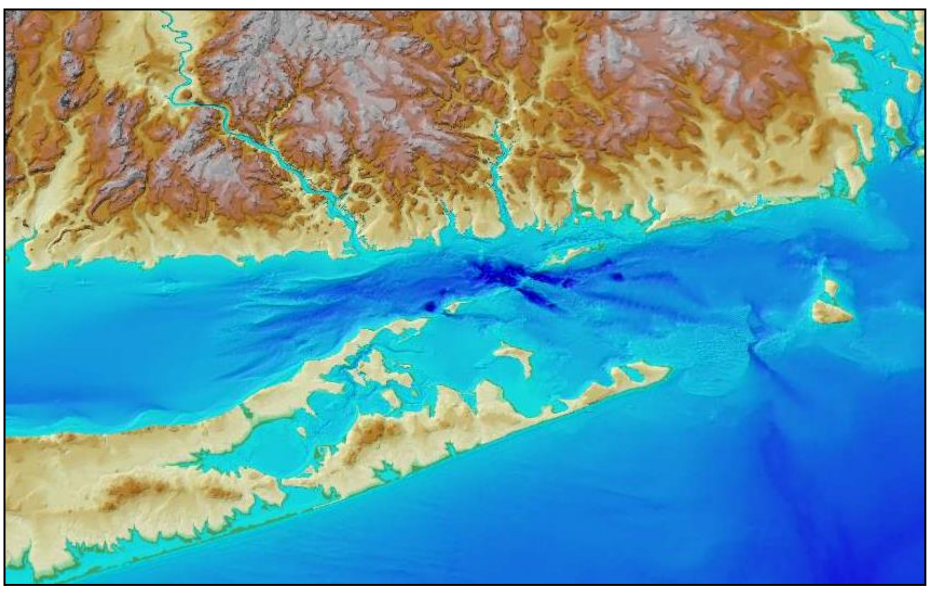
Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Sites in Eastern Long Island Sound, Connecticut and New York

APPENDIX I

Site Management and Monitoring Plan for Eastern Long Island Sound Disposal Site



Prepared by: **United States Army Corps of Engineers**

and

United States Environmental Protection Agency

November 2016

The following document is the Site Management and Monitoring Plan (SMMP) for the Eastern Long Island Sound Dredged material disposal site (ELDS).

This document has been developed and agreed to pursuant to the Water Resources Development Act Amendments of 1992 (WRDA 92) and to the Marine Protection, Research, and Sanctuaries Act of 1972 for the management and monitoring of ocean disposal activities, as resources allow, by the U.S. Environmental Protection Agency New England Office, and the U.S. Army Corps of Engineers New England District.

U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742

U.S. Environmental Protection Agency
New England, Office of Ecosystem Protection
5 Post Office Square, Suite 100
Boston, MA 02109

TABLE OF CONTENTS

Table of Tables

List of Figures

Attachments

Acronyms and Keywords

aRPD	Apparent Redox Potential Discontinuity
C.F.R.	Code of Federal Regulations
CLDS	Central Long Island Sound Dredged Material Disposal Site
cm	centimeter(s)
cm/s	centimeter(s) per second
CPUE	Catch per Unit Effort
CSDS	Cornfield Shoals Dredged Material Disposal Site
CT	Connecticut
CTDEEP	Connecticut Department of Energy and Environmental Protection (formerly CTDEP)
CWA	Clean Water Act
cy	cubic yard(s)
CZM	Coastal Zone Management
DAMOS	Disposal Area Monitoring System
DMMP	Dredged Material Management Plan
DQM	Dredging Quality Management
EFH	Essential Fish Habitat
ELDS	Eastern Long Island Sound Dredge Material Disposal Site
ERL	Effects Range – Low
ERM	Effect Range – Median
ESA	Endangered Species Act
FMP	Fisheries Management Plan
ft	foot (feet)
ft/s	foot (feet) per second
ITM	Inland Testing Manual
km	kilometer(s)
km^2	square kilometer(s)
LIS	Long Island Sound
LISS	Long Island Sound Study
m	meter(s)
m/s	meter(s)/second
m^3	cubic meter(s)
µm	micrometer(s)
MPRSA	Marine Protection, Research, and Sanctuaries Act of 1972
NAD83	North American Datum 1983
nmi	nautical mile(s)
nmi^2	square nautical mile(s)
NEPA	National Environmental Policy Act
NLDS	New London Dredged Material Disposal Site (formerly NLDN)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NY	New York
NYSDEC	New York State Department of Environmental Conservation

QA	Quality Assurance
QAPP	Quality Assurance Project Plan
Pa	Pascal
PAH(s)	Polycyclic Aromatic Hydrocarbon(s)
PCB(s)	Polychlorinated Biphenyl(s)
psu	practical salinity units
PV	Plan-view (photograph taken by a sediment profile system)
RHA	Rivers and Harbors Act
RIM	Regional Implementation Manual
SEIS	Supplemental Environmental Impact Statement
SMMP	Site Management and Monitoring Plan
SPI	Sediment profile imaging
TOC	Total organic carbon
USACE-NAE	U.S. Army Corps of Engineers, New England District
U.S.C.	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WLDS	Western Long Island Sound Dredged Material Disposal Site
WRDA	Water Resources Development Act of 1992 (Public Law 102-580)

1.0 INTRODUCTION

Long Island Sound is adjacent to one of the most densely populated and industrialized regions in North America. Long Island forms the southern boundary of the Sound and stretches eastward from New York City to Montauk over a distance of 110 miles (177 km) and has a maximum width of 23 miles (37 km). It has a population of approximately 8 million (2014 census). To the north Connecticut has a population of approximately 3.6 million (2014 census) with the highest population density being found in communities along western and central Long Island Sound, and in the greater Hartford area.

Cargo and petroleum products are shipped through Long Island Sound to and from the New York City area and several ferries traffic people and goods between Long Island and Connecticut. Maintenance of adequate navigation depth in marine terminals, port facilities, and private marinas is vital to the economics of the Long Island Sound region. Both commercial and recreational industries 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. The U.S. Army Corps of Engineers New England District (USACE-NAE) estimates that 52.9 million cubic yards (cy) (40.4 million m^3) of material will need to be dredged over the next 30 years in the ports and harbors surrounding Long Island Sound (2015-2045). The dredging needs of the eastern Long Island Sound region are estimated to be 20 million cy (15 million m^3) as of September 15, 2016 (USACE, 2016). The total expected dredging needs for the entire Sound region exceed the capacity of 40 million cy (30 million m^3) available at the two designated sites in the Sound (Central and Western Long Island Sound disposal sites; CLDS and WLDS, respectively) that would remain after the upcoming closure of the New London and Cornfield Shoals disposal sites (NLDS and CSDS, respectively) in December 2016.

Pursuant with the Marine Protection, Research, and Sanctuaries Act (MPRSA; also known as the Ocean Dumping Act) 33 U.S.C. §§ 1401 et seq., the USEPA has selected the Eastern Long Island Sound dredged material disposal site (ELDS) as the preferred alternative to provide for the long-term needs of dredged material disposal for the States of Connecticut and New York (Figure 1). The ELDS is located adjacent to the NLDS.

Prior to use of the ELDS, each project must receive a permit issued by USACE under Section 103 of the MPRSA, 33 U.S.C. § 1413 with concurrence by the USEPA. As discussed further in this Site Management and Monitoring Plan (SMMP), the USACE-NAE will coordinate with resource agencies on an individual project basis, as needed, for Essential Fish Habitat (EFH) under the Magnuson Stevens Act, for threatened and endangered species under the Endangered Species Act (ESA), and for other consultations.

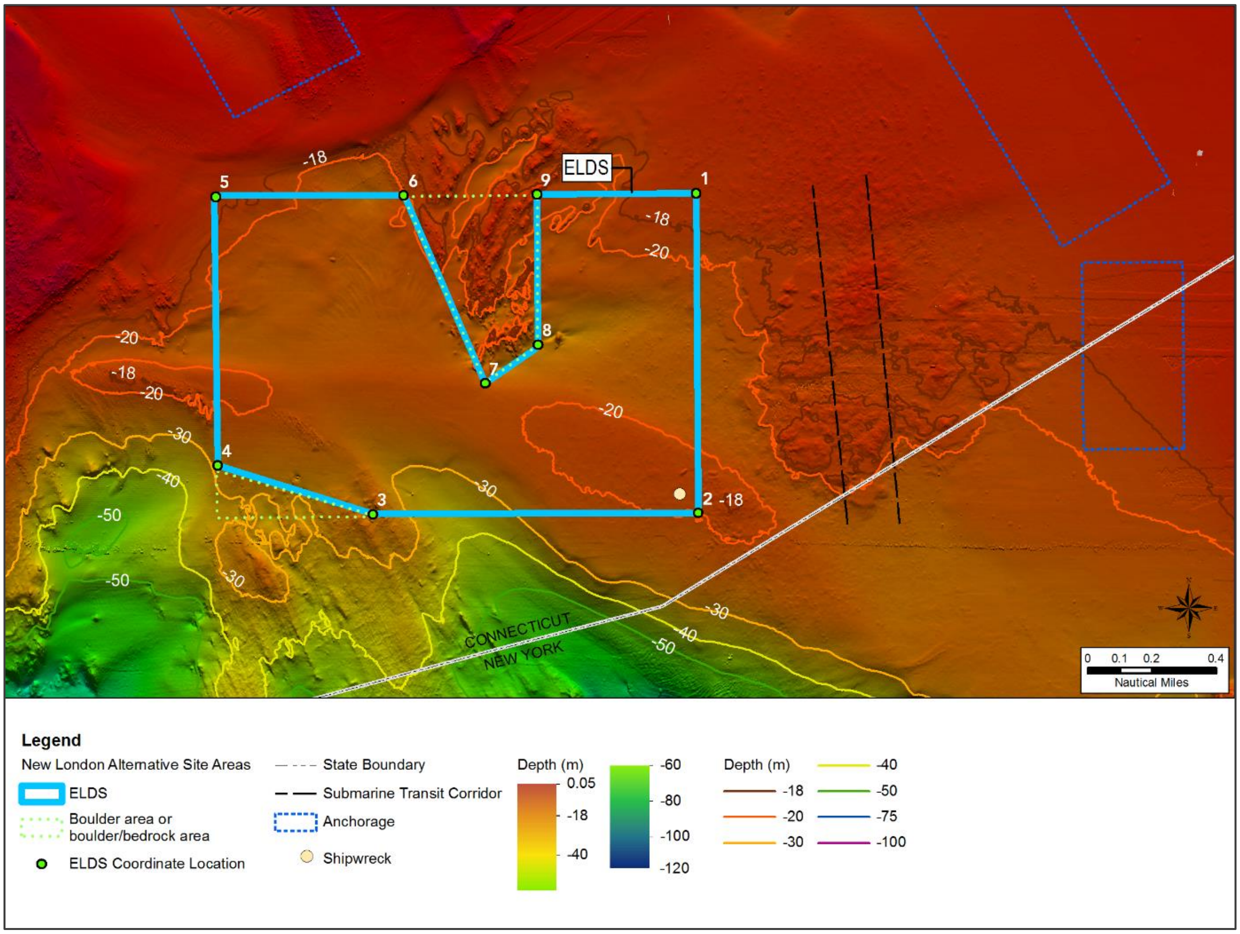


Figure 1. Location of Eastern Long Island Sound Dredged Material Disposal Site (ELDS) (USEPA, 2016).

Management plans for designated ocean dredged material disposal sites are required pursuant to §102(c) of the MPRSA, as amended by §506(a) of the Water Resources Development Act (WRDA) of 1992. In accordance with MPRSA [Section 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." The purpose of this SMMP is to summarize prior site monitoring results and outline a management plan and monitoring program for the ELDS that complies with the requirements of 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 USEPA, USACE-NAE, and other agencies such as the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and state regulatory agencies (see Section 9.0), to determine whether modifications in site usage, management, testing protocols, or additional monitoring are warranted.

To ensure that ocean dredged material disposal sites are managed to minimize adverse effects of disposal on the marine environment, the MPRSA §102(c) as amended by §506(a) of the WRDA of 1992, requires the completion of a SMMP upon designation of a site [MPRSA Section 102(c)(3)].

MPRSA further requires that a SMMP established for sites like the ELDS includes a schedule for review and revision of the plan to occur not less than 10 years after adoption of the plan, and every 10 years thereafter. Prior to the revision for the ELDS SMMP, USEPA and USACE-NAE will review the plan annually to ensure that the intent of the original procedures and protocols continue to meet the management objectives of the ELDS, and will continue to be used.

The ELDS is located to the southwest of the mouth of Thames River estuary. Specifically, it is located within a 1 x 1.5 nautical mile (nmi) area with two bedrock/boulder areas excluded. The total surface area of this polygon is 1.3 square nautical miles (nmi^2) (4.5 m^2) (Figure 1). The closest points of land to the ELDS are the Harkness Merrill State Park, Waterford, CT, located approximately 1.1 nmi (2.0 km) to the north, and Fishers Island, New York, located approximately 2.3 nmi (4.3 km) to the southeast.

As detailed in the site designation, the ELDS would provide the required capacity for estimated dredging needs while avoiding bedrock areas. Coordinates (NAD83) identified as Points 1-9 in Figure 1 are as follows: (1) 41°16.81′ N., 72°05.23′ W.; (2) 41°15.81′ N., 72°05.23′ W.; (3) 41°15.81′ N., 72°06.58′ W.; (4)41°15.97′ N., 72°07.22′ W; (5) 41°16.81′ N., 72°07.22′ W.; (6) 41°16.81′ N., 72°06.44′ W.; (7) 41°16.22′ N., 72°06.11′ W.; (8) 41°16.34′ N., 72°05.89′ W.; and (9) 41°16.81′ N., 72°05.89′ W.

Water depths within the ELDS range from approximately 45 feet (14 m) in the north to 100 feet (30 m) in the south. The southwest corner of the 1 x 1.5 nmi area (located to the south of Points 3 and 4 in Figure 1) contains a bedrock area and was therefore excluded from the boundaries of the ELDS. Similarly, the bedrock area to the north of the 1 x 1.5 nmi area (located in the center of the area marked by Points 6, 7, 8, and 9) was also excluded from the site boundary of the ELDS (USEPA, 2016).

2.0 REGULATORY FRAMEWORK AND AUTHORITIES

The intent of this SMMP is to provide a management framework and monitoring program that strives to minimize the potential for adverse impacts to the marine environment from dredged material disposal at ELDS. To this end, the SMMP identifies actions, provisions, and practices necessary to manage the operational aspects of dredged material disposal at ELDS. Section 40 C.F.R. § 228.10(a) of the MPRSA requires that the impact of disposal at a designated site be evaluated periodically.

2.1 Management

Management of the disposal site involves: regulating the times, quantity, and physical/ chemical characteristics of dredged material that is disposed at the site; establishing disposal controls, conditions, and requirements; and monitoring the site environment to verify that potential unacceptable conditions which may result in adverse impacts are not occurring from past or continued use of the disposal site and that permit terms are met.

In addition, the plan also incorporates the six requirements for ocean disposal site management plans discussed in MPRSA § 102(c)(3), as amended. These are:

1. 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 [§102(c)(3) Section II C];
2. A baseline assessment of conditions at the site [§102(c)(3) Section III];
3. A program for monitoring the site [§102(c)(3) Section IV];
4. Special management conditions or practices to be implemented at each site that are necessary for protection of the environment [§102(c)(3) Section V.A];
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 [§102(c) (3) Section VI];
6. A schedule for review and revision of the plan (which shall not be reviewed and revised less frequently than ten years after adoption of the plan, and every ten years thereafter) [§102(c)(3) Section VII].

40 C.F.R. Section 228.10 requires that a disposal site be periodically assessed based on the available body of pertinent data. Recognizing and correcting any potential unacceptable condition before it causes an adverse impact to the marine environment or presents a navigational hazard to commercial and recreational water-borne vessel traffic is central to this SMMP.

The practices that will be applied to address these management goals at ELDS include coordination among federal and state agencies, testing of material for acceptability for disposal at the site, review of general and specific permit conditions, review of allowable disposal technologies and methods, implementation of inspection, surveillance and enforcement procedures, periodic environmental monitoring at the site and at relevant reference sites for comparative evaluation, and information management and record keeping.

2.2 Monitoring

Section 40 C.F.R. § 228.10(b) specifically requires consideration of the following types of potential effects when evaluating impacts at a disposal site:

- Movement of materials into sanctuaries or onto beaches or shorelines [228.10(b)(1)];

- Movement of materials towards productive fishery or shellfishery areas [228.10(b)(2)];
- Absence from the disposal site of pollutant-sensitive biota characteristic of the general area [228.10(b)(3)];
- 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 [228.10(b)(4)];
- 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 [228.10(b)(5)];
- Accumulation of material constituents (including without limitation, human pathogens) in marine biota at or near the site (*i.e.*, bioaccumulation [228.10(b)(6)]); and
- Evaluating compliance with CWA or MPRSA permit conditions and conduct enforcement actions where warranted and as appropriate.

The monitoring approach defined in this SMMP focuses on those factors that provide an early indication of potential unacceptable impacts. The plan also incorporates ongoing regional monitoring programs in Long Island Sound that can provide additional information. The identification of unacceptable impacts from dredged material disposal at ELDS will be accomplished in part through comparisons of the monitoring results to historical (*i.e.*, baseline) conditions, and in part through comparison to nearby reference locations.

If site monitoring demonstrates that the disposal activities are causing unacceptable impacts to the marine environment as defined under 40 C.F.R. § Section 228.10(b), the site managers may place appropriate limitations on site usage to reduce the impacts to acceptable levels. Such responses may range from withdrawal of the site's designation; to limitations on the amounts and types of dredged material permitted to be disposed; or to limitations on the specific disposal methods, locations, or schedule.

Any proposal for the open-water disposal of dredged material from a particular project must begin with an examination of the nature of the material. Federal and non-federal projects evaluated under MPRSA are subjected to the same qualitative analysis. In order to be approved for open-water disposal, or most other disposal options, dredged material must be found suitable by applying the tiered testing protocols and evaluating the results.

Material that includes silts, material with high organic content, and other shoal material from harbors and areas with a history of contamination and industrial use are subjected to additional chemical testing to determine the relative likelihood of suitability. For materials exhibiting higher concentrations of contaminants in comparison to reference site values, project proponents may elect not to incur the cost of further testing and investigate non-open-water alternatives such as containment and treatment. For materials with chemical test results that do not exhibit high concentrations of contaminants, or where the project proponents wish to maintain the option of open-water disposal and other uses, the sediment is subjected to further tests aimed at predicting the biological response to exposure to the material during different phases of the disposal process. These tests are generally described as bioassay (toxicity) testing and bioaccumulation (tissue uptake of contaminants) testing.

The next tier of testing, the toxicity test, consists of exposing test organisms to the dredged material and comparing survivability rates to those of organisms exposed to reference and control materials. Where the dredged material exhibits greater toxicity to benthic test species than the reference sediments (using statistical tests and nationally developed interpretation guidance), project proponents may elect to forgo any further cost of testing for suitability for open-water disposal and seek alternate disposal options. Otherwise, material that exhibits toxicity comparable to the reference sediments shall undergo bioaccumulation testing before any determination on suitability for open-water disposal can be made. In general terms, bioaccumulation involves a long exposure of test organisms to the sediment followed by analysis of their tissues to determine the potential for uptake of contaminants from the dredged material. The test results are evaluated to determine the risk of exposure to ecological and human health.

Dredged material that is determined through these testing protocols to pose no unacceptable risk to the human or ecological health is deemed suitable for open-water disposal. These findings may be accompanied by specific management requirements, such as limitation on disposal rates, to minimize water column concentrations.

2.3 Dredged Material Disposal Authorities

The primary authorities that apply to the disposal of dredged material in the U.S. are the Rivers and Harbors Act of 1899 (RHA), WRDA, CWA, and MPRSA. 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). It also modifies other Acts, as necessary (*e.g.*, MPRSA).

All dredging, dredged material transport, and disposal must be conducted in compliance with permits issued for these activities. Surveillance and enforcement responsibilities at the disposal site are shared between the USACE-NAE and USEPA with assistance from the U.S. Coast Guard [33 U.S.C. § Sec 1417I]. The permittee is responsible for ensuring compliance with all project conditions including disposal of material at the correct location and within applicable site use restrictions. USEPA has enforcement responsibility under MPRSA. The USEPA and the USACE-NAE will cooperate to ensure effective enforcement of permit violations.

Section 404 of the Clean Water Act (33 U.S.C. § 1344) authorizes the USACE to issue permits for the disposal of dredged materials in the territorial sea, the contiguous zone, and ocean, as long as the material meets guidelines developed by USEPA pursuant to CWA §404(b)(1). USEPA's guidelines are promulgated at 40 C.F.R. Part 230. These guidelines set forth environmental standards and analytical requirements for use in determining when the USACE should authorize disposal of particular dredged material at a particular location. The USACE regulations governing the issuance of §404 permits are codified at 33 C.F.R. Parts 320-338.

Because Long Island Sound is an estuary, it falls within the geographical jurisdiction of Section 404 of the Clean Water Act as described above. However, in 1980, Congress enacted the "Ambro Amendment," an amendment to the MPRSA requiring that the disposal of dredged material in Long Island Sound from all federal projects and non-federal projects that exceed 25,000 cubic yards (19,114 cubic meters) comply with the MPRSA provisions.

Under Section 103 of MPRSA, the USACE-NAE is assigned permitting responsibility for dredged material, subject to USEPA review and concurrence that the material meets applicable ocean disposal criteria. The USACE-NAE is required to use USEPA-designated open-water disposal sites for dredged material disposal to the maximum extent feasible. If USEPA designated sites are not available, the USACE-NAE may select a site which may be used for two consecutive 5-year periods.

All projects authorized for dredged material disposal at ELDS are required to obtain a current State Water Quality Certificate from the Connecticut Department of Energy and Environmental Protection (CTDEEP) pursuant to Section 401 of the CWA [33 U.S.C., § 1341]. A state water quality certificate is also required for federal disposal projects that receive authorization from the USACE-NAE. To receive certification, the dredged material disposal must be consistent with the provisions of the CWA and the Connecticut Water Quality Standards (Sections 22a-426 through 22a-363f of the Connecticut General Statues – Structures, Dredging, and Fill) and water quality certification is made in conjunction with issuance of a state permit under this statute. In some cases applicants may qualify for authorization under a state Programmatic General Permit, which is a more expedited process (CTDEP, 2001).

3.0 MANAGEMENT PLAN

All dredged material projects using ELDS are subject to CWA Section 404, although private projects larger than 25,000 cubic yards and all federal projects will also be authorized under MPRSA Section 103, as stated in Section 2.0. The site will be managed in a manner that ensures the following site management goals are met:

- Ensure and enforce compliance with permit conditions;
- Minimize loss of sediment from the disposal site;
- Minimize conflicts with other uses of the area;
- Maximize site capacity;
- Minimize environmental impact from sediments disposed at the site; and
- Recognize and correct conditions that could lead to unacceptable impacts.

USEPA and the USACE-NAE will jointly manage ELDS and will also coordinate with the States of Connecticut and New York. The effectiveness of the management approach depends on having efficient planning processes, consistent compliance and enforcement, a robust yet flexible monitoring plan, and an effective communication structure that includes timely receipt and review of information relevant to the site management goals. To this end, the New England Regional Dredge Team meets quarterly and includes participation by the relevant federal and state agencies and standard agenda items of monitoring and compliance at open water sites including ELDS. In addition, USEPA and USACE-NAE have an annual meeting dedicated to the review of monitoring data, setting of monitoring objectives, and scoping of investigations for each open water site.

Management of ELDS will follow an approach adopted for other Long Island Sound disposal sites and will include the following practices:

- Evaluation of the suitability of material for disposal in accordance with the applicable requirements for the specific type of project (*i.e.*, MPRSA and CWA);
- Specification of disposal conditions, location, and timing in permits as appropriate (*e.g.*, disposal will not occur between June 1 and September 30 to ensure that dredging windows for fisheries are met or disposal may be restricted during spring tides to ensure that water quality criteria are not exceeded outside the boundaries of the site);
- Enforcement of all permit conditions;
- Disposal specified to occur at the specified target coordinates (to be determined on an annual basis);
- To ensure compliance, all scows disposing material at the ELDS are required to utilize tracking instrumentation in accordance with the USACE-NAE Dredging Quality Management (DQM) system to allow determination of actual disposal locations;
- Positioning of disposal coordinates are set each year with the intent of minimizing environmental impacts and maximizing long-term site capacity;
- Limiting the buildup of material in height above the bottom such that it is not a hazard to navigation or more likely to be mobilized by storm events;
- Conducting disposal site monitoring in a consistent, systematic manner (Attachment A); and
- Specification of de-designation (*i.e.*, closure) conditions and dates as appropriate [§102(c)(3) Section VII].

3.1 Specific Management Practices

In addition, special management practices may exist at ELDS for individual projects based on site monitoring data and long-term management goals:

- Specification of the dredged material volume that can be disposed at specific locations within the site or the total dredged material volume disposed at the site;
- Modifications to the site designation or to disposal methods, locations, or time of disposal; and
- Requirement for additional monitoring focused on a specific aspect of a project.

40 C.F.R. Section 228.10(c) requires that a disposal site be periodically assessed based on the available body of pertinent data in order to recognize and correct any potential unacceptable condition before it causes an adverse impact to the marine environment or presents a navigational hazard to commercial and recreational water-borne vessel traffic. Both agencies will cooperate to ensure effective enforcement of all disposal requirements. The MPRSA gives authority to USEPA to enforce permit conditions.

The USACE-NAE will provide USEPA with summary information on each project at two stages of the dredging and disposal process. A Summary Information Sheet will be provided when dredging operations begin, and a Summary Report will be submitted when dredging operations have been completed.

The following list represents special conditions that are to be applied to projects using ELDS. 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:

- At least ten working days in advance of the start date, the First Coast Guard District, Aids to Navigation Office shall be notified of the location and estimated duration of the dredging and disposal operations.
- At least ten working days in advance of the start date, the Coast Guard Captain of the Port Long Island Sound shall be notified of the location and estimated duration of the dredging and disposal operations.
- The Captain of the Port, Long Island Sound shall be notified at least two hours prior to each departure from the dredging site.
- The DQM system must be operational on each disposal scow and record each disposal event. This information is automatically uploaded to a USACE-NAE database.
- 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 USACE-NAE.

- The permittee must notify the USACE-NAE upon completion of dredging for the season by completing and submitting the form that the USACE-NAE will supply for this purpose.
- Except when directed otherwise by the USACE-NAE, all disposal of dredged material shall adhere to the following: The permittee shall release the dredged material at a specified set of coordinates within the site. All disposal is to occur at the specified target coordinates with the scow moving at minimal speed to maintain steerage (generally less than two knots). The USACE-NAE will provide the target coordinates. 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.
- USEPA and the USACE-NAE (and/or their designated representatives) reserve all rights under applicable law to free and unlimited access to and/or inspection of (through permit conditions): 1) the dredging project site including the dredge plant, the towing vessel and scow at any time during the course of the project; 2) any and all records, including logs, reports, memoranda, notes, etc., pertaining to a specific dredging project (federal or non-federal); 3) towing, survey monitoring, and navigation equipment. An example of a scow log is provided in Attachment B.
- If dredged material regulated by a specific permit issued by the USACE or federal authorization is released (due to an emergency situation to safeguard life or property at sea) in locations or in a manner not in accordance with the terms or conditions of the permit or authorization, the master/operator of the towing vessel and/or the Disposal Inspector shall immediately notify the USACE-NAE of the incident, as required by permit. The USACE-NAE shall copy USEPA on such notification no later than the next business day. In addition, both the towing contractor and the USACE-certified disposal inspector shall make a full report of the incident to the USACE-NAE and USEPA within ten days.

3.2 Modifications to the Management Plan

Based on the findings of the monitoring program, modifications to the site use may be required. Corrective measures such as those listed below, but not limited to, will be developed by USEPA and the USACE-NAE.

- Stricter definition and enforcement of disposal permit conditions;
- Implementation of more conservative evaluation procedures on whether sediments proposed for dredging are suitable for open-water disposal;
- Implementation of special management practices to prevent any additional loss of contaminants to the surrounding area;
- Excavation and removal of any unacceptable sediments from the disposal site (an unlikely, worst-case scenario given that the permitting program should exclude such material from the site to begin with, and since excavation could make matters worse by releasing contaminants during the process);

- Closure of the site as an available dredged material disposal area (*i.e.*, to prevent any additional disposal at the site);
- Use of marine mammal observers during disposal operations;
- Establishment of dredging windows; and
- Compliance with EFH under the Magnuson Stevens Act and Endangered Species Act (ESA) concerns.

In addition to management practices for the disposal site and for individual projects, a SMMP must also include a monitoring plan (see Section 6.0). Coordination and outreach should occur on both a regular and as needed basis and include state and federal agencies, scientific experts, and the public. To ensure communications are appropriate and timely, site management activities and monitoring findings will be communicated through a combination of scientific reports and peer-reviewed publications, participation in symposia, and public meetings and fact sheets.

4.0 BASELINE ASSESSMENT

MPRSA 102(c) (3)(A) as amended by WRDA 92 requires that the SMMP include a summary of baseline conditions at the site. Baseline conditions are reported in the Supplemental Environmental Impact Statement (SEIS) for the site designation (USEPA, 2016). This section provides a brief site description and overview of the ELDS; more detailed information is found in the SEIS and in monitoring data from USEPA, CTDEEP, and the Long Island Sound Study (LISS).

4.1 Site Characteristics

Much of the seafloor in eastern Long Island Sound consists of an east-west trending depression with depths ranging from 100 to 200 feet (30 to 60 m). The bottom topography is irregular due to submerged reefs and shoals, exposed bedrock, and scoured areas. Depressions in Long Island Sound formed as a result of erosion of sediment by tidal currents. Shoals are either areas of sediment deposition (such as the Mattituck Sill), or glacial deposits of rocks and boulders.

The ELDS is located immediately adjacent to the NLDS. It is contained within an area referred to in the SEIS as Sites NL-Wa and NL-Wb, which have a combined surface area of 1.5 x 1 nmi. Two bedrock/boulder areas within Sites NL-Wa/b with a total surface area of 0.2 nmi^2 (0.7 km^2) were excluded, resulting in a surface area of 1.3 nmi^2 (4.5 km^2) for the ELDS (Figure 1).

The seafloor of most of Site NL-Wa (*i.e.*, eastern part of the ELDS) is flat, with water depths predominantly between 60 and 100 feet (18 and 30 m) except the southern boundary where depths reach approximately 120 feet (37 m). Predominant depths of Site NL-Wb (*i.e.*, western part of the ELDS) are similar to Site NL-Wa; the site is deepest (approximately 100 feet, or 30 m) at its southern end adjacent to the southwestern bedrock area. Water depths in the north-central boulder area are shallower and more variable ranging mostly between 45 and 66 feet (14 to 20 m).

4.2 Physical Characteristics

The physical parameters that are important in evaluating the stability of a potential site for dredged material disposal include water elevations, bottom type, currents, waves, and the density structure of the water column, which were studied for the SEIS. Currents directly affect the transport and dispersion of sediment by imparting shear stress to the surface sediments and transporting suspended sediments.

Water Elevations

Long Island Sound in an unusual estuary in that it is connected to the ocean at both ends: at The Race in the east, and through the East River at the west. Because the East River channel is narrow, the tidal variations in water level in the Sound are forced by ocean level fluctuations that propagate through Block Island Sound to The Race. There are several important tidal oscillation periods, and the geometry of the Sound causes the semi-diurnal (approximately two cycles per day) fluctuations to amplify to the western end of the Sound. The largest tidal constituent increases from 1.9 feet (0.58 m) at Lake Montauk Harbor (on the eastern tip of Long Island) to 7.6 feet (2.3 m) at Kings Point, New York (in western Long Island Sound). The various tidal constituents combine to cause spring and neap tides that can raise or lower the level of high and low water, by 0.8 feet (0.25 m) at the Race and by 2 feet (0.61 m) at Kings Point.

Currents, Waves, and Velocity

The magnitude of the tidal currents also varies vertically throughout the water column with stronger currents occurring near the surface. Peak near-surface tidal currents through The Race are typically 3.9 ft/s (1.2 m/s) and can exceed 5.3 ft/s (1.6 m/s) during spring tides (USEPA, 2016). Westward from The Race, tidal current velocities decrease rapidly as Long Island Sound widens. Tidal currents in the western and central basins are typically 0.7 to 1.0 ft/s (0.2 to 0.3 m/s). Near-bottom currents are strongest in eastern Long Island Sound, with peak near-bottom velocities of 2.0 to 2.3 ft/s (0.6 to 0.7 m/s) during spring tides. Near-bottom currents weaken toward western Long Island Sound to only 0.7 ft/s (0.2 m/s).

As part of the physical oceanography study for the SEIS, significant wave heights were calculated from data at seven mooring stations during three seasons (Figure 2). Four mooring stations were located in eastern Long Island Sound (Stations 1, 2, 3, and 7) together with wave measurements at the CLIS buoy. Wave heights in the deeper waters of eastern Long Island Sound are homogenous compared to Block Island Sound where waves are larger and have longer periods. Mean significant wave heights in eastern Long Island Sound are largest in the winter, and maximum wave heights have reached 8 feet (2.5 m).

In recent years, the largest recorded wave heights in Long Island Sound occurred on August 28-30, 2011 (Tropical Storm Irene) and October 28-31, 2012 (Superstorm Sandy). The significant wave heights during these storms peaked at 13 feet (4 m) at the CLIS buoy. The longer wave periods during these unusual storms are important to sediment transport because the depth to which wave motions extend increases with the wave period. During winter storms the dominant wave periods reach up to 5 or 6 seconds (s) in Long Island Sound; during Tropical Storm Irene and Superstorm Sandy, longer wave periods were observed with values reaching 8 seconds (s) at the CLIS buoy.

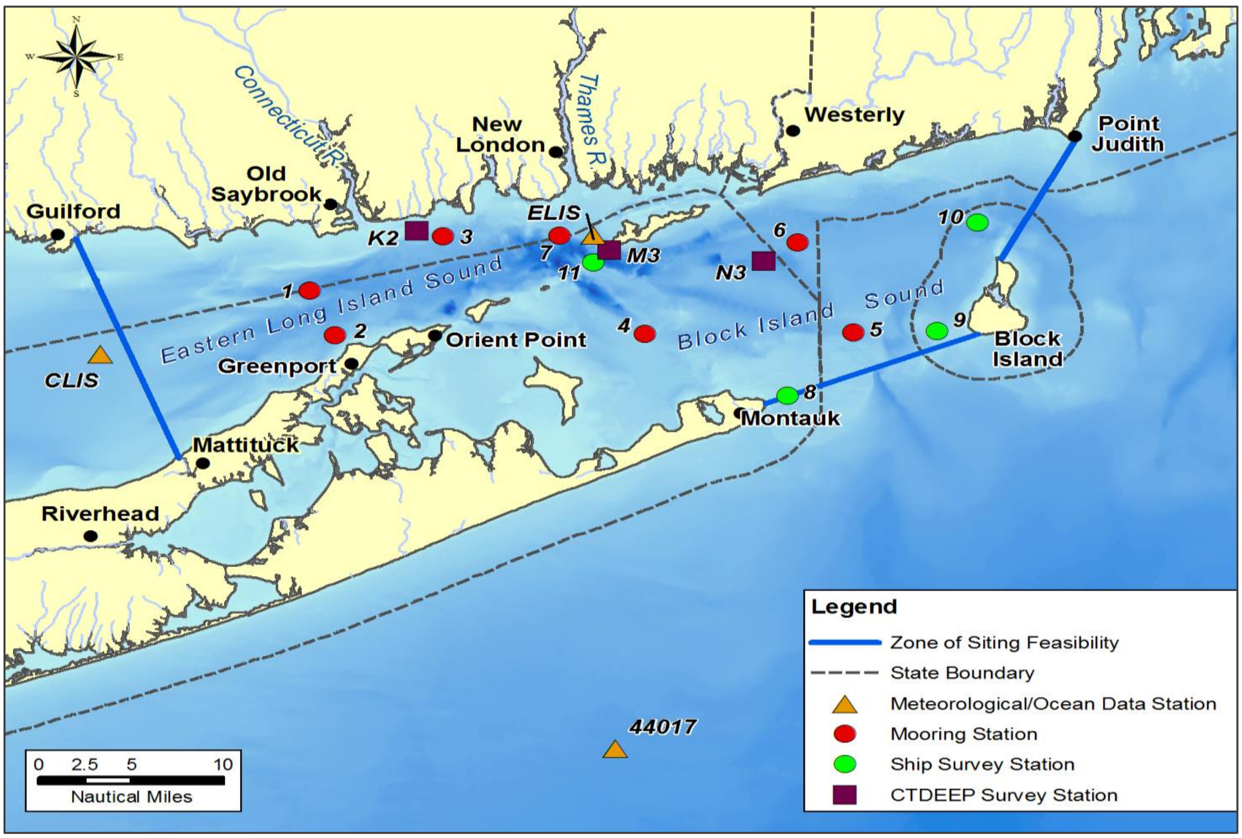


Figure 2. Locations of meteorological/ocean buoys, and mooring and ship survey stations (USEPA, 2016)

Over time, as currents move over a mound, hydraulic forces act on the sediment particles in the form of shear and lift. The response of the particles to these forces is determined by current speed, particle size, shape, density, and any friction or cohesion exerted by adjacent sediment grains.

As part of the physical oceanographic study, the bottom stress was simulated for conditions during Superstorm Sandy (October 28-31, 2012). The extreme value analysis for significant wave heights for summer-fall conditions suggests that this wave height would occur once every 30 years. The maximum sustained (15-minute average) wind speed of 46 knots (23.6 m/s) occurred on October 29, 2012 during Superstorm Sandy.

Stability of dredged material at the sites was assessed using the University of Connecticut's FVCOM model (see Chapter 4.5 of the SEIS) to assess the shear stress on the bottom of the ELDS. The maximum bottom stress values during 2013 were below 0.75 Pascal (Pa) for the ELDS; the maximum bottom stress in the excluded bedrock/boulder area adjacent to the southwestern boundary of the ELDS was calculated with 0.76 Pa. The relatively low maximum bottom stresses at the ELDS are consistent with the observations made by the DAMOS program at the NLDS site which compared pre-storm and post-storm bathymetric surveys and concluded that there was little movement of the dredged sediments due to a major storm (SAIC, 2003). Low bottom stress is also consistent with the topography of the NLDS, which indicates that surface sediments are not reworked by storms and tidal currents (*e.g.*, SAIC, 2004; AECOM, 2009).

Climate change is likely to result in changes to the temperature, water level, and perhaps the salinity and wave climate in Long Island Sound. The magnitude of these changes are not expected to significantly modify the bottom stress magnitudes expected at the proposed disposal sites. Climate change is likely to result in increases in unexpected shoaling of sediments and coastal erosion. In addition, these storms may result in additional dredging needs which may also present opportunities for beneficial use of dredged material.

4.3 Sediment and Water Quality

Sediments were studied as part of three surveys for the SEIS: a 2015 sediment chemistry survey, a 2013 benthic survey, and a 2014 Sediment profile imaging Plan-view survey (SPI/PV; see Sections 6.1 and 6.3 for more detailed descriptions).

Total organic carbon concentrations (TOC) in eastern Long Island Sound sediments in the area between Bartlett Reef and Mattituck Sill are lower than 0.5% in most areas. The mean TOC concentration (based on the 2013 and 2015 surveys) at the ELDS was measured at approximately 1.0% (Table 1). At the NLDS, located immediately to the east of the ELDS the TOC concentration was 2.4%, reflecting in part the disposed dredged material.

The predominant grain size at the ELDS is sand (Table 1). Sediments at the adjacent NLDS are on average finer-grained (due to the disposed dredged material). Specifically, at the ELDS, the mean sand content was measured at 83%. For comparison, the mean sand content at the NLDS was measured as 53%. The mean silt and clay content at the NLDS was 39%, which was 2.8 times higher than the mean silt and clay content at the ELDS (mean of 14%). The highest silt and clay content at all studied stations (*i.e.*, ELDS, NLDS, and offsite stations) was measured at 78% at a station in the NLDS that has received most of the dredged material in the previous decade (AECOM, 2009).

The predominant sediment grain size observed during the 2014 SPI/PV survey throughout most of the ELDS was a fine sand layer overlying silt and clay. These grain sizes were consistent with findings by a more extensive SPI/PV survey conducted in 2007 at the NLDS and at off-site reference stations (AECOM, 2009); they were also consistent with the findings of the 2015 sediment chemistry survey and 2013 benthic survey.

Table 1. Mean Grain Size and TOC Content in Sediment

Site	2015 Sediment Chemistry Survey				2013 Benthic Survey				2014 SPI/PV Survey
	Gravel	Sand	Silt and Clay	Total Organic Carbon	Gravel	Sand	Silt and Clay	Total Organic Carbon	Predominant Grain Size
	Percent				Percent				
ELDS									
NL-Wa	2.2	85.2	12.6	0.5	6.3	79.7	14.0	1.3	Fine sand overlying silt and
NL-Wb	2.2	82.9	15.0	1.0	n/a				Fine sand
Off-site of ELDS									
NLDS	9.4	54.7	35.9	1.7	7.3	50.6	42.1	3.0	Fine sand, overlying silt+clay
Off-site – east of NLDS	0.4	71.8	27.8	0.4	n/a				Very fine sand

Source: USEPA, 2016

Metals, polycyclic aromatic hydrocarbon (PAH), pesticide, and polychlorinated biphenyl (PCB) concentrations were tested during the 2015 sediment chemistry survey (USEPA, 2016). Most concentrations were below the National Oceanic and Atmospheric Administration [NOAA] Effects Range-Low [ERL]; none of the concentrations exceeded the Effects Range-Median [ERM] values.

In order to be determined as suitable for disposal at ELDS, sediment must meet chemical and biological criteria that are defined as protective of water quality. In addition, screening level modeling is performed to further evaluate the potential for water column effects as part of the suitability determination. Given this level of testing, the SMMP does not require specific water column monitoring at the ELDS. Rather, it relies on the National Estuary Program's LISS routine measurements; if issues are identified by this monitoring that indicate a potential relationship to ELDS, then a monitoring plan will be developed consistent with LISS methodologies.

The mean salinity at the ELDS is 30 psu, with monthly mean salinities ranging between approximately 27 and 31 psu (USEPA, 2016). During the physical oceanography study for the SEIS, the highest near-bottom salinity in Long Island Sound occurred consistently near The Race due to the inflow of more saline waters from Block Island Sound. Salinities are slightly lower further west in Long Island Sound due to inflow of freshwater from rivers, particularly the large Connecticut River.

Monthly mean water temperatures at the ELDS vary from approximately 4 to 20ºC with highest temperatures occurring in September and lowest temperatures occurring in March. Water entering from Block Island Sound is slightly cooler than water in Long Island Sound throughout the summer. The southern side of the Long Island Sound had the warmest bottom temperatures in the summer during the physical oceanography study.

The water column in Long Island Sound is well-mixed from fall through late spring, but increased freshwater runoff and increasing water temperatures cause buoyant, warmer water to become layered over more dense, colder water during the summer and early fall. Hypoxic events, prevalent in the summer in the western and central Long Island Sound, do not extend to eastern Long Island Sound. Contaminants analyzed in the water column at the Cornfield Shoals and the Central Long Island Sound sites (CSDS and CLIS, respectively) showed either low concentrations or were not detected.

The circulation pattern in the eastern basin of Long Island Sound ensures that the water is rapidly mixed in both the horizontal and vertical dimensions. Consequently, measurements of water quality parameters (such as salinity, temperature, turbidity, dissolved oxygen) show only subtle variations. The short-term variability and seasonal cycles in runoff and biological productivity are much more substantial factors that affect the water quality in eastern Long Island Sound.

4.4 Bioaccumulation

Project data do not exist for the ELDS, therefore, previous studies were reviewed including clam, worm, and lobster tissue at the NLDS site (USEPA and USACE, 2004a). Most recently, four dredging projects with bioaccumulation data were examined as part of the site designation. Data included worm *(Nereis virens)* and clam *(Macoma nasuta)* bioaccumulation testing and comparisons to risk-based tissue concentrations. The projects evaluated included the Americas Styrenics project (2014), US Coast Guard Academy (2013), Patchogue River Federal Navigation Project (2011), and the North Cove Federal Navigation Project (2003). For all projects no bioaccumulation tissue exceeded FDA Action/Tolerance Levels for protection of human health. In addition, risk model results did not exceed risk values for carcinogenic and non-carcinogenic risks from exposure through the food chain (USEPA, 2016).

4.5 Living Resources

Zooplankton include metazooplankton (organisms larger than 200 micrometers [µm]) and microzooplankton (organisms between 35 and 200 µm in size). Overall, the seasonal patterns in metazooplankton abundances and species composition over the last 60 years seem to be relatively unchanged in Long Island Sound. Specifically, peak abundances during the periods 1952-1953, 2002-2004, and 2008-2009 occurred between April and June of each year; minimum abundances occurred between December and February.

Routinely reported taxa have included the following: Arthropoda (copepods, mysids, crab larvae, amphipods, barnacle nauplii, and cladocerans); Annelida (polychaete larvae); Mollusca (gastropod and bivalve larvae); Echinodermata (sea star larvae); Chordata (*Oikopleura* sp.); Bryozoa; and Chaetognatha (*e.g.*, the arrow worm, *Sagitta elegans*). Copepods accounted for 80 to 90% of the abundances. The seasonal metazooplankton cycles are dominated by the copepods *Acartia hudsonica, Temora longicornis,* and *Pseudocalanus* sp. in winter and spring, and by the copepods *Acartia tonsa, Paracalanus crassirostris,* and *Oithona similis* in the summer and fall.

As for phytoplankton, there is a distinct decreasing gradient in mesozooplankton biomass and abundances from west to east in Long Island Sound. Based on 2002 to 2009 data from the CTDEEP zooplankton monitoring program, the mean annual total mesozooplankton abundance is 4 and 3 times higher in western and central Long Island Sound, respectively, compared to eastern Long Island Sound.

<u>Benthic Community</u>

The benthic community within the ELDS (*i.e.*, Site NL-Wa, Site NL-Wb) and its vicinity (*i.e.*, NLDS, off-site of the NLDS) is primarily made up of the three major taxonomic groups: Annelida, Arthropoda, and Mollusca (USEPA, 2016).

The SPI/PV survey assessed successional stages of the organisms living in the sediment (referred to as 'infauna'). Current theory holds that organism-sediment interactions in fine-grained sediments follow a predictable sequence of development after a major disturbance such as dredged material disposal. This sequence has been subjectively divided into three successional stages (Rhoads and Germano, 1986). A successional stage is assigned by assessing which types of species or organisms-related activities are apparent in a SPI image. Stage I is the initial stage of colonization. Stage III is the most developed stage with a mature community of deposit-feeding infauna.

All of the stations assessed during the 2014 SPI/PV survey at the ELDS and its vicinity were classified as Stage III succession except for the two westernmost stations at Site NL-Wa. Sediments at the NLDS were heavily bioturbated with numerous burrows and evidence of subsurface feeding. The stations were classified as either Stage I on III, Stage II on III, or Stage

III. Stations at NL-Wb exhibited Stage II succession with a fairly dense shell layer. The shell lag and pebbles on the substrate had encrusting and attached epifauna on them suggesting a fairly stable substrate. The apparent redox potential discontinuity (aRPD) depth, a measure of oxygenation in the sediment, at the NLDS ranged from 1.9 to 4.7 cm with a mean of 3.1 cm, indicating good habitat quality. At Site NL-Wa, the aRPDs were at least 2.8 cm at the various stations, also indicating good habitat quality. Conditions were similar at Site WL-Wb; sediments from all four stations were bioturbated with some evidence of subsurface feeding, and the shell lag and pebbles also had encrusting and attached epifauna, suggesting a fairly stable substrate. Reference stations located 1.5 nmi (2.8 km) to the east from the NLDS (*i.e.*, DAMOS monitoring Stations NLON-REF) had evidence of two polychaetes typical of Stage III succession. These organisms were *Saccoglossus kowaleswski* as evidenced by its distinctive fecal coil on the surface, and *Chaetopterus variopedatus* as evidenced by its thick parchment tube in the sediment through which it pumps water. The aRPD at DAMOS monitoring Stations NE-REF (located 0.4 nmi [0.7 km] to the east of the NLDS) ranged from 2.5 to 6.8 cm with a mean of 4.6 cm. At Stations NLON-REF, the aRPD ranged from 2.2 to 4.6 cm with a mean of 3.6 cm. These depths are indications of good habitat quality (USEPA, 2016).

Additional surveys of mounds at the NLDS have shown that the benthic community readily recolonizes, with Stage I/II communities well established as soon as eight months after a disposal event and with historic mounds showing Stage III communities. Surveys also show that benthic communities are similar to those found at off-site reference stations (USEPA, 2016).

Other measure of benthic conditions are the ecological parameters abundance (*i.e.*, total individuals), species richness, diversity, and Pielou's Evenness (*i.e.*, a measure of the distribution of the abundance of the organisms in a sample among the species in that sample). These ecological parameters determined during the 2013 benthic survey indicate that, overall, both Site NL-Wa and the NLDS had relatively good species diversity and were not dominated by just a few species (Table 2). The data from within the NLDS and Site NL-Wa were consistent with observations at locations off-site of the NLDS, although the species richness was slightly lower at off-site stations (USEPA, 2016).

<u>Commercial/Recreational Fish and Shellfish Resources</u>

Long Island Sound, a semi-enclosed estuary, is an important economic resource for both commercial and recreational/sport fishermen. The region is occupied by more than 105 fish species; however, only a few of them are considered year-round residents (Gottschall et al., 2000). Most finfish species such as scup, bluefish, and striped bass migrate through the area in response to seasonal variations in water temperature, salinity, and access to spawning and nursery grounds in Long Island Sound.

Table 2. Ecological Parameters of Benthic Infauna (2013 Benthic Survey)

Site	No. of Samples	Statistics	Total Individuals	Species Richness	Diversity Index	Pielou's Evenness
ELDS						
NL-Wa	11	Minimum	187	33	1.32	0.38
		Maximum	703	91	3.46	0.85
		Mean	**399**		**2.76**	**0.69**
		Total Species Richness		**172**		
Off-site of ELDS						
NLDS	8	Minimum	259	60	2.84	0.68
		Maximum	875	100	3.80	0.83
		Mean	**615**		**3.30**	**0.75**
		Total Species Richness		**208**		
Off-site of NLDS	6	Minimum	59	21	2.33	0.53
		Maximum	1,874	78	3.23	0.88
		Mean	**762**		**2.83**	**0.71**
		Total Species Richness		**154**		

Source: USEPA, 2016

Finfish abundance and distribution show several patterns. The overall abundance of finfishes and the species diversity has remained fairly stable since 1984 (USEPA, 2016). However, western and central Long Island Sound have shown significantly higher abundances compared to eastern Long Island Sound, based on CTDEEP data from 1984 to 2012 (Figure 3). This is likely a result of more extensive mud habitat in western and central Long Island Sound that supports greater fish densities (USEPA and USACE, 2004a). Particularly, the shallow mud and transitional substrates adjacent to the western and central basins in Long Island Sound have the highest average catch per unit effort (CPUE).

In 2013, trawl data were collected in eastern Long Island Sound. The most abundant finfish species present in the vicinity of the ELDS was scup (59% of species caught); scup also had the greatest biomass (55% of species caught). There was no significant difference between the abundance or CPUE near and off of the various sites surveyed for this site designation in eastern Long Island Sound for species of interest identified, namely scup, winter flounder, striped bass, bluefish, windowpane flounder, and striped sea robin (Table 3).

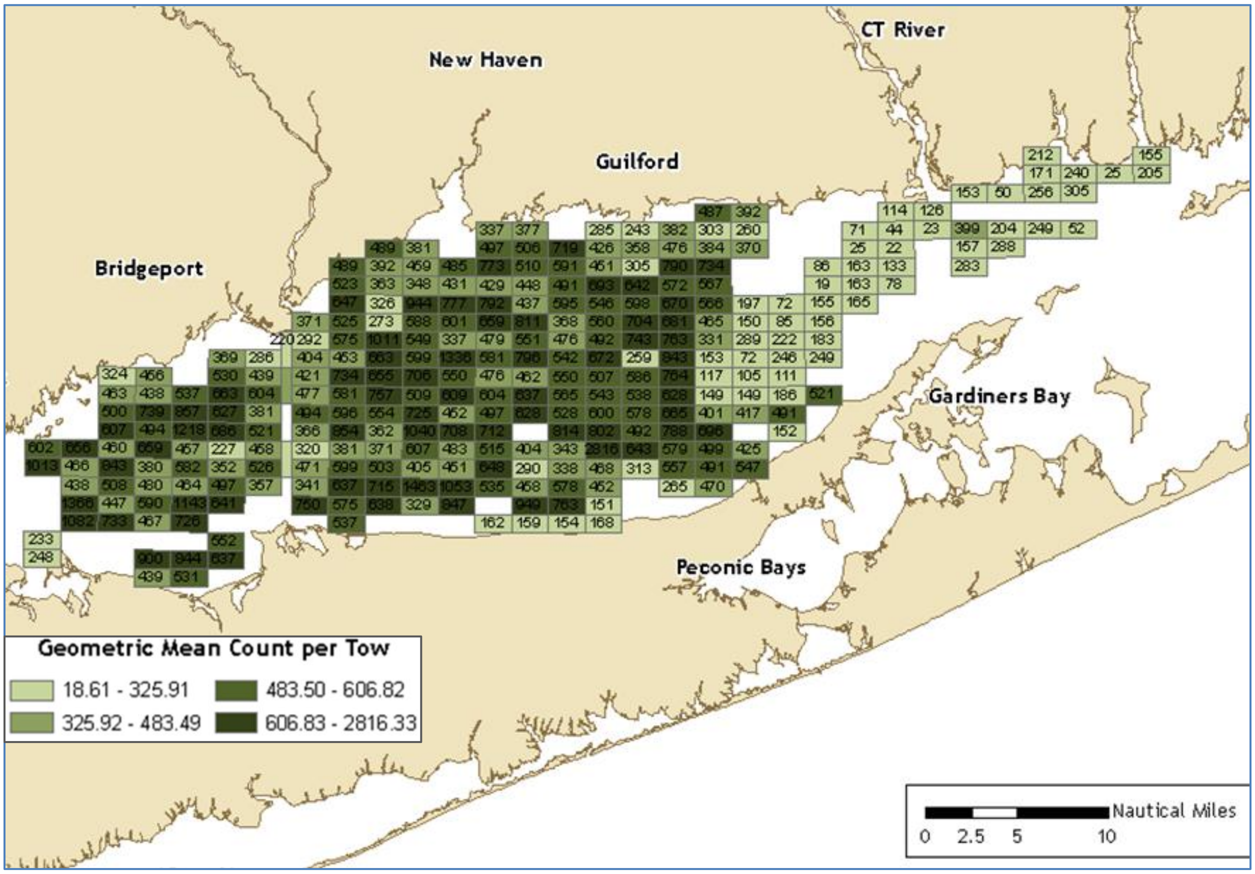


Figure 3. Mean finfish abundance per tow by location during the CTDEEP Long Island Sound Trawl Surveys, 1984-2012 (Source: CTDEEP, unpublished data, August 2013).

Table 3. Average Catch per Unit Effort for Finfish Species of Interest in Eastern Long Island Sound

Species of Interest		**Average Catch per Unit Effort (CPUE)**		**P-value**
		Near-site ELDS vicinity	**Off-site (West)**	
Primary	Scup	8.19	7.40	0.919
	Winter flounder	0.18	0.29	0.530
	Striped bass	0.02	0.01	0.519
	Bluefish	0.01	0.00	0.374
Secondary	Windowpane flounder	0.12	0.86	0.309
	Striped sea robin	0.02	0.07	0.329

Source: USEPA, 2016

Important commercial or recreational bivalve mollusk resources within Long Island Sound include the bay scallop (*Argopecten irradians*), eastern oyster (*Crassostrea virginica*), northern quahog/hard clam (*Mercenaria mercenaria*), softshell clam (*Mya arenaria*), and surf clam (*Spisula solidissima*). Lobster *(Homarus americanus),* longfin squid *(Loligo pealeii),* horseshoe crab *(Limulus polyphemus),* channeled whelk *(Busycon canaliculatum),* and knobbed whelk *(Busycon carica).* With the exception of lobster and longfin squid, commercially and recreationally important shellfish resources of Long Island Sound occur in shallow nearshore waters.

Based on the CTDEEP data, lobsters, which were most abundant on muddy substrate, occurred Sound-wide in all seasons prior to 1999, particularly in western and central Long Island Sound. Since then, much of the remnant lobster population has been concentrated in deeper waters of central Long Island Sound and the Race (USEPA, 2016).

Endangered and Threatened Species and Species of Special Concern

An endangered species is one whose overall survival in a particular region or locality is in jeopardy as a result of loss or change in habitat, overall exploitation by man, predation, adverse interspecies competition, or disease. Unless an endangered species receives protective assistance, extinction may occur. Threatened or rare species are those with populations that have become notably decreased because of the development of any number of limiting factors leading to a deterioration of the environment. A species may also be considered as a species of "special concern." These may be any native species for which a welfare concern or risk of endangerment has been documented within a state. Endangered and threatened species are protected under the federal Endangered Species Act, 16 U.S.C. §§ 1531 et seq. and under state law while species listed as "special concern" are protected only by state law.

Endangered and threatened species and species of special concern are discussed in more detail below for mammals, reptiles, fish, and birds. Individual federally listed species and species listed for the States of Connecticut and New York are presented in Table 4.

- ***Marine Mammals:*** Six endangered marine mammals and one species of special concern were identified for the SEIS study area. In general, whales and other marine mammals are not frequently observed in Long Island Sound; however, incidental sightings have resulted in the inclusion of several species on the endangered species list for Connecticut and New York (USEPA, 2016). Marine mammals are not expected to spend significant portions of time within the ELDS and adverse impacts to mammals are not likely to occur.

Table 4. Marine and Coastal Endangered and Threatened Species and Species of Special Concern in Long Island Sound

Common Name	Scientific Name	Status		
		Federal	CT	NY
Marine Mammals				
Blue whale	*Balaenoptera musculus*	E		E
Finback whale	*Balaenoptera physalus*	E		E
Humpback whale	*Megaptera novaeangliae*	E		E
North Atlantic right whale	*Megaptera novaeangliae*	E		E
Sei whale	*Balaenoptera borealis*	E		E
Sperm whale	*Physeter catodon*	E		E
Harbor porpoise	*Phocoena*		SC	SC
Marine Reptiles				
Green sea turtle	*Chelonia mydas*	T	T	T
Hawksbill sea turtle	*Eretmochelys imbricata*	E		E
Kemp's Ridley sea turtle	*Lepidochelys kempii*	E	E	E
Leatherback sea turtle	*Dermochelys coriacea*	E	E	E
Loggerhead sea turtle	*Caretta*	T	T	T
Finfish				
Atlantic seasnail	*Liparis atlanticus*		SC	
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	E	E	
Blueback herring	*Alosa aestivalis*		SC	
Radiated shanny	*Ulvaria subbifurcata*		SC	
Sand tiger shark	*Carcharias taurus*		SC	
Shortnose sturgeon	*Acipenser brevirostrum*	E	E	E
Birds				
Alder flycatcher	*Empidonax alnorum*		SC	
American bittern	*Botaurus lentiginosus*		E	SC
American oystercatcher	*Haematopus palliatus*		T	
Bald eagle	*Haliaeetus leucocephalus*		T	T
Black rail	*Laterallus jamaicensis*			E
Black skimmer	*Rynchops niger*			SC
Common loon	*Gavia immer*		SC	SC
Common moorhen	*Gallinula chloropus*		E	
Common nighthawk	*Chordeiles minor*		E	SC
Common tern	*Sterna hirundo*		SC	T
Glossy ibis	*Plegadis falcinellus*		SC	
Grasshopper sparrow	*Ammodramus savannarum*		E	SC
Great egret	*Ardea alba*		T	

Table 4. Marine and Coastal Endangered and Threatened Species and Species of Special Concern in Long Island Sound

Common Name	Scientific Name	Status		
		Federal	CT	NY
Horned lark	*Eremophila alpestris*			SC
King rail	*Rallus elegans*		E	T
Least bittern	*Ixobrychus exilis*		T	T
Least tern	*Sternula antillarum*		T	T
Little blue heron	*Egretta caerulea*		SC	
Northern goshawk	*Accipiter gentilis*		T	SC
Northern harrier	*Circus cyaneus*		T	T
Osprey	*Pandion haliaetus*			SC
Peregrine falcon	*Falco peregrinus*		T	E
Pied-billed grebe	*Podilymbus podiceps*		E	T
Piping plover	*Charadrius melodus*	T	T	E
Red knot	*Calidris canutus rufa*	T		
Roseate tern	*Sterna dougallii*	E	E	E
Saltmarsh sharp-tailed	*Ammodramus caudacutus*		SC	
Seaside sparrow	*Ammodramus maritimus*		T	SC
Snowy egret	*Egretta thula*		T	
Upland sandpiper	*Bartramia longicauda*		E	T
Whip-poor-will	*Caprimulgus vociferous*		SC	SC
Yellow-breasted chat	*Icteria virens*		E	SC
Yellow-crowned night heron	*Nyctanassa violacea*		SC	

Endangered; T = Threatened; SC = Species of Special Concern

Sources: CTDEEP (2015a,b); NYSDEC (2015); USFWS (2015a,b,c,d,e)

- ***Reptiles:*** Sea turtles are the only endangered reptiles noted in the Long Island Sound area. Sea turtles are highly migratory and are often found throughout the world's oceans (NOAA, 1995). Five species of sea turtles as possibly being found in the waters of Long Island Sound. Use of Long Island Sound by turtles appears to be related to the availability of prey, annual migration patterns, and age. The coastal waters of New York provide an important habitat for juvenile Kemp's ridley, green, and loggerhead turtles and adult-sized leatherbacks. Hawksbill turtles are only an incidental visitor to Long Island Sound, therefore Long Island Sound is not considered important habitat to the Hawksbill turtle.

- ***Finfish:*** Two federally listed fish may be located in Long Island Sound, the shortnose sturgeon *(Acipenser brevirostrum)* and the Atlantic sturgeon *(Acipenser oxyrinchus oxyrinchus)*. The shortnose sturgeon is also listed as endangered in both the States of Connecticut and New York. The Atlantic sturgeon is also listed as endangered for the

State of Connecticut. Sturgeon are not expected to be impacted by disposal activities at ELDS as they are highly mobile species.

Shortnose sturgeon occur in the lower Connecticut River from the Holyoke Pool to Long Island Sound. Unlike other anadromous species such as salmon and shad, shortnose sturgeon do not appear to make long-distance offshore migrations. It can be inferred that shortnose sturgeon utilizes portions of Long Island Sound since it is known to spawn in the Connecticut River. Shortnose sturgeon have not been observed in Long Island Sound during CTDEEP trawls since 1984.

Atlantic sturgeon is an anadromous species that lives up to 60 years, reaching lengths up to 14 feet (4 m) and weighing over 800 pounds (363 kilograms). Long Island Sound may be an important feeding or resting area on-the-way to and from spawning areas in the Hudson River because all sizes of Atlantic sturgeon have been seen or captured in the Sound. Atlantic sturgeon have been reported throughout Long Island Sound, but would most likely occur in transit during spawning migrations (CTDEEP, 2015b).

In addition, there are four finfish species of special concern. These include the blueback herring *(Alosa aestivalis),* sand tiger shark *(Carcharias taurus),* radiated shanny *(Ulvaria subbifurcata),* and Atlantic seasnail *(Liparis atlanticus).*

- ***Birds:*** Long Island Sound is utilized by a wide diversity of marine and coastal birds including both migratory and resident species. Open-water bird species found in Long Island Sound include waterfowl, colonial water birds, and pelagic species. Shorebirds and raptors may occasionally use open-water habitats for foraging or as fly-over during migrations, but are not likely to be present in offshore waters. Thirty-three endangered, threatened, or special status coastal and marine bird species are known to occur in coastal counties of New York and Connecticut and may occur within Long Island Sound. Waterfowl, raptors, and some colonial water bird species may occasionally use the open waters of Long Island Sound for foraging or flyover, but none of the listed species are likely to be present at the ELDS.

As part of the SEIS preparation, USEPA coordinated with USFWS, NMFS, and the States of Connecticut, New York, and Rhode Island. By letters dated August 12, 2016 and August 11, 2016, both NMFS and USFWS, respectively, concurred with USEPA's determination for designating ELDS as a dredged material disposal site and indicated no further consultation under Section 7 of the ESA was required for species under their jurisdictions.

<u>Essential Fish Habitat</u>

In eastern Long Island Sound, EFH has been designated for 38 managed species (species with active federal fisheries management plans (FMPs). Fifteen of these species have designated EFH within the vicinity of eastern Long Island Sound. The data were compiled from the NOAA's Guide to Essential Fish Habitat Designations in the Northeastern United States (NOAA, 2016). This guide summarizes EFH designated by species and life stage for that species (*i.e.*, eggs, larvae, juveniles, and adults) in 10-minute by 10-minute squares of latitude and longitude. The ELDS site is located within square #41107200 (Figure 4).

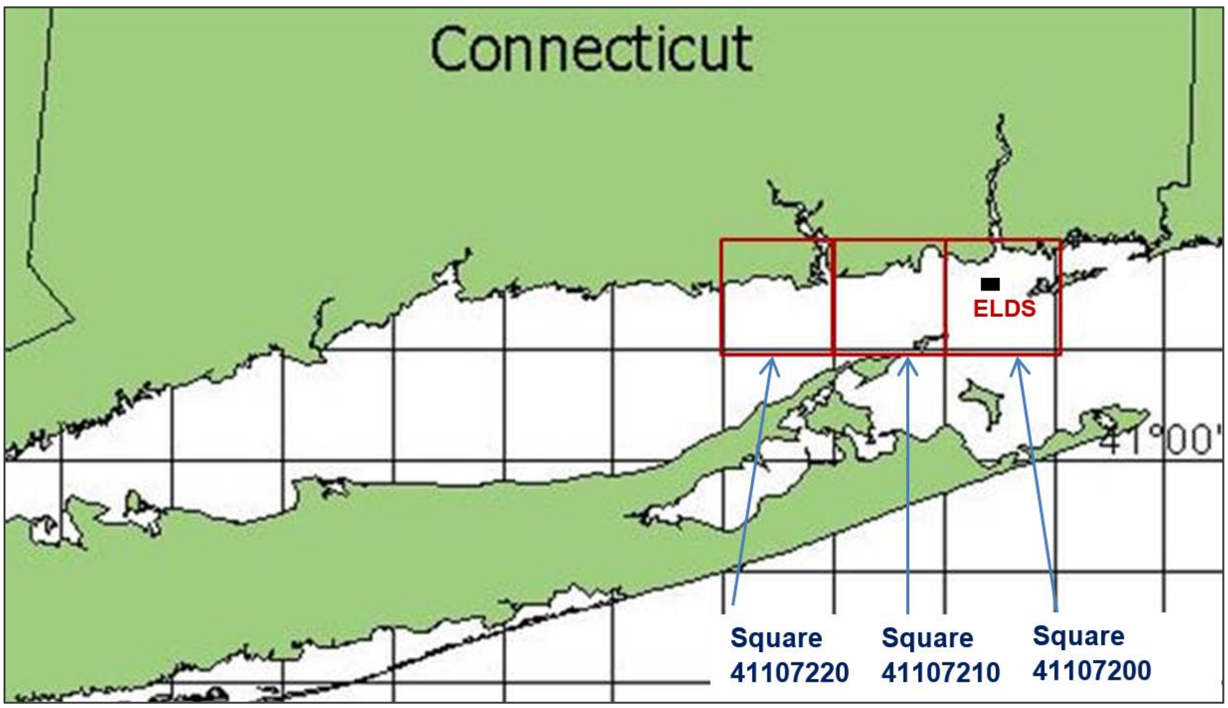


Figure 4. NOAA Fisheries 10 x 10 minute EFH squares (NOAA, 2016).

Within the square that contains the ELDS, EFH has been designated for nine species: Atlantic salmon *(Salmo salar)* (juveniles and adults), Atlantic sea herring *(Clupea harengus)* (adults), bluefish *(Pomatomus saltatrix)* (juveniles and adults), cobia *(Rachycentron canadum)* (all life stages), dusky shark *(Carcharhinus obscurus)* (juveniles), king mackerel *(Scomberomorus cavalla)* (all life stages), red hake *(Urophycis chuss)* (adults), sand tiger shark *(Carcharias taurus)* (larvae), and Spanish mackerel *(Scomberomorus maculatus)* (all life stages).

Impacts to EFH at the ELDS would be temporary and localized, with conditions quickly returning to baseline after each dredged material disposal event. Impacts to EFH would include temporary increases in turbidity, sedimentation, and nutrient availability, as well as a temporary decrease in prey abundance due to burial of benthic prey items, followed by a temporary increase in prey abundance during site recolonization. Short-term adverse impacts are expected to be minimal. Additionally, monitoring under the DAMOS program has consistently demonstrated that the benthic communities readily recover after disposal events (*e.g.*, AECOM, 2009).

USEPA coordinated with NMFS. By letter dated August 12, 2016, NMFS concurred with USEPA's determination that designating the ELDS as a dredged material disposal site would result in no more than minimal adverse impacts on EFH.

4.6 Cultural Resources

USEPA has consulted with the tribes and CT State Historic Preservation Office. There is one documented submerged wreck within the ELDS area 0.1 nmi west of the NLDS at 41°15.936'N, 72°05.292'W (USEPA, 2016). This wreck is an unknown vessel in 59 feet (18 m) of water and has been classified by NOAA as "submerged/dangerous." No other information regarding this wreck (*e.g.*, age, vessel type) is available. This wreck is recorded in multiple databases. A 164 foot (50 m) foot buffer will be maintained to avoid disposal on top of and in the immediate vicinity of the wreck.

4.7 Site Capacity

The water volume below 59 feet (18 m) at the ELDS is approximately 24 million cy (18 million m^3). After considering slopes of the disposal site, the estimated capacity of the ELDS is 20 million cy (15 million m^3). Disposal has occurred at the NLDS immediately adjacent to the eastern boundary of the ELDS site.

5.0 DISPOSAL HISTORY

The ELDS is located immediately to the west of the NLDS. The ELDS will receive dredged material from federal navigation projects from harbors and channels of dredging centers in eastern Long Island Sound, with numerous smaller harbors in Connecticut and New York contributing to the total disposal volumes.

The USACE keeps a continuous record of use of any disposal site in Long Island Sound (Table 5). At the NLDS, a total of 3.4 million cy (2.6 million m^3) of dredged material has been disposed between 1984 and 2015, although disposal of dredged material in the vicinity of the NLDS likely dates back to at least 1955. The largest volume of material disposed at the NLDS has originated from maintenance and improvement of the U.S. Navy facility in New London, but usage also includes a number of smaller private projects.

Dredged material at the NLDS has been disposed at distinct mounds and managed to maximize site capacity and containment of material. These mounds have been monitored individually through the USACE DAMOS program to assess stability, thickness of dredged material, and benthic recolonization status relative to previous survey results and in comparison to nearby reference areas.

Table 5. Disposal Volume at the New London Disposal Site (NLDS)

Year	Reported Disposal Volume (cubic yards)	Year	Reported Disposal Volume (cubic yards)
1984 Total	223,689	2000 Total	5,300
1985 Total	374,154	2001 Total	1,995
1986 Total	193,500	2002 Total	11,425
1987 Total	171,245	2003 Total	4,450
1988 Total	91,850	2004 Total	8,000
1989 Total	41,800	2005 Total	8,700
1990 Total	126,222	2006 Total	382,135
1991 Total	65,262	2007 Total	No disposal
1992 Total	79,320	2008 Total	No disposal
1993 Total	21,930	2009 Total	No disposal
1994 Total	7,650	2009-10	3,318
1995 Total	847,325	2010-11	No disposal
1996 Total	504,400	2011-12	No disposal
1997 Total	12,325	2012-13	19,142
1998 Total	7,300	2013-14	No disposal
1999 Total	23,250	2014-15	180,676
Total Volume (1984 to 2015):	**3,416,363**		

Source: USACE, DAMOS program

6.0 MONITORING PROGRAM

The USACE-NAE and USEPA will share responsibility for monitoring of the ELDS site. In addition, monitoring data may be generated by the agencies or through coordination or use of data gathered under other programs. Monitoring data from other agencies (*e.g.*, CTDEEP Trawl Surveys and LISS programs) will be utilized as appropriate to maximize the availability of information at the ELDS.

USEPA has the responsibility for determining that an unacceptable impact has occurred as a result of dredged material disposal at ELDS. However, such determinations will be made in consultation with other agencies and be based on available monitoring data. The data gathered from the monitoring program will be routinely evaluated by USEPA, the USACE-NAE, and other agencies such as the NMFS, USFWS, and state regulatory agencies. USEPA is responsible for determining any modification to site use or de-designation.

6.1 Monitoring Methods

Monitoring surveys at ELDS fall into two general categories: confirmatory studies and focused studies. Confirmatory studies are designed to test hypotheses related to expected physical and ecological response patterns following disposal of dredged material on the seafloor at the active or recently active target locations within ELDS. The data collected and evaluated during these studies provide answers to strategic management questions in determining the next step in the site management process. Focused studies are periodically undertaken within the monitoring program to follow up on any unexpected results from a confirmatory survey (such as slower than expected recolonization following cessation of disposal at a given target location) or to evaluate inactive or historical disposal areas within the site (such as following the passage of a large storm).

The primary monitoring tools for confirmatory surveys are collection of acoustic and imaging data. Acoustic surveys include the collection of bathymetric, backscatter, and side-scan data. The bathymetric data provide measurements of water depth that, when processed, can be used to map the seafloor topography. The mapped data are used to track changes in the size and location of seafloor features. Backscatter and side-scan sonar data provide images that support characterization of surficial topography, sediment texture, and roughness. Backscatter data can be processed into a seamless image with corrections for topography while side-scan sonar data retain a higher resolution image without correction for topography. The comparison of synoptic acoustic data types has the greatest utility for assessment of dredged material disposal.

Sediment-profile imaging (SPI) is a monitoring technique used to provide data on the physical characteristics of the seafloor as well as the status of the benthic biological community. The technique involves deploying an underwater camera system to photograph a cross section of the sediment-water interface. SPI is coupled with a plan-view (PV) camera system to provide imaging of a larger area of the seafloor to aid characterization of the benthic biological community.

In addition to the above techniques, focused surveys may include any of the following:

- Collection of sediment or water samples for laboratory analysis;
- Remotely operated vehicle surveys with camera and sampling capabilities; and
- Additional remote sensing techniques such as sub-bottom profiling

Specifics on monitoring techniques and data processing and analysis can be found in the most recent DAMOS contribution for the NLDS (Carey and Bellagamba Fucile, 2015).

6.2 Material Movement

The following potential effects (as defined in 40 C.F.R. 228.10) are discussed in this section:

- Movement of materials into estuaries or marine sanctuaries or onto oceanfront beaches or shorelines.
- Movement of materials toward productive fishery or shellfishery areas.

The site designation specifies that ELDS is a containment (non-dispersive site); therefore substantive movement of materials out of the site is not expected. Loss of mound material could mean that the material is being lost inappropriately and may potentially impact areas outside of the site.

Bathymetric baseline data for new or modified mounds will be collected after one year of consolidation. Bathymetric surveys of mounds (historic and recently completed) and the entire site will also be performed periodically. Information on mound size and height will be compared with previous data to determine if loss of material has occurred and reported in DAMOS reports and available on the USACE website.

Data from the sediment erosion modeling conducted during the site designation process suggest the location of the ELDS is optimal for mound stability.

Bathymetry will be used to define substantive changes in bathymetry and topography (greater than 0.5 foot [15 cm]). Sediment profile imagery may also be used to evaluate changes in sediment characteristics. The sediment profile imagery can be used to observe layers of material too thin to detect by precision bathymetric methods and can also be used to evaluate if the benthic community in the sediments has been disturbed or is under stress relative to the reference sites. Comparison of sediment profile imagery data from areas of concern to reference areas will be used to determine whether the transported material has a potentially significant adverse biological effect (since it will be assessing benthic community health).

Changes in bathymetry across the mound of more than 0.5 foot (15 cm) or development of large areas of predominately muddy sediments not previously documented may be an indication of substantial transport of material from the site. If such changes are documented, Tier 3 characterization of sediment quality or further characterization of benthic communities may be required. At the NLDS, which has received dredged material, monitoring shows no evidence of substantial movement of materials from the NLDS to adjacent areas. This determination is based on periodic bathymetric surveys of the NLDS that provide a means of comparison of depth changes in the disposal site.

The frequency of monitoring at a given site is driven by the amount of material disposed at the site as well as previous findings and other relevant factors such as the passage of a large storm or reported issues in the area (Attachment B). Four bathymetric surveys and other monitoring activities were completed at NLDS since 2000 (Table 6). These surveys included a focused survey in 2002 following the passage of a large coastal storm. Although Fishers Island shelters the NLDS from long-fetch easterly and southeasterly winds, it is exposed to the west and southwest. As the October 2002 storm center tracked to the west of the NLDS, a significant southwesterly wind pattern developed. The bathymetric survey performed soon after this storm identified no large-scale changes in the topography of the seafloor at NLDS. The imaging survey did identify the presence of a shell lag deposit at some locations, indicative of small-scale winnowing of the surface sediments. However, the occurrence of advanced successional species, well-developed apparent redox potential discontinuity (aRPD) depths, and the presence of numerous biogenic surface features (*e.g.*, worm tubes, burrows) over the shallower portions of the site provided evidence that there was minimal disturbance of surficial sediment.

Table 6. DAMOS Survey Activities at NLDS since Year 2000

Survey Date	Purpose of Survey	Reference
October 2015	Characterization of the bathymetry and surficial sediment properties of the entire site using multibeam bathymetry	Battelle, data analysis in progress
September 2014	Characterization of the physical and biological conditions over NLDS and associated reference areas using sediment profile and plan view imaging	Carey and Bellagamba Fucile, 2015 (DAMOS Data Report 2015-01)
September 2010	Collection of cores to characterize the vertical distribution of material at a capped mound of dredged material at the site, including a comparison of laboratory analytical methodologies	AECOM, 2012 (DAMOS Contribution No. 189)
June-July 2006	Performance of multibeam bathymetry, imaging, benthic sampling, and coring to assess the recovery and stability of a capped mound at the site	AECOM, 2010 (DAMOS Contribution No. 182)
October 2002	Performance of single beam bathymetry, imaging, and side-scan sonar to evaluate the stability of deposits at NLDS following passage of a large coastal storm	SAIC, 2003 (DAMOS Contribution No. 149)
June 2001	Collections of cores and sediment grabs and performance of imaging to assess the recovery and stability of a capped mound at the site	SAIC, 2004 (DAMOS Contribution No. 152)
August 2000	Performance of single beam bathymetry and imaging survey over the entire site to assess stability and biological recovery of disposal mounds at the site	SAIC, 2001 (DAMOS Contribution No. 133)

6.3 Biological Characteristics

The following potential effects (as defined in 40 C.F.R. 228.10) are discussed in this section:

- Absence from the disposal site of pollution-sensitive biota characteristics of the general area;
- 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.

Overall, based on results from 2001, 2006, and 2014 surveys, the benthic community within the NLDS has recovered to the level of the reference sites. The recovery of a healthy benthic habitat coupled with the testing requirements for material disposed at the site indicate that bioaccumulation potential is not considered significant. This determination was made based on the following information:

As stated in Section 4.3, current theory holds that organism-sediment interactions in fine-grained sediments follow a predictable sequence of development after a major disturbance such as dredged material disposal (Carey and Bellagamba Fucile, 2015). This sequence has been subjectively divided into three successional stages (Rhoads and Germano, 1986). Successional stage is assigned by assessing which types of species or organisms-related activities are apparent in a SPI image. Stage III organisms, the most developed, are deposit-feeding infauna.

Therefore, SPI is a monitoring technique used to provide data on the physical characteristics of the seafloor as well as the status of the benthic biological community. The technique involves an underwater frame/camera system that can photograph a cross-section of the sediment-water interface. Analysis of the resulting images for a standard set of characteristics allows comparison between different locations and different surveys. The DAMOS Program has successfully used SPI for over 25 years. One of the main characteristics described in SPI data is the aRPD depth. This parameter provides a measure of the integrated time history of the balance between near-surface oxygen conditions and biological reworking of sediments (Carey and Bellagamba Fucile, 2015). As biological activity increases, the aRPD depth increases as organisms move sediment particles from the sediment surface down deeper into the sediments. The 2001, 2006, and 2014 surveys all assessed the benthic recolonization over mounds where disposal of dredged material has not occurred for multiple years. Recolonization was complete over these mounds, consistent with expectations based on the standard theory of infaunal succession. There was limited disposal at the site between 2007 and early 2014, but with the increase in disposal for the 2014-15 season and continued disposal in 2015-16, future surveys will be scheduled to assess changes.

6.4 Water and Sediment Quality

Inclusive of 40 C.F.R. 228.10 the following types of potential effects at the disposal site are discussed in this section:

- 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.

The water quality in Long Island Sound is strongly affected by runoff and discharges from its urban surroundings. The watershed of Long Island Sound has an area of approximately 16,250 square miles (42,100 km^2). The three largest rivers draining into Long Island Sound are, from east to west, the Thames River, Connecticut River, and Housatonic River. The Connecticut River enters the eastern Long Island Sound between Old Saybrook and Old Lyme, Connecticut, covering approximately 75% of the total drainage area. The Thames River enters the eastern Long Island Sound between New London and Groton, Connecticut, covering 9% of the drainage area. Except for selected coastal areas, waters in Long Island Sound are classified as SA waters. The best uses of Class SA waters are shellfishing for market purposes, primary and secondary contact recreation, and fishing.

Turbidity measurements are made in the spring and summer, the most biologically productive seasons in Long Island Sound. CTDEEP has been monitoring turbidity indirectly by measuring water clarity (using a Secchi disk) since June 2000. The average Secchi depth in Long Island Sound is 7.5 feet (2.3 m).

As described in Section 4.3, the predominant grain size within the ELDS is sand. The mean TOC concentration at the ELDS is 1%. Mean metals concentrations were approximately twice as high at the NLDS as at the ELDS, although none of the metal concentrations measured at any station exceeded the NOAA ERM values. Metal concentrations at the three stations from the eastern part of the ELDS (Site NL-Wa), located just to the west of the NLDS, had lower concentrations than stations located within the NLDS, suggesting that dredged material is contained within the NLDS. Stability of the sediment at the disposal mounds was also evidenced by the DAMOS program surveys; the 2006 assessment of surface sediments at the Seawolf Mound found metals concentrations that were similar across the mound and that were consistent with pre-dredge characterization of the disposed material (AECOM, 2010).

Concentrations of pesticides, PCBs and PAHs measured at the ELDS were low and did not exceed the ERM or ERL values. Additionally, surveys at the Seawolf Mound at the NLDS were conducted by the DAMOS program through the collection of 16 vibracores in 2010 (AECOM, 2012). The 2010 survey results indicated that PAH concentrations in the surface sediment (upper 1.7 feet [0.5 m]) were similar across the Seawolf Mound stations and were consistent with pre-dredge characterization of the capping material. Only one sample had a concentration slightly above the ERL value, but the total PAH concentrations of all individual stations was below the ERL value.

Available data for the Long Island Sound region indicate that sediments in the open waters of Long Island Sound are generally not toxic to benthic organisms. The toxicity tests during the 2013 benthic survey demonstrated that contaminants and physical conditions at the ELDS do not elicit a toxic response to exposed organisms.

In addition, the SEIS evaluated the rate of dilution of the dissolved materials and fine suspended sediments that may remain in the water after disposal operations and the direction of transport, using the circulation model FVCOM. The highest concentrations occur after release. The material was diluted by tidal circulation and moved rapidly. After 12 hours, the diluted concentration was the range of 10^{-7}.

The STFATE predictions of the distribution of the disposed sediment on the seabed show that it is contained within the site and the mound is elongated along the axis of the current. Under mean flow conditions the maximum mound height after disposal from a 3,000 cy scow would be 0.21 feet (6.4 cm); under high flow conditions the maximum height would be 0.18 feet (5.5 cm). STFATE predictions for the amount of material reaching the seafloor show that under both mean and high flow conditions, 99-100% of the sand, silt, and clumps in the scow would reach the seafloor. Most of the clay also reaches the seafloor. Specifically, 83% of the clay is predicted to reach the seafloor during operations under high flow conditions, and 96% of it would reach the seafloor under mean flow conditions.

The longer-term (greater than 100 hours from release) transport and dilution of material in the water column after disposal operations show maximum concentrations in the range of 10^{-7} at locations on the coast of Connecticut, and Fishers Island and the North Fork of Long Island. These values reflect further dilution by a factor of approximately 100 from initial dilution at the site. An exception exists at the west coast of Fishers Island where releases from the ELDS would result in the maximum concentrations of 10^{-6}.

6.5 Quality Assurance

An important part of any monitoring program is a quality assurance (QA) regime to ensure that the monitoring data are reliable.

Relevant laboratories are required to submit Quality Assurance (QA) sheets with all analyses on a project-specific basis. Further details are provided in the Ocean Testing Manual (Green Book; USEPA and USACE, 1991); Inland Testing Manual (ITM; USEPA and USACE, 1998), and the Regional Implementation Manual (RIM; USEPA and USACE, 2004b).

Monitoring activities will be accomplished through a combination of USEPA and USACE-NAE resources (*e.g.,* employees, vessels, laboratories) and contractors. Documentation of QA is required by both agencies for all monitoring activities (*i.e.*, physical, chemical, and biological sampling and testing). QA is documented in the form of a Quality Assurance Project Plan (QAPP) and/or Monitoring Work Plan. QAPPs are required for all USEPA and USACE-NAE monitoring activities. Analytical methods, detection limits, and QA procedures are contained in the RIM (USEPA and USACE, 2004b).

7.0 ANTICIPATED SITE USE

MPRSA 102(c)(3)(D) and (E) requires that the SMMP includes consideration of the quantity of the material to be disposed at 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. ELDS is designated to receive dredged material only. No other material may be disposed at the site.

A total volume of 52.9 million cy (40.4 million m^3) is expected to be dredged in Long Island Sound over the next 30 years. Of that, approximately 18.4 million cy (14.1 million m^3) of dredged material are anticipated to be dredged in eastern Long Island Sound; considering a 10% bulking factor, the total estimated volume to be disposed in eastern Long Island Sound is approximately 20 million cy (15 million m^3) (USACE, 2016). Dredged material will come from federal navigation projects with the rest of the volume coming from other facilities in Long Island Sound ((marinas, boatyards, and harbors, and a few large private projects), which is consistent with the pattern of dredging in Long Island Sound over the past 30 years. Sediments projected for disposal are expected to come primarily from maintenance dredging projects, although expansion dredging may be required for deeper draft vessels or from increased commerce in Long Island Sound.

Historically one third of the dredged material volume comes from large projects (>500,000 cy; 382,300 m^3), one third from medium sized projects (200,000 to 500,000 cy; 152,900 to 382,300 m^3), and one third from small projects (<200,000 cy; 152,900 m^3). The sediment properties are expected to be variable although the predominant sediment type will likely be silty material (silts, sandy silts, etc.). In eastern Long Island Sound, approximately 60% of the projected dredged material is fine-grained sediment and 40% of the dredged material is sand.

Dredging and disposal in Long Island Sound has historically been accomplished using a bucket dredge to fill split hull or pocket scows for transport to the disposal site or by using hopper dredges. These types of equipment are expected to be the primary mode of any open-water disposal in Long Island Sound in the future, although disposal is not specifically limited to this equipment.

All projects using the ELDS for disposal must be either permitted or authorized under MPRSA and the CWA (see Section 2.0). The quality of the material will be determined on a project specific basis under the testing requirements necessary to meet open-water disposal requirements of either CWA 404 or MPRSA 103. The quality of the dredged material will be consistent with MPRSA regulations (40 C.F.R. Part 227). National guidance for determining whether dredged material is acceptable for open-water disposal is provided in the Green Book (USEPA and USACE, 1991), ITM (USEPA and USACE, 1998), and RIM (USEPA and USACE, 2004b). Site capacity will be evaluated and reported by USACE-NAE every three years.

8.0 REVIEW AND REVISION OF THIS PLAN

MPRSA 102 (c)(3)(F) 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 USEPA, the USACE-NAE, have agreed to review this plan annually as part of the annual agency planning meeting and coordinate with other state and federal agencies periodically.

9.0 COORDINATION AND OUTREACH

Section 307 of the Coastal Zone Management (CZM) Act of 1972 requires that federal agencies proposing activities within or outside the coastal zone, that affect any land or water use, or natural resource of the coastal zone, ensure that those activities are conducted in a manner which is consistent to the maximum extent practicable, with the enforceable policies of approved State coastal management programs. As part of the National Environmental Policy Act (NEPA) process, USEPA prepared a federal determination of consistency with the Connecticut, New York, and Rhode Island approved Coastal Zone Management Programs in April 2016.

Concurrence regarding the Section 7 of the Endangered Species Act, and the Essential Fish Habitat was obtained during the NEPA process for the SEIS from NMFS and the USFWS (USEPA, 2016). The NMFS and USFWS concurrence confirmed that the selection and use of the ELDS will not adversely affect threatened or endangered species or adversely modify critical habitat. No further consultation will be required and no conservation recommendations will be needed due to the use of ongoing and mutually agreed upon seasonal constraints on disposal operations (June 1 through October 1) as well as the ongoing disposal site monitoring program. The NMFS concurrence will confirmed that the selection and use of ELDS will not adversely affect habitat.

Additionally, a New England Regional Dredging Team has been established. The team is comprised of representatives from USEPA, USACE-NAE, NMFS, USFWS, and representatives from the States of Connecticut, Massachusetts, New York, and Rhode Island. The team meets approximately every six months to discuss management and monitoring of New England dredged material disposal sites. Monitoring activities may be discussed at these meetings, or additional meetings may be coordinated to discuss the SMMP.

The USEPA and the USACE will continue to inform the public. Information about the monitoring program and USACE-NAE monitoring reports is available at the USACE-NAE website: *http://www.nae.USACE.army.mil/Missions/DisposalAreaMonitoringSystem(DAMOS)/DisposalSites/CentralLongIslandSound.aspx*. Information about the ELDS designation and SMMP is available at the USEPA New England Regional Dredged Material Program website: *https://www.epa.gov/ocean-dumping/dredged-material-management-long-island-sound*.

10.0 FUNDING

The costs involved in site management and monitoring will be shared between USEPA the USACE-NAE. This SMMP will be in place until modified or the site is de-designated and closed.

Monitoring programs conducted under other federal (*i.e.*, LISS) and state agencies (*i.e.*, CTDEEP Trawl Survey) will depend solely on funds allocated to the programs by those agencies or other supporting agencies.

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.

11.0 REFERENCES

AECOM. 2009. Monitoring Survey at the New London Disposal Site, July/August 2007. DAMOS Contribution No. 180. U.S. Army Corps of Engineers, New England District, Concord, MA, 80p.

AECOM. 2010. Monitoring Survey at the New London Disposal Site, June/July 2006. DAMOS Contribution No. 182. U.S. Army Corps of Engineers, New England District, Concord, MA, 80p.

AECOM. 2012. Monitoring Survey at the Seawolf Disposal Mound, September 2010. DAMOS Contribution No. 189. U.S. Army Corps of Engineers, New England District, Concord, MA, 136p.

Battelle. (In preparation). Monitoring Survey at the New London Disposal Site, October 2015.

Carey, D.A. and E. Bellagamba Fucile. 2015. Data Summary Report of the New London Disposal Site and Vicinity Sediment Profile and Plan-View Imaging Survey. DAMOS Data Report 2015-01, 45p.

CTDEEP (Connecticut Department of Energy and Environmental Protection). 2015a. Endangered, threatened and special concern species in Connecticut. Accessed on December 23, 2015 at: *http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323474&deepNav_GID=1628*.

CTDEEP. 2015b. Atlantic Sturgeon Fact Sheet. Accessed on March 17, 2015 at: *http://www.ct.gov/deep/cwp/view.asp?a=2723&q=325960*

CTDEP (Connecticut Department of Environmental Protection). 2001. Coastal Permits Webpage. *http://www.dep.state.ct.us/LISfact/coastal.htm* (now CTDEEP)

Gottschall, K.F., M.W. Johnson, and D.G. Simpson. 2000. The Distribution and Size Composition of Finfish, American Lobster, and Long-finned Squid in Long Island Sound Based on the Connecticut Fisheries Division Bottom Trawl Survey, 1984-1994. U.S. Dept. of Commerce, NOAA Tech. Rep. NMFS 148, 195p.

NOAA (National Oceanographic and Atmospheric Administration). 1995. Our Living Oceans – Report on the Status of U.S. Living Marine Resources, 1995. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. NOAA Tech. Memo. NMFS-F/SPO-19. 160p.

NOAA. 2016. Guide to Essential Fish Habitat Designations in the Northeastern United States. Accessed on October 12, 2016 at: *http://www.greateratlantic.fisheries.noaa.gov/hcd/webintro.html*

NYSDEC (New York State Department of Environmental Conservation). 2015. List of Endangered, Threatened and Special Concern Fish & Wildlife Species of New York State. Accessed on September 21, 2016 at: *http://www.dec.ny.gov/animals/7494.html*

Rhoads, D.C. and J.D. Germano, 1986. Characterization of Organism-Sediment Relations Using Sediment Profile Imaging: An Efficient Method of Remote Ecological Monitoring of the Seafloor (Remots System). Marine Ecology-Progress Series. 8:115-128.

SAIC (Science Applications International, Inc.). 2001. Monitoring Cruise at the New London Disposal Site, August 2000. DAMOS Contribution No. 133. U.S. Army Corps of Engineers, New England District, Concord, MA.

SAIC. 2003. Post-Storm Monitoring Survey at the New London Disposal Site Seawolf Mound October 2002. DAMOS Contribution No. 149. U.S. Army Corps of Engineers, New England District. Concord, MA.

SAIC. 2004. Monitoring Survey at the New London Disposal Site, June 2001. DAMOS Contribution No. 152. U.S. Army Corps of Engineers, New England District, Concord, MA. 104p.

USACE (U.S. Army Corps of Engineers). 2016. Memorandum from USACE New England District to USEPA Region 1 with updated dredging and disposal capacity needs for Eastern Long Island Sound. U.S. Army Corps of Engineers, New England District. September 2016. USFWS (United States Fish and Wildlife Service). 2015a. ECOS Species by County Report: Middlesex County, Connecticut. Accessed on February 23, 2015 at: *http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=09007*

USEPA (U.S. Environmental Protection Agency). 2016. Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound, Connecticut and New York. Prepared by USEPA, Louis Berger, and the University of Connecticut.

USEPA and USACE. 1991. Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual. USEPA-503/8-91/001. 219p plus appendices.

USEPA and USACE. 1998. Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual (Inland Testing Manual). USEPA Office of Water, EPA-823-B-98-004.

USEPA and USACE. 2004a. Environmental Impact Statement for the Designation of Dredged Material Disposal Sites in Central and Western Long Island Sound Connecticut and New York, inclusive of Appendices, U.S. Environmental Protection Agency in cooperation with the USACE New England District.

USEPA and USACE. 2004b. Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters.

USFWS (U.S. Fish and Wildlife Service). 2015a. ECOS Species by County Report: Middlesex County, Connecticut. Accessed on February 23, 2015 at: *http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=09007*

USFWS. 2015b. ECOS Species by County Report: New London County, Connecticut. Accessed on February 23, 2015 at: *http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=09011*

USFWS. 2015c. ECOS Species by County Report: Suffolk County, New York. Accessed on February 23, 2015 at: *http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=36103*

USFWS. 2015d. ECOS Species Profile for Atlantic sturgeon *(Acipenser oxyrinchus oxyrinchus)*. Accessed on February 23, 2015 at: *http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action? spcode=E0A7*

USFWS. 2015e. ECOS Species Profile for Shortnose sturgeon *(Acipenser brevirostrum)*. Accessed on February 23, 2015 at: *http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E00B*

ATTACHMENT A: Monitoring Plan

Movement of the Dredged Material	2: Absence of Pollutant-Sensitive Biota	3: Changes in Water Quality	4: Changes in Benthic Health and Diversity	5: Accumulation of Material Constituents in Biota
Baseline taken within 1 year after disposal; entire site bathymetry at 3-4 year intervals	SPI within 1-3 years of disposal and survey of historic mounds once every 5 years.	Annual water quality measured in site vicinity (LISS Monitoring program data)	Annual CTDEEP trawl survey data	Sediment bioaccumulation potential estimated for sediments collected within site and reference areas at least every 5 years.
Mound changes by > 1.0 feet within 5 year interval	Significant differences between site and reference areas	Consistent gradients in measures of long-term water quality changes in vicinity	Significant differences in community composition or abundance from baseline or contiguous areas is found	Significant increase in bioaccumulation potential relative to baseline conditions or reference areas
Bathymetry taken ≤ 2 months after 10-year storm	SPI within 1-3 years of disposal and survey of historic mounds once every 5 years	No additional studies	No additional studies*	No additional studies
Mound changes by > 1.5 feet from last survey	Significant differences between site and reference areas	No additional studies	No additional studies	No additional studies
Bathymetry and sediment survey within 1 km. of site boundary	SPI at site and reference areas; grain size analysis	Water quality measured at site and reference areas	Studies may include measurement of species distribution at site and reference areas	Studies may include the collection of biota from site and reference areas

ATTACHMENT B: Example Scow Log

INSPECTOR'S DAILY REPORT OF DISPOSAL BY SCOW

NOTE: Dredged material volume stated below is approximate and shall not be used for measurement and/or payment.

Permittee ____________________ Disposal Area ____________
Permit/Contract No. ____________________ Date ____________
Project ____________________ Towboat ____________
Dredging Contractor ____________________ Owner ____________

Trip No.	Scow No.	Started From Place	Time	Disposal Time	Returned To Place	Time	Round Trip Time	Trip Dist	Lat/Long Coordinates* Specified	Actual	Dist./Dir. From Buoy

Trip No.	No. of Pockets Loaded	Dumped	Reason Pocket Not Dumped	Disposal Depth	Speed	Weather	Sea Conditions/ Visibility	Approx. Volume (CY)	Scow Draft

Comments:

*Check the datum used ___NAD27 ___NAD83. Also note any factors that may affect reliability of navigation instrument and readouts.

Time On	Time Off	Hours On Duty	Reviewed By: Permittee's Representative or, for Corps Projects, Corps' Resident Engineer or Field Inspector
Total Hours On Duty			

To the District Engineer, U.S. Army Engineer District, New England, Concord, Massachusetts:
I certify that I informed the tug captain of the conditions of the U..S. Army Corps of Engineers permit or contract regarding the distance from the buoy and the speed of the scow during the release of the dredged material. I also informed the captain that failure to comply with these conditions would constitute a violation of the permit and would be reported to the Corps. I certify that this report is correct and that I am not an employee of the dredging or towing firm, or the permittee, nor have I been employed by any of them at any time during the past six months. The approximate volume of dredged material stated on this report is only an estimate. It was made either by me, the dredging or towing contractor, or the Corps of Engineers Resident Engineer of Field Inspector. I do not certify that it correctly states the volume of material dredged.

______________________________ ____________________
Signature of Disposal Inspector (Certification No.)

Print Name Here ______________________________
R:\complnce\marie\2002scowrprt.doc Revised June 2002. Previous versions are obsolete and shall not be used.

[This page intentionally left blank.]