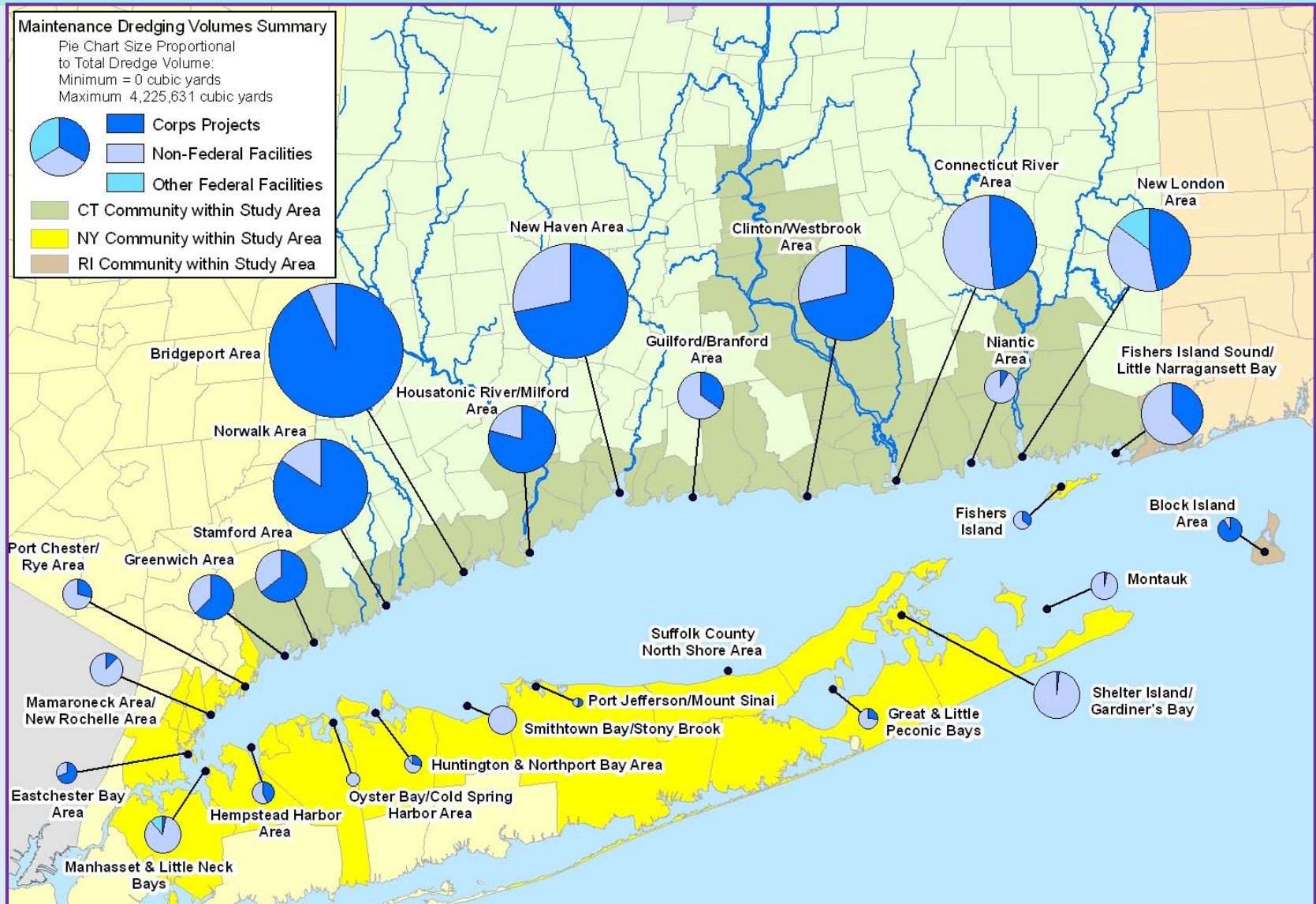


Implementation of the Long Island Sound Dredged Material Management Plan



DMMP Recommendations

- Project/Harbor Specific Recommendations for Federal Base Plans and Alternatives
- Procedural Recommendations for Project Alternatives Consideration and Review
- Recommendations for States and Agencies on Further Study and Development of Beneficial Use and other Non-Open Water Alternatives
- Recommendations on Continuing Ongoing Sound-Wide Monitoring and Management

Dredging Volume Projections

- The 52.9 million cubic yards is the total volume if all Federal and non-Federal projects are fully dredged as needed over the next 30 years.
- Due to budget realities at the Federal, State and Local levels it is highly unlikely that any more than 1/3 of these projects would actually be dredged in that period.
- The DMMP needed to look at all potential projects and all sources of dredged material and develop options for their placement, as it cannot be predicted with any certainty which projects will be funded or not.
- Since we cannot predict which projects will be funded beyond a 2-year window, we cannot know which placement sites will be needed except in the near term, but must have options identified for all potential projects.

Sediment Classification

Distribution of Dredged Material by Type and State in LIS Harbors				
Material Type	Volumes in CY	Rhode Island	Connecticut	New York
Total Demand	52,890,300	386,200 0.7%	39,362,800 74.4%	13,141,300 24.9%
Sand (29.3%)	15,497,700	384,000 99.4%	7,117,300 18.1%	7,950,400 60.5%
Suitable Fines (including mixed) Materials (64.5%)	34,089,700	2,200 0.6%	29,647,700 75.3%	4,439,800 33.8%
Unsuitable (6.2%)	3,303,600	None 0.0%	2,597,800 6.6%	705,800 5.4%

See DMMP Table 4-1 for details on dredged material type breakdowns by Dredging Center and 30-year timeline. Harbor-specific volumes, types and timelines are given in DMMP Chapter 5.

Typical Placement Options for Material Types

Material Type	30-Year Volume	% of Total Demand	Potential Disposal Options				
Sand	15,497,700	29.3%	Direct Beach Placement	Nearshore Bar/Berm Placement	CDF/CAD Cell Capping	Construction Fill	Other Coastal Resiliency
Suitable Fine-Grained Material	34,089,700	64.5%	Open Water	Marsh Creation and SLR Enhancement	Land Elevation	Brownfields (After Treatment)	CDF Fill and Capping
Unsuitable Material	3,303,600	6.2%	CAD Cells	CDF (Interior)	Treatment and Re-use	Landfills	
Total 30-Year Volume Demand	52,890,300						

The Federal Standard

§ 335.7 Definitions.

The definitions of 33 CFR parts 323, 324, 327, and 329 are hereby incorporated. The following terms are defined or interpreted from parts 320 through 330 for purposes of 33 CFR parts 335 through 338.

Beach nourishment means the discharge of dredged or fill material for the purpose of replenishing an eroded beach or placing sediments in the littoral transport process.

Federal Standard means the dredged material disposal alternative or alternatives identified by the Corps which represent the least costly alternatives consistent with sound engineering practices and meeting the environmental standards established by the 404(b)(1) evaluation process or ocean dumping criteria.

Practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Territorial sea means the belt of the seas measured from the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters, extending seaward a distance of three miles as described in the convention on the territorial sea and contiguous zone, 15 U.S.T. 1606.

Cost Analysis and the Base Plan

- For any Federal project, the Corps is required to determine the Federal Base Plan. The Federal Base Plan is the least costly means of implementing that project that is feasible and environmentally acceptable under Federal standards of analysis.
- The Base Plan may require cost-sharing if new facilities are required.
- A plan other than the Federal Base Plan may be recommended for implementation if a non-Federal sponsor is willing to pay the difference in project cost, or if another cost-shared Federal program is applicable under which the difference in cost can be shared between the non-Federal sponsor and the Federal government.

Cost Sharing for New Placement Facilities Under the Base Plan

Even under the Base Plan, if New Placement Facilities are Required (CAD Cells, CDFs, etc.) there are Cost Sharing Requirements. Prior to WRDA 1996 these would have been considered 100% Non-Federal Costs. Since WRDA 1996 New Placement Facilities are Considered Improvement Features and are cost-shared under the WRDA 1986 provisions for navigation projects by project depth.

DMMP Table 1-2

Project Cost Sharing for Navigation Improvements and Disposal Facilities

Project Design Depth	Federal Share	Non-Federal Up-Front Share	Non-Federal Additional Share
Projects up to 20 Feet	90%	10%	10%
Projects >20 feet up to 45 feet	75%	25%	10%
Project over 45 feet	50%	50%	10%

Beyond the Base Plans - Federal Programs for Beneficial Use and Other Project Purposes

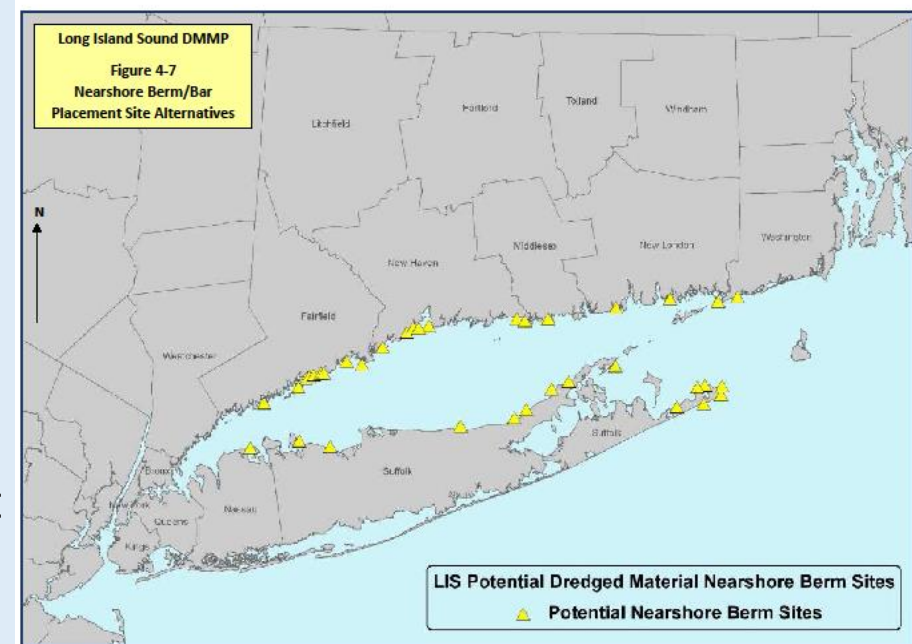
- Using other Federal programs to share the cost of an alternative more costly than the Base Plan requires cost-benefit analysis.
- For shore protection and storm damage reduction projects this requires reductions in property damage that offset the increased placement cost. The sponsor must provide permanent public access easements and 25% to 35% of the increased cost.
- For ecosystem restoration uses the value of habitat gained or enhanced must offset the increased cost. Real estate and 35% of the increased cost are non-Federal responsibilities.
- Smaller-scale projects (up to \$5 to \$10 million Federal) can be pursued under the Corps continuing authority programs (no direct Congressional action required).
- Larger-scale projects would require specific Congressional authority to study and implement.

Summary of Continuing Authorities and Sponsor Requirements

Purpose	Authority	Feasibility Cost Share Fed / Non-Fed	Implementation Cost Share Fed / Non-Fed	Federal Project Limit
Emergency Stream Bank and Shoreline Protection	Section 14, 1946 Flood Control Act, as amended	100% / 0% for initial \$100,000; 50% / 50% remaining cost	65% / 35%	\$ 5,000,000
Hurricane and Storm Damage Reduction (Beach Erosion)	Section 103, 1962 River and Harbor Act, as amended	100% / 0% for initial \$100,000; 50% / 50% remaining cost	65% / 35%	\$ 5,000,000
Regional Sediment Management	Section 204, 1992 Water Resources Development Act, as amended	100% / 0%	65% / 35%	\$ 10,000,000
Aquatic Ecosystem Restoration	Section 206, 1996 Water Resources Development Act, as amended	100% / 0% for initial \$100,000; 50% / 50% remaining cost	65% / 35%	\$ 10,000,000
Project Modifications for Improvements to the Environment	Section 1135, 1986 Water Resources Development Act, as amended	100% / 0% for initial \$100,000; 50% / 50% remaining cost	75% / 25%	\$ 10,000,000

Sandy Material Base Plans and Alternatives Beaches and Nearshore Bar Placement Sites

- For nearly all projects generating sand, direct beach (pipeline) or nearshore bar placement (hopper or scow) will be the Federal Base Plan
- Sponsors desiring beach placement where nearshore is the base plan, or sponsors desiring placement at a more distant location, must pay the difference in cost or a Section 204 study must be completed and a project adopted for the Corps to share in the cost difference (35% Sponsor -65% Federal).
- In those few instances where the base plan for sand is open water placement, the same requirements for sponsor funding or Section 204 apply.
- Section 204 (since 2015) is viewed as a 50-year project life with sponsor requirements for renourishment over that period, whether Federal project source materials are available or not.
- Any real estate interests required must be permanent, and typically must include beach management rights for endangered species and public access.

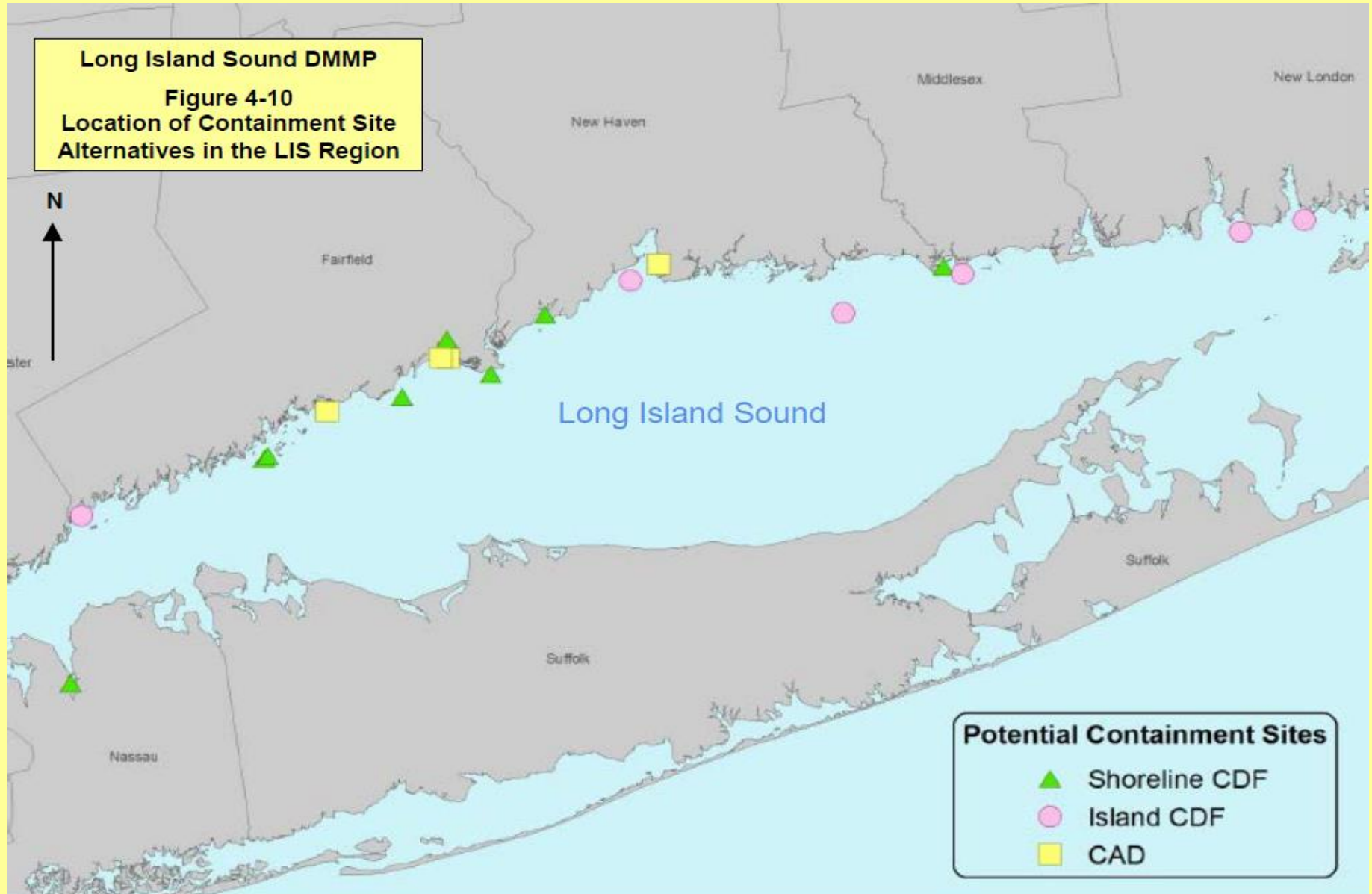


Unsuitable Material Containment Alternatives

Examples of Potential CDF or CAD Cell Projects

- The DMMP identified several harbors in both states where Corps FNPs and other Federal agency projects include one or more project segments where the future dredged material has been shown to be or is assumed to be unsuitable. These include portions of New London, New Haven, Stamford, Greenwich, and Port Chester Harbors, Eastchester River and Glen Cove Creek.
- The base plan for unsuitable material is containment in CAD cells developed for a harbor or project or group of harbors. As opposed to more permanent CDFs, CAD cells allow retention of the shallow marine environment once they are filled and capped.
- There is an opportunity for CT and NY to address issues with a few harbors in the western Sound where maintenance dredging of FNPs and other facilities has been long delayed by questions over what to do with unsuitable materials. Those include Stamford, Greenwich and Port Chester Harbors.
- The DMMP identified two potential opportunities to develop either CAD cells or CDFs that would accommodate the needs of two or more of these harbors.
- Addressing harbors in both states would require a partnership involving both states and the Corps. As these are the base plans for these harbors and materials, cost sharing would follow the WRDA 1986 provisions for non-Federal funding of 20% of the design and construction cost, including capping. Any non-Federal use of the cells would require the sponsors to pay 100% of the cost of that extra capacity. This was the model followed for Providence and Boston Harbors CAD cells.

Alternative Placement Sites Identification – CDFs & CADs



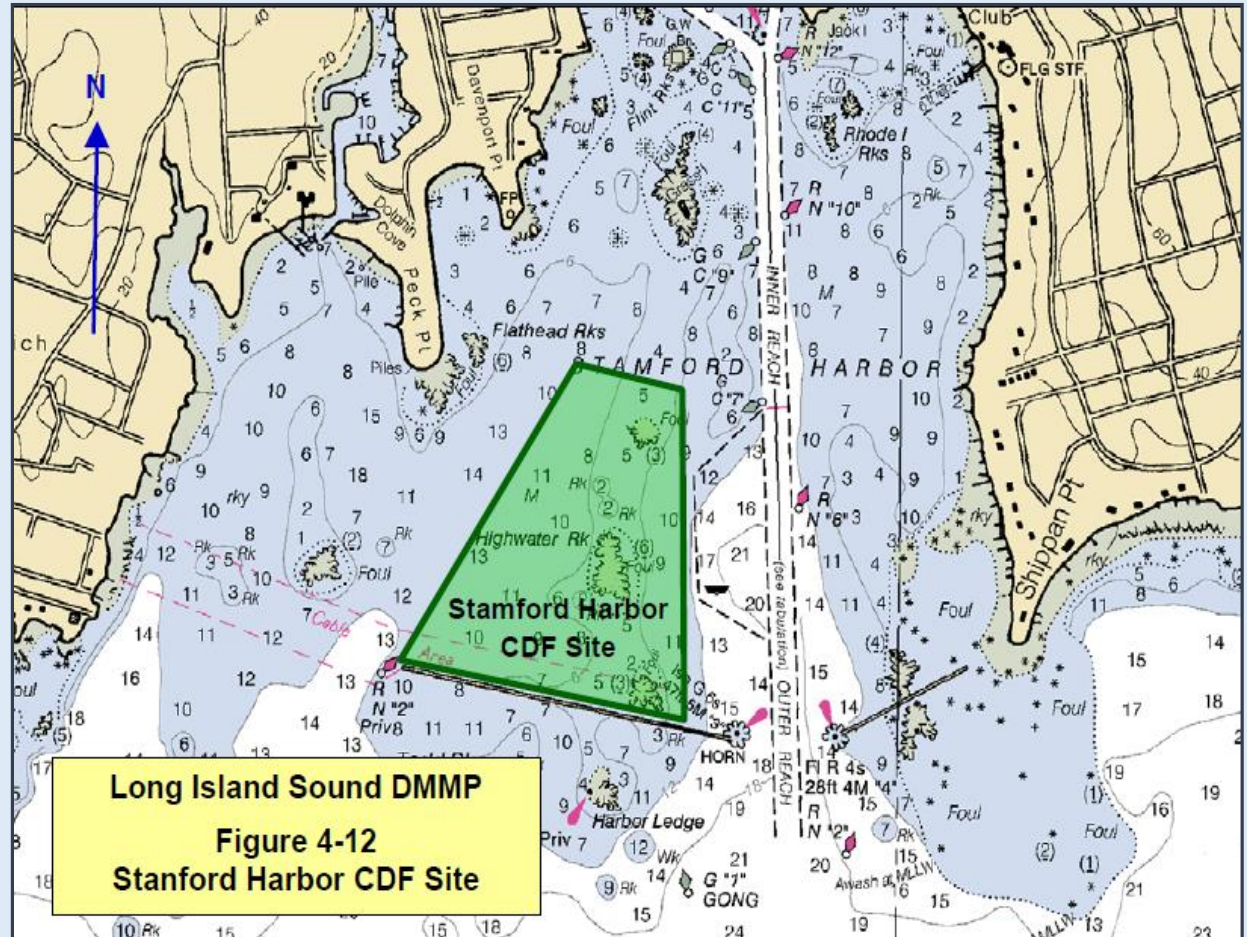
Alternative Placement Sites Identification – Stamford CDF

Stamford Outer Harbor

Smaller-Scale CDF or Sub-Regional CAD Cell Site

70 Acres

1.7 MCY Capacity as CDF site



A similar site was located in Greenwich outer harbor, also known as Captain Harbor, where a CAD cell or CDF could be constructed to fill the needs of Greenwich, or multiple harbors in the western Sound.

Alternative Placement Sites

Examples of Beneficial Use for Marsh Creation

- The DMMP identified a number of opportunities for marsh creation using fine-grained dredged material. The more promising sites were located in Little Narragansett Bay (RI & CT), New Haven Harbor, Norwalk Harbor.
- The base plan for suitable fine-grained material is typically open water placement. Further project-specific studies may conclude that marsh creation is the base plan where environmental benefits are counted.
- However, should the incremental cost of marsh creation (or marsh enhancement/thin layer placement) not be entirely offset, then implementing that beneficial use would require a non-Federal commitment to fund the incremental cost, or applicability of another Federal program as described earlier, including cost-sharing.
- Other Federal authorities most applicable to marsh creation include Section 204 and Section 1135. Cost sharing is 35% Non-Federal under both these authorities.
- Two marsh creation opportunities were highlighted in the DMMP and the public hearing presentations. Those are for CT and RI, and possibly NY as well, at Little Narragansett Bay. Another is for CT at New Haven Harbor.

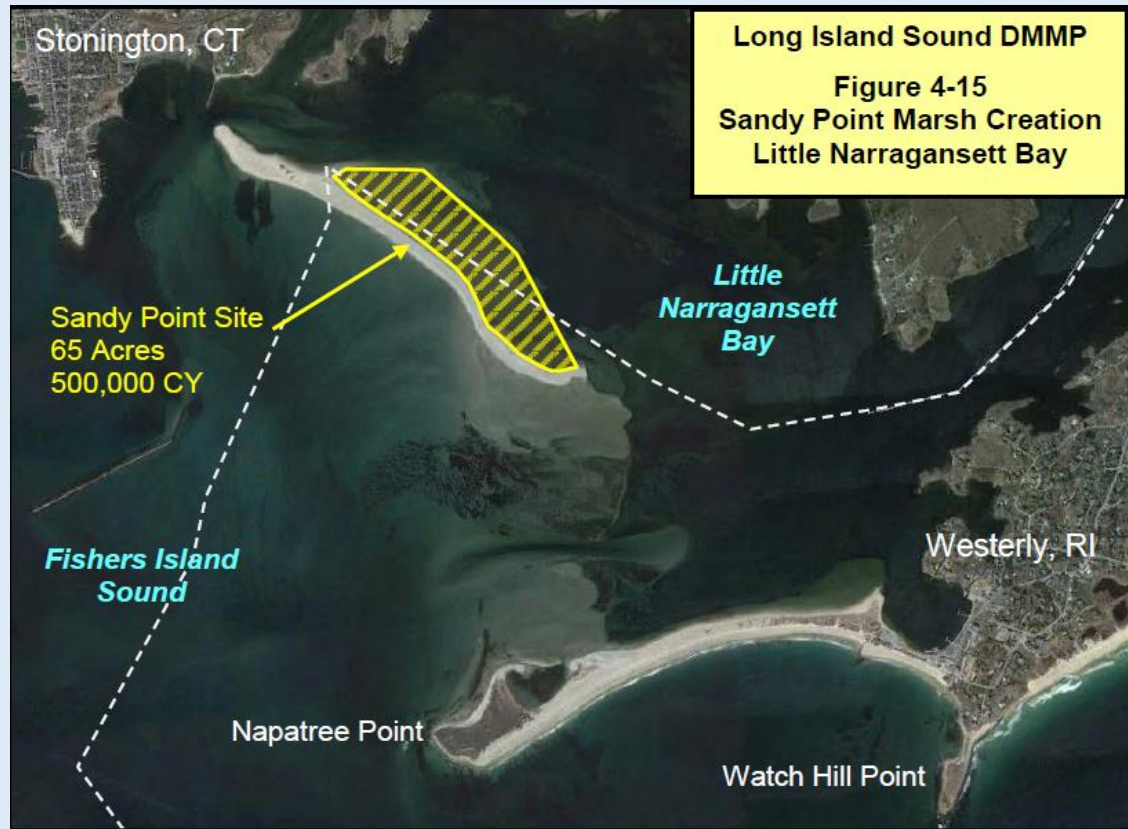
Marsh Creation Site – Little Narragansett Bay

Little Narragansett Bay RI

Sandy Point
Marsh Creation Site

65 Acres

500,000 CY Capacity



This site could be sized to accommodate the needs of the FNP for Pawcatuck River and Little Narragansett Bay, RI and CT, Stonington and Mystic Harbors in CT and Fishers Island Harbor NY. Site is the remnant spit and marsh area largely destroyed in the hurricanes of the 1930s and 1950s.

Marsh Creation Site – New Haven Harbor – Sandy Point

New Haven Harbor

Sandy Point
Marsh Creation Site

70 Acres

1.1 MCY Capacity



This site could be sized to partially accommodate the needs of the FNP for New Haven Harbor and West River. A CAD Cell could be developed here to meet the needs of New Haven's unsuitable upper tributary channels materials, before filling the marsh area atop it. The fill would also buttress the Sandy Point spit and its value as a coastal protection feature.

Remediation Placement Alternatives For Fine-Grained Materials

One of the DMMP recommendations was for the States and the Corps to consider using fine-grained dredged materials, particularly those parent materials dredged for future improvement projects, as remedial cap material for dredged material placement sites and disposal mounds that date from eras prior to the advent of sediment testing requirements. Open water placement in the Sound is a practice that goes back for many decades, and there are sites and mounds within the Sound where materials that would not meet today's testing requirements were likely placed. The DAMOS program could assist in identifying the areas most needing remediation. Partnerships between the Corps and the states could be established to target future placement to those sites to isolate the prior placed materials and assist in the long-term ecological recovery of those sites.

What is Required to Implement these Alternatives

- To implement any alternative beyond the Federal Base Plan for a project will require non-Federal funding.
- Alternatives beyond the base plans for which another Federal authority applies will require non-Federal sponsorship and cost-sharing
- To implement a base plan requiring placement facility construction will require non-Federal sponsorship and cost sharing.
- To implement remediation opportunities in the Sound will require Federal-state partnership.
- To implement any plan involving projects from multiple states will require interstate partnerships.
- Any plans involving Federal participation will likely need the states to engage their representatives to support budgeting and authorization.

***AND NOW A BRIEF PRESENTATION ON THE
DISPOSAL AREA MONITORING SYSTEM
(DAMOS) PROGRAM
BY STEVE WOLF***

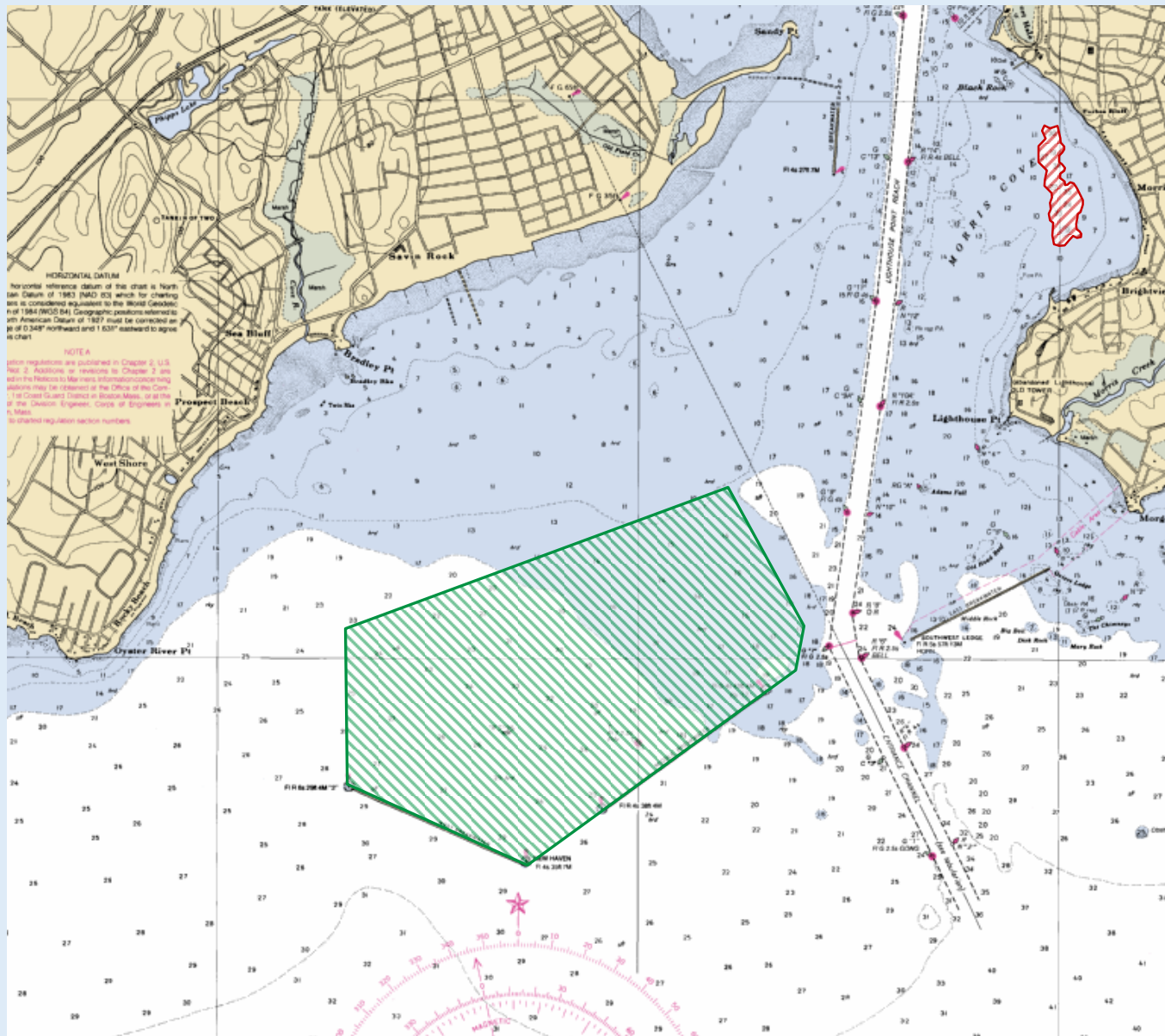
Alternative Placement Sites Identification

New Haven
Breakwaters

Regional CDF Site

1000 Acres

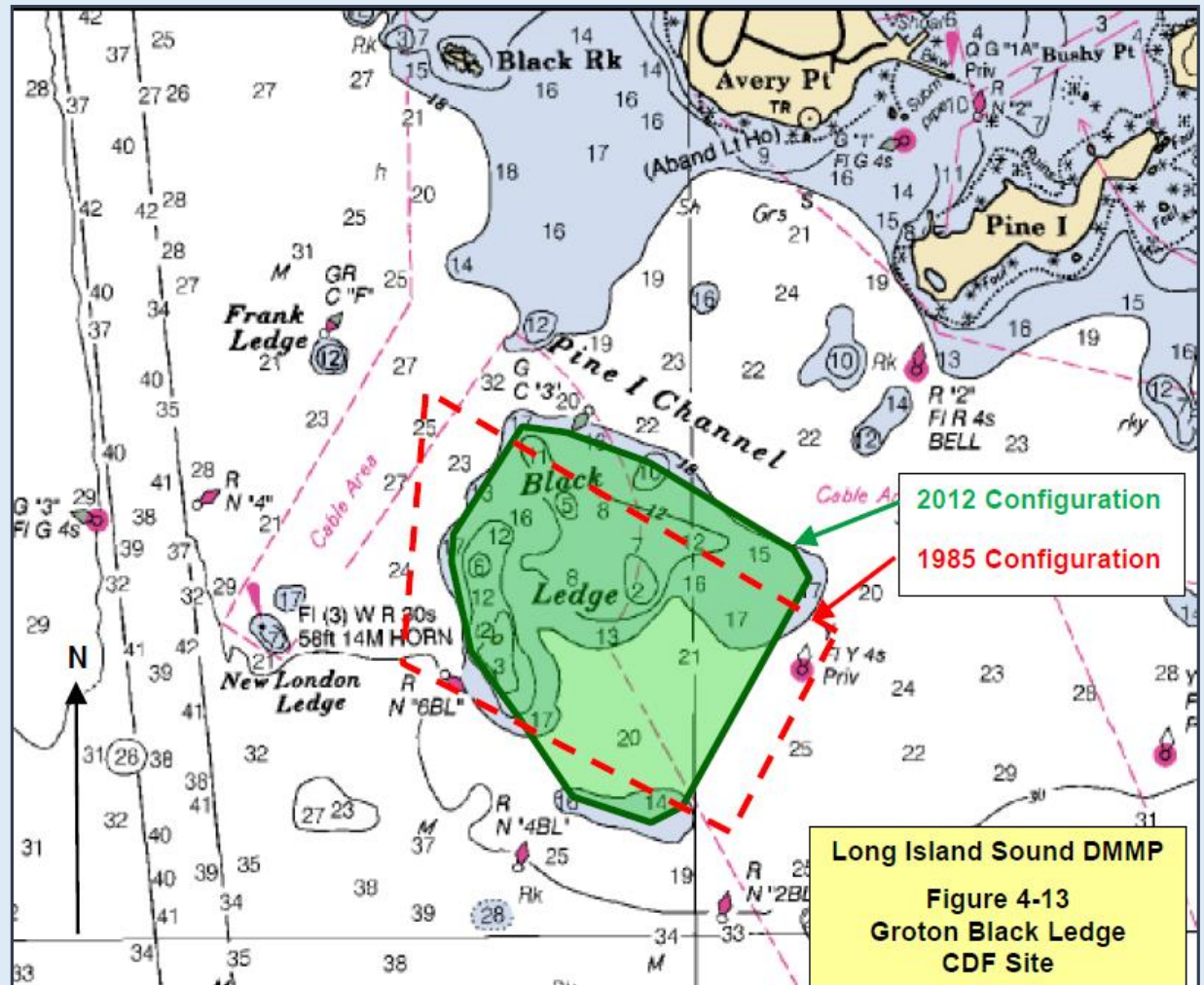
60 MCY Capacity



Alternative Placement Sites Identification

Black Ledge
Groton, CT

Smaller-Scale CDF
7,500,000 CY Capacity



Updated Dredging Needs Summary

Table 4-1 - Summary of All Potential Future Dredging Center Activity in the Long Island Sound Region

Dredging Center	Material Type	2015-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	Total CY
Block Island RI Dredging Center	Suitable Sand	100,000	82,000	43,000	58,000	58,000	43,000	384,000
	Suitable Fine	2,200	0	0	0	0	0	2,200
Fisher's Island NY Dredging Cent.	Suitable Fine	28,300	8,300	16,200	4,100	4,200	4,100	65,200
Fisher's Island Sound and Little Narragansett Bay Dredging Center	Suitable Sand	0	37,500	0	19,900	0	19,900	77,300
	Suitable Fine	148,800	712,400	36,400	36,400	35,500	584,000	1,553,500
New London CT Dredging Center	Suitable Fine	567,900	390,100	1,716,900	95,500	90,300	2,992,800	5,853,500
	Unsuitable	50,000	0	30,900	0	0	0	80,900
Niantic CT Dredging Center	Suitable Sand	83,000	15,000	2,600	12,100	5,000	5,000	122,700
	Suitable Fine	88,200	265,000	2,900	11,600	5,000	5,000	377,700
Connecticut River CT Dredging Center	Suitable Sand	169,800	1,235,500	96,200	1,577,700	76,100	129,300	3,284,600
	Suitable Fine	1,081,000	227,400	365,600	96,200	65,600	699,300	2,535,100
Clinton-Westbrook CT Dredging Center	Suitable Sand	39,300	14,300	35,700	35,700	1,983,700	35,700	2,144,400
	Suitable Fine	190,200	112,400	189,200	215,900	81,700	108,400	897,800
Guilford-Branford CT Dredging Center	Suitable Sand	0	0	6,800	0	6,800	0	13,600
	Suitable Fine	395,300	195,500	112,600	0	251,000	71,500	1,025,900
New Haven CT Dredging Center	Unsuitable	0	0	0	0	418,600	0	418,600
	Suitable Fine	577,600	7,181,800	481,300	993,200	187,300	1,016,200	10,437,400
Housatonic-Milford CT Area Dredging Center	Suitable Sand	833,400	35,700	201,800	15,300	201,800	117,300	1,405,300
	Suitable Fine	80,500	114,900	27,700	58,400	20,700	153,300	455,500
Bridgeport CT Area Dredging Center	Suitable Sand	0	18,400	0	0	0	16,700	35,100
	Suitable Fine	2,658,100	780,100	27,500	27,500	37,500	58,200	3,588,900
	Unsuitable	1,379,800	88,000	0	0	0	0	1,467,800
Norwalk CT Area Dredging Center	Suitable Fine	121,600	443,300	653,400	222,300	37,500	232,800	1,710,900
	Unsuitable	0	20,000	0	20,000	0	20,000	60,000

Updated Dredging Needs Summary

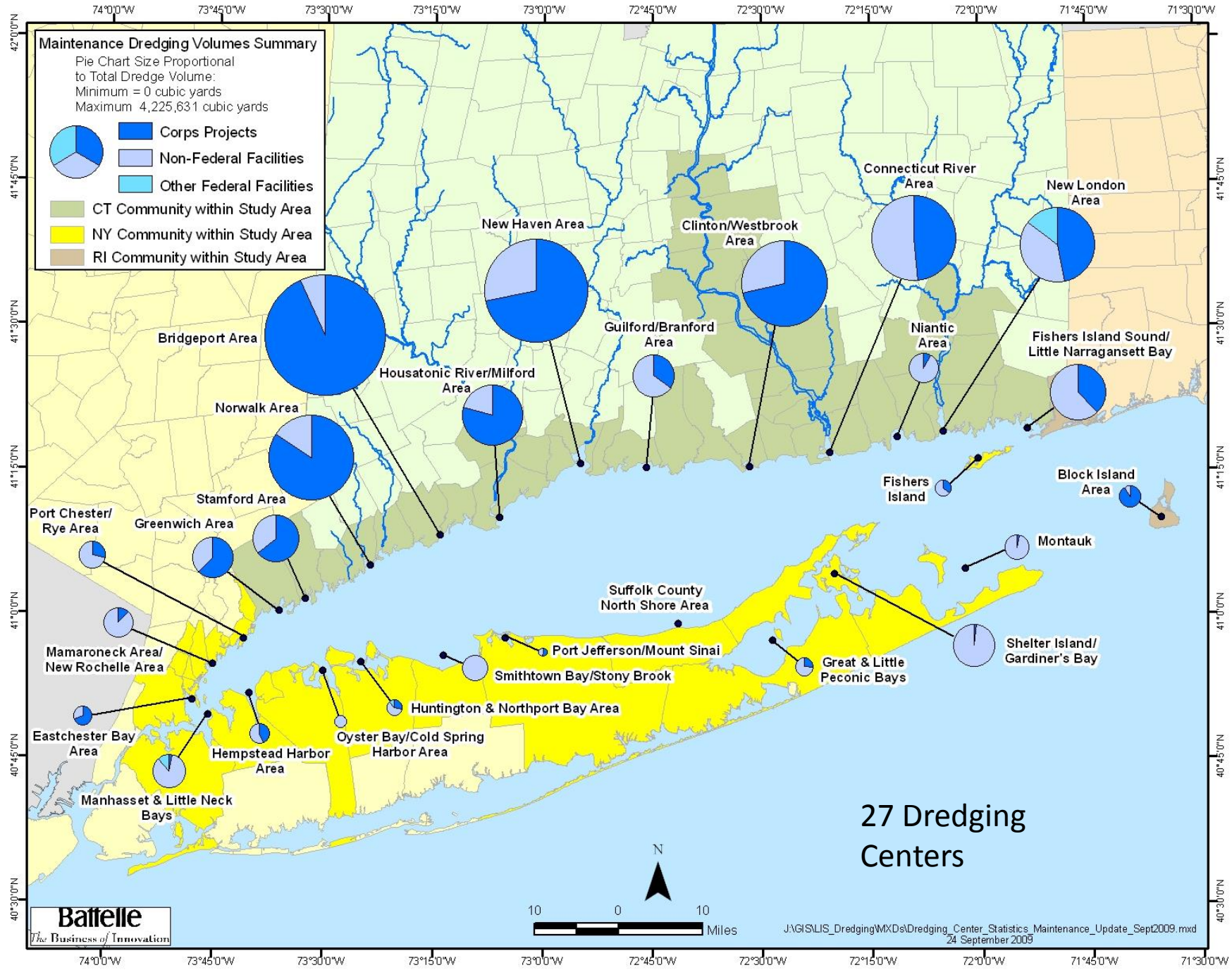
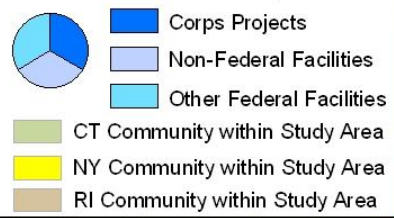
Dredging Center	Material Type	2015-2020	2021-2025	2026-30	2031-35	2036-40	2040-45	Total CY
Stamford CT Area Dredging Center	Suitable Sand	0	34,300	0	0	0	0	34,300
	Suitable Fine	174,600	84,400	20,000	506,000	30,000	30,000	845,000
	Unsuitable	0	0	0	144,600	0	0	144,600
Greenwich CT Area Dredging Center	Suitable Fine	190,900	47,800	19,500	19,400	83,800	5,100	366,500
	Unsuitable	296,400	22,800	7,500	7,400	86,700	5,100	425,900
Port Chester-Rye NY Area Dredging Center	Suitable Fine	147,900	23,000	12,000	13,000	12,000	80,500	288,400
	Unsuitable	199,600	0	0	0	0	166,400	366,000
Mamaroneck-New Rochelle NY	Suitable Fine	141,000	191,900	33,000	98,400	53,000	118,400	635,700
Eastchester Bay NY Area Dredging Center	Suitable Fine	13,800	1,800	7,100	7,200	112,400	900	143,200
	Unsuitable	0	286,300	0	0	0	0	286,300
Little Neck & Manhasset Bays DC	Suitable Fine	128,700	884,600	50,200	50,200	83,100	347,200	1,544,000
Hempstead Harbor NY Area Dredging Center	Suitable Fine	39,300	14,300	196,200	9,300	9,300	9,200	277,600
	Unsuitable	14,300	0	0	19,600	0	19,600	53,500
Oyster Bay - Cold Springs Harbor	Suitable Sand	4,600	10,400	1,600	1,600	4,000	4,000	26,000
	Suitable Fine	6,800	15,500	2,300	2,300	5,900	6,000	39,000
Huntington and Northport Bays NY Dredging Center	Suitable Sand	3,017,200	33,200	20,500	6,600	5,600	53,000	3,136,100
	Suitable Fine	32,800	46,600	36,300	22,400	18,600	57,900	214,600
Smithtown Bay – Stony Brook Harbor NY	Suitable Sand	394,500	105,500	100,000	100,000	103,200	100,100	903,200
	Suitable Fine	69,600	18,600	17,600	17,600	18,200	17,700	159,400
Port Jefferson - Mount Sinai NY	Suitable Sand	41,600	31,800	31,800	31,800	31,700	31,900	200,600
Suffolk County Northeast Shore	Suitable Sand	10,100	10,300	69,100	10,200	10,200	64,700	174,600
Great and Little Peconic Bays NY Dredging Center	Suitable Sand	212,800	211,900	210,600	210,700	213,700	213,600	1,273,200
	Suitable Fine	141,800	141,300	140,400	140,400	155,700	142,400	862,100
Shelter Island - Gardiners Bay NY Dredging Center	Suitable Sand	334,000	295,400	229,100	219,100	147,000	150,200	1,374,900
	Suitable Fine	81,000	73,900	54,800	54,800	36,700	36,800	337,900
Montauk NY Dredging Center	Suitable Sand	164,000	89,200	89,100	89,200	89,100	89,200	609,800
TOTAL ALL DREDGING	All Materials	14,452,300	14,652,400	5,395,400	5,281,600	4,876,200	8,062,400	52,720,300
TOTAL SUITABLE SAND		5,404,300	2,260,400	1,137,900	2,387,900	2,935,900	1,073,600	15,199,700
TOTAL SUITABLE FINE		7,107,900	11,974,900	4,219,100	2,702,100	1,435,000	6,777,700	34,217,000

Implementation of the Long Island Sound Dredged Material Management Plan



Maintenance Dredging Volumes Summary

Pie Chart Size Proportional to Total Dredge Volume:
 Minimum = 0 cubic yards
 Maximum = 4,225,631 cubic yards



27 Dredging Centers

