMP will be completed by 2019. The EPA, the USACE, and other federal and state agencies have agreed to review this plan yearly as part of the annual agency planning meeting agenda (Section 3.2). Reassessment of the EFH and endangered species issues will also be conducted on a ten year basis with NMFS.

10. COORDINATION AND OUTREACH

The EPA and the USACE coordinate closely on management of the disposal site, and evaluation of permit applications for disposal of dredged material disposal. The EPA and the USACE also coordinate closely with the Massachusetts and Regional Dredging teams. Coordination and outreach will be continuous and include state and Federal agencies, scientific experts, and the public. These teams may provide recommendations on management of the MBDS. Other meetings may be called in response to unusual physical events or unexpected monitoring observations. During these meetings, monitoring data will be evaluated and the SMMP will be revised as necessary depending on current conditions and available site-specific and scientific information.

To ensure communications are appropriate and timely, site management activities and monitoring findings will be communicated through many mechanisms: scientific reports, peer reviewed publications, participation in symposia, the USACE and EPA websites, public meetings, and fact sheets. For example, the DAMOS Program holds periodic symposia (typically every three years) to report results and seek comments on the program. In addition, DAMOS monitoring results are published in an ongoing series of technical reports that are mailed to interested parties and organizations, are distributed at various public meetings, and published on the DAMOS website[14]. The USACE also has prepared and distributed several Information Bulletins and brochures on different aspects of the dredged material management. Site-related reports can also be reviewed at both the USACE Technical Library and the EPA regional libraries:

U.S. EPA New England

U.S. Army Corps of Engineers

[14] http://www.nae.usace.army.mil/damos/index.asp

Regional Library
John W. McCormack Federal Bldg
Five Post Office Square
Boston, MA 02109
Hours: Monday-Thursday 9:30 to 3:30 pm
Tel: 617-918-1990
http://www.epa.gov/libraries/region1.html

NAE Technical Library
696 Virginia Road

Concord, MA 01742-2751
Hours: Monday-Friday 7:30-4:00
Tel: 978-318-8118

Any party interested in being added to the DAMOS mailing list should provide their contact information to the USACE at:

U.S. Army Corps of Engineers, New England District
Regulatory Division
Marine Analysis Section
696 Virginia Road
Concord, MA 01742-2751

11. FUNDING

The costs involved in site management and monitoring will be shared between EPA New England and USACE-NAE and are subject to the availability of funds. This SMMP will be in place until modified or the site is de-designated and closed.

These recommendations do not necessarily reflect program and budgeting priorities of the Federal government in the formulation of EPA's national Water Quality program or the USACE national Civil Works water resources program. Consequently, any recommendations for specific activities or annual programs in support of efforts in the waters of coastal Massachusetts may be modified at higher levels within the Executive Branch before they are used to support funding level recommendations. Requests for funding are also subject to review and modification by Congress in its deliberations on the Federal budget and appropriations for individual programs. Similarly, state agency programs will depend solely on funds allocated to the programs by those agencies or other supporting agencies.

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