# LONG ISLAND SOUND DREDGED MATERIAL MANAGEMENT PLAN (DMMP)

# PHASE 2 LITERATURE REVIEW UPDATE

**Contract No. W912WJ-09-D-0001-TO-0022**


Prepared For:
United States Army Corps of Engineers
New England District
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June 2010

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# 1.0 INTRODUCTION

The US Army Corps of Engineers (USACE) is conducting baseline efforts to formulate alternatives for the management of dredged material in Long Island Sound (LIS). As part of that effort, Woods Hole Group, Inc. was contracted to update the literature review that was performed in support of the 2004 Final Environmental Impact Statement (2004 EIS) for the Designation of Dredged Material Disposal Sites in Central and Western Long Island Sound (USEPA, 2004). This report describes the second phase of the two-phase Literature Review Update task. This report is accompanied by a Microsoft Access database, which contains detailed reviews and citations for the sources reviewed for this task.

## 1.1 PURPOSE OF STUDY

The purpose of this study was to update a comprehensive database of literature on LIS compiled by the USACE in 1999. This database, developed in support of the 2004 Designation EIS (USEPA, 2004), described documents and data relevant to dredged material management from 1998 through December 2001 (database was revised from original 1999 publication to include documents through 2001). Woods Hole Group subsequently performed a Phase 1 Literature Review Update (Woods Hole Group, 2009) which identified more recently published (2002-2008) data and information. The intent of the current project, the Phase 2 Literature Review Update, was to prepare a comprehensive database of relevant and pertinent scientific literature generated between 2002 and 2008 based on selections from the Phase 1 made by USACE. The results of the Phase 2 Literature Review Update were then added to original USACE (1999) database.

This Phase 2 Literature Review Update task required follow up on a number of documents that were identified in Phase 1, but could not be obtained in full at that time. Some documents of interest from the Phase 1 were determined to have been published prior to 2002 but were retained in the database because they were of interest to USACE.

This report and the accompanying database provide an overview of the relevant information available for developing management alternatives for Long Island Sound dredged material, and can be used to identify data gaps and potential research needs.

## 1.2 OVERVIEW OF WORK PRODUCT

The main work product of the LIS Dredged Material Management Plan (DMMP) Phase 2 Literature Review Update is a Microsoft Access database documenting and summarizing the data sources encountered and reviewed for the project. The results of the Literature Review Update (Phases 1 and 2) are appended to the 1999 Long Island Sound Dredged Material Disposal Database (USACE, 1999).

This report summarizes the efforts undertaken in both phases of the Literature Review Update and provides an overview of the literature reviewed in Phase 2. Also included in this submittal is an abridged hard-copy version of the appended Phase 2 database records

(Attachment A) for in-report review and the updated Microsoft Access database. The Microsoft Access database (provided on a DVD-R) is accompanied by the available electronic documents included in the Phase 2 Literature Review Update. These electronic documents are coded by document number to facilitate access and review.

# 2.0 METHODS

The LIS DMMP Literature Review Update was divided into two phases. Phase 1 included a literature search and database setup, while Phase 2 included the review of a subset of literature encountered in the Phase 1 and database population.

The study area for this task is defined as the entire state of Connecticut, Washington County in Rhode Island, and the New York counties of Bronx, Queens, Kings, New York, Westchester, Nassau, and Suffolk. This area surrounds Long Island Sound and Block Island Sound (including the subregions Western LIS, Central LIS, Eastern LIS, Block Island Sound, Gardiner's Bay and Peconic Bay), which were also investigated in the literature search.

## 2.1 PHASE 1

The primary task of the Phase 1 Literature Review Update (Attachment B) was a directed literature search to identify reports and studies relevant to the development of dredged material management alternatives in the Long Island Sound study area. Literature searches on a variety of keyword topics (Table 1) were conducted through online scientific databases (Elseveir's *Science Direct*, CSA/Illumina's *Aquatic Science and Fisheries Abstracts* and *GeoRef*, and Thomson Reuter's *ISI Web of Science*) as well as Google Scholar. The general approach utilized in the literature search was to query the online databases on the permutations of keywords (Table 1) and a geographic region derived from the previously described study area and subregions. Additionally, Woods Hole Group queried (via telephone and email) federal and state points of contact provided by USACE for relevant information. The Phase 1 Literature Review Update produced a list of approximately 500 documents relevant to dredged material management in the Long Island Sound region. This list of documents was provided to USACE as a Microsoft Excel spreadsheet that included the authors and title of each source.

Phase 1 also included an update of the Long Island Sound Dredged Material Disposal Database (USACE, 1999). This task converted the original Microsoft Access 97 database to Microsoft Access 2003 using a conversion utility. All fields included in the original database were carried forward.

## 2.2 PHASE 2

Following submittal of the list of documents obtained in Phase 1, USACE selected a subset of approximately 170 documents to be carried forward and included in the Phase 2 database. Woods Hole Group reviewed these documents and entered them into an updated Long Island Sound Dredged Material Disposal Database. When necessary,

additional post-search contact was made with document authors to clarify relevance, follow up on draft reports and planned studies, or to complete a series of investigations.

**Table 1. Phase 1 Literature Review Update Keyword Topics**

| *Keyword Topics* | |
|---|---|
| Historic Disposal Activities | Recreation |
| Sediment Chemistry | Dredged Material Regulation |
| Sediment | Socioeconomics |
| Water Quality | Shipping |
| Hypoxia | Beneficial Use Dredged Material |
| Bathymetry | CAD Facilities |
| Physical Oceanography | Treatment Dredged Material |
| Fisheries | Transport Dredged Material |
| Fish | Landfills |
| Shellfish | Brownfields |
| Essential Fish Habitat | Earthfill and Construction Projects |
| Benthic Community | Habitat Restoration |
| Benthic Resources | Wetlands |
| Human Health Risk | Beach Nourishment |
| Toxicity | Remediation Reuse Contaminated Soil |
| Global Warming | Highway Sanding and Maintenance |
| Climate Change | Siltation Waterways |
| Sea Level Rise | Waterway Contamination |
| Economic Data | Marine Industry Economics |
| Dredged Material Disposal | Cultural Resources |
| Threatened and Endangered Species | Ferry Systems |
| Amphibians | Short Sea Shipping |
| Reptiles | Marine Terminals |
| Birds | Utility Construction and Permitting |
| Mammals | Energy Resources |
| Historic Resources | Liquid Natural Gas (LNG) |
| Public Parklands | Hydrokinetic |
| Beaches | |

Note: Topics derived in consultation with USACE

For each document selected for the Phase 2 Literature Review Update, and for each additional document identified through follow-up, Woods Hole Group conducted a detailed review of the document's title page and abstract/summary in order to obtain the following information with which to populate the database:

- Authors
- Title
- Year of Publication

- Document Type (published report, journal article, website, etc.)
- Other Citation Information (as applicable)
- Work Type (environmental analyses, field sampling, lab analyses, modeling, monitoring, etc.)
- Study Location
- Summary (including purpose and results of research, applicability to LIS resources, and applicability to dredged material disposal management)
- Period Covered by Study
- Electronic Availability and Format
- Geographic Information Systems (GIS) Compatibility and Format
- Principle Point of Contact Information (name, agency/institution, phone number, email address, website link)
- Topic
- Subtopic

If all the aforementioned database fields could not be populated upon detailed review of the title page and abstract/summary, a brief review of tables, figures and text was conducted to ascertain the missing information. If the information was not readily available from the document, the corresponding field was left unpopulated in the database.

The literature search yielded certain documents that were relevant to dredged material management, but were focused either on areas outside the study area or on policies and guidelines not specific to any part of the study area. These documents were included in the database and noted as either "Outside Study Area" or "N/A" in the database's "Location" field.

During the review, documents were categorized by topic and study location in the database. All topics included in the 1999 Database (USACE, 1999) are included in this list, and are defined in Attachment C. Study location categories were revised from the 1999 Database (USACE, 1999), in consultation with USACE-NAE, to address the specific needs of the Long Island Sound Dredged Material Management Plan research. Definitions of the location categories are provided as Attachment D.

The final task in the Phase 2 Literature Review Update was to append the results of the literature review to the Long Island Sound Dredged Material Disposal Database (USACE, 1999), which was converted to Microsoft Access 2003 during Phase 1. All fields included in the original database were carried forward and populated in the Phase 2 Literature Review Update to the extent practicable upon review of the abstract/summary.

## 3.0 RESULTS

From the Phase 1 Literature Review Update, 171 documents were identified by USACE for review in the Phase 2 task. Woods Hole Group conducted an initial review of these documents and determined that 26 of the listed titles were duplicates. Therefore, a total of 145 documents from the Phase 1 were carried forward to the Phase 2 Literature

Review Update. Follow up on a number of documents, in particular Long Island Sound Study's (LISS) "2009 Monitoring, Assessment, and Research Needs to Support Attainment of LISS Goals and Targets" and conference abstracts from the 2000 MIT Sea Grant Conference "Dredged Material Management: Options and Environmental Considerations", generated 64 more documents to be included in the Phase 2 Literature Review Update. In total, 209 documents were summarized and entered into the database for this project.

The results of the Phase 2 Literature Review Update are presented in this report as an abridged version of the database in Attachment A. The abridged database includes the following fields: Author, Title, Year of Publication, Summary, and Contact Agency. The full results of the Phase 2 Literature Review Update, including all fields from the 1999 (USACE) LIS Dredged Material Disposal Database, are appended to the 1999 database and included as a Microsoft Access 2003 database on an accompanying DVD-R. The full version of the database includes the following fields: Document ID, Author, Title, Year of Publication, Document Type, Document Source, Journal or Book, Publisher, Document Number, Place of Publication, Number of Pages, Relevant Pages, Work Type, Location, Summary, Main Topic, Main Subtopic, General Criteria 1, General Criteria 2, Specific Criteria 1, Specific Criteria 2, Notes, Study Period Start, Study Period End, Longitude, Longitude EW, Latitude, Latitude NS, Disposal Type, Cap, Baseline, Impacts, Historical, DMMP Relevance, Electronic, Electronic Format, GIS Compatible, GIS Format, Contact, Name, Agency and Department, Address, Telephone, Fax, Email, USACE Copy, EPA Copy, ENSR Copy, Available on Web, Web Address, Topic 1, Topic 2, Subtopic 1, and Subtopic 2. As directed by USACE, Woods Hole Group focused on populating the database fields described in Section 2.2. Database fields were populated if information was readily available from a review of the document title page and abstract/summary.

Documents in the Phase 2 Literature Review Update were mostly final reports, journal papers, and conference proceedings (papers and presentations). Table 2 presents the distribution of document types reviewed in this task. A wide variety of work types were also represented in the documents reviewed for the Phase 2 Literature Review Update. Most of these work types were field sampling projects, environmental analyses, review studies, monitoring projects, or regulations/manuals. Table 3 presents the distribution of work types reviewed in this task. Review and compilation of the Phase 2 Literature Review Update documents also revealed that 187 (89%) were available electronically, and 39 (19%) were associated with GIS data.

**Table 2. Phase 2 Literature Review Update Document Type Counts**

| | |
|---|---|
| Abstract | 10 |
| Book | 2 |
| Brochure | 5 |
| Conference Proceedings | 21 |
| Data Report | 5 |
| Database (published) | 6 |
| Database (unpublished) | 0 |
| Journal Paper | 36 |
| M.S. Thesis | 0 |
| Magazine | 0 |
| Maps/Charts | 6 |
| Ph.D. Thesis | 0 |
| Planned/Future | 4 |
| Proposal | 0 |
| Report (draft) | 7 |
| Report (final, published) | 93 |
| Website | 14 |

Note: Document types originated in the Dredged Material Disposal Database (USACE 1999). Website type was added for the Phase 2 Literature Review Update.

**Table 3. Phase 2 Literature Review Update Study Type Counts**

| | |
|---|---|
| Data comparison | 8 |
| Directory | 12 |
| Environmental Analyses | 38 |
| Field Sampling | 44 |
| Forum for current research | 7 |
| Lab Analysis/Tests | 7 |
| Model | 7 |
| Monitoring | 27 |
| Regulations/Manuals | 21 |
| Review | 38 |

Note: Study types originated in the Dredged Material Disposal Database (USACE 1999).

The 22 documents that were not available electronically were either conference abstracts/papers included in the MIT Sea Grant conference proceedings, or incomplete research projects from the LISS grant program. Original documents could not be obtained for these studies from the primary investigators, so conference papers and abstracts were scanned to PDF from the MIT Sea Grant conference proceedings. Four documents from the 2009 LISS report were not available. These documents were retained in the database in case future publications become available. Thirteen of the

electronically available documents are not included in the files provided on DVD-R because they were too large. These thirteen documents (DocumentID: 2184, 2185, 2186, 2187, 2188. 2189, 2190, 2191, 2192, 2193, 2200, 2201, and 2202) are large USGS datasets previously provided to USACE on DVD-R as part of the Phase 1 submittal.

Documents reviewed in the Phase 2 Literature Review Update cover study areas throughout Long Island Sound, the coast, and the upland areas. Many documents also investigate areas outside the study area, generally as case studies of dredged material management in other regions. Some documents are not associated with any geographic location; these are typically policy documents, reviews and guidance on dredged material management. Figure 1 shows the distribution of study locations in the documents reviewed for Phase 2.

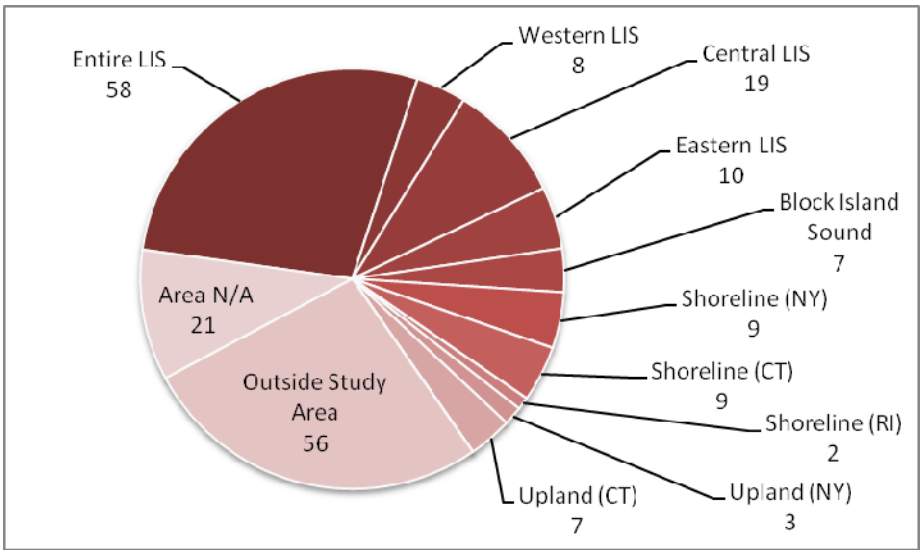


**Figure 1. Study Locations from Phase 2 Literature Review Update Documents.**

The main topics covered include "Environmental Evaluation and Economics of Disposal Options" (28%), "Ecology, Habitats and Species" (14%), "Sediment" (13%), "Water Quality" (11%), and "Fisheries/Shellfisheries" (10%). Combined, these topics account for 75% of the topics addressed in the documents. Table 4 shows the distribution of topics covered. This includes all documents in the update to the database. If a document is associated with more than one topic (there are two "Topic" fields in the database), both topics are included in the topic count. For the 209 documents in the Phase 2 Literature Review Update, a total of 294 topics were recorded upon review.

**Table 4. Phase 2 Literature Review Update Topic Counts**

| | |
|---|---|
| Benthic (Macro-Invertebrate) Resource | 9 |
| Coastal Management | 11 |
| Ecology, Habitats and Species | 40 |
| Economic Data and Analysis | 0 |
| Environmental Evaluation and Economics of Disposal Options | 81 |
| Fisheries/Shell Fisheries | 29 |
| Fishing Activities and Human Health Risks | 3 |
| General Interest | 6 |
| Geology and Geomorphology | 8 |
| Historic Disposal Activities and Dump Sites | 15 |
| Historic, Cultural and Archaeological Resources | 0 |
| Marine Wildlife and Endangered Species | 3 |
| Physical Impact of Fishing Activities | 0 |
| Physical Oceanographic | 8 |
| Public Parklands, Beaches and Sanctuaries | 1 |
| Sediment | 38 |
| State Dredged Material Disposal Guidance | 10 |
| Water Quality | 32 |
| Meteorology | 0 |

Note: Topics originated in the Dredged Material Disposal Database (USACE 1999). Some of the documents were associated with more than one topic.

## 3.1 KEY LITERATURE

Although all documents included in the Phase 2 Literature Review Update are relevant to the development of dredged material management alternatives, several key documents were identified that are useful to the planning process for the LIS DMMP. These key documents are briefly summarized below.

### *3.1.1 Guidelines for the Beneficial Use of Dredged Material*

This 1996 report from the Ports and Estuaries Group at HR Wallingford presents a range of realistic beneficial use options in the United States and European Union, based on a literature review and discussions with relevant agencies. The document includes guidance on how to evaluate the applicability of dredged material for beneficial use applications, and discusses issues of contamination, transport, dewatering, storage, environmental value, and cost. The document also provides patterns for various beneficial use implementations, including a description of the methods, definition of suitable material, design criteria and monitoring needs. Although this document precedes the period of interest for the Literature Review Update (2002 to 2008), it was included in the Phase 2 because it was deemed relevant to dredged material management and had not been documented in the original (USACE, 1999) database. No updated version of this document was available.

This document is number 2305 in the database. It is considered a key document because it provides an overview of beneficial use options used by a variety of agencies worldwide.

### *3.1.2 National Coastal Program Dredging Policies*

This 2000 report from the National Oceanographic and Atmospheric Administration (NOAA) Office of Ocean & Coastal Resource Management summarizes the state dredging programs in all fifty states, including Connecticut, New York, and Rhode Island. The review addresses each state's permitting process, economic concerns, habitat/sediment/water quality concerns, typical dredging techniques, disposal options, beneficial use, and state-specific issues to the extent that information is available. Although this document precedes the period of interest for the Literature Review Update (2002 to 2008), it was included in the Phase 2 because it was deemed relevant to dredged material management and had not been documented in the original (USACE, 1999) database. No updated version of this document was available.

This document is number 2224 in the database. It is considered a key document because it provides an overview of dredging policies throughout the United States.

### *3.1.3 Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities - Testing Manual*

This 2003 report by the U.S. Army Engineer Research and Development Center Environmental Laboratory provides technical guidance for a tiered testing approach for evaluating potential contaminant migration pathways from confined disposal facilities. The guidance describes a four-tier system which determines the need for pathway evaluation, determines the need for management actions, evaluates pathways, and assesses risk from the identified pathways.

This document is number 2352 in the database. It is considered a key document because it provides guidance on evaluating the effects of dredged material.

### *3.1.4 Understanding the Physical and Environmental Consequences of Dredged Material Disposal: History in New England and Current Perspectives*

This 2004 journal article from USACE New England District summarizes the results of the Disposal Area Monitoring System (DAMOS) projects throughout New England. Monitoring of the short-term and long-term physical and biological effects from ocean disposal of dredged material shows that the impacts of disposal are typically near-field and short-term.

This document is number 2221 in the database. It is considered a key document because it reviews and synthesizes 35 years of disposal area monitoring data at sites that include the Long Island Sound study area.

### *3.1.5 Evaluating Environmental Effects of Dredged Material Management Alternatives - A Technical Framework*

This 2004 report from the U.S. Army Engineer Research and Development Center Environmental Laboratory and the U.S. Environmental Protection Agency (USEPA) establishes a framework with which USACE and USEPA personnel can identify environmentally acceptable alternatives for the management of dredged material. It provides an overview of dredging operations and management alternatives, presents additional testing guidelines, discusses open water disposal, confined disposal and beneficial use alternatives, and finally outlines the procedures for alternative selection.

This document is number 2281 in the database. It is considered a key document because it presents a framework for making decisions about dredged material that is endorsed by both USACE and USEPA.

### *3.1.6 Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters*

This 2004 report from USACE New England District and USEPA Region 1 provides regional guidance on sediment testing and reporting requirements for obtaining a Department of Army permit from the USACE New England District for open-water disposal of dredged material in New England waters. It specifically discusses permit application and coordination requirements, sampling methodologies, updated reference site locations, contaminants of concern and analytical reporting limits, and species and test conditions for biological testing. The manual applies national testing guidelines under Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA) (33 USC 1401 et seq.) and Section 404 of the Clean Water Act (CWA) (33 USC 1344 et seq.) to the New England area.

This document is number 2357 in the database. It is considered a key document because it provides an overview of the required steps for obtaining approval of open-water disposal in the region that includes the Long Island Sound study area.

### *3.1.7 Comparative Risk Assessment Methods and Their Applicability to Dredged Material Management Decision-Making*

This 2004 journal article from USACE Waterways Experiment Station and Menzie-Cura & Associates evaluates the potential application of comparative risk assessment methods as a decision-making framework for selecting alternative technologies for dredged material management. The methodology recommends reducing uncertainty by using more than one set of criteria, categories, and experts, as well as implementing probabilistic approaches.

This document is number 2361 in the database. It is considered a key document because it presents a framework for making decisions about the appropriate management of dredged material.

### *3.1.8 Beneficial Uses of Dredged Material*

This 2006 website developed by the U.S. Army Engineer Research and Development Center Environmental Laboratory and the USEPA classifies beneficial uses into three categories (engineered uses, agricultural and product uses, and environmental enhancement) and presents case studies and suitability criteria for a number of beneficial uses within these categories. It presents a framework for deciding the appropriate beneficial use for a material which includes evaluating the contaminant status, site selection, technical feasibility, environmental acceptability, cost-benefit analysis, and a review of legal/regulatory constraints.

This document is number 2307 in the database. It is considered a key document because it provides an overview of beneficial use applications recognized by USACE and USEPA.

### *3.1.9 Multicriteria Decision Analysis: A Comprehensive Decision Approach for Management of Contaminated Sediments*

This 2006 journal article is from a team of collaborators out of the U.S. Army Engineer Research and Development Center Environmental Laboratory, Cambridge Environmental, University of Florida, Purdue University, University of New Hampshire, the Federal Highway Administration, and the USACE Hazardous, Toxic and Radioactive Waste Center of Expertise. The paper reviews multicriteria decision analysis (MCDA), which is a framework for managing contaminated sediments and sites where stakeholder concern is important and economics, environmental impacts, safety, and risk cannot be easily monetized. The report reviews existing decision support tools, gives an overview of current MCDA methods, and presents a case study of MCDA implementation in the context of contaminated sediment management.

This document is number 2284 in the database. It is considered a key document because it presents a framework for making decisions about the appropriate management of dredged material.

### *3.1.10 Long Island Sound Environmental Data Synthesis*

This document (not published as of this report) is a research project in progress at Connecticut Sea Grant. When complete, the report will summarize and synthesize data and information on the patterns and processes that characterize the Long Island Sound ecosystem. It also addresses how these patterns and processes may be altered in response to global and regional change and the implications for improving ecosystem-based management of Long Island Sound.

This document is number 2218 in the database. It is considered a key document because it will be a central repository for all major environmental studies of the Long Island Sound study area.

### *3.1.11 Summary of Available Guidance and Best Practices for Determining Suitability of Dredged Material for Beneficial Uses*

This 2008 report from the U.S. Army Engineer Research and Development Center Environmental Laboratory reviews current guidance and best practices relevant to the evaluation of dredged material for beneficial use. Materials from ongoing dredging programs and existing confined disposal facilities may be evaluated using this guidance for a variety of beneficial uses, including habitat development, beach nourishment, aquaculture, parks and recreation, agriculture/forestry/horticulture, strip mine reclamation and solid waste management, shoreline stabilization and erosion control, construction and industrial use, and material transfer.

This document is number 2356 in the database. It is considered a key document because it reviews the currently endorsed methods for determining the most appropriate beneficial use of dredged material.

## 4.0 SUMMARY

This report describes the procedures implemented in, and results of the Phase 1 and Phase 2 Literature Review Update to the Long Island Sound Dredged Material Disposal Database. This report includes the annotated database in both hard-copy and electronic formats. The hard-copy of the database, presented as an attachment to this report, is an abridged version of the full database that facilitates review of Phase 2 Literature Review Update documents and allows users to quickly identify documents of interest that can then be investigated further in the full electronic database. The full electronic database is provided as a Microsoft Access 2003 database on an accompanying DVD-R along with electronic copies of the Phase 2 documents. Details on database design can be found in the Long Island Sound Dredged Material Disposal Database report. (USACE, 1999) Database field definitions are discussed in Attachments C and D.

Two hundred nine documents were identified, reviewed, and summarized. There were eight data comparisons, 12 directories, 38 environmental analyses, 44 field sampling efforts, seven forums for current research, seven lab analyses, seven models, 27 monitoring programs, 21 regulations and manuals, and 38 reviews. Thirty-nine documents contain or present geospatial data. One hundred eighty seven documents were available electronically, and all but four of the remaining 22 were scanned from hard copy.

The most prevalent topics covered were “Environmental Evaluation and Economics of Disposal Options”, “Ecology, Habitats, and Species”, “Sediment”, “Water Quality”, and “Fisheries/Shellfisheries”. The most prevalent study areas were the entire Long Island Sound and areas outside the Long Island Sound study region.

Documents summarized in the database will be important sources of information for the development of dredged material management alternatives in the Long Island Sound DMMP. Of the 209 documents included in this study, 55 were determined to be relevant to Long Island Sound resources, 89 were determined to be relevant to dredged material

management, and 65 were determined to be relevant to both Long Island Sound resources and dredged material management. This suggests the database includes a large body of information on which the USACE can draw when developing the dredged material management plan for Long Island Sound.

# 5.0 REFERENCES

LISS. 2009. Long Island Sound Study: Research Project Summaries. Accessed December, 2009 at [http://www.longislandsoundstudy.net/research_projects.htm].

USACE. 1999. Dredged Material Disposal Database Report and User's Manual – Long Island Sound: Connecticut and New York. Prepared by ENSR. July 1999.

USEPA. 2004. Final Environmental Impact Statement for the Designation of Dredged Material Disposal Sites in Central and Western Long Island Sound, Connecticut and New York.

Woods Hole Group. 2009. Phase 1 Literature Review Update. Task Order # W912WJ-09-D-0001 Prepared for US Army Corps of Engineers by Woods Hole Group, Inc. July 2009.

# ATTACHMENT A LONG ISLAND SOUND DREDGED MATERIAL DISPOSAL DATABASE – ABRIDGED PHASE 2 LITERATURE REVIEW UPDATE

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| Authors | Title | Year | Summary | Contact Agency |
|---|---|---|---|---|
| August, P. | Evaluation of RI Region Long-term Dredge Disposal Sites Working Group: Meeting 5 Draft Summary | 2003 | Meeting notes from the fifth meeting of the working group to identify long-term disposal sites in Rhode Island. During this meeting, the working group had a presentation on estimating the costs of tiered dredged material testing from USACE, had a review of Draft Interim Report summarizing all meetings to date, had a discussion on the draft evaluation criteria for disposal site identification, and had an overview of the next steps in the process. Applicability: n/a to LIS resources, discusses dredged material management. | Coastal Institute |
| Balcom, N. and Howell, P. | Responding To A Resource Disaster: American Lobsters In Long Island Sound 1999-2004 | 2006 | Overview of lobster mortality events, fishery landings and effort, habitat and water quality, list and contact info for associated research projects. | Connecticut Sea Grant Extension |
| Balcom, N.C. | Climate Change Expected To Affect Plants And Animals In Long Island Sound | 2008 | Discussion of effects of climate change on the ecology of Long Island Sound. Anticipated effects include extirpation as ranges contract or shift, new predator prey interactions, new diseases. Many estuarine species are sensitive to temperature, and changes in water temperature a few degrees outside the normal range can affect growth, reproduction, behavior, and mortality. Long Island Sound is especially vulnerable since its waters host both cold-water and warm-water species. Populations of winter flounder and lobster have already declined, while warming temperatures may be giving invasive species an advantage. Applicability: discusses climate change impacts on LIS resources, n/a to dredging. | Connecticut Sea Grant |
| Balcom, N.C., and Yarish, C. | Grateloupia Turuturu: A Red Seaweed Invading Long Island Sound | 2006 | Description of appearance and range of the invasive seaweed, and its potential impact on the Lond Island Sound ecology. Applicability: Addresses LIS invasive and impacts to LIS resources, n/a to dredging. | Connecticut Sea Grant |
| Balcom, P.H., Fitzgerald, W.F., Vandal, G.M., Lamborg, C.H., Rolfhus, K.R., Langer, C.S., and Hammerschmidt, C.R. | Mercury Sources And Cycling In The Connecticut River And Long Island Sound | 2004 | Mercury monitoring at four atmospheric deposition stations (Marshlands-Rye NY, Milford Point, Hammonassett-Madison, Avery Point-Groton), six water pollution control facilities (Greenwich, Stamford, Norwalk, Bridgeport, New Haven, Mattabassett-Cromwell, Hartford), and four rivers discharging to Long Island Sound (Connecticut, Housatonic, Thames, Quinnipiac). Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that mercury may be present in dredged material. | University of Connecticut Department of Marine Sciences |
| Banslaben, J., Cox, J.C., and Will, R.J. | Beneficial Use Of Dredged Bedrock In The New York/New Jersey Harbor | 2003 | Deepening of the Kill van Kull and Arthur Kill channels to accommodate new container ships will result in large quantities of dredged bedrock. This report outlines how numerous beneficial use opportunities can become feasible based on bedrock characteristics, case-specific constraints, and applicable regulatory concerns. Historical beneficial uses of dredged bedrock include artificial reef, crustacean habitat, offshore disposal, revetments and dykes, shoreline protection, seawalls, sediment feeder material, and breakwater. Potential uses in the NY/NJ harbor include artificial reef, oyster reef, lobster reef, inshore reef, sediment feeder material, groins and jetties, revetments, seawalls, breakwaters, wave-attenuating devices, and aggregate production. Applicability: n/a to LIS resources, covers dredged material beneficial use options in NY/NJ harbor. | U.S. Army Engineer District, New York |
| Baxter, C.D.P., King, J.K., Silva, A.J., Page, M., and Calabretta, V.V. | Site Characterization Of Dredged Sediments And Evaluation Of Beneficial Uses | 2004 | Characterizes sediments and investigates beneficial use opportunities for materials from maintenance dredging for the Port of Providence, expansion of a liquid natural gas facility, and the redevelopment of a former naval base in North Kingstown, RI. A combination of sidescan and subbottom acoustic profiling, gravity coring, and vibracoring provided an efficient and cost-effective alternative to traditional drilling and sampling site investigation techniques. Bench-scale testing indicated that sediments could be blended with other material to create borrow material, structural fill, and brownfields/landfill capping material. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses investigation techniques and possible beneficial uses. | University of Rhode Island, Departments of Ocean/Civil and Environmental Engineering |
| Beaulieu, E., Poppe, L.J., Paskevich, V.F., Doran, E.F., Chauveau, B.E., Crocker, J.M., Beaver, A.L., and Schattgen, P.T. | Sidescan Sonar Imagery And Surficial Geologic Interpretation Of The Sea Floor Off Bridgeport, Connecticut | 2005 | 290.3 sq. km sidescan sonar survey completed in 2003 for west-central Long Island Sound off the coast of Bridgeport, CT. Includes images and interpretations of surficial features, sediments, and sedimentary environments. Applicability: relevant to LIS resources in that it describes conditions of a portion of LIS, relevant to dredged material management in that the study area includes an historic disposal area. | USGS Coastal and Marine Geology Team |
| Bolam, S.G., and Rees, H.L. | Minimizing Impacts Of Maintenance Dredged Material Disposal In The Coastal Environment: A Habitat Approach | 2003 | The review first proposes that macroinvertebrate communities at stressed habitats are more resilient (based on literature review). Second, based on review of literature on benthic community recovery following dredged material deposition, a comparison is made on the successional sequence and recovery rate between euhaline and polyhaline systems. Findings reveal that invertebrate recovery in unstressed environments takes between 1-4 years, while recovery in stressed environments takes 9 months. Differences are attributed to the number of succesional stages needed to recover. The management implications of these findings are discussed in terms of minimizing dredged material disposal impacts on fisheries resources. Applicability: n/a to LIS resources directly but results from UK could be transferable to LIS, discusses impacts of dredged material disposal. | Centre for Environment, Fisheries and Aquaculture Science |
| Bolam, S.G., Schratzberger, M., and Whomersley, P. | Macro- And Meiofaunal Recolonisation Of Dredged Material Used For Habitat Enhancement: Temporal Patterns In Community Development | 2006 | Uncontaminated maintenance dredge material from a marina in England was pumped as a slurry onto an adjacent eroded saltmarsh. For the following 42 months, meiofaunal and macrofaunal invertebrate community structure was measured to assess recolonization. Different analytical methods yielded different results. Univariate analyses indicated that meiofaunal community structure was not significantly different from reference areas, while macrofaunal community structure was below the reference area. Multivariate analyses suggested that both meiofaunal and macrofaunal communities were below the references area. Applicability: n/a to LIS resources, discusses use of dredged material for saltmarsh restoration. | Centre for Environment, Fisheries and Aquaculture Science |
| Bourque, A.S., Pederson, J., and Shine, J. | Biological And Chemical Analyses Of Boston Harbor Confined Aquatic Disposal Cells | 2000 | Investigation of the effect of CAD cells on benthic biological and chemical characteristics. Sediment profile images, water quality parameters, grain size, invertebrate composition and abundance, trace metals concentrations, and organic carbon concentrations were analyzed in two CAD cells and a reference sediment site. Results suggest that CAD cells have no major effect on benthic communities. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses the effects of a disposal method. | MIT Sea Grant College Program |

| Authors | Title | Year | Summary | Contact Agency |
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| Brandon, D.L., and Price, R.A. | Summary Of Available Guidance And Best Practices For Determining Suitability Of Dredged Material For Beneficial Uses | 2008 | This report compiles current guidance and best practices useful to evaluate dredged material from ongoing dredging projects or CDFs for BUs. Beneficial Uses are divided into ten categories: 1) Habitat development, 2) Beach nourishment, 3) Aquaculture, 4) Parks and recreation, 5) Agriculture, forestry, and horticulture, 6) Strip mine reclamation and solid waste management, 7) Shoreline stabilization and erosion control, 8) Construction and industrial use, 9) Material transfer, and 10) Multiple purpose. Applicability: n/a to LIS resources aside from potential benefit from beneficial use, discusses guidance for beneficial use of dredged material. | U.S. Army Engineer Research and Development Center, Environmental Laboratory |
| Bunch, B.W., Channell, M., Corson, W.D., Ebersole, B.A., Lin, L., Mark, D.J., McKinney, J.P., Pranger, S.A., Schroeder, P.R., Smith, S.J., Tillman, D.H., Tracy, B.A., Tubman, M.W., and Welp, T.L. | Evaluation Of Island And Nearshore Confined Disposal Facility Alternatives, Pascagoula River Harbor Dredged Material Management Plan | 2003 | Engineering studies in support of the development of a DMMP for the Pascagoula, MS navigation project, and evaluating the options for placing dredged materials in an island CDF. Studies include numerical modeling of circulation/water quality/wave climatology to examine the potential impacts of an island CDF and for design considerations, Field measurements of currents and waves in the Mississippi Sound, studies of sediment consolidation process in the CDF to assess its dredged material volume capacity. Results were presented for three alternative locations. Applicability: n/a to LIS resources, relevant to dredged material management because studies in support of DMMP development. | U.S. Army Engineer Research and Development Center, Environmental Laboratory |
| Burt, T.N. (Ports and Estuaries Group at HR Wallingford) | Guidelines For The Beneficial Use Of Dredged Material | 1996 | Guidance and presentation of realistic options for beneficial use resulting from literature research and discussions with USA and EU agencies. Chapter 2 has guidance on how to characterize dredged material for the purpose of assessing its applicability to beneficial use; it then outlines issues of contamination, transport, dewatering, storage, environmental value, and cost. Subsequent chapters give detailed guidance on each type of beneficial use, including a description of the use, descriptions of suitable material, design criteria, and monitoring needs. Applicability: n/a to LIS resources, outlines beneficial uses of dredged material. | HR Wallingford Ports and Estuaries Group |
| Cerrato, R.M. and Holt, L. | North Shore Bays Benthic Mapping: Groundtruth Studies | 2008 | Used high-resolution backscatter and bathymetric data and ground truthing samples for macrofauna and sediment properties to create benthic biotope maps for Oyster Bay, Huntington Harbor, and Port Jefferson Harbor. Concluded that acoustic mapping of the estuary floor provided a useful foundation from which to map benthic biotopes, but that accurate community characterization required more sampling. Applicability: Relevant to LIS resources in that it delineates benthic habitat in WLIS, relevant to dredged material management in that it discusses an approach to rapidly characterize benthic habitat which could influence material management decisions. | Marine Sciences Research Center, Stony Brook University |
| Chang, T.J., Bayes, T.D., and McKeever, S. | Selection Of Wetland Sites For Reservoir Dredging Materials At Charles Mill Lake Of Ohio | 2000 | A combined appoach of GIS processing and sediment sampling was employed to select areas within a reservoir for dredging and dredged material disposal to create wetlands. Lake bottom survey data was digitized, interpolated, and rasterized, and then compared to historical data to locate sediment deposits for sampling. Sediment samples were analyzed for grainsize and the data was spline-interpolated to create raster images of the lake's gravel deposits and grainsize distribution. This data was used to select areas for dredged material disposal in the creation of wetlands. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses a planning approach for beneficial use. | Ohio University, Civil Engineering Department |
| Cieniawski, S. and Tuchman, M. | The Use Of Innovative Sediment Treatment Technologies In The Great Lakes | 2000 | Presents results of bench-scale testing of 9 sediment treatment technologies, and 2 technologies (basic extractive sludge treatment process and low temperature thermal desorption process) for remediating contaminated sediments. Though the technologies were effective at removing PAHs and PCBs, the process proved too expensive. The presentation then discusses two new technologies that recoup treatment costs by creating a marketable product (Glass aggregate and cement-lock). Applicability: n/a to LIS resources, relevant to dredged material management in that evaluates sediment treatment processes. | US Environmental Protection Agency - Region 2, NY/NJ Sediment Decontamination Program |
| Civco, D. and Gilmore, M. | Application Of Remote Sensing Technologies For The Delineation And Assessment Of Coastal Marshes And Their Constituent Species | 2007 | The goal of this project was to examine the spatial, spectral, and temporal aspects of coastal marsh vegetation characterization, identification, and delineation along Long Island Sound using both remote sensing and in situ radiometry data. Major tasks include the delineation and monitoring of coastal marshes from moderate resolution (30 m/pixel) Landsat remote sensing imagery, development of a spectral library of dominant tidal marsh plant species throughout the growing season, development of optimal sensing techniques, and assessment of the marshes in the context of surrounding land cover, impervious surfaces and potential for future migration as a response to sea level rise. Raster files were produced delineating low coastal marsh and high coastal marsh for the CT and NY coastlines of LIS. Resuts are available at UCONN's CLEAR website. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that past dredging has been a factor in marsh loss. | University of Connecticut, Department of Natural Resource Management and Engineering |
| Codiga, D.L. | FOSTER-LIS | | Monitoring aboard New London-Orient Point ferry. Horizontally-directed currents are measured in a vertical profile, from near the sea surface to near the seafloor, by an acoustic Doppler current profiler (ADCP). Near-surface water is pumped past sensors in the engine room and its temperature, salinity, and chlorophyll concentration are measured. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Long Island Sound Study |
| Codiga, D.L. and Aurin, D.A. | Residual Circulation In Eastern Long Island Sound: Observed Transverse-Vertical Structure And Exchange Transport | 2007 | Residual currents in eastern Long Island Sound (LIS) are investigated using direct velocity measurements from an acoustic Doppler current pro filer mounted on a ferry. Circulation at the site has major influence on exchange of water and water-borne materials between LIS and the coastal ocean. Applicability: relevant to LIS resources in that it describes conditions inLIS, relevant to dredged material management in that open dumping in this vicinity would be subject to the described processes. | University of Rhode Island Graduate School of Oceanography |

| Authors | Title | Year | Summary | Contact Agency |
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| Comoss, E.J., Kelly, D.A., and Leslie, H.Z. | Innovative Erosion Control Involving The Beneficial Use Of Dredged Material, Indigenous Vegetation And Landscaping Along The Lake Erie Shoreline | 2000 | The paper describes an innovative erosion control technique, using dredged material and indigenous vegetation planted in conjunction with geotextiles and wattles. The result was a low cost solution which reduced sediment loading to Lake Erie and had ancillary recreational and wildlife benefits. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses beneficial use techniques. | Pennsylvania Department of Conservation and Natural Resources |
| Connecticut Department of Environmental Protection | Water Quality Standards | 2002 | Connecticut Water Quality Standards protect inland and coastal surface waters, and groundwater. They were developed to protect surface and ground waters from degradation, segregate waters used for drinking from those that play a role in waste assimilation, restore surface waters that have been used for waste assimilation to conditions suitable for fishing and swimming, restore degraded ground water to protect existing and designated uses, provide a framework for establishing priorities for pollution abatement and State funding for clean up, and adopt standards that promote the State's economy in harmony with the environment. They are comprised of three elements. The standards are policy statements which discuss issues such as classification of different water resources according to the desirable use, anti-degradation, allowable types of discharges, the fundamental principles of waste assimilation, and a variety of other subjects. The criteria are descriptive and numerical standards that describe the allowable parameters and goals for the various water quality classifications. The Classification Maps that show the Class assigned to each surface and groundwater resource throughout the State, and show the goals for the water resources. Applicability: Water quality standards protective of LIS resources, n/a to dredged material management except to the extent that disposal affects water quality. | CTDEP Bureau of Water Management, Planning & Standards Division |
| Connecticut Department of Environmental Protection | Endangered, Threatened & Special Concern Birds | 2007 | Listing of endangered, threatened, and special concern birds in Connecticut. Applicability: describes resources of LIS watershed area, applicable to dredged material management In that dredged material disposal in areas used by endangered or threatened species would require review by natural resource agency. | |
| Connecticut Department of Environmental Protection | Long Island Sound Water Quality Monitoring Program Maps | | Maps depict the extent of low dissolved oxygen in Long Island Sound for bi-weekly surveys conducted by the Connecticut Department of Environmental Protection, Bureau of Water Protection and Land Reuse's Long Island Sound Water Quality Monitoring Program from June to September. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Long Island Sound Study |
| Connecticut Department of Environmental Protection | Long Island Sound Water Quality Monitoring | | The Connecticut Department of Environmental Protection performs an intensive year-round water quality monitoring program on Long Island Sound. Water samples are analyzed for water temperature, salinity, dissolved silica, particulate silica, dissolved nitrogen, particulate nitrogen, dissolved oxygen, chlorophyll a, and total suspended solids. October through May, monthly samples are collected from 18 stations. June through September, bi-weekly hypoxia surveys are conducted at 48 stations. Also includes discussion of the Nitrogen Control Program. Applicability: investigation of a LIS resource (water quality), n/a to dredging. | Long Island Sound Study |
| Connecticut Department of Environmental Protection Office of Long Island Sound Programs and New York State Department of Environmental Conservation | Long Island Sound Study Habitat Restoration Initiative - Annual Summary For The Year 2008 | 2007 | This report summarizes the accomplishments of the Long Island Sound Study's (LISS) Habitat Restoration Initiative (HRI) for year 2008. In 2006, the Policy Committee, comprised of the Commissioners of NYS DEC and CT DEP, and Regional Administrators of EPA region 1 and 2, met to sign a new MOU and establish updated goals for the Habitat Restoration Initiative. The goals outlined were to restore or protect an additional 300 acres of coastal habitat and open up an additional 50 miles of riverine migratory corridor to diadromous fish from January 1, 2006 to December 31, 2011, as stated in EPA's Strategic Plan, and ultimately restore 2,000 acres by 2020. Five coastal habitat restoration projects were completed, totaling 16.1 acres in 2008. A total of 667 acres of habitat have been restored through the program. Three riverine migratory corridor projects were completed which now provide access to an additional 2.92 miles of migratory passageways for fish. By the end of 2008, 146 miles of riverine migratory corridor were opened to fish passage. Details of wetland restoration projects, riverine migratory corridor projects, submerged aquatic vegetation projects, coastal grassland and coastal forest projects are provided. Applicability: relevant to LIS resources in that it describes conditions inLIS, n/a to dredged material management. | Connecticut Department of Environmental Protection Office of Long Island Sound Programs |
| Connecticut Department of Environmental Protection, Bureau of Natural Resources - Inland Fisheries Division | Connecticut Fish Distribution Report: 2008 | 2008 | Locations and numbers of 2008 stocking program for trout, Kokanee salmon, Northern Pike, walleye, channel catfish, Atlantic Salmon, brown trout, shad, alewife. Applicability: describes resources of LIS watershed area, n/a to dredged material management. | CT DEP - Bureau of Natural Resources, Inland Fisheries Division |
| Connecticut Department of Environmental Protection, Bureau of Natural Resources - Marine Fisheries Division | A Study Of Marine Recreational Fisheries In Connecticut | 2008 | The document contains the Marine Angler Survey (Job 1), the Long Island Sound Trawl Survey (Job 2 Part 1), the Estuarine Seine Survey (Job 2 Part 2), the Inshore Survey (Job 3), Cooperative Interagency Resource Monitoring (Job 5), and Public Outreach (Job 6). The Long Island Sound Trawl Survey (LISTS) was initiated in 1984. Each year, the CTDEP Marine Fisheries Division conducts the survey by otter trawl in the Spring (April-June) and Fall (September-October) in both CT and NY waters of Long Island Sound between Greenwich and New London. The objectives of the program are to provide data on catch per unit effort for 40 species, age-specific indices of abundance for scup/summer flounder/winter flounder/tautog, recruitment index for bluefish/weakfish, length frequency distributions for bluefish/scup/striped bass/summer flounder/winter flounder/tautog/weakfish, finfish total counts and biomass, invertebrate biomass, and a species list for Long Island Sound. The Estuarine Seine Survey provides an annual index of recruitment for young-of-year winter flounder and all finfish and crab species taken. The Cooperative Interagency Resource Monitoring provides monthly monitoring of water quality parameters important in the development of summer hypoxia in Long Island Sound including temperature, salinity, and dissolved oxygen, and provides indicators of hypoxia impacts on living resources. Applicability: describes status of a LIS resource, does not address dredging. | CT Department of Environmental Protection |
| Connecticut Department of Environmental Protection, Bureau of Natural Resources - Marine Fisheries Division | State Of Connecticut Department Of Environmental Protection 2010 Marine Fisheries Information Circular | 2010 | Describes the Connecticut statutes and regulations that govern the taking of lobsters, marine and anadromous finfish, squid and crabs by commercial and recreational fishermen. The document does not present the actual regulations, but rather is intended to be a layman's summary. Applicability: describes regulation of a LIS resource, does not address dredging. | CTDEP Bureau of Natural Resources - Marine Fisheries Division |

| Authors | Title | Year | Summary | Contact Agency |
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| Connecticut Department of Environmental Protection, Remediation Division | Environmental Land Use Restrictions: An Environmental Program Fact Sheet | 2009 | Defines the Environmental Land Use Restriction (ELUR) as an easement granted to CTDEP by landowners preventing specific uses or activities for the purpose of minimizing the risk of human exposure to pollutants or hazards on that property. Also outlines the regulations and statutes that enable ELUR and describe program requirements. Outlines the two major types of ELUR (restriction of use to industrial/commercial, prohibition of exposure of inaccesible soil), the circumstances under which ELUR may be used, and the way in which ELURs may be released. Applicability: protects LIS resources from migrating contamination, n/a to dredged material unless contamination was created by dredged material placement. | CTDEP Remediation Division |
| Connecticut Department of Environmental Protection, Wildlife Division | Connecticut's Endangered, Threatened And Special Concern Species | 2004 | List of endangered/threatened/special concern mammals, birds, reptiles, amphibians, fish, insects, and plants. Applicability: describes resources of LIS watershed area, applicable to dredged material management in that dredged material disposal in areas used by endangered or threatened species would require review by natural resource agency. | CT DEP, Environmental and Geographic Information Center - Natural Diversity |
| Connecticut Department of Transportation | State Of Connecticut Maritime Policy | 2006 | The policy that the Connecticut Maritime Commission recommends be adopted. In support of promoting maritime transportation of goods and people in Long Island Sound, CTDOT cites dredging and sediment management as a priority for port viability. This website discusses dredging priorities, the permit process, and economic development. The highest dredging priority is maintaining channel depth at the three largest ports (Bridgeport, New Haven, New London), but the state also recognizes the importance of other commercial and recreational ports in the state. Dredging permitting process is subject to the Ocean Dumping Act, and will be contingent on the dredged material management plan in the future. It is CT policy to seek funding to prepare and implement the DMMP, to prioritize dredging projects in the state, and to collect information on the need to increase channel depths for economic development. Priorities for economic development include port accesibility by sea and by land (rail), high-speed passenger ferry service, and establishing multimodal transportation nodes. Applicability: n/a to LIS resources, discusses the need for dredging and dredged material management program to maintain viability of ports for marine transport. | CT Department of Transportation, Connecticut Maritime Commission |
| Connecticut Sea Grant | Invasive Species Of Long Island Sound | | Listing of invasive species in Long Island Sound, including descriptions, pathway of invasion, current distribution, and impact. Species include phragmites, bread-crumb sponge, orange striped anemone, common periwinkle, European flat oyster, Asian shore crab, green crab, kelp bryozoan, compound sea squirt, Asian stalked tunicate, sea grape, compound tunicate, golden star tunicate, red alga, Dead man's fingers, lionfish, and mute swan. Applicability: Addresses LIS invasive and impacts to LIS resources, n/a to dredging. | USFWS |
| Costa-Pierce, B.A. and Weinstein, M.P. | Use Of Dredge Materials For Coastal Restoration | 2002 | Summary of 24 case studies from USACE/USEPA website on wetlands restoration with dredged material. Project costs ranged from $1.00-$11.25 per cubic yard, mode of $1.50 per cubic yard. Identifies long-term monitoring as a priority for understanding the key ecological engineering aspects of beneficial use. The editorial opines on future policy directions to promote beneficial use of dredged material. The appendix, summary of a NOAA-SeaGrant symmposium, is an open letter outlining the recommended priorities for a joint NOAA/USACE effort (inventory and prioritize restoration potential, understand engineering practices needed to create functional coastal ecosystems, identify situations where dredged material not appropriate for habitat restoration, understand issue of scale and transferability of models, develop interdisciplinary teams to research and monitor, develop performance standards and adaptive management practices, research new technology to clean contaminated sediment, develop university curricula). Applicability: n/a to LIS resources, outlines beneficial uses of dredged material. | University of Rhode Island Graduate School of Oceanography, Rhode Island Sea Grant College Program |
| Crannell, B., Eighmy, T.T., Butler, L., Emery, E., and Cartledge, F. | Use Of Phosphate To Stabilize Heavy Metals In Contaminated Sediments | 2000 | Samples of heavy metal contaminated sediments were treated with 10% phosphate and lime in lab testing to see if phosphate was a reliable remediation technique. Results indicated that treatment reduced the solubility of lead by 79%, cadmium by 59% and zinc by 50%. Solubilities were reduced because the apatite minerals (phosphate) incorporated heavy metals into their structure. The use of phosphate minerals as a reactive barrier in disposal facilities also proved to be an effective inhibitor of heavy metals diffusion. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses remediation technologies. | University of New Hampshire, Department of Civil Engineering |
| Creef, E., Hennington, S.M., and Mathies, L.G. | Beneficial Use Of Dredged Materials: Part Of The Solution To Restoration Of Louisiana'S Coastal Wetlands | 2000 | Reviews the history of using dredged material to restore loss of Louisiana's coastal wetlands and presents factors that limit the amount that can be restored by Corps dredging (logistics, chemical and physical characteristics of the material, channel dynamics, and land use restrictions). Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | U.S. Army Corps of Engineers, New Orleans District |
| Cuomo, C. and Valente, R. | Monitoring Of Bottom Water And Sediment Conditions At Critical Stations In Western Long Island Sound | 2003 | The study evaluates the role of hypoxia and anoxia (and related sulphide and ammonia releases from the sediment) as a structuring influence on the benthic environment and communities of western Long Island Sound, especially as they pertain to lobster habitat. Field surveys were conducted in order to obtain sediment profile images and bottom water data (dissolved oxygen, hydrogen sulphide and ammonia) from sampling stations in WLIS. Results were compared to co-temporal water quality monitoring from CTDEP and to conditions at the time of the lobster mortality event in 1999. The study observed severe hypoxia and higher water temperatures. The data strongly support the idea that fall hypoxia is driven by processes occurring within the sediments and at the sediment-water interface. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | University of New Haven, Dept. Biology and Environmental Science |
| Cura, J.J., Bridges, T.S., and McArdle, M.E. | Comparative Risk Assessment Methods And Their Applicability To Dredged Material Management Decision-Making | 2004 | Evaluates the potential application of comparative risk assessment methods as a decisionmaking framework for selecting alternative technologies for dredged material management, and makes recommendations for implementing such a framework. To mitigate subjectivity, it is suggested that decision-makers develop a method that is logically consistent and allows for uncertainty by comparing risks on the basis of more than one set of criteria, more than one set of categories, and more than one set of experts. Also suggests implementing probabilistic approches where possible. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses decision strategies for material management. | The Science Collaborative |
| Dalton, J.L., Gardner, K.H., Seager, T.P., Weimer, M.L., Spear, J.C.M., and Magee, B.J. | Properties Of Portland Cement Made From Contaminated Sediments | 2004 | Bench and pilot scale testing of the beneficial use of dredged material as a feedstock (1–12% dredged material from the New York/New Jersey (NY/NJ) harbor) in the conventional manufacture of Portland cement. The paper also presents a summary of practical and economic considerations. X-ray diffraction analysis and ASTM tests for strength, soundness, and setting time suggested that with better optimized burning conditions, dredged material can be successfully incorporated into full scale manufacture. Other studies by this research group indicate that contaminant (metals) availability is reduced when contaminated dredged materials are manufactured into Portland cement, rather than mixed with it. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses a potential beneficial use. | University of New Hampshire, Environmental Research Group |

| Authors | Title | Year | Summary | Contact Agency |
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| Dam, H.G. and O'Donnell, J. | A Synthesis Of Water Quality And Planktonic Resource Monitoring Data For Long Island Sound | 2010 | The objective of this project is to synthesize existing water quality and plankton monitoring data, making recommendations useful to Long Island Sound restoration management and decision-making. Analysis suggests there is significant spatial variation of salinity/DIN/chlorophyll in the Sound due to differences at the extreme ends, temperature is stable, decreases in dissolved nitrogen and particulate matter, increases in phosphorous and silica, a decline in chlorophyll in the 1990s and subsequent rebound, no change in DO aside from a significant decrease in western LIS, no change in the spatial extent of hypoxia, variation in DO explained by temperature, density stratification controls DO decline, water quality parameter timescale is typically on order of decades, and no significant change in primary productivity since the 1950s. Study findings suggest that monitoring programs should be long term (multi-decade) to be effective, that current reduction in nutrients has not been enough to impact hypoxia, and that it is too simplistic to assume that nutrient reduction reduces phytoplankton biomass and reduces hypoxia. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | University of Connecticut, Department of Marine Sciences |
| D'Amico | LI Embayment Benthic Mapping | 2003 | NYSDEC has contracted Stony Brook University to develop benthic maps for Port Jefferson Harbor, Huntington – Northport Bays, and Oyster Bay – Cold Spring Harbor. The side scan photography has been completed for all three embayments and benthic sampling will be conducted in Port Jefferson and Huntington – Northport Bays. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Long Island Sound Study |
| Deacon, J.R., Smith, T.E., Johnston, C.M., Moore, R.B., Weidman, R.M., and Blake, L.J. | Assessment Of Total Nitrogen In The Upper Connecticut River Basin In New Hampshire, Vermont, And Massachusetts, December 2002–September 2005 | 2006 | A study of total nitrogen concentrations and loads was conducted from December 2002 to September 2005 at 13 river sites in the upper Connecticut River Basin. Ten sites were selected to represent contributions of nitrogen from forested, agricultural, and urban land. Three sites were distributed spatially on the main stem of the Connecticut River to assess the cumulative total nitrogen loads. Ambient surface water-quality sampling was supplemented with sampling of effluent from 19 municipal and paper mill wastewater-treatment facilities. Concentrations of total nitrogen at agricultural, urban, and main stem sites were significantly greater ($p<0.05$) than at forested sites and significantly less than concentrations at wastewater-treatment sites ($p<0.05$). Annual yields and loads are presented. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | U.S. Geological Survey, New Hampshire-Vermont Water Science Center |
| DeGuise | LIS Environmental Data Synthesis | 2007 | A synthesis of information on the patterns and processes that characterize the Long Island Sound ecosystem. The document also addresses how these patterns and processes may be altered in response to global and regional change and the implications for improving ecosystem-based management of the Sound. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Connecticut Sea Grant College Program |
| Douglas, W.S., Baier, L.J., Gimello, R.J., and Lodge, J. | A Comprehensive Strategy for Managing Contaminated Dredged Material in the Port of NY and NJ | 2003 | A discussion of the management of dredged materials from the Port of NY and NJ. Reviews short term solutions (HARS/MudDumpSite and Newark Bay CDF), intermediate term solutions (brownfield and landfill remediation, coalmine reclamation, transportation projects), and long term solutions (higher efficiency beneficial use, environmental manufacturing, dredged material management plan, watershed planning to reduce quantity and contamination of sediments). Discussion then focuses on challenges to implementation. Applicability: n/a to LIS resources, focuses on dredged material management. | New Jersey Department of Transportation, Office of Maritime Resources |
| Douglas, W.S., Dunlop, P., and Jafari, F. | Constructing And Maintaining The Port Of NY And NJ, USA: Operational And Management Challenges In Moving From Disposal To Beneficial Use | 2006 | Dredged materials from the Port of NY/NJ have been used beneficially for landfill cover, mine reclamation and brownfield remediation with substantial environmental and local economic benefit. This paper outlines the strategies used to overcome the significant logistical, regulatory and economic issues that stood in the way of achieving the transition to beneficial use. Review costs of disposal and beneficial use options, discusses operations and logistics, presents a beneficial use framework, and reviews the management of environmental impacts. Applicability: n/a to LIS resources, relevant to dredged material management in that it reviews a successfully implemented beneficial use program in New York. | NJ Department of Transportation, Office of Maritime Resources |
| Douglas, W.S., Maher, A., and Jafri, F. | Dredged Material from New York/New Jersey Harbor, USA, for Construction of Roadway Embankments | 2005 | A pilot study was initiated in 1998 to evaluate the use of dredged material stabilized with pozzolanic additives (SDM) in the construction of highway embankments. Using 80,000 cubic yards of silty dredged material, 2 embankments were constructed from SDM on a commercial development area adjacent to the New York/New Jersey Harbor. This article presents the evaluation of the environmental effects of the SDM, including fugitive air emissions, leachate, and stormwater quality. The findings demonstrate that although there are measurable releases of contaminants to the environment from the SDM, these releases are not significant long-term threats to human health or the environment. Applicability: n/a to LIS resources, discusses beneficial use of dredged material. | New Jersey Department of Transportation, Office of Maritime Resources |
| East-West Gateway Coordinating Council of Governments | Highway Runoff And Water Quality Impacts | 2000 | An overview of highway runoff and its potential impact on the environment. Identifies sources and factors affecting highway runoff and its pollutant components. Presents a literature review on the water quality impacts of highway runoff. Identifies the existing best management practices to ameliorate the water quality impacts. Also discusses nonstructural and structural (vegetative surfaces, detention ponds, infiltration facilities, sand filters) management practices which can reduce the impact highway runoff has on surface and ground water. Applicability: n/a to LIS resources directly although highway runoff does impact LIS resources, relevant to dredged material management in that runoff management practices may be potential use for dredged material. | East-West Gateway Council of Governments |
| Eeenhoorn, H. and van der Sluijs, W. | Handling And Treatment Of Contaminated Sediments In The Netherlands | 2000 | The Netherlands anticipated dredging 200 million cubic meters of sediments, many heavily contaminated, between 2000 and 2010. Studies indicated that 30% of the contaminated sediments could be reused by through simple techniques like sedimentation basins. However, up-scaling treatment facilities could not meet the capacity problem. Therefore, Dutch Ministry recommended local open pits for disposal, as long as they are carefully sited, since there is strong public opposition for large CDFs. The paper presents a classification system for rating the contaminant levels in sediments, and presents a framework for dredged material management in the Netherlands. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses another country's system of material management. | Dutch Ministry of Transport, Public Works and Water Management, Aquatic Sediment Expert Center (AKWA) |

| Authors | Title | Year | Summary | Contact Agency |
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| Elphick, C.S., Gjerdrum, C., Comins, P., and Rubega, M. | Salt Marsh-Breeding Sparrows In Long Island Sound: Status And Productivity Of A Globally Important Species | 2005 | Objectives were to assess population size of salt marsh sharp-tailed sparrow and seaside sparrow, estimate breeding productivity, and identify suitable indicators of salt marsh health. 2002-2003 observations of 40 study plots in 7 marshes. Population estimates in the marshes indicate that these study areas, and LIS salt marshes in general, are potentially globally important bird areas. Habitat selection and indicators, nest site selection, demographic parameters, and indicators of avian community health are discussed. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | University of Connecticut, Department of Ecology and Evolutionary Biology |
| ENSR | Monitoring Survey at the Central Long Island Sound Disposal Site, September 2003. | 2004 | The Central Long Island Sound Disposal Site (CLDS) was monitored as part of the US Army Corps of Engineers New England District Disposal Area Monitoring System (DAMOS) on 8-10, 16-17, and 22 September 2003. The 2003 field effort included bathymetric and sediment-profile imaging (SPI) surveys designed to document changes in seafloor topography, evaluate the physical distribution of dredged material and assess the benthic recolonization status associated with recent dredged material disposal activity. Applicability: relevant to LIS resources in that it characterizes a portion of LIS, relevant to dredged material management in that it monitors effects of disposal. | US Army Corps of Engineers-New England District, Regulatory Division |
| ENSR | Monitoring Survey At The Central Long Island Sound Disposal Site, June 2004. | 2005 | Central Long Island Sound Disposal Site (CLDS) was monitored as part of the Disposal Area Monitoring System (DAMOS) on 17-18 and 28-29 June 2004. The 2004 field effort consisted of bathymetric and sediment-profile imaging (SPI) surveys designed to characterize seafloor topography, evaluate the physical distribution of dredged material around recent and historic disposal events and to assess whether the algal/detrital layer observed in the September 2003 survey had persisted or reoccurred in 2004. Applicability: relevant to LIS resources in that it characterizes a portion of LIS, relevant to dredged material management in that it monitors effects of disposal. | US Army Corps of Engineers-New England District, Regulatory Division |
| ENSR | Stamford-New Haven North/Cap Site 2 Investigation May 2004. | 2005 | An investigation was conducted in May 2004 as part of the Disposal Area Monitoring System (DAMOS) to assess the physical distribution of sediments and chemical profiles in two engineered mounds in Long Island Sound, Stamford New Haven-North (STNH-N) and Cap Site 2 (CS-2). Applicability: relevant to LIS resources in that it characterizes a portion of LIS, relevant to dredged material management in that it monitors effects of disposal. | US Army Corps of Engineers-New England District, Regulatory Division |
| ENSR | Monitoring Survey At The Western Long Island Sound Disposal Site, June 2004. | 2005 | The Western Long Island Sound Disposal Site (WLDS) was monitored as part of the Disposal Area Monitoring System (DAMOS) on 19- 20 June 2004 and 30 June - 1 July 2004. The 2004 field effort consisted of bathymetric and sediment-profile imaging (SPI) surveys designed to characterize seafloor topography, evaluate the physical distribution of dredged material around recent and historic disposal events and to assess the benthic conditions over recently formed and historic disposal mounds. Applicability: relevant to LIS resources in that it characterizes a portion of LIS, relevant to dredged material management in that it monitors effects of disposal. | US Army Corps of Engineers-New England District, Regulatory Division |
| ENSR | Monitoring Survey At The Cornfield Shoals Disposal Site, June 2004. | 2005 | The Cornfield Shoals Disposal Site (CSDS) was monitored as part of the Disposal Area Monitoring System (DAMOS) on 14-16 June 2004. The June 2004 field effort consisted of a bathymetric survey designed to document any significant accumulation of dredged material around the center of the disposal site since the previous set of investigations in the early 1990s. Applicability: relevant to LIS resources in that it characterizes a portion of LIS, relevant to dredged material management in that it monitors effects of disposal. | US Army Corps of Engineers-New England District, Regulatory Division |
| ENSR | Baseline Bathymetric Surveys At The Central And Western Long Island Sound Disposal Sites, July 2005. | 2007 | Bathymetric surveys were conducted in July 2005 at the Central Long Island Sound Disposal Site (CLDS) and the Western Long Island Sound Disposal Site (WLDS) as part of the Disposal Area Monitoring System (DAMOS). Applicability: relevant to LIS resources in that it characterizes a portion of LIS, relevant to dredged material management in that it monitors effects of disposal. | US Army Corps of Engineers-New England District, Regulatory Division |
| Estes, T. J., Waugh, J., Schwartz, R. L., Green, G., Buhr, V., Braddock, B., and Detzner, H.-D. | Mechanical Dewatering Of Navigation Sediments: Equipment, Bench-Scale Testing, And Fact Sheets | 2004 | This document introduces the basic pieces of equipment that make up a dewatering circuit or train, some advantages and disadvantages of different equipment options, the state of the practice in bench-scale testing, discussions of performance specifications and cost, and several fact sheets on various process technologies and their applications. The specific technology addressed in this report is undergoing evaluation for potential demonstration for mechanical dewatering at CDFs. Dewatering technology can enable beneficial uses of suitable material, and reduce transportation costs for contaminated material. The appendix provides fact sheets on several dewatering plants and demonstration projects. Applicability: n/a to LIS resources aside from potential benefit from beneficial use, discusses dredging technology. | U.S. Army Engineer Research and Development Center, Dredging Operations and Environmental Research Program |
| Federal Energy Regulatory Commission | Broadwater Lng Project Final Environmental Impact Statement | 2008 | Discussion of the potential environmental impacts of a proposed floating storage and regasification unit (FSRU), yoke mooring system (YMS), and pipeline for liquid natural gas (LNG) in the central basin of Long Island Sound. Existing environment, potential impacts and mitigation measures are discussed in Section 3 with respect to geology and soils, water resources, biological resources, threatened and endangered species, land use/recreation/visual resources, socioeconomics, marine transportation and onshore traffic, cultural resources, air quality and noise, reliability and safety, and cumulative impacts. Environmental data presented includes: marine habitats, wetlands (tidal wetland, barrier beach), and sanctuaries (USFWS Coastal Areas, management areas, NYSDOS Significant Coastal F&W Habitat), shellfish distribution, RI shellfish beds, CT oyster grounds, restricted harvesting areas, fish distribution (CT, RI), flounder and tautog migratory routes, RI fisheries concentration zone, RI winter flounder spawning area, marine mammal distribution, eelgrass beds, seal haulout and special use areas, bird distribution, terrestrial habitat and management areas (parks. small mammal, CT natural area preserves, CT Natural diversity database areas, RI conservation areas, wildlife refuges, estuarine research reserves, RI rare species, tribal land), distribution of surficial sediments, sediment copper/mercury/lead along pipeline route, benthic communities along pipeline route, fish species, essential fish habitat, commercial and recreational fishery species, avian species in offshore waters, endangered species in offshore waters, and state listed species within 4 miles of proposed onshore facility. Section 5 outlines conclusions. During construction, the primary impacts would be physical disturbance of the seafloor and related turbidity inthe water column. During normal operation, the impacts of primary concern would consist of minor impacts to water quality, air quality, fisheries resources associated with impingement and entrainment, recreational boating and fishing, commercial fishing, and commercial vessel traffic, as well as minor to moderate impacts on visual resources. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that the project area would be an area to avoid in dredged material management. | Federal Energy Regulatory Commission - Office of Energy Projects |
| Federal Energy Regulatory Commission | List Of Major Pending Pipeline Projects As Of May 18, 2009 | 2009 | Listing of all current natural gas pipeline projects (current to 5/18/09) in the United States. For each project, a description is given, a parent company is named, the state(s) in which the project occurs is named, and links to the Notice of Application, the DEIS, and the FEIS are provided where applicable. A total of 30 projects are listed. Applicability: lists projects which may impact resources of LIS, any underwater pipeline projects would be areas to be considered in dredging and dredged material management. | |

| Authors | Title | Year | Summary | Contact Agency |
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| Field, L., MacPherson, G., and Lundy, K. | The Capping Proposal For Cell 1, Tommy Thompson Park - A Wetland Creation Opportunity On The Toronto Waterfront | 2000 | Describes feasibility testing of a program to cap and create wetlands on a CDF in Toronto Harbor. Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | The Toronto and Region Conservation Authority |
| Fitzgerald, W.F. and Visscher, P.T. | Final Report: Microbiological And Physicochemical Aspects Of Mercury Cycling In The Coastal/Estuarine Waters Of Long Island Sound And Its River-Seawater Mixing Zones | 2002 | Hg-Organic Interactions, Methylmercury Production in Sediments, River-Seawater Mixing Zones, Hg0 and Hg Speciation in Long Island Sound. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that mercury may be present in dredged material. | University of Connecticut Department of Marine Sciences |
| Fredette, T.J., and French, G.T. | Understanding The Physical And Environmental Consequences Of Dredged Material Disposal: History In New England And Current Perspectives | 2004 | Summary of USACE's Scientific Report Series and Disposal Area Monitoring System indicates that ocean disposal of dredged material has minimal environmental impact when carefully managed. Monitoring of short-term and long-term physical and biological effects show that the impacts of disposal are typically near-field and short-term. Applicability: Reviews impacts of dredged material disposal to LIS resources. | US Army Corps of Engineers, New England District |
| Fuss & O'Neill, Inc. and Woods Hole Group | Environmental Impact Evaluation - Hammonasset Beach Erosion Study | 2008 | A study of the historical and ongoing shoreline erosion at the western end of Hammonasset Beach State Park, identification of potential long-term remedial actions, evaluation of potential environmental impacts of alternatives to address the erosion, and recommendation for the most cost-effectiveand environmentally-responsible long-term course of action for DEP to pursue. Includes a description of the proposed action, an evaluation of the direct, indirect, and cumulative effects of the proposed action, unavoidable adverse environmental affects, alternatives, and mitigation measures. The two alternatives considered in detail involve nourishment (placement of 563,000 cubic yards using either local dredging spoils or upland material) with and without a new coastal structure to better retain the sand placed on the beach. No Action was determined to be the alternative with most significant impacts. Impacts of the nourishment alternatives are discussed with respect to park infrastructure, traffic, coastal resources, socioeconomic resources, cultural resources, air quality, noise, hydrology and water quality, wildlife and fisheries, inland wetlands, construction, consistency with planning, and sea level rise. The preferred alternative is beach nourishment with the construction of a groin because impacts are short term and can be mitigated. Applicability: relevant to LIS resources in that it describes conditions in an area adjacent to LIS, relevant to dredged material management in that the proposed beach nourishment would utilize dredged material. | Connecticut Department of Environmental Protection |
| G.E.C., Inc. | Calcasieu River And Pass, Louisiana Dredged Material Management Plan And Supplemental Environmental Impact Statement | 2009 | The purpose of this study is to develop a management plan for the placement of material dredged for the maintenance and operation of the Calcasieu Ship Channel for the next 20 years. Currently, the project does not have the adequate dredged material disposal capacity needed (97M yd3 needed vs 5M yd3 available in CDF) to maintain the channel to authorized depths. Since the port is the 11th largest seaport in the U.S. and the second largest Strategic Petroleum Reserve facility, channel reductions could have a large economic impact. The study evaluates a no action alternative, a lowest cost alternative maximizing CDF use with some marsh nourishment , an alternative maximizing marsh nourishment with some CDF use, and an alternative placing all material at an ocean disposal site. Impacts of the alternatives are compared on the basis of physical conditions, geology, soils, water quality, air quality, wetlands, essential fish habitat, oyster grounds, threatened and endangered species, recreation, and noise. A tentatively selected plan is indicated to be Alternative B, which maximizes use of CDFs. Alternative C is selected as the environmentally preferred plan. Alternative B is the lowest cost alternative which meets the project goal and is consistent with environmental and engineering requirements. Screening criteria and planning criteria are outlined and discussed. Supporting information for the impact categories is included in the appendices. Applicability: n/a to LIS resources, example of the evaluations necessary for DMMP. | U.S. Army Corps of Engineers, New Orleans District |
| Gaffney, R. | Dredged Material:What To Do With It? Cost-Effective Beneficial Use Of Dredged Material | 2005 | Presentation of results of testing on methodology for separating dredged material contained in New Jersey's CDFs. Bench-scale tests for pneumatic separation and hydraulic separation. Developed a way to remove sandy fraction of dredged material from a CDF for use in infrastructure projects. Applicability: n/a to LIS resources, discusses beneficial use of dredged material. | Ocean and Coastal Consultants, Inc. |
| Gahagan & Bryant Associates, Inc. | Poplar Island Restoration Project Beneficial Use Of Dredged Material | 2004 | Review of the Poplar Island Environmental Restoration Project, which seeks to restore Poplar Island to its 1847 footprint of 1140 acres (50% tidal wetland, 50% upland) using dredged materials from the channels approaching Baltimore Harbor and recreate nesting/foraging/nursery habitat. Details the design and construction of the containment dike, and the monitoring studies and targets to measure project success. Applicability: n/a to LIS resources, outlines beneficial uses of dredged material. | Gahagan & Bryant Associates, Inc. |
| Germano, J. D., and Cary, D. | Rates And Effects Of Sedimentation In The Context Of Dredging And Dredged Material Placement | 2005 | Dredging and disposal of dredged material in aquatic environments can expose animals and plants to episodic pulses of suspended sediment. Resuspended material can be deposited in thin layers adjacent to the dredging or disposal areas. This report examines the effects of suspended and redeposited material on estuarine organisms. The report synthesizes responses from several experts regarding the minimum levels of sedimentation expected to have impacts on early life stages of fish, early life stages of shellfish, and submerged aquatic vegetation. It also summarizes expert opinion on the appropriate scale of laboratory and in-situ tests for further investigation, and on the requirements and limitations of predictive models. Applicability: n/a to LIS resources specifically but does address general impacts of resuspended sediment on fish and vegetation, relevant to dredged material management in its discussion of impacts of dredging. | U.S. Army Engineer Research and Development Center, Dredging Operations and Environmental Research Program |

| Authors | Title | Year | Summary | Contact Agency |
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| Gobler, C.J., Buck, N.J., Sieracki, M.E. and Sanudo-Wilhelmy, S.A. | Nitrogen And Silicon Limitation Of Phytoplankton Communities Across An Urban Estuary: The East River-Long Island Sound System | 2006 | To understand how nutrient loading may impact phytoplankton community growth, structure, and photosynthetic efficiency in Long Island Sound (LIS), nutrient enrichment (N, P, or Si) experiments were conducted at stations along the longitudinal gradient of the East River-Long Island Sound system during high and low river flow conditions (spring and summer). An absence of response in ELIS phytoplankton following nutrient enrichment during spring together with elevated dissolved inorganic nutrients concentrations and river discharge rates suggests that seasonal variation in river flow can impact the degree to which ELIS phytoplankton are nutrient-limited. Experimental results are compared to mean monthly concentrations and ratios of dissolved inorganic nitrogen (DIN; nitrate, nitrite, and ammonium), dissolved inorganic phosphorus (DIP; orthophos-phate), and dissolved silicon (DSi) found in the East River (ER), western, central, and eastern Long Island Sound (WLIS, CLIS, ELIS) as measured by the Connecticut Department of Environmental Protection (Table 4). Applicability: relevant to LIS resources in that it describes conditions inLIS, n/a to dredged material management. | Stony Brook University, Marine Sciences Research Center |
| Goebel, N.L. and Kremer, J.N. | Temporal And Spatial Variability Of Photosynthetic Parameters And Community Respiration In Long Island Sound | 2007 | Daily and annual integrated rates of primary productivity and community respiration were calculated using physiological parameters measured in oxygen-based photosynthesis-irradiance (P-I) incubations at 8 stations throughout central and western Long Island Sound (cwLIS) during the summer and autumn of 2002 and 2003 and the late spring of 2003. Based on results, algal-related rates of respiration (Ra) were estimated at ~50% of total plankton community respiration. Applicability: relevant to LIS resources in that it describes conditions inLIS, n/a to dredged material management. | University of California - Santa Cruz, Ocean Sciences Department |
| Goebel, N.L., Kremer, J.N. and Edwards, C.A. | Primary Production In Long Island Sound | 2006 | Daily and annual integrated rates of primary productivity and community respiration were calculated using physiological parameters measured in oxygen-based photosynthesis-irradiance (P-I) incubations at 8 stations throughout central and western Long Island Sound (cwLIS) during the summer and autumn of 2002 and 2003 and the late spring of 2003. The spatial gradients in productivity parallel nitrogen loads along the main axis of the Sound. Daily integrals of productivity were used to test and formulate a simple, robust biomass-light model for the prediction of phytoplankton production in Long Island Sound. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | University of Connecticut Department of Marine Sciences |
| Gorokhovich, Y. and Voustianiouk, A. | Prioritization Of Coastal Properties For Conservation In New York State | 2009 | Used Geographic Information System (GIS) to assign conservation priority scores to unprotected and undeveloped parcels greater than five acres in size within New York's Long Island Sound coastal area. Parcel scoring based on parcel distances to coastline, wetlands, streams, water bodies, public lands, stewardship sites, and roads. Identified 744 suitable vacant parcels, many of which were clustered together, enabling larger scale conservation. Results of the model will be used by LISS and NYSDEC officials in conservation of the most significant remaining unprotected and undeveloped parcels. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that it identifies parcels that should either be excluded from upland management of dredged material or included as potential beneficial use sites. | Department of Environmental, Geographic and Geological Sciences, Lehman College |
| Great Eastern Ecology, Inc. | Norton Basin/Little Bay Statistical Analysis Preliminary Project Report And Summary Of Data Analyses | 2004 | This report provides a summary of multivariate and univariate statistical approaches to explore relationships between biotic resources (fish, macrocrustacean and benthic macroinvertebrates) and environmental variables. Presumably, a statistical evaluation of such relationships could provide guidance to restoration measures (recontouring to establish shallow estuarine habitat) and understanding baseline ecological parameters. Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | U.S. Army Corps of Engineers, New York District |
| Guilfoyle, M.P., Fischer, R.A., Pashley, D.N., and Lott, C.A. | Summary Of First Regional Workshop On Dredging, Beach Nourishment, And Birds On The South Atlantic Coast | 2006 | USACE, the American Bird Conservancy, and USFWS organized a conference on February 1-4, 2005 to disseminate information on the beneficial use of dredged material deposition along the South Atlantic Coast for the purpose of habitat improvement, management, and conservation of colonial and non-colonial waterbirds and shorebirds. The document presents summaries of presentations from the workshop. Workshop sessions included (1) South Atlantic Coastal Bird Status and Distribution, (2) Overview of Beach Nourishment on the Altantic Coast, (3) Beach Nourishment and Piping Plovers, (4) Biological Effects of Beach Nourishment, (5) Bird Use of Dredged Material, and (6) Bird Monitoring and Information Resources. Applicability: n/a to LIS resources directly but does apply to similar bird communities in LIS, outlines beneficial uses of dredged material. | U.S. Army Engineer Research and Development Center, Environmental Laboratory |
| Gurfinkel, A. | ETHEC Industries - Integrated ETHEC Technology | | ETHEC (Electro-THErmo-Chemical) technology is a one step energy efficient and fully automated industrial process line that uses programmable heating to recycle contaminated sediment, on the dredging site, into beneficial products. In the first stage of the process, solids are concentrated by water vapor extraction and the residues can be turned into fertilizers/fuels/industrial chemicals (organic contaminants) or construction material/metal recovery (inorganic contaminants). Contaminants are removed from the dewatered solids in stage two. In the third stage, chemicals are stabilized in solids through a thermo-chemical reaction. End products are fill, cement, or light aggregate. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses remediation technology that creates beneficial use products. | ETHEC Industries |
| Hammerschmidt, C.R., Fitzgerald, W.F., Lamborg, C.H., Balcom, P.H., and Visscher, P.T. | Biogeochemistry Of Methylmercury In Sediments Of Long Island Sound | 2004 | Measurements of mercury, bioturbation, pH, and iron in sediments and porewater from three stations in Long Island Sound (Western, Central, Eastern) on three dates. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that mercury and iron may be present in dredged material. | University of Connecticut Department of Marine Sciences |
| Henningson, J.C. | Claremont Channel Deepening: A Public Private Partnership Success Story | 2000 | Describes a deepening project that dredged 1.25M cy and constructed a dredged material processing facility to serve NY/NJ Harbor. Material was benefically used to bulk fill, capping and grading of a new golf course, mine filling, and intertidal habitat construction. Other material was disposed of in a CDF. The success story of a public private partnership is also detailed. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses beneficial use and program funding strategies. | Henningson Environmental Services |
| Holst and Young | Surface Elevation Tables | 2003 | Deployment of SETs in Long Island marshed to monitor marsh elevation. Project expanded to include monitoring sulfides/nitrate/nitrite/ammonia/total dissolved phosphorous/pH/redox potential in porewater and tidal elevation/water temperature/salinity. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Long Island Sound Study |
| Hoogewerff, G.J. | Dredging And Disposal Of Contaminated Sediment In The Netherlands | 2000 | Dutch research on remediation techniques concluded that complete transformation of contaminated sediments to reusable materials was not economically feasible. Therefore, recent research has focused on "surgical" dredging methods that optimize the use of CDFs only for contaminated sediments, and on low const remediation techniques (soil washing, sand separation, ripening, land farming, CDF managemnt). Paper reviews Dutch policy and technology, as well as presents a case study. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses another country's technology and system of material management. | Royal Boskalis Westminster N.V., Engineering Department |

| Authors | Title | Year | Summary | Contact Agency |
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| Institute for Sustainable Energy | Existing & Proposed Infrastructure Crossings Of Long Island Sound Marine Environment- Marine Mammals | 2003 | General distribution areas in LIS for Atlantic whitesided dolphin, gray seal, harbor seal, hooded seal, and humpback whale. Also identifies cable crossings in LIS. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that it identifies habitat sites for marine mammals useful in managing time of year restrictions for dredging and placement. | |
| Institute for Sustainable Energy - Task Force on Long Island Sound | Comprehensive Assessment And Report Part II Environmental Resources And Energy Infrastructure Of Long Island Sound - Appendix I Long Island Sound Advocacy Groups And Programs | 2003 | List of academia, government, NGOs, Chambers of Commerce, land trusts, and working groups with interests in Long Island Sound. Descriptions of many organizations are provided. Applicability: relevant to LIS resources in that it describes groups working on issues related to LIS resources, relevant to dredged material management in that the listed organizations may have input on certain aspects of a management plan. | Institute for Sustainable Energy at Eastern Connecticut State University |
| Kane-Driscoll, S.B., Wickwire, W.T., Cura, J.J., Voorhees, D.J., Butler, C.L., Moore, D.W., and Bridges, T.S. | A Comparative Screening-Level Ecological And Human Health Risk Assessment For Dredged Material Management Alternatives In New York/New Jersey Harbor | 2002 | This study presents a framework for a screening level ecological and human health risk assessment that compares risks associated with management altematives for contaminated dredged materials. The major objectives of the workwere to identify exposure routes that show the potential for risk and develop a framework that can be used to compare relative potential risks among eight management alternatives. The eight management alternatives include Subaqueous Confined Aquatic Disposal Facility, Island Confined Disposal Facility, Near-Shore Confined Disposal Facility, Upland Confined Disposal Facility, Landfill Disposal, No-Action, Cement-Lock Treatment Technology, and Manufactured Soil Technology. Applicability: n/a to LIS reources directly but provides a framework for evaluating dredged material impacts on environmental resources and human health, discusses approach to evaluating risks from dredged material management. | Exponent, Inc. |
| Kiker, G.A., Bridges, T.S., and Kim, J. | Integrating Comparative Risk Assessment With Multi-Criteria Decision Analysis To Manage Contaminated Sediments: An Example For The New York/New Jersey Harbor | 2008 | This paper provides an example of the use of decision analysis study to build on a previous screening-level, comparative risk assessment of contaminated sediment from the New York/New Jersey harbor area. Using multi-criteria decision analysis, it explores the effect of different criteria weights, utility functions, and cost estimates on the ranking of seven contaminated sediment management alternatives. Values used in weighting decision criteria were surveyed from two interaction sessions with sediment management professionals. Applicability: n/a to LIS resources, relevant to dredged material management in that it presents an alternative decision making framework for dredged material management. | U.S. Army Engineer Research and Development Center, Environmental Laboratory |
| King, J.W. | Rhode Island Ocean Samp:Fall 2008 Endeavor Cruise Results And Proposed Future Work | 2008 | Bathymetry, benthic imaging, grab sampling south and west of Block Island; sedimentary environment of Ninigret Pond; benthic habitats of Greenwich Bay; Block Island Sound seafloor topography and high resolution subbottom seismic profiles, glacial geology. Applicability: relevant to LIS resources in that it describes conditions in the vicinity of LIS, n/a to dredged material management. | University of Rhode Island - Graduate School of Oceanography |
| Lamborga, C.H., Fitzgerald, W.F., Skoogb, A., and Visscherb, P.T. | The Abundance And Source Of Mercury-Binding Organic Ligands In Long Island Sound | 2004 | The abundance and strength of mercury (Hg)-complexing organic matter was measured in samples collected from Long Island Sound (LIS) and related locations. Rivers, lakes, sewage effluent, and marine porewaters were also sampled. Offshore and sewage effluent samples were relatively ligand-poor, while river, lake, and porewater samples were ligand-rich. Normalized ligand abundance in LIS water was intermediate. A first-order mass balance for ligand and DOC suggests that terrestrial organic matter and phytoplankton exudates are the dominant sources of ligand to LIS, while tidal exchange and an unknown term are the dominant sinks. Applicability: investigates a resource (water quality) of LIS, n/a to dredging. | Woods Hole Oceanographic Institute, Department of Marine Chemistry and Geochemistry |
| Lawler, Matusky & Skelly Engineers LLP | Public And Private Dredged Material Management Strategies In New Jersey: A Case Study Economic Analysis | 2005 | Describes several potential uses for dredged material, and presents examples of pilot studies that have investigated the feasibility of the beneficial use of dredged material. Potential barriers in New Jersey include the variable supply and consistency of dredged material, and the lack of demand for dredged material. Solutions to these barriers are suggested: establishing one or more regional staging / processing facilities (RPFs), and regulatory action promoting or requiring the use of dredged material in projects and taxbased incentives. A case study analysis was performed at four diverse locations in New Jersey to determine the costs and benefits associated with State and private dredged material management in New Jersey. In each case study, baseline conditions and 2-3 alternative strategies (beneficial use) were analyzed over a 50 year planning period. Findings and recommendation follow. Applicability: n/a to LIS resources, discusses beneficial use of dredged material. | NJDOT Office of Maritime Resources |
| Lawrence J. Poppe, L.J., Williams, S.J., Moser, M.S., Forfinski, N.A., Stewart, H.F., and Doran, E.F. | Quaternary Geology And Sedimentary Processes In The Vicinity Of Six Mile Reef, Eastern Long Island Sound | 2008 | Descriptions and maps of bedrock and glacial moraines, bathymetry, glaciolacustrine deposits, sediment texture, seismic lines, megaripples, postglacial marine deposits, modern reworked sediments, barchanoid sand wave, transverse sand waves in the vicinity of Six Mile Reef. Applicability: relevant to LIS resources in that it describes conditions of a portion of LIS, n/a to dredged material management. | U.S. Geological Survey |
| Lee, Y.J. and Lwiza, K. | Interannual Variability Of Temperature And Salinity In Shallow Water: Long Island Sound, New York | 2005 | Variabilities of temperature and salinity over Long Island Sound (LIS), New York, are examined using observations from CTDEP, Bureau of Water Management LIS Ambient Water Quality Monitoring program (1991 to 2002). Seasonal variations in the temperature and salinity are primarily associated with heat flux and freshwater discharge, but forcings other than local processes control the interannual variabilities of the temperature and salinity in LIS, most probably through horizontal exchanges. Another possible source of variability is the position of the Gulf Stream. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Stony Brook University, Marine Sciences Research Center |

| Authors | Title | Year | Summary | Contact Agency |
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| Leonard, L., Posey, M., Cahoon, L., Laws, R., and Alphin, T. | Sediment Recycling: Marsh Renourishment Through Dredged Material Disposal | 2002 | Field experiment in North Carolina National Estuarine Reserve to determine if the placement of dredged material can be used to offset elevation losses in deteriorating marshes without decreasing productivity or funcionality in adjacent non-degraded marshes. Dredged material was placed in deteriorated and non-deteriorated marsh plots at thicknesses ranging from 0cm to 10cm. The response of vascular plants, benthic microalgae (BMA), benthic infauna, and sediment redox potential to sediment additions were monitored between May 2000 and October 2001. Short-term sediment deposition rates, surficial flow attributes, and changes in sediment composition and granulometry were also examined. The results suggest that the addition of dredged material to deteriorating marshes led to increases in vascular plant stem densities and increased microalgal biomass. Sediment additions to non-deteriorating marshes had little to no impact. Sediment additions also increased oxygen levels, and benthic invertebrate communities quickly recovered and showed no long-term negative effects on diversity and abundance. Applicability: describes beneficial use of dredged material to improve environmental resources (marshes), but not in LIS. | University of North Carolina at Wilmington, Department of Earth Science |
| Linkov, I., Satterstrom, F. K., Kiker, G., Seager, T. P., Bridges, T., Gardner, K. H., Rogers, S. H., Belluck, D. A., and Meyer, A. | Multicriteria Decision Analysis: A Comprehensive Decision Approach For Management Of Contaminated Sediments | 2006 | The purpose of this report is to review an alternative decision support method (alternative to comparative risk assessment, lifecycle assessment, benefit-cost analysis) for evaluating new technologies for contaminated sediment management. Multicriteria decision analysis (MCDA) is a framework for managing contaminated sediments/sites where stakeholder concern is important and economics/environmental impacts/safety/risk cannot be easily monetized. The report reviews existing decision support tools, gives an overview of current MCDA methods, and presents a case study of MCDA implementation. Applicability: n/a to LIS resources, relevant to dredged material management in that it presents an alternative decision making framework for dredged material management. | US Army Engineer Research and Development Center, Risk and Decision Science Focus Area |
| Linkov, I., Satterstrom, F.K., Kiker, G., Batchelor, C., Bridges, T., and Ferguson, E. | From Comparative Risk Assessment To Multi-Criteria Decision Analysis And Adaptive Management: Recent Developments And Applications | 2006 | This paper reviews existing decision-making approaches at regulatory agencies in the United States and Europe and synthesizes state-of-the-art research in comparative risk assessment (CRA), multicriteria decision analysis (MCDA), and adaptive management methods applicable to environmental remediation and restoration projects. The paper proposes a basic decision analytic framework that couples MCDA with adaptive management and its public participation and stakeholder value elicitation methods. It also demonstrates application of the framework to a realistic case study based on contaminated sediment management issues in the New York/New Jersey Harbor. Applicability: n/a to LIS resources, relevant to dredged material management in that it presents an alternative decision making framework for dredged material management. | US Army Engineer Research and Development Center, Risk and Decision Science Focus Area |
| Linkov, I., Satterstrom, F.K., Yatsalo, B., Tkachuk, A., Kiker, G.A., Kim, J., Bridges, T.S., Seager, T. P., and Gardner, K. H. | Comparative Assessment Of Several Multi-Criteria Decision Analysis Tools For Management Of Contaminated Sediments | 2007 | A number of methods and software packages are available to support the implementation of Multicriteria Decision Analysis (MCDA) in the management of contaminated sediments. This paper uses two case studies, one in NY/NJ Harbor and the other in New Hampshire, to compare three different MCDA approaches. Results suggests that although the MCDA methodologies differ, the management conclusions were similar. Applicability: n/a to LIS resources, relevant to dredged material management in that it evaluates an alternative decision making framework for dredged material management. | US Army Engineer Research and Development Center, Risk and Decision Science Focus Area |
| Long Island Sound Study | Restoring Long Island Sound'S Habitats | 2002 | A map of sites in CT and NY that have been identified as potential restoration sites, or where restoration is complete or in progress. The type of habitat of each site is listed. The second page is a description of the restoration program. Applicability: delineates critical resources on the coastline of LIS, n/a to dredging except as related to benficial reuse for beach nourishment or marsh restoration. | EPA Long Island Sound Office |
| Long Island Sound Study | Sound Health 2008: A Report On The Status And Trends In The Health Of The Long Island Sound | 2008 | Status report of the state of Long Island Sound, including indicators for hypoxia, toxic contaminants, pathogens, shellfish, finfish, coastal birds, habitats, and altered landscapes. Includes special features on climate change and conditions by basin. Specific indicators of LIS health include: hypoxia area and duration (1987-2007), hypoxia frequency (1991-2007), Cu/Zn/Hg in sediments (1200-2000), PCB concentration in striped bass (1985-2006), seasonal yearly surface water temperature at New London (1976-2007), warmwater vs coldwater fish species per tow (1984-2007), water(1991-2007)/sediment(2000-2004)/benthic(2000-2004) quality indices by basin, oyster/lobster/clam harvest (1984-2007), fish biomass (1992-2007), winter flounder/scup/striped bass counts per trawl (1984-2007), CT and NY nesting populations of piping plover/least tern (1984-2006), CT and NY breeding pairs of colonial waterbirds (1998-2004). Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Long Island Sound Study |
| Maher, A., Bennert, T., Jafari, F., Douglas, W.S., and Gucunski, N. | Geotechnical Properties of Stabilized Dredged Material (SDM) From The New York/New Jersey Harbor | 2004 | A pilot study was initiated in 1998 to construct two embankments on a site in Elizabeth, NJ, where stabilized dredged material (SDM) was successfully used as a cover for more than 100 acres of commercial development area. The pilot study included a laboratory phase for geotechnical evaluation of SDM. The results of the laboratory phase, as reported in this paper, demonstrate that SDM satisfies most of the geotechnical criteria for fill construction, except those for durability, requiring proper coverage and protection similar to those provided for fills constructed with cohesive soils. Applicability: n/a to LIS resources, discusses beneficial use of dredged material. | Rutgers University, Department of Civil and Environmental Engineering |
| Maher, A., Douglas, W.S., and Jafari, F. | Field Placement And Evaluation of Stabilized Dredged Material (SDM) From The New York/New Jersey Harbor | 2006 | Analysis of a pilot study on the use of stabilized dredged material for the construction of highway embankments. Two embankments were constructed from 80,000 cubic yards; geotechnical properties and handling of the material were evaluated during and one year after construction; the constructability and performance of the embankments were also analyzed. Results suggest that SDM satisfies most geotechnical criteria for fill construction, but not the criteria for durability. This means that SDM requires proper coverage and protection, and precludes long term stockpiling prior to final placement. Use of SMD costs up to $8 per cubic yard more than traditional fills. Applicability: n/a to LIS resources, outlines beneficial uses of dredged material. | Rutgers University, Department of Civil and Environmental Engineering |
| McMullen, K.Y., Poppe, L.J., Paskevich, V.F., Doran, E.F., Moser, M.S., Christman, E.B., and Beaver, A.L. | Surficial Geologic Interpretation And Sidescan Sonar Imagery Of The Sea Floor In West-Central Long Island Sound | 2005 | 293 sq. km sidescan sonar survey completed in 2001 for west-central Long Island Sound off the coast of Milford, CT. Includes images and interpretations of surficial features, sediments, and sedimentary environments. Applicability: relevant to LIS resources in that it describes conditions of a portion of LIS, relevant to dredged material management in that the study area includes an historic disposal area. | USGS Coastal and Marine Geology Team |

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| McMullen, K.Y., Poppe, L.J., Schattgen, P.T., and Doran, E.F. | Enhanced Sidescan-Sonar Imagery, North-Central Long Island Sound | 2008 | Enhanced imagery removes tonal artifacts. Includes enhanced imagery for the surveys off Bridgeport, CT, Milford, CT, and Branford, CT. Applicability: relevant to LIS resources in that it describes conditions of a portion of LIS, relevant to dredged material management in that the study area includes historic disposal areas. | USGS Coastal and Marine Geology Team |
| Miller, D.C., | Detrimental Effects Of Sedimentation On Marine Benthos: What Can Be Learned From Natural Processes And Rates? | 2002 | Field and lab studies investigate what rates and frequencies of sediment movement characterize natural events, and what rates and frequencies are detrimental to representative benthic species and functional groups. Results are presented as case studies that address ecological impacts of dredge materials placement, site selection and benthic community responses. The goal of this work is to design materials placement to mimic natural sedimentation and minimize anthropogenic impacts to benthic communities. Applicability: n/a to LIS resources, relevant to dredged material management in that it investigates the threshold of impacts for dredged material placement. | University of Delaware, Graduate College of Marine Studies |
| Mitch, A.A. | Toxic Contamination In Long Island Sound: 2006 Update | 2006 | Objective was to compile data on contaminant (metals, PCBs, pesticides, PAHs) concentrations in the water column, sediments, and biota for the period from 1994 through 2005 and compared these data to measurements collected over the previous decade. Data analysis of 1994-2005 revealed hotspots, making averaging an innapropriate summary statistic. Researchers had to use the median value for these data, rendering them not comparable to the data from the previous decade (which was averaged). Results of the literature review for 1994-2005 data are presented in tables and figures. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that it calls attention to contaminated sediments in harbors (thought it does not specifically locate the data). | Yale School of Forestry & Environmental Studies |
| Munns, W.R., Berry, W.J., and Dewitt, T.H. | Toxicity Testing, Risk Assessment, And Options For Dredged Material Management | 2002 | Current regulations for discharge of dredged material evaluate toxicity on a case-by-case basis, rather than cumulative risk. An alternative approach is reviewed that focuses on the disposal site and the effects (temporal and spatial) of multiple discharge events. The approach can be used to manage dredged material disposal in a holistic fashion. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses an alternative approach to disposal evaluation. | US Environmental Protection Agency, NHEERL Atlantic Ecology Division |
| Mushacke, F. | Quantitative And Qualitative Trends Of Vegetative Tidal Wetlands In New York'S Marine District With A Focus On Long Island Sound And Peconic Bay | 2007 | Documentation of changes in tidal marsh distribution from 1974-2005 along LIS and Peconic Bay using aerial infrared photo interpretation. Despite legislative protection in 1973, tidal wetlands in NY have continued to experience losses due to historic and contemporary anthropogenic impacts combining with natural events. Follow up studies (in process and described in Attachment 3) include monitoring of sediment buildup and loss in wetlands using Surface Elevation Tables and marker horizons. SETs are the topic of the LISS Grant, and data will be available in the future. Applicability: Relevant to LIS resources in that it documents marsh losses in LIS and Peconic Bay, relevant to dredged material management in that it may highlight opportunities for beneficial use (marsh restoration). | New York State Department of Environmental Conservation |
| Myers, T. E., Bowman, D.W., and Myers, K. F. | Dredged Material Composting at Milwaukee And Green Bay, WI, Confined Disposal Facilities | 2003 | The purpose of these studies was to determine the feasibility of bioremediating PAH- and PCB-contaminated dredged material with mixtures of wood chips and biosolids. The larger objective is to convert CDFs from perpetual containment facilities to storage and treatment facilities by cleaning the material to meet beneficial use requirements. Demostration scale studies were initiated at Jones Island CDF and Bayport CDF. Results indicate that PCBs are susceptible to composting, depending on conditions, but that PAHs are not. Applicability: n/a to LIS resources, study of bioremediation of dredged material. | U.S. Army Engineer Research and Development Center, Dredging Operations and Environmental Research Program |
| Myre, P.L. and Germano, J.D. | Field Verification Program (FVP) Disposal Mound Monitoring Survey 2005. | 2007 | The Field Verification Program (FVP) Disposal Mound was monitored as part of the Disposal Area Monitoring System (DAMOS) in June 2005. The FVP mound was created at the Central Long Island Sound Disposal Site (CLDS) during the 1982-83 disposal season as part of the joint USEPA/USACE Field Verification Program. The primary objective of the 2005 survey was to determine current benthic community conditions and the distribution of contaminants across the FVP disposal mound. Applicability: relevant to LIS resources in that it characterizes a portion of LIS, relevant to dredged material management in that it monitors effects of disposal. | US Army Corps of Engineers-New England District, Regulatory Division |
| National Marine Fisheries Service | Annual Landings By Species For Connecticut As Of 24-Apr-09 | 2009 | Annual landings in pounds and dollars for CT commercial fish catch 2002-2007. Applicability: relevant to LIS resource, n/a to dredging. | |
| New England Fishery Management Council | Essential Fish Habitat Description Atlantic Cod (Gadus Morhua) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Atlantic Cod. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New England Fishery Management Council | Essential Fish Habitat Description Haddock (Melanogrammus Aeglefinus) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Haddock. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New England Fishery Management Council | Essential Fish Habitat Description Atlantic Halibut (Hippoglossus Hippoglossus) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Atlantic Halibut. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New England Fishery Management Council | Essential Fish Habitat Description Atlantic Herring (Clupea Harengus) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Atlantic Herring. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |

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| New England Fishery Management Council | Essential Fish Habitat Description Monkfish (Lophius Americanus) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Monkfish. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New England Fishery Management Council | Essential Fish Habitat Description Ocean Pout (Macrozoarces Americanus) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Ocean Pout. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New England Fishery Management Council | Essential Fish Habitat Description Pollock (Pollachius Virens) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Pollock. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New England Fishery Management Council | Essential Fish Habitat Description Red Hake (Urophycis Chuss) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Red Hake. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New England Fishery Management Council | Essential Fish Habitat Description Windowpane Flounder (Scophthalmus Aquosus) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Windowpane Flounder. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New England Fishery Management Council | Essential Fish Habitat Description Winter Flounder (Pleuronectes Americanus) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Winter Flounder. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New England Fishery Management Council | Essential Fish Habitat Description Witch Flounder (Glyptocephalus Cynoglossus) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Witch Flounder. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New England Fishery Management Council | Essential Fish Habitat Description Yellowtail Flounder (Pleuronectes Ferruginea) | 1998 | Description and delineation of the essential habitat for eggs, larvae, juveniles and adult of Yellowtail Flounder. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | |
| New York State Department of Environmental Conservation | Beneficial Use Determinations (Buds) | 2009 | Description of the Beneficial Use Determinations (BUDs) program outlining the circumstances under which waste material may be designated for beneficial use, thereby exempting it from the Part 360 Solid Waste Management Facilities regulations. 6 NYCRR Part 617 State Environmental Quality Review and 6 NYCRR Part 621 Uniform Procedures do not apply to the BUD review process. There are 16 pre-determined BUDs listed in 6 NYCRR Part 360-1.15(b). Generators and potential users can petition the Department for a case-specific BUD. Case-specific BUDs are generally for waste material used as a substitute for a component material in the manufacture of a product; a substitute for a commercial product; or an alternative fuel. When granting a case-specific BUD, the Department will determine the precise point in the proposed process and/or use at which the waste material ceases to be regulated as a solid waste. NYCRR Part 360-1.15 (http://www.dec.ny.gov/regs/4415.html) describes the criteria for eligibility as a BUD. Applicability: n/a to LIS resources, outlines beneficial uses of dredged material in New York. | NYSDEC Bureau of Solid Waste, Reduction & Recycling |
| New York State Department of Environmental Conservation | Region 3 Upland Disposal/Management Of Dredged Sediments | 2009 | Description of the alternatives for disposal and management of dredged material in Region 3. Dredged sediments in Region 3 not issued a permit under the Environmental Conservation Law or a Water Quality Certification under the Federal Water Pollution Control Act are considered a solid waste and regulated by 6 NYCRR Part 360, requiring disposal at a solid waste management facility. As an alternative under BUDs, uncontaminated sediments are not considered solid waste if they are used as fill material in accordance with the generic BUD at 6 NYCRR Part 360-1.15(b)(7). Sediments with moderate contaminant levels may be eligible for beneficial use as a case specific BUD. The document outlines the sampling requirements (based on voume dredged) and analytical parameters (based on grain size) that are required to submit to NYSDEC for BUDs. Applicability: n/a to LIS resources, outlines beneficial uses of dredged material in New York. | NYSDEC Region 3 Division of Solid & Hazardous Materials |
| New York State Department of Environmental Conservation | Tidal Wetlands | 2010 | Description of tidal wetlands, the New York Tidal Wetland Act to protect them from filling and dredging, and the New York State Official Tidal Wetlands Inventory to track their status. Tidal wetland trends are described. The main cause of wetlands destruction has shifted from human caused factors such as filling to natural factors such as storms and flow restrictions. Links to information on how DEC classifies tidal wetlands, inventories of aerial photos and tidal wetland maps, and guidelines for the restoration and monitoring of salt marshes. Applicability: relevant to LIS resources in that it describes conditions inLIS, n/a to dredged material management. | NYSDEC Bureau of Marine Resources |

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| New York State Department of Environmental Conservation and Connecticut Department of Environmental Protection | A Total Maximum Daily Load Analysis To Achieve Water Quality Standards For Dissolved Oxygen In Long Island Sound | 2000 | Document discusses applicable water quality standards, quantifies yearly nitrogen and TOC loading to Long Island Sound from point sources and nonpoint sources, and develops in-basin and out-of-basin TMDLs for nitrogen from a water quality model. Implementation of the TMDL is phased. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Long Island Sound Study |
| New York State Department of Environmental Conservation, Division of Solid & Hazardous Materials | Active Long Island Landfills | 2008 | Locations, contact info and types of material received at landfills on Long Island. N/A to LIS resources except as landfills impact them, relevant to dredged material management in that some landfills could potentially accept dredged material for upland disposal. | New York State Department of Environmental Conservation, Division of Solid & Hazardous Materials, Solid Waste Management Facilities |
| NOAA Coastal Services Center | Dredging And Disposal Of Marine Sediments: Regulations And Guidelines | | An overview of the regulations and guidelines that apply to dredging and disposal in U.S. coastal waters. The international agreement the London Convention mandates that all dredged material be characterized (physical and chemical properties), impacts of disposal options be assessed, and monitoring and assessment be implemented. On the federal level, the Marine Protection, Research, and Sanctuaries Act and the Ocean Dumping Act regulate dumping and prohibit dumping that would adversely affect the environment. EPA is given the responsibility to identify ocean dumping sites, while USACE is given the task of issuing permits to dump at these sites. The Water Pollution Control Act regulates dumping of dredged materials in the ocean and wetlands. The National Environmental Policy Act requires federal agencies to consider the environmental impacts of their actions. The Coastal Zone Management Act encourages states to develop their own coastal management plans. States with coastal management plans may regulate all federal and private dredging activity in their waters. A summary of coastal program dredging policies is available in a separate document. Applicability: n/a to LIS resources, relevant to dredging and dredged material management policy. | NOAA Coastal Services Center |
| NOAA National Ocean Service, Office of Response and Restoration | Rhode Island, Connecticut, New York, and New Jersey ESI | 2002 | Geodatabase containing vector data related to the development of the NOAA Environmental Sensitivity Index in the coastal areas of Rhode Island, Connecticut, New York, and New Jersey. The data include hydrogrpahy, ESI shoreline types, bird nesting/foraging/rafting sites, fish distribution, invertebrate distribution, marine mammal distribution and seal haul-out sites, terrestrial mammal distribution, reptile concentration and nesting areas, habitat and plant distribution, rare plant occurences, management areas, and human use site locations (bridges, state borders, airports, aquaculture sites, beaches, boat ramps, commercial fishing sites, Coast Guard, ferries, historical sites, marinas, water intakes, and wash over sites). More detailed information is available for each dataset in the relational tables. Applicability: documents resources of the LIS coastline, relevant to dredged material management in that areas delineated by NOAA in the ESI should be taken into account when managing dredged material. | NOAA, Office of Response and Restoration |
| NOAA Office of Ocean & Coastal Resource Management | National Coastal Program Dredging Policies An Analysis Of State, Territory, & Commonwealth Policies Related To Dredging & Dredged Material Management | 2000 | Summarizes state dredging programs. Reviews permitting process, economic concerns, habitat/sediment/water quality concerns, typical dredging techniques, disposal options, beneficial use, and state-specific issues for dredging projects in CT. Reviews permitting process, habitat/sediment/water quality concerns, disposal options, beneficial use, and state-specific issues for dredging projects in NY. Reviews permitting process, economic concerns, habitat/sediment/water quality concerns, disposal options, and beneficial use for dredging projects in RI. Applicability: Relevant to LIS resources in that it describes dredged material management in the states surrounding LIS, relevant to dredged material management in that it discusses policies relevant to dredging in the states bordering LIS. | NOAA NOS, Office of Ocean & Coastal Resource Management - Coastal Programs Division |
| Northeast Fisheries Science Center | Efh Source Documents: Life History And Habitat Characteristics | 2008 | Essential Fisheries Habitat is defined as waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. The EFH species reports comprise a survey of the important literature as well as original analyses of fishery-independent data sets from the NOAA Fisheries Service and several coastal states. Species reports present information on current and historic stock sizes, geographic range, and the period and location of major life history stages. The habitats of managed species are described by the physical, chemical, and biological components of the ecosystem where the species occur. Information on the habitat requirements is provided for each life history stage, and it includes, where available, habitat and environmental variables that control or limit distribution, abundance, growth, reproduction, mortality, and productivity. The website includes documentation of the methods for document preparation (NMFS-NE-122 ), and the EFH documents themselves. Applicability: Describes areas supporting LIS fishery resources, dredging or dredged material disposal in these areas would require consultation with natural resource agencies. | NOAA's National Marine Fisheries Service Northeast Fisheries Science Center |
| Olsen, C. and Lyman, M. | Monitoring Long Island Sound Hypoxia 2002 | 2003 | CT DEP water quality monitoring program. Monthly water samples are collected from more than forty sites in LIS and analyzed for nitrogen, phosphorus, silica content, chlorophyll a, and total suspended solids. On the boat, instruments measure temperature, salinity, dissolved oxygen, and light penetration throughout the water column. During the summer, CT DEP conducts additional summer hypoxia surveys at bi-weekly intervals to better define the areal extent (Figure 2) and duration (Figure 3) of hypoxia. During the summer of 2002, surveys began in early June and ended by the middle of September representing 284 stations sampled during seven cruises. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | CT DEP, Water Management Bureau |

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| Olsen, C. and Lyman, M. | Monitoring Long Island Sound Hypoxia 2004 | 2005 | CT DEP water quality monitoring program. Monthly water samples are collected from more than forty sites in LIS and analyzed for nitrogen, phosphorus, silica content, chlorophyll a, and total suspended solids. On the boat, instruments measure temperature, salinity, dissolved oxygen, and light penetration throughout the water column. During the summer, CT DEP conducts additional summer hypoxia surveys at bi-weekly intervals to better define the areal extent (Figure 2) and duration (Figure 3) of hypoxia. In 2004, 160 stations were sampled during 7 cruises. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | CT DEP, Water Management Bureau |
| Paskevich, V.F. and Poppe, L.J. | Georeferenced Sea-Floor Mapping And Bottom Photography In Long Island Sound | 2000 | Maps showing the shape of the marine transgressive surface and the thickness of postglacial sediments in Long Island Sound, regional distribution of sea-floor sedimentary environments in long island sound, map showing the distribution of surficial sediments in Long Island Sound, map showing the distribution of total organic carbon in Long Island Sound, metals in the surface sediments of Long Island Sound, the distribution of mercury in sediment from Long Island Sound and surrounding marshes, clostridium perfringens distribution in Long Island Sound sediments: data report, maps of benthic foraminifera distribution and environmental changes in Long Island Sound between the 1940s and the 1990s, a benthic community geographical information system (GIS) for Long Island Sound. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that the study area covers dredged material disposal sites. | USGS Coastal and Marine Geology Team |
| Pearce, J. and Balcom, N. | The 1999 Long Island Sound Lobster Mortality Event: Findings Of The Comprehensive Research Initiative | 2005 | Review of environmental conditions related to lobster mortality event of 1999. Applicability: relevant to LIS resource, n/a to dredging. | Connecticut Sea Grant College Program, University of Connecticut |
| Petruny-Parker, M., Boyd, J., Rubinstein, N., Carey, D., and August, P. | Coastal Institute Working Group Review Of The Siting Criteria For An Offshore Long-Term Dredged Material Disposal Site(S) For The Rhode Island Region | 2003 | Investigation of the feasibility of designating a long-term dredged material disposal site off the coast of Rhode Island. The working group meetings brought together stakeholders, science and policy advisors from the University of Rhode Island, and staff from the ACOE, EPA, RI Coastal Resources Management Council (CRMC), RI Department of Environmental Management (DEM), and the MA Coastal Zone Management (CZM) to discuss issues in the preparation of an EIS for the project. The group's task was to identify criteria for evaluating potential sites, identify the data and information needed to evaluate the criteria, and use the criteria to evaluate potential sites. Discussions were structured around the following areas of concern: impacts to fisheries (commercial and recreational), recreational interests, commerce, biodiversity, remedial use, military use, economics of use, and hydrodynamics. GIS data were developed and reviewed. The working group meetings resulted in the identification of two potential sites east of Block Island. Applicability: n/a to LIS resources directly but does address similar resources in Block Island Sound and Rhode Island Sound, focuses on identifying dredged material disposal sites. | Coastal Institute |
| Pleasant, A. , Zarcadoolas, C. , Engelman, A. , Thorpe, M. and Lerner, J. | An Exploratory Study Of Public Knowledge And Perceptions Of Dredging And Reuse Of Dredged Materials | 2004 | An explorative, qualitative study of public knowledge and perceptions of dredging and the reuse of dredged material in Rhode Island. Findings reveal misunderstandings about dredging and mistrust of public officials involved in the dredging practice. The survey uncovered the potential for increased mistrust and misunderstanding if agencies do not enhance information flow and public engagement. Applicability: n/a to LIS resources, discusses perceptions of dredged material management. | |
| Poppe, L.J., Ackerman, S.D., Doran, E.F., Beaver, A.J., Crocker, J.M., and Schattgen, P.T. | Interpolation Of Reconnaissance Multibeam Bathymetry From North-Central Long Island Sound | 2006 | Bathymetric grids and imagery from acoustic surveys in North-central Long Island Sound. Applicability: relevant to LIS resources in that it describes conditions of a portion of LIS, relevant to dredged material management in that the study area includes historic disposal areas. | USGS Coastal and Marine Geology Team |
| Poppe, L.J., Ackerman, S.D., Doran, E.F., Moser, M.S., Stewart, H.F., Forfinski, N.A., Gardner, U.L., and Keene, J.A. | Geologic Interpretation And Multibeam Bathymetry Of The Sea Floor In Southeastern Long Island Sound | 2006 | 95 sq. km multibeam bathymetry survey in southeastern Long Island Sound. Includes bathymetry data and interpretation of surficial geology. Applicability: relevant to LIS resources in that it describes conditions of a portion of LIS, n/a to dredged material management. | USGS Coastal and Marine Geology Team |
| Poppe, L.J., Ackerman, S.D., McMullen, K.Y., Schattgen, P.T., Schaer, J.D., and Doran, E.F. | Interpolation Of Reconnaissance Multibeam And Single-Beam Bathymetry, Offshore Milford, Connecticut | 2008 | 153 sq. km singlebeam and multibeam bathymetry survey in north-central Long Island Sound. Includes bathymetry data and imagery. Applicability: relevant to LIS resources in that it describes conditions of a portion of LIS, n/a to dredged material management. | USGS Coastal and Marine Geology Team |
| Poppe, L.J., and Polloni, C. | Long Island Sound Environmental Studies | 1998 | An archive of sidescan sonar, high-resolution seismic-reflection, bathymetric, sediment (texture and geochemistry), biologic, surficial geologic and bibliographic data from Long Island Sound. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that the study area covers dredged material disposal sites. | USGS Coastal and Marine Geology Team |
| Poppe, L.J., Denny, J.F., Williams, S.J., Moser, M.S., Stewart, H.F., Forfinski, N.A., and Doran, E.F. | The Geology Of Six Mile Reef, Eastern Long Island Sound | 2007 | 156 sq. km multibeam bathymetry survey in eastern Long Island Sound. Includes bathymetry data and interpretation of surficial geology. Applicability: relevant to LIS resources in that it describes conditions of a portion of LIS, n/a to dredged material management. | USGS Coastal and Marine Geology Team |

| Authors | Title | Year | Summary | Contact Agency |
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| Poppe, L.J., DiGiacomo-Cohen, M.L., Smith, S.M., Stewart, H.F. and Forfinski, N.A. | Seafloor Character And Sedimentary Processes In Eastern Long Island Sound And Western Block Island Sound | 2006 | Multibeam bathymetric data and seismic reflection profiles reveal previously unrecognized glacial features and modern bedforms. Bedform assymetry and scour around obstructions indicate net sediment transport to the west across the northern part of the study area near Fishers Island, and to the east across the southern part of the study area near Great Gull Island. Applicability: relevant to LIS resources in that it describes conditions in a portion of LIS, n/a to dredged material management. | USGS Coastal and Marine Geology Team |
| Poppe, L.J., DiGiacomo-Cohen, M.L., Smith, S.M., Stewart, H.F., and Forfinski, N.A. | Geological Interpretation And Multibeam Bathymetry Of The Sea Floor In The Vicinity Of The Race, Eastern Long Island Sound | 2007 | 94 sq. km multibeam bathymetry survey in eastern Long Island Sound. Includes bathymetry data and interpretation of surficial geology. Applicability: relevant to LIS resources in that it describes conditions of a portion of LIS, n/a to dredged material management. | USGS Coastal and Marine Geology Team |
| Poppe, L.J., Knebel, H.J., Lewis, R.S., and DiGiacomo-Cohen, M.L. | Processes Controlling The Remobilization Of Surficial Sediment And Formation Of Sedimentary Furrows In North-Central Long Island Sound | 2002 | Sidescan sonar, bathymetric, subbottom, and bottom-photographic surveys and sediment sampling in the vicinity of the New Haven Dump Site to understand processes forming sedimentary furrows. Applicability: relevant to LIS resources in that it describes conditions in a portion of LIS, relevant to dredged material management in that it is an investigation of processes in the vicinity of a dump site. | USGS Coastal and Marine Geology Team |
| Poppe, L.J., McMullen, K.Y., Williams, S.J., Crocker, J.M. and Doran, E.F. | Estuarine Sediment Transport By Gravity-Driven Movement Of The Nepheloid Layer, Long Island Sound | 2008 | Sidescan sonar imagery shows down-slope gravity-driven movement of the nepheloid layer is an important sediment transport mode into the basins of north-central Long Island Sound. Applicability: relevant to LIS resources in that it describes conditions in a portion of LIS, n/a to dredged material management. | USGS Coastal and Marine Geology Team |
| Poppe, L.J., Paskevich, V.F., Lewis, R.S., and DiGiacomo-Cohen, M.L. | Geological Framework Data From Long Island Sound, 1981-1990: A Digital Data Release | 2002 | High-resolution seismic reflection data were collected and used to establish the basic stratigraphy within the Sound and to map the major geologic units; field verification of the geologic interpretations of the seismic profiles was primarily accomplished with vibratory cores. These interpretations were in turn used to produce basin-wide syntheses of the late Quaternary depositional history. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that the study area covers dredged material disposal sites. | USGS Coastal and Marine Geology Team |
| Poppe, L.J., Paskevich, V.F., Moser, M.S., DiGiacomo-Cohen, M.L., and Christman, E.B. | Sidescan Sonar Imagery And Surficial Geologic Interpretation Of The Sea Floor Off Branford, Connecticut | 2004 | 41.1 sq. km sidescan sonar survey completed in 2001 for west-central Long Island Sound off the coast of Branford, CT. Includes images and interpretations of surficial features, sediments, and sedimentary environments. Applicability: relevant to LIS resources in that it describes conditions of a portion of LIS, relevant to dredged material management in that the study area includes an historic disposal area. | USGS Coastal and Marine Geology Team |
| Poppe, L.J., Paskevich, V.F., Williams, S.J., Hastings, M.E., Kelly, J.T., Belknap, D.F., Ward, L.G., Fitzgerald, D.M., and Larsen, P.F. | Surficial Sediment Data from the Gulf of Maine, Georges Bank, and Vicinity: A GIS Compilation | 2003 | Textural data and lithologic descriptions generated on surficial sediment samples from Block Island Sound and Montauk Point. Applicability: relevant to LIS resources in that it describes conditions of a portion of the study region, n/a to dredged material management. | USGS Coastal and Marine Geology Team |
| Preston, J. | Connecticut River Riparian Area Mapping | 2004 | Compiles information on the existence and condition of shoreline vegetated buffers and riparian areas that are known to be an important natural tool to counter the affects of nonpoint source water pollution. This investigation attempts to pull together both existing GIS data and field observations in an initial effort to produce a regional tool that can guide further resource protection. Maps occurrences of riparian buffers, invasive species, riparian buffer restoration and protection opportunities along lower Connecticut River and main tributaries. Notable findings include the emergence of “hot spots” of restoration opportunities, many not surprisingly associated with existing developed areas. Applicability: relevant to LIS resources in that it describes conditions in LIS vicinity, relevant to dredged material management in that it describes areas that are valued and deemed worthy of protection. | Tidewater Institute |
| Price, R.A. | Beneficial Uses Of Dredged Material: Testing And Evaluating Dredged Material For Beneficial Use Suitability | 2005 | A summary of beneficial uses of dredged material and the available guidance and technical resources. References "Engineering Manual on Beneficial Uses", USACE/USEPA's "Identifying, Planning, and Financing Beneficial Use Projects Using Dredged Material", USACE/USEPA's "Evaluating Environmental Effects of Dredged Material Management Alternatives - A Technical Framework", Great Lakes Commission's "Testing and Evaluating Dredged Material for Upland Beneficial Uses: A Regional Framework for the Great Lakes", DOER's "Summary of Available Guidance for Determining Suitability of Dredged Material for Beneficial Use", DOER Technical Notes C2/C3/C4/C5/C6/C7, and three USACE websites. Presents case studies of topsoil production. Applicability: n/a to LIS resources, outlines beneficial uses of dredged material. | U.S. Army Engineer Research and Development Center, Environmental Laboratory |
| Reed, D.J. | Dredged Materials And Environmental Restoration: A Win-Win Story? | 2000 | Review of the convergence of societal and environmental benefit in dredged material beneficial use, as well as the tradeoffs inherent in the process (short term losses in commercial shellfish harvest). Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | University of New Orleans, Department of Geology and Geophysics |

| Authors | Title | Year | Summary | Contact Agency |
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| Rhoades, J.M., Yozzo, D.J., Cianciola, M.M., and Will, R.J. | Norton Basin/Little Bay Restoration Project: Historical And Environmental Background Report | 2001 | An investigation of the current and historical conditions of Norton Basin and Little Bay was necessary to determine goals and objectives in the restoration by filling of borrow pits in these areas. The investigation also identified contaminants and biological resources that needed to be considered. The areas experienced tremendous anthropogenic impacts, but were spared industrial impacts. The Edgemere Landfill was a major source of impact before closure, albeit insignificant compared to other inputs in the region. Water and sediment data exist, but baseline ecological data was required to determine the ecological significance of the borrow pits as habitat. Project issues include transportation and source of dredged material for filling, and the historical significance of shipwrecks in the area. Report conculdes that rehabilitation of existing subtidal habitat could be more successful and valuable than restoration of intertidal salt marsh. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses the planning process of a beneficial use project. | U.S. Army Corps of Engineers New York District, Planning Division: Environmental Analysis Branch - Technical Studies Section |
| Rhode Island Department of Environmental Management | Rules And Regulations For Dredging And The Management Of Dredged Material | 2003 | Regulations for dredged material management in Rhode Island. The Regulations address pre-application, the characterization of dredged material, applications for dredging and management, upland disposal and beneficial use (including criteria), in-water disposal, dewatering, rehandling facilities, and application review. Applicability: relevant to resources in Block Island Sound - which is in the LIS study area, addresses dredged material management policy in Rhode Island. | RIDEM, Office of Waste Management |
| Rhode Island Department of Environmental Management, Division of Fish and Wildlife - Marine Fisheries | 2010 Management Plan For The Finfish Fishery Sector | 2009 | For all restricted and non-restricted fish, provides information on stock status, management program, and performance of fishery and quotas. Restricted finfish include: scup, summer flounder, tautog, striped bass, black sea bass, and winter flounder. Non-restricted finfish include: bluefish, menhaden, monkfish, and cod. Recommendations are made on the management of the fisheries for 2010 based on past data. Applicability: relevant to resources in Block Island Sound - which is in the LIS study area, n/a to dredged material. | RIDEM, Marine Fisheries Section |
| Rhode Island Department of Environmental Management, Division of Fish and Wildlife - Marine Fisheries | 2010 Management Plan For The Shellfish Fishery Sector | 2009 | For quahogs, soft-shelled clams, and other shellfish, provides info on commercial landings, resource assessment, management program, fishery management goals and objectives, and future management recommendations. Tables include quahog landings since 1950, quahog density since 1999, soft-shelled clam landings since 1997, and oyster landings since 1991. Applicability: relevant to resources in Block Island Sound - which is in the LIS study area, n/a to dredged material. | RIDEM, Marine Fisheries Section |
| Rhode Island Department of Environmental Management, Division of Fish and Wildlife - Marine Fisheries | 2010 Management Plan For The Crustacean Sector | 2009 | For lobster and crab, provides information on stock status, management program, fishery management goals and objectives, and licensing recommendations. Figures present lobster abundance since 1979, YOY lobster settlement index since 1990, lobster landings since 1977, lobster CPUE since 1991, and cancer and horseshoe crab landings and abundance since 1959. Applicability: relevant to resources in Block Island Sound - which is in the LIS study area, n/a to dredged material. | RIDEM, Marine Fisheries Section |
| Rozsa, Yamalis, Holst, and Young | Rates Of Tidal Wetland Loss | 2002 | Developed a database of tidal marsh polygons and acreage information from air photo interpretation for tidal rivers in Western Long Island Sound, similar plans for New York. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Long Island Sound Study |
| SAIC | Post-Storm Monitoring Survey At The New London Disposal Site Seawolf Mound October 2002 | 2003 | The survey was designed to detect any large-scale changes in the morphology of the mound, as well as any small-scale evidence of surface erosion or winnowing that may have occurred due to wave energy during the storm. Bathymetric, side-scan sonar, and REMOTS® sediment profile imaging surveys were conducted to characterize post-storm conditions on the mound. Applicability: relevant to LIS resources in that it characterizes a portion of LIS, relevant to dredged material management in that it monitors effects of disposal. | US Army Corps of Engineers-New England District, Regulatory Division |
| Sanudo-Wilhelmy, S. and Gobler, C. | Trace Metals, Organic Carbon And Inorganic Nutrients In Surface Water Of Long Island Sound: Sources, Cycling And Effects On Phytoplankton Growth | 2003 | The objective of this project was to establish the concentration and distribution of dissolved metals and inorganic nutrients in the surface waters of Long Island Sound and to examine the relative importance of various sources (i.e., riverine inputs, sewage) of these nutrients and metals. Two field excursions yielded an extensive dataset of dissolved trace metals, inorganic, and organic constituents during high and low riverine flow conditions in surface waters of the Long Island Sound. Results indicate there are two distinct biogeochemical regimes within LIS: an area of high metal levels in the East River/Narrows and an area of low levels in the eastern region of the Sound. During low flow conditions, the East River was the most dominant external source of most trace metals, while during high flow conditions; the most important external source was the Connecticut River. Detections of copper, nickel and zinc under low flow conditions indicates that remobilization of contaminated sediments is a large source in LIS. Nutrient addition experiments indicate that increased N-loading to Long Island Sound could spread the hypoxia problem from Western Long Island Sound to central and eastern Long Island Sound waters. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Stony Brook University, Marine Sciences Research Center |
| Schroeder, P. R., and Aziz, N. M. | Effects Of Confined Disposal Facility And Vadose Zone Characteristics On Leachate Quality | 2003 | This technical note presents the results of an analysis of the impact of confined disposal facility (CDF) design, site climatology, and the characteristics of the foundation soil on leachate transport to the water table below. The results serve as guidance in CDF design and assist in decision-making regarding the use of leachate controls. In order to determine peak contaminant concentrations reaching the water table, the HELPQ model was used to simulate leachate generation rates and contaminant concentrations for a variety of conditions. The effects of soil foundation thickness, of soil properties, of contaminant properties, and of climate on leachate are discussed. Applicability: n/a to LIS resources, relevant to dredged material management because addresses design of disposal facilities. | U.S. Army Engineer Research and Development Center, Dredging Operations and Environmental Research Program |

| Authors | Title | Year | Summary | Contact Agency |
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| Schroeder, P. R., Palermo, M. R., Myers, T. E., and Lloyd, C. M. | The Automated Dredging And Disposal Alternatives Modeling System (Addams) | 2004 | ADDAMS is a collection of computer programs (applications) designed to assist in managing dredging projects. The objective of ADDAMS is to provide state-of-the-art computer-based tools that will increase the accuracy, reliability, and cost-effectiveness of Corps dredged material management activities in a timely manner. There are two general types of ADDAMS applications: dredged material management and environmental effects evaluation. ADDAMS applications are summarized in the appendix to this report. The report also provides setup and user instructions. Applicability: n/a to LIS resources specifically but provides framework for evaluation of impacts on environmental resources, provides tools for dredged material management. | USACE Environmental Effects of Dredging Program |
| Shisler, J.K., and Szuch, R.P. | Wetland Development With Dredged Material | 2005 | Brief review of the history, terminology, beneficial reuse options, benefits, planning considerations, typical problems, and keys to success of wetland development with dredged materials. Applicability: n/a to LIS resources, outlines beneficial uses of dredged material for wetland development. | Blasland, Bouck & Lee, Inc. |
| Simenstad, C., Cagney, P., and Barton, J. | Past And Potential Role Of Dredge Materials In Wetlands Creation And Restoration In The Pacific Northwest | 2000 | Reviews obstacles to beneficial reuse in Pacific Northwest, including low cost of deep water disposal and lack of proactive integrated planning. Discusses a few case studies. Concludes that contaminated sediment remediation is primary driver for dredged material use, secondary is habitat enhancement. In order to capitalize on the upcoming opportunities for habitat restoration and enhancement, it is essential to take an ecosystem perspective (rather than species or habitat specific) when designing projects for long term low maintenance sustainability. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses decision strategies for material management and beneficial use. | University of Washington, School of Aquatic and Fishery Sciences |
| Simpson, D. | Semi-Annual Performance Report: Assessment And Monitoring Of The American Lobster Resource And Fishery In Long Island Sound | 2005 | Sea-sampling for catch composition study, expanded DEP Long Island Sound Trawl Survey, lobster tagging study, stock identification, spatial analysis of habitat structure and distribution, age determination. Applicability: relevant to LIS resource, n/a to dredging. | NOAA National Marine Fisheries Service, Northeast Region - State, Federal & Constituent Programs Division |
| Skinner, L.C., Kane, M.W., Gottschall, K., and Simpson, D.A. | Chemical Residue Concentrations In Four Species Of Fish And The American Lobster From Long Island Sound, Connecticut And New York: 2006 And 2007 | 2009 | Striped bass, bluefish, weakfish, American eels and American lobster (hepatopancreas only) were collected and analyzed for PCBs (as Aroclors) and mercury. In addition, lobster (hepatopancreas) were analyzed for cadmium and chlorinated dioxins and furans. PCB concentrations in both striped bass and bluefish have declined by 70 percent or more since the mid 1980s but the declines are primarily due to reduced levels of lipids. PCBs in hepatopancreas of lobster differed by sex. Length-mercury relationships were present for striped bass, bluefish and weakfish. Male lobsters show greater cadmium concentrations than females, but levels have not changed since 1979/1981. Male lobsters had greater levels of dioxins and furans than females. Health advice for human consumption of some fish species was modified by the state health authorities as a result of this work. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources |
| Smith, E. R., and Gailani, J. Z. | Nearshore Placed Mound Physical Model Experiment | 2005 | Placement of dredged material in the nearshore permits natural winnowing/separation of the fine and sand particles. Nearshore mound locations, material, and configurations must be chosen judiciously to assure that the mound does not negatively impact the surrounding environment and that material remains in the littoral system and nourishes the beach. The DOER program has supported a series of physical model and field experiments intended to assess consequences of nearshore placement of the dredged material. This technical note discusses physical model experiments on local migration of a mound at the edge of the surf zone. Applicability: n/a to LIS resources aside from potential benefit from beneficial use, discusses dredging technology. | U.S. Army Engineer Research and Development Center, Dredging Operations and Environmental Research Program |
| Stacey, P., and Beristain, M. | Toxic Contamination In Long Island Sound | 1990 | Outlines the contaminants of concern in Long Island Sound, the potential sources of contamination, the fate and transport of chemicals in the Sound, and the effects on the environment and human health. The document also addresses the status of controls on pollution in Long Island Sound. Applicability: discusses vulnerability of environmental resources, n/a to dredged material management. | New York SeaGrant Extension Program |
| State of Connecticut Department of Agriculture | Leasing Oyster And Clam Grounds | 2009 | Procedures for bidding on and leasing oyster and clam grounds in Connecticut. Applications to lease grounds must be approved by the Commissioner of Agriculture, and advertised in a local paper and on the CTDoA website. Application fees cover advertising and recording. Successful bidders also pay a surveying fee and a buoying fee. The department requires that bids are greater than $4/acre and the leasing period is 3 years. Leases may be renewed as long as lessee has paid rentals. The bidding process is a sealed competitive bid. Applicability: describes regulation of an environmental resource in LIS; describes a regulated resource which would not be subject to dredging and would require consultation with natural resource agencies for material disposal. | State of Connecticut Department of Agriculture |
| State of Connecticut Department of Agriculture | New Shellfish Bed Lease Opportunities | 2009 | Listing of shellfish grounds available for lease in Connecticut as of June 1, 2009. Includes 31.57 acres in Greenwich, 143.5 acres in Branford with restrictions for fish trawling, and 191.3 acres in Branford with restrictions for fish trawling and lobster fishing. Applicability: describes regulation of an environmental resource in LIS; describes a regulated resource which would not be subject to dredging and would require consultation with natural resource agencies for material disposal. | State of Connecticut Department of Agriculture |
| Stern, E.A., Lodge, J., Jones, K.W., Clesceri, N.L., Feng, H., and Douglas, W.S. | Decontamination And Beneficial Use Of Dredged Materials | 2000 | Summarizes a system than transforms contaminated dredged material from NY/NJ harbor into an environmentally-benign material to manufacture a variety of beneficial use products. Describes the Biogenesis/Weston soil and sediment washing technology and the Gas Technology Institute/Endesco Rotary Kiln cement manufacturing technology. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses beneficial use techniques and decontamination technologies. | US Environmental Protection Agency - Region 2, NY/NJ Sediment Decontamination Program |

| Authors | Title | Year | Summary | Contact Agency |
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| Stony Brook University Center for Survey Research | Public Perception Survey Of Long Island Sound Watershed Residents | 2006 | Survey of Long Island Sound watershed residents found that the Sound is more important to those that live closer to it, residents of Long Island and CT use the Sound most, non-water activities are more common than water activities, those that use the Sound more often give it a higher water quality rating, overall water quality rated fair to poor, many suburban residents of the region engage in behaviors that are damaging to water quality, residents generally have low environmental knowledge, residents with better environmental knowledge generally practiced more responsible lawn care techniques, residents expressed high levels of concern for the environment despite their lack of knowledge, most residents believe that their actions do not decrease water quality in the Sound, some said they could change their everyday behavior to help the Sound, willingness to change was linked to younger aged people and those with more knowledge and concern, many residents are exposed to local media. Applicability: Investigates public awareness of and attitudes towards LIS resources. n/a to dredging. | Stony Brook University Center for Survey Research, Department of Political Science |
| Streever, W.J., Patin, T.R., and Davis, J.E. | Creating And Restoring Wetlands With Dredged Material: A Summary Of Approaches And Issues | 2000 | A review of case studies that provides an overview of the standard methods of wetlands creation from dredged materials. Data from the case studies suggest that some characteristics of created wetlands are indistinguishable from natural ones, while other characteristics are different. Data further suggest that some characteristics converge over time between constructed and natural wetlands, while others do not. Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | U.S. Army Engineer Research and Development Center |
| Sustainable Long Island | Brownfield Sites By Community | | A table of the number of brownfield sites in each Long Island municipality, along with a total of the funding those sites have received. Applicability: n/a to LIS resources, relevant to dredged material management in that dredged material can be beneficially used at brownfields sites. | Sustainable Long Island |
| Sweeney, A. and Sanudo-Wilhelmy, S.A. | Dissolved Metal Contamination In The East River–Long Island Sound System: Potential Biological Effects | 2004 | 23 stations on 55 mile transect in western Long Island Sound sampled for surface water quality in summer 1999. Measured salinity, secchi depth, silver, cadmium, copper, lead, nitrate, phosphate, chlorophyll-a. Applicability: investigation of a LIS resource (water quality), n/a to dredging. | Marine Sciences Research Center, Stony Brook University |
| Tiner, R., Bergquist, H., Halavik, T., and MacLachlan, A. | Eelgrass Survey For Eastern Long Island Sound, Connecticut And New York | 2003 | Current and historical distribution of eelgrass developed by air photo interpretation. Groundtruthing was performed at selected sites along with estimations of eelgrass bed density. Out of a total of 246 field sites, 112 were found to have eelgrass. A total of 163 eelgrass beds accounting for nearly 1,600 acres were inventoried. Eelgrass beds were mostly present from Rocky Neck State Park east to the Rhode Island border. GIS shapefiles were generated from the study results. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management as it identifies habitat sites for SAV which should be protected during dredging and placement. | U.S. Fish and Wildlife Service, Southern New England Coastal Program |
| Tiner, R., Bergquist, H., Halavik, T., and MacLachlan, A. | 2006 Eelgrass Survey For Eastern Long Island Sound, Connecticut And New York | 2007 | Current and historical distribution of eelgrass developed by air photo interpretation. Groundtruthing was performed at selected sites along with estimations of eelgrass bed density. A total of 176 eelgrass beds were interpreted and 126 were verified in the field. A total of 176 eelgrass beds accounting for 1,905 acres were inventoried. 13 more beds and 306 more acres of eelgrass beds were detected in 2006, compared to the 2002 survey. Eleven sub-basins experienced increases in eelgrass acreage, while five had losses. It is highly likely that at least some of the "gains" in eelgrass acreage are actually the result of higher quality imagery or capture of the imagery at times of improved water clarity which allowed for more eelgrass to be detected. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management as it identifies habitat sites for SAV which should be protected during dredging and placement. | U.S. Fish and Wildlife Service, Southern New England Coastal Program |
| Tiner, R.W., Huber, I.J., Nuerminger, T., and Marshall, E. | Salt Marsh Trends In Selected Estuaries Of Southwestern Connecticut | 2006 | Documentation of changes in marsh vegetation zones (low marsh and high marsh) in six salt marsh areas in southwestern Connecticut since 1974 through air photo interpretation. Results indicate that sea-level rise has caused continued conversion of low marsh to tidal flats, and conversion of high marsh to low marsh. Applicability: Relevant to LIS resources in that it documents marsh losses in southwestern CT, relevant to dredged material management in that it may highlight opportunities for beneficial use (marsh restoration). | U.S. Fish and Wildlife Service, National Wetlands Inventory Program |
| U.S. Army Corps of Engineers | Evaluation Of Dredged Material Proposed For Disposal At Island, Nearshore, Or Upland Confined Disposal Facilities - Testing Manual | 2003 | Provides technical guidance for evaluation of potential contaminant migration pathways from confined disposal facilities (CDFs). A suite of evaluation procedures and laboratory test procedures were developed to evaluate CDF contaminant pathways and is presented. A tiered testing and evaluation approach is used. Tier I determines the need for pathway evaluations, pathways of concern, contaminants of concern, and which pathways require more detailed evaluations. Tier II determines the need for management actions derived from techniques that use the chemical, physical, and biological characteristics of the dredged material and basic information about the CDF. Tier III focuses primarily on definitive evaluations, including pathway testing. Tier IV includes formal quantitative risk assessment designed to answer specific questions. Applicability: n/a to LIS resources specifically but provides framework for evaluation of risk from CDF contaminant migration, relevant to dredged material management as a framework for evaluation of dredged material management options. | U.S. Army Engineer Research and Development Center, Environmental Laboratory |
| U.S. Army Corps of Engineers - New York District | Dredged Material Management Plan For The Port Of New York And New Jersey: 2008 Update, Volume I | 2008 | Update to the 1999 Dredged Material Management Plan Implementation Report (DMMP IR) summarizing the progress and highlight areas of particular interest as part of an ongoing process to keep stakeholders and interested members of the public informed of the latest developments in the management of dredged material within the New York New Jersey Harbor. This document, combined with the 2005 Status Report (Appendix A), provides updated placement locations, dredging volumes and technical descriptions of beneficial use options. Applicability: n/a to LIS resources, discusses management and beneficial use of dredged material. | U.S. Army Corps of Engineers - New York District |
| U.S. Environmental Protection Agency - Office of Superfund Remediation and Technology Innovation | The Use Of Soil Amendments For Remediation, Revitalization And Reuse | 2007 | Description of the principles of soil amendment application for remediating and revegetating contaminated sites. The report focuses on amendments that are residuals from other processes and have beneficial properties when added to soil. Commonly used amendments include municipal biosolids, animal manures and litters, sugar beet lime, wood ash, coal combustion products such as fly ash, log yard waste, neutralizing lime products, composted biosolids, and a variety of composted agricultural byproducts, as well as traditional agricultural fertilizers. Soil amendments limit exposure pathways and immobilize contaminants. Plantings are a major component of soil amendment strategies since transpiration can direct large flows of water away from groundwater and receiving surface waters. The report covers the types of problems addressed by soil amedments, types of sites that are suitable, types of soil amendments, logistical considerations, revegetation, permitting, benefits of amendments, and monitoring. Applicability: n/a to LIS resources, relevant to dredged material management since dredged material may be used as a soil amendment. | EPA Office of Superfund Remediation and Technology Innovation |

| Authors | Title | Year | Summary | Contact Agency |
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| U.S. Environmental Protection Agency - Office of Wetlands, Oceans, & Watersheds | Beneficial Uses Of Dredged Material | 2007 | This website is a collaborative effort with USACE which provides information on the regulations on disposal of dredged material and a general description of beneficial use. There are links to USACE website of case studies on beneficial use. The EPA website outlines the Marine Protection Research and Sanctuaries Act (MPRSA), the London Converntion, and various topics in dredged material management (regulations, planning, testing and evaluation, alternatives evaluation, and ocean dumping sites). There is also a link to "Guidance Document for the Development of Site Management Plans for Ocean Dredged Material Disposal Sites". Links are also provided to international, national, and regional dredging and dredged material management organizations. Applicability: n/a to LIS resources, relevant to dredged material management in that it review applicable regulations and links to other relevant organizations and information. | U.S. Environmental Protection Agency, Oceans and Coastal Protection Office |
| U.S. Environmental Protection Agency and U.S. Army Corps of Engineers | Environmental Impact Statement For The Designation Of Dredged Material Disposal Sites In Central And Western Long Island Sound, Connecticut And New York | 2004 | This Final Environmental Impact Statement (EIS) describes the environmental effects of designating a dredged material disposal site(s) in western and central Long Island Sound. The EIS describes the evaluation of open ocean, upland, beneficial use, treatment technologies, and four open-water alternatives for dredged material disposal and a No Action Alternative. Initial screening eliminated the open ocean, upland, beneficial use, and treatment technology alternatives. The remaining alternatives (four open-water and the No Action alternatives) were then assessed throughout the document. The primary potential effects identified include: temporary increase in suspended solids and burial of aquatic resources. The Environmental Protection Agency's Preferred Alternative is to designate the Western Long Island Sound and Central Long Island Sound Dredged Material Disposal sites. Alternative sites are described in terms of bathymetry, geological setting and geomorphology, meteorology, and physical oceanography. The document details existing conditions and potential impacts at the alternative sites with respect to sedimentation and erosion, sediment quality, water quality, benthic invertebrates, fish and shellfish, marine and coastal birds, marine mammals and reptiles, endangered and threatened species, bioaccumulation potential, socioeconomic factors, air quality and noise, and cumulative impacts. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that it discusses potential impacts of disposal. | USEPA Region 1 |
| U.S. Environmental Protection Agency and U.S. Army Corps of Engineers | Evaluating Environmental Effects Of Dredged Material Management Alternatives - A Technical Framework | 2004 | This document provides a consistent technical framework for USACE and USEPA personnel to follow in identifying environmentally acceptable alternatives (under NEPA, CWA, MPRSA) for the management of dredged material. It also provides additional technical guidance to augment present implementation and testing manuals for addressing the environmental acceptability of available management options, and enhances consistency and coordination in USACE/USEPA decision making. The document provides an overview of dredging operations and management alternatives, then lays out a framework for determining environmental acceptibility, presents assessments of open water disposal and confined disposal and beneficial use alternatives, and finally discusses alternative selection. Applicability: n/a to LIS resources aside from potential benefit from beneficial use, presents framework for dredged material management. | U.S. Army Engineer Research and Development Center, Environmental Laboratory |
| U.S. Environmental Protection Agency and U.S. Army Corps of Engineers | Beneficial Uses Of Dredged Material | 2006 | Classifies beneficial uses into three categories: engineered uses, agricultural and product uses, and environmental enhancement. The website decribes different examples of these three categories of beneficial use, presents case studies, and presents a framework for deciding the appropriate beneficial use for a given type of dredged material. The decision process for determining the beneficial use (if any) for dredged material includes evaluating the contaminant status, site selection, technical feasibility, environmental acceptability, cost-benefit analysis, and a review of legal constraints. Written descriptions of the applicability of various sediment types (rock, gravel/sand, consolidated clay, silt/soft clay, mixture) to the types of beneficial use are presented, along with a summary matrix. Applicability: n/a to LIS resources, outlines beneficial uses of dredged material and presents a decision framework for beneficial use. | U.S. Army Engineer Research and Development Center, Environmental Laboratory |
| U.S. Environmental Protection Agency Region 1 and U.S. Army Corps of Engineers New England District | Regional Implementation Manual For The Evaluation Of Dredged Material Proposed For Disposal In New England Waters | 2004 | Provides guidance for applicants proposing open-water disposal of dredged material in New England waters. The RIM provides New England-specific guidance on: permit application and coordination requirements; sampling methodologies; updated reference site locations; contaminants of concern and analytical reporting limits; and species and test conditions for biological testing. Applicability: n/a to LIS resources, provides guidance on New England dredged material open water disposal. | U.S. Army Corps of Engineers New England District, Regulatory Office |
| U.S.Army Corps of Engineers, New York District | Jamaica Bay Marsh Islands, Jamaica Bay, New York Integrated Ecosystem Restoration Report Environmental Assessment And Finding Of No Significant Impact | 2005 | Environmental Impact Report and Finding of No Significant Impact for a project to restore salt marsh in Jamaica Bay through filling, regrading, and replanting. The report reviews existing resources and impacts of alternative restoration plans. Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | U.S. Army Corps of Engineers, New York District |
| U.S.Army Corps of Engineers, New York District | Jamaica Bay, Marine Park And Plumb Beach, New York Environmental Restoration Project Draft Interim Feasibility Report Kings And Queens Counties, New York | 2010 | Feasibility and impact analysis of eight coastal restoration projects in Jamaica Bay to improve tidal flushing and water quality and to restore coastal habitat previously impaired by dredging. Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | U.S. Army Corps of Engineers, New York District |
| U.S.Army Corps of Engineers, New York District | Integrated Ecosystem Restoration Report/Environmental Assessment Marine Park, Brooklyn, New York | | Finding of No Significant Impact for a project to restore an area of salt marsh degraded by historical filling. The report reviews the project, existing conditions at the site, environmental and economic impacts of restoration alternatives, and a monitoring plan for the project. Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | U.S. Army Corps of Engineers, New York District |

| Authors | Title | Year | Summary | Contact Agency |
|---|---|---|---|---|
| U.S.Army Corps of Engineers, New York District | Initial Appraisal Report Beneficial Uses Of Dredged Material For Aquatic Ecosystem Restoration At Norton Basin And Little Bay | | Analysis of the environmental benefits and economic costs of beneficially using dredged material from the New York, New Jersey Harbor Deepening Project for an aquatic ecosystem restoration at Norton Basin and Little Bay (filling borrow pits to restore historical bathymetry and function). Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | U.S. Army Corps of Engineers, New York District |
| U.S.Army Corps of Engineers, New York District | Draft Integrated Ecosystem Restoration Report/Environmental Assessment Spring Creek, Brooklyn, New York | | Assessment of the Spring Creek restoration project. The report describes existing conditions within the study area and project site; Assesses opportunities and alternative plans for the restoration of the degraded ecosystem at the Spring Creek site; Determines the environmental benefits of restoration relative to the economic costs; Evaluates the technical, environmental, and institutional feasibility of the federal action to address ecosystem restoration opportunities; Determines if there is local support for implementation of the alternative plans for ecosystem restoration; and Recommends a restoration plan for construction. Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | U.S. Army Corps of Engineers, New York District |
| US Army Corps of Engineers - Seattle District | Feasibility Phase Final Report - Puget Sound Confined Disposal Site Study, Washington | 2003 | The Puget Sound Confined Disposal Site Study focused public and private attention on the issue of contaminated marine sediment disposal and treatment, yielding a number of tools, policies and actions to achieve this success. The study sponsors and co-sponsors have determined that private sector regional landfill operators can meet the near-term needs of the Puget Sound region for environmentally acceptable and cost-effective disposal and management of contaminated marine sediment. When two regional landfills began marketing their facilities as acceptors of contaminated marine sediments, CDF studies were terminated. The study examined alternative facility configurations and management roles, evaluated the ecosystem restoration opportunities afforded by the establishment of disposal capacity for contaminated sediment, and evaluated alternative disposal and sediment treatment options. A programmatic EIS was prepared. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses the process of studying dredged material management alternatives and the ultimate solution for Puget Sound. | Washington State Department of Ecology, Environmental Assessment Program |
| US Fish & Wildlife | Threatened & Endangered Species System: Environmental Conservation Online System - New York | 2009 | Listing of all federally threatened and endangered animals and plant (including marine species) that are known to inhabit New York and its waters. Links to species profiles online. Applicability: describes resources of LIS watershed area, applicable to dredged material management In that dredged material disposal in areas used by endangered or threatened species would require review by natural resource agency. | |
| US Fish & Wildlife | Threatened & Endangered Species System: Environmental Conservation Online System - Connecticut | 2009 | Listing of all federally threatened and endangered animals and plant (including marine species) that are known to inhabit Connecticut and its waters. Links to species profiles online. Applicability: describes resources of LIS watershed area, applicable to dredged material management In that dredged material disposal in areas used by endangered or threatened species would require review by natural resource agency. | |
| Valente, R.M. | Response Of Benthic Infauna And Epifauna To Ocean Disposal Of Red Clay Dredged Material In The New York Bight: A Study Using Sediment-Profile Imaging, Surface Imaging And Traditional Methods | 2006 | 1 million cubic yards of red clay was dredged from Newark Bay (NJ) and disposed of in an open water dump in the New York Bight. Monitoring surveys, using sediment imaging and grab sampling, were conducted in 1998 (1 year after disposal) and 2002 (5 years after disposal) to evaluate the ability of benthic organisms to colonize the compact and low-organic sediment. Comparison of the two sampling efforts revealed that 5 years after disposal, the clay had become smoother and more heterogeneous in texture, and were colonized to a much greater degree by relatively abundant and diverse infaunal and epifaunal communities. Abundance and diversity was high in 2002 compared to the reference sites, however the community structure at the red clay sites was completely different than that of the reference sites, due to the different sediment texture and composition. Applicability: n/a to LIS resources directly but does apply to similar benthic communities in LIS, discusses impacts of dredged material open water disposal. | SeaRay Environmental |
| Valente, R.M. and Fredette, T.J. | Benthic Recolonization Of A Capped Dredged Material Mound At An Open Water Disposal Site In Long Island Sound | 2002 | Surveys were conducted to assess recolonization of the Seawolf Mound by benthic macroinvertebrates. Sediment grab samples for benthic taxonomic analysis were collected at six stations across the capped mound in September 1997 (1.5 years following completion of the capping operation) and again in June 2001 (5 years postcap). Sediment-profile images (SPI) were collected simultaneously at the six stations in both years, as well as in July 1998 and August 2000. Applicability: study of a LIS resource, relevant to dredged material management in that study investigations benthic recolonization post-dredged deposition. | DAMOS Program Manager, US Army Corps of Engineers, New England District |
| Varekamp, J., Kreulen, B., ten Brink, B.M., and Mecray, E. | Mercury Contamination Chronologies From Connecticut Wetlands And Long Island Sound Sediments | 2003 | Sediment cores were used to investigate the mercury deposition histories of Connecticut and Long Island Sound. Applicability: relevant to LIS resources in that it describes conditions inLIS, relevant to dredged material management in that mercury may be present in dredged material. | Wesleyan University, Department of Earth and Environmental Sciences |

| Authors | Title | Year | Summary | Contact Agency |
|---|---|---|---|---|
| Varekamp, J.C., Mecray, E.L. and Maccalous, T.Z. | Once Spilled, Still Found: Metal Contamination In Connecticut Coastal Wetlands And Long Island Sound Sediment From Historic Industries | 2005 | Metals contaminant levels in sediment cores from various Long Island Sound and coastal CT stations. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management in that contaminants may be present in dredged material. | Wesleyan University, Department of Earth and Environmental Sciences |
| Varekamp, J.C., Thomas, E., Altabet, M., Cooper, S., and Brinkhuis, H. | Environmental Change In Long Island Sound In The Recent Past: Eutrophication And Climate Change | 2010 | Documentation of environmental change (water temperature, organisms, dissolved oxygen, pollution, salinity) using sediment cores approximately 1630 to present. Records show that sediment influx to LIS began with colonial clear cutting, hypoxia began in the 1800s, bottom water salinity in western LIS dropped as a result of runoff and WWTP flow in the East River during the 1800s, eutrophication followed in suit with increased planktic and benthic productivity. Records show clear evidence for eutrophication of the Sound since the mid 19th century, as evidenced by enhanced storage of Organic Carbon, Biogenic Silica, and Nitrogen, heavier nitrogen isotopes, lighter carbon isotopes,and changes in benthic foraminiferal faunas and diatom floras. The pattern changed in the 1960s and 1970s. The fundamental shifts in promary producers in the ecosystem together with the persistent freshening, warming, hypoxia and ongoing pollution may all have impacted the lobster populations. Concludes that multiple stressors weakened the lobster population in LIS, making it vulnerable to attack by pathogens. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Wesleyan University |
| Varney, R.W. | Islander East Pipeline Project Final Environmental Impact Statement | 2002 | EPA Region 1 Comments to FERC on the Islander East Pipeline Project FEIS, which proposes a pipeline through CT and Long Island Sound, a total of 50 miles of new pipeline (22 miles across LIS). Overall, EPA questions whether another proposed pipeline (Iroquois' Eastern Long Island System Alternative (ELI) is adequate to meet gas needs of the region. EPA notes that the ELI was designated the environmentally preferred alternative to the Islander East Pipeline, but that the FEIS is not clear about why it did not become the preferred alternative since it meets project need with less impact to environment. Additional comments include: FEIS lacks details needed to understand direct/indirect/secondary impacts to wetlands and waters; EPA does not agree that Islander East project would result in limited adverse environmental impacts; EPA recommends reducing widths of rights-of-way; EPA recommends continued coordination with abutting land trusts and conservation organizations. Applicability: addresses project which may impact resources of LIS, underwater pipeline project area should be considered in dredging and dredged material management. | USEPA Region 1, Office of Environmental Review |
| Vorros, A. | Dredged Materials In Abandoned Coal Mine Reclamation | 2005 | Outline of Hazelton project that will use dredged material amended with coal ash to reclaim an abandoned coal mine. Applicability: n/a to LIS resources, outlines beneficial use of dredged material. | NY/NJ Clean Ocean and Shore Trust |
| Wahle, R.A., Dunnington, M., O'Donnell, K., and Bell, M. | Impact Of Dredged Sediment Disposal On Lobster And Crab Abundance And Movements At The Rockland Disposal Site | 2004 | Investigation of whether late-autumn dredged material disposal at the Rockland Disposal Site could negatively impact lobster migration. 72 lobster traps were set over the disposal area, and sampled before and during disposal. Lobster were counted, tagged and released at each trap location. Sampling occurred in coordination with 81 disposal events (total of 57,105 cubic meters of material). Lobster catch rates declined over the course of the study in both impacted areas and control areas. No significant impact of disposal on lobster abundance or movement was detected. Declines were likely due to seasonal migration out of the study area, confirmed by recaptures. The abundance of emigrating lobsters at the disposal site in mid-November suggests that direct impacts to lobsters may be minimized when disposal occurs after the autumn emigration period. Rock crabs, by contrast, experienced increased catch a few weeks after the onset of disposal, possibly because the newly deposited material provided a richer source of food than the surrounding areas. Applicability: n/a to LIS resources directly but does apply to similar lobster communities in LIS, discusses impacts of dredged material open water disposal. | Bigelow Laboratory for Ocean Sciences |
| Wakeman, T.H. | The Difficulties Of Dredging And Placement For Beneficial Use Projects | 2000 | The NY/NJ Port Authority has set a goal of having 15ft channels to accommodate the largest shipping vessels, but beneficial use at the HARS and upland NJ/PA is being encumbered by regulatory uncertainty, shallow cuts, debris, water management, low production rates, heavy vessel traffic, discontinuous operational requirements, and public opposition. The paper reviews the efforts of the Port Authority to address these challenges. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses barriers to beneficial use. | Stevens Institute of Technology, Center for Maritime Systems |
| Walter, P.J., Andrews, B., and Myre, P.L. | Evaluating Dredged Material In A Sub-Channel Confined Aquatic Disposal Environment: Experience From The Boston Harbor Navigation Improvement Project | 2000 | Sediment samples collected from a Boston Harbor in-channel CAD cell prior to and after capping were evaluated for geotechnical behavior to assess the change in material strength from self-weight consolidation and sand cap loading. Dredging activity resulted in sediment with higher water content and low shear strength. Self-weight consolidation had no effect in a five month period, but capping increased shear strength of the dredged material. Results can be used to develop protocols to assess CAD sediment strength in the field, and to develop guidelines for determining geotechnical cap-readiness. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses testing stability of disposed material. | Science Applications International Corp. |
| Wang, Y.H. | The Intertidal Erosion Rate Of Cohesive Sediment: A Case Study From Long Island Sound | 2003 | Studies contributing to the generation of a bottom erosion model for the study of cohesive sediment movement. Current, wave, and turbidity data were collected from a bottom mounted instrument array, bottom shear stress was calculated, and the erosion rate was derived from the observed sediment concentration. Examination of the relationship between erosion rate and bottom stress showed that the erosion rate varied at intertidal frequency, and displayed a pattern of two-stage erosion. Applicability: n/a to LIS resources but does address LIS processes, relevant to dredged material management in that it describes sediment movement within LIS. | National University of Taiwan, Center for Ocean Research |

| Authors | Title | Year | Summary | Contact Agency |
|---|---|---|---|---|
| Ward, J.E., Strychar, K., and Wikfors, G.H. | Phytoplankton Dynamics In Long Island Sound: Influence Of Environmental Factors On Naturally Occurring Assemblages (EPA Grant # X 98 1613-01-1) | 2005 | The objective of this project was to determine how phytoplankton dynamics in LIS differ among sites and change seasonally over a two year period, determine which environmental factors (e.g., nutrients, hypoxia, temperature) are the primary determinants of phytoplankton assemblages and physiological condition of different species, and examine the relationships between phytoplankton assemblages and planktonic grazers. Results suggest that seasonal temperatures, turbidity, dissolved oxygen and salinity affect the composition and abundance of phytoplankton in the Sound less than do nutrient loads. Applicability: relevant to LIS resources in that it describes conditions in LIS, relevant to dredged material management as it addresses effects of increased turbidity. | Department of Marine Sciences, University of Connecticut |
| Weinstein, M.P., and Weishar, L.L. | Beneficial Use Of Dredged Material To Enhance The Restoration Trajectories Of Formerly Diked Lands | 2002 | A common problem with formerly diked lands being restored to coastal marsh habitat is their low elevation (associated with longterm lack of tidal inundation and sediment accretion, heavy equipment compaction) and oxidation from exposure to the atmosphere. Low elevation may cause these areas to become open water or tidal flats upon initial tidal reintroduction. The use of dredged material may help in these situations. The paper reviews, using a case study, the use of dredged material in wetland restoration for: enhancing the sediment budget at low elevations, accelerating the restoration trajectories toward acceptable endpoints, improving the geomorphology of the marsh planform, providing high marsh refugia for species that depend on this habitat type for survival, reestablishing upland dike elevations for off-site protection of people and property, and stabilizing shorelines to reduce erosion rates. Applicability: n/a to LIS resources, outlines beneficial uses of dredged material for marsh restoration. | New Jersey Marine Sciences Consortium |
| Wells, B., and Norfleet, T. | The Role Of The U.S. Army Corps Of Engineers In Brownfield Redevelopment | 2003 | Describes the role of the USACE as a partner to other agencies in Brownfields redevelopment, including financial assistance and technical expertise in flood control, dredging, and environmental restoration. Also enumerates the legal, procedural, and financial barriers that can inhibit the Corps' involvement in projects that might benefit from their resources. Corps involvement in 6 Brownfields projects is described. To facilitate future Corps' involvement in Brownfields work, specific authorization and program funding are recommended. Applicability: n/a to LIS resources, discusses dredgding as it pertains to brownfields remediation. | Northeast-Midwest Institute |
| Welp, T.L., Clausner, J.E., Thompson, D., Mujica, J., and Boddie, G. | Demonstration Project On Dredging And Marsh Development Using A Flexible-Discharge Dustpan Dredge At Head Of Passes/Southwest Pass Mississippi River | 2004 | This report presents the demonstration results of the dustpan dredge Beachbuilder using a flexible discharge at the Head of Passes/Southwest Pass on the Mississippi River in June 2002. Dustpan dredges equipped with a flexible-discharge floating hose and sufficient pumping capacity potentially have the mobility required for safe passage of vessel traffic and can economically pump dredged material the distances required for placement in a beneficial use scenario such as marsh construction. Applicability: n/a to LIS resources aside from potential benefit from beneficial use, discusses dredging technology. | U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory |
| Wenning, R.J. and Woltering, D.M. | Use Of Ecological Risk Assessment Methods To Evaluate Dredged Material Management Options | 2000 | Reviews the useful elements and the limitations associated with the application of a sediment toxicity testing and ecological risk assessment framework to characterize and evaluate the potential hazards of sediment-bound chemicals on aquatic biota and identify disposal options. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses decision tools for material managment. | ENVIRON International Corp. |
| White, P., Pimentel, E., and Pound, M. | Contaminated Sediment Management Options In San Francisco Bay | 2000 | Limited contaminated sediment cleanups have been performed in San Francisco Bay because of lengthy pemitting process and active public participation. This has limited projects to dredging with upland disposal. A regional framework is needed to encourage beneficial use projects and necessary fill and CDF options, given future cleanup needs. Applicability: n/a to LIS resources, relevant to dredged material management in that it discusses management limitations and potential solutions. | CH2M Hill |
| Williams, P.B. | The Experience Of Tidal Wetland Restoration Using Dredged Materials In San Francisco Bay - Its Implications For Future Restoration Planning | 2000 | Reviews the history of tidal marsh loss in the San Francisco Bay estuary to diking and agricultural conversion. Reviews "second generation" and a "third generation" restoration case studies, and discusses the effects of large scale tidal marsh restoration on the overall sediment budget of the estuary. Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | Philip Williams & Associates |
| Wilson, R.E., Flagg, C.N., Codiga, D.L., and Waliser, D.E. | Sound Science: Research In Real Time | | Surface water sampling on Bridgeport-Port Jefferson PT Barnum ferry. Measurements of the near-surface water properties are based on sampling water from a sea-water intake system. Measured quantities include sea surface temperature (SST), salinity, chlorophyll-a, and dissolved oxygen. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | Long Island Sound Study |
| Yozzo, D.J., Wilber, P., and Will, R.J. | Beneficial Use Of Dredged Material For Habitat Creation, Enhancement, And Restoration In New York–New Jersey Harbor | 2004 | Preliminary screening of the proposed beneficial use alternatives for dredged materials from the NY/NJ Harbor that are unsuitable for open-ocean disposal. The screening identifies the advantages, disadvantages, potential volumes, and estimated costs associated with the construction of artificial reefs, oyster reef restoration, intertidal wetland and mudflat creation, bathymetric recontouring, filling dead-end canals/basins, creation of bird/wildlife islands, and landfill/brownfields reclamation. Applicability: n/a to LIS resources, outlines beneficial uses of dredged material. | Barry A. Vittor & Associates, Inc. |
| Zajac, R.N., Seals. K., and Simpson, D. | Food Webs In Long Island Sound: Review, Synthesis And Potential Applications | 2008 | Reviewed over 2,200 journal articles and reports, plus unpublished data, (1995-2005) to assess and collect data that could be used to develop the food web models for LIS. Identified a significant lack of LIS-specific data that can be used for food web model development (i.e. biomass, production, consumption, diet composition), particularly for inshore waters, bays and rivers, and also for many taxonomic groups. Given data gaps in other areas, focused on developing a food web model for the offshore, deep-water environments of LIS. The completed model describes the structure of the food web and the flow of biomass among the functional groups. Applicability: relevant to LIS resources in that it describes conditions in LIS, n/a to dredged material management. | University of New Haven, Dept. Biology and Environmental Science |

| Authors | Title | Year | Summary | Contact Agency |
|---|---|---|---|---|
| Zimmerman, R. and Rozas, L. | Design Planning For Salt Marshes Created From Dredged Materials: A Case Study In Galveston Bay, Texas | 2000 | Field study to inform design criteria for salt marshes created with dredged materials. A study of nekton use of various vegetated and non-vegetated areas in natural marshes (investigating environmental conditions and topological features) indicates that created marshes should be designed to have large areas of low marsh interspersed with numerous channels and interconnected ponds to maximize fish habitat. Applicability: n/a to LIS resources, relevant to dredged material management in that it is a case study of habitat restoration as it pertains to dredged material management. | National Marine Fisheries Service |

# ATTACHMENT B PHASE 1 LITERATURE REVIEW LETTER REPORT

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Sent by Electronic Mail

July 10, 2009

U.S. Army Corps of Engineers, New England District
696 Virginia Road
ATTN: Mike Keegan, Mark Habel, Susan Holtham
Concord, MA 01742-2751

**Re: Long Island Sound Environmental Data Sources Update**

Dear Sirs and Madam,
Woods Hole Group is pleased to present this brief letter report on the Phase I literature review for Long Island Sound. As we discussed this brief report is designed to explain the methodology used to evaluate the literature contained in the attached electronic file and not designed to be a comprehensive in nature. We also enclose the list of titles obtained during the search as an Excel file. We hope you will find this adequate for completion of the Phase I project, and that we will be able to continue with Phase II shortly.

Sincerely,

The Woods Hole Group, Inc.

Lee Weishar, Ph.D.; PWS
Senior Scientist
USACE Program Manager

***Literature Search***

We performed hundreds of literature searches on the topics indicated in the Statement of Work. Keyword searches were done using three online scientific databases obtained via subscription to the Marine Biological Library's online service (Elsevier's *Science* Direct, CSA/Illumina's *Aquatic Science and Fisheries Abstracts/GeoRef*, and *Web of Science*). Keyword searches were done using words indicated in the RFP. These searches generally included a combination of geographic extent (e.g. *Long Island Sound, or Connecticut, or New York or Rhode Island*) PLUS another descriptor or subject noted in the RFP. Those descriptor/subject keywords include the following:

Historic Disposal Activities
Sediment Chemistry
Sediment
Water Quality
Hypoxia
Bathymetry
Physical Oceanography
Fisheries
Fish
Shellfish
Essential Fish Habitat
Benthic Community
Benthic Resources
Human Health Risk
Toxicity
Global Warming
Climate Change
Sea Level Rise
Economic Data
Dredged Material Disposal
Threatened and Endangered Species
Amphibians
Reptiles
Birds
Mammals
Historic Resources
Public Parklands
Beaches
Recreation
Dredged Material Regulation
Socioeconomics
Shipping
Beneficial Use Dredged Material
CAD Facilities
Treatment Dredged Material
Transport Dredged Material
Landfills
Brownfields
Earthfill + Construction Projects
Habitat Restoration
Wetlands

Beach Nourishment
Remediation Reuse Contaminated Soil
Highway Sanding + Maintenance
Siltation Waterways
Waterway Contamination
Marine Industry Economics
Cultural Resources
Ferry Systems
Short Sea Shipping
Marine Terminals
Utility Construction + Permitting
Energy Resources
LNG
Hydrokinetic

Each keyword search turned up tens to hundreds of 'hits'. Titles were scanned for relevant content. If deemed relevant from the title, the document was downloaded. If the document appeared relevant it was saved in electronic format.

We also performed searches using the Google online search engine for web-based information. These included directed searches, aiming for information sponsored by State and Federal agencies, private resource management entities (i.e. Audubon), and privately owned corporations (i.e. marinas).

***Agency Contacts***

State and Federal Points of Contact provided by USACE were queried for relevant information. All Points of Contact were contacted both by telephone and by e-mail. These individuals were told of this project, and asked whether they were involved in projects, or knew of reports or literature, regarding Long Island Sound topics of interest. A list of all topics indicated in the RFP was provided to these agency contacts via e-mail. Several documents were obtained in this way, and several referrals to websites and other sources of information were obtained.

***Results***

We obtained over 1,000 files and organized them generally by the topics provided in the Statement of Work. Certain documents spanned more than one topic, and some did not fit squarely into any particular topic in the SOW. These files are arranged by Agency (e.g. CT State reports), or by sub-topic (e.g. Environmental Impact Statements).

We compiled a list of these documents in an Excel spreadsheet. During the course of this exercise, we were able to eliminate several documents that were deemed irrelevant on second review, and we found 12 duplicate documents. In addition, we became aware that many 'files' were linked; particularly in the case of web-based information that was saved in HTML format. These types of files could have 20-40 "files" linked to the main file that comprised a single document. In addition, the Appendices of certain Environmental Impact Statements contained hundreds of "files", some of which were tables and figures stored as individual files. The revised estimate of the number of full documents obtained is now closer to 500.

We understand that USACE staff will examine the titles list and choose which of them to include 1) in Phase II and 2) in the Environmental Data Update for Long Island Sound.

***Database Conversion***

As part of the Phase I project, we also updated the Access 97 Database of Long Island Sound literature. This work was done by Darren Mansfield (WHG's IT specialist) and Beth Hays, who used the conversion utility in ACCESS 2003 to bring the old database forward to a newer version. Following several discussions with USACE staff, we converted the database to Access 2003 rather than the newest version, Access 2007. This was done because the 2007 version is incompatible with many previous versions, and we wanted to provide access to as many users as possible.

After converting the database, we ran several quality assurance checks running both the 97 database and the 2003 database on different machines. This allowed us to confirm that the older and newer versions would produce identical results. Quality Assurance runs were done using publication dates, subjects, keywords, titles and various other relevant factors. Results were identical on both versions of access, indicating a successful database conversion.

Please feel free to contact me is more detailed information is required.

# ATTACHMENT C LONG ISLAND SOUND DREDGED MATERIAL DISPOSAL DATABASE - TOPIC DEFINITIONS

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## Topics

Benthic (macro-invertebrate) resource - Information on the presence of benthic resources in Long Island Sound, at and outside of the existing and historic disposal sites. Information on recolonization and species assemblages as an indicator of toxicity. Information on biodiversity.

Coastal Management - Information on coastal management approaches, policies. Erosion control. Shoreline uses.

Ecology, Habitats and Species - Information on specific habitats/species.

Economic Data and Analysis - Information on economic data and reports or studies on navigation traffic, usage and economic benefits of waterborne commerce in the Sound and its value as a commercial waterway by canvassing and interviewing marine trades associations, port authorities, harbor associations, fishermen's group and regional recreational boating groups and interests.

Environmental Evaluation and Economics of Disposal Options - Information and studies on dredged material disposal costs for alternative disposal methods and sites, costs of dredged material testing and evaluation. Information on environmental evaluation of management options available for such alternative sites and methodologies.

Fisheries/Shellfisheries - Information on the presence of fish and shellfish including spawning, nursery (larvae) and migration, particularly information based on trawl and similar sampling efforts. Presence and extent of fishing and shellfishing grounds and areas and aquaculture within the Long Island Sound Region, whether natural or managed, commercial or recreational. Information on the economic value of fisheries and shellfisheries, including catch/effort and locations for lobster. Location and evaluation of essential fisheries habitat areas and presence, extent and value of submerged aquatic vegetation.

Fishing Activities and Human Health Risks - Contamination of fish catch, biomagnification of contaminants and consumption, particularly from disposal site vicinity. Human health effects of LIS caught seafood consumption. Information on the incidence and location of past blooms of nuisance and toxic phytoplankton species. Information on State Health advisories in the Sound including locations, incidences, contaminants, and species.

General Interest – Articles published in large circulation newspapers (or in newsletters and websites) that do not align with any other topic category described herein.

Geology and Geomorphology - Information on geological structure of Long Island Sound and coastlines. History of the geological features. Geochemistry.

Historic Disposal Activities and Dump Sites - Information on past dredged material disposal activities. Information on effects of disposal and capping at disposal sites. (Note: appropriate nomenclature for this category is “Historic disposal activities and

disposal sites," however historic nomenclature is preserved in the database to facilitate merging with prior databases and future querying.)

Historic, Cultural and Archaeological Resources - Location of known and potentially significant cultural, historic and archaeological resources in the LIS region.

Marine Wildlife and Endangered Species - Information on presence and geographical extent of marine wildlife, Federal and State listed species and critical habitats.

Physical Impact of Fishing Activities - Locations of fishing grounds, particularly for draggers. Effect of dragging activity on disposal mound integrity and benthic recolonization.

Physical Oceanographic - Hydrography (detailed bathymetry), waves and wind fetch, currents and water circulation information, and storm frequency and their effect on disposal sites. Erosion/deposition data and sediment transport information for disposal sites and the Sound as a whole.

Public Parklands, Beaches and Sanctuaries - Location of public parks and beaches and other public waterfront uses potentially affected adversely by dredging and the disposal of dredged material. Location/identification of sanctuaries potentially adversely affected by dredging and the disposal of dredged material. Also includes information on valuable habitats such as tidal marshes.

Sediment - Sediment information and mapping, including side scan data, particularly in formats useful in developing maps of the Sound. Also sediment chemistry data and analysis.

State Dredged Material Disposal Guidance - Information and guidance developed by the states of Connecticut and New York, and where appropriate, Rhode Island, to regulate dredged material disposal and disposal site identification, screening, use, monitoring and management.

Water Quality - Water column chemistry data and investigations. Measurement and variability of water quality data throughout the Sound. Nutrient (enrichment).

Meteorology - Information on meteorological and climatic conditions.

# ATTACHMENT D LONG ISLAND SOUND DREDGED MATERIAL DISPOSAL DATABASE - LOCATION DEFINITIONS

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## Locations

Entire LIS – Long Island Sound. Bounded on the west by the line between Throgs Neck (NY) and Willets Point (NY), and on the east by the line between Sandy Point (RI) and Orient Point (NY) through the chain of islands including Fishers, Plum and the Gulls.

Western LIS – Western Basin of Long Island Sound. Bounded on the west by the line between Throgs Neck (NY) and Willets Point (NY), and on the east by the line between Stratford Point (CT) and Port Jefferson (NY) along Stratford Shoal.

Central LIS - Central Basin of Long Island Sound. Bounded on the west by the line between Stratford Point (CT) and Port Jefferson (NY) along Stratford Shoal, and on the east by the line between Mulberry Point (CT) and Mattituck Point (NY) along the Mattituck Sill.

Eastern LIS - Eastern Basin of Long Island Sound. Bounded on the west by the line between Mulberry Point (CT) and Mattituck Point (NY) along the Mattituck Sill, and on the east by the line between Sandy Point (RI) and Orient Point (NY) through the chain of islands including Fishers, Plum and the Gulls.

Block Island Sound – Waters east of Long Island Sound and south of Washington County, Rhode Island. Bounded on the west by a line between Sandy Point (RI) and Orient Point (NY) (through the chain of islands including Fishers, Plum and the Gulls) and continuing to the midpoint of Montauk Point (NY) (through Gardiners Island). Bounded on the east by a line from Montauk Point (NY) through Block Island (RI) to Point Judith (RI). This area is referred to as Rhode Island Sound in the 1999 Long Island Sound Dredged Material Disposal Database (USACE, 1999).

Gardiners & Peconic Bays – A complex of bays between the forks of Long Island that is bounded on the seaward side by a line from midway out Montauk Point (NY), through Gardiners Island, to Orient Point (NY).

Shoreline (CT) - Coastal lands adjacent to Long Island Sound located in Connecticut.

Shoreline (NY) - Coastal lands adjacent to Long Island Sound located in New York.

Shoreline (RI) - Coastal lands adjacent to Long Island Sound located in Rhode Island.

Upland (CT) – Lands in Connecticut that are in the Long Island Sound watershed above the first major change in terrain features after the shoreline area.

Upland (NY) - Lands in New York that are in the Long Island Sound watershed above the first major change in terrain features after the shoreline area.

Upland (RI) - Lands in Rhode Island that are in the Long Island Sound watershed above the first major change in terrain features after the shoreline area.

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