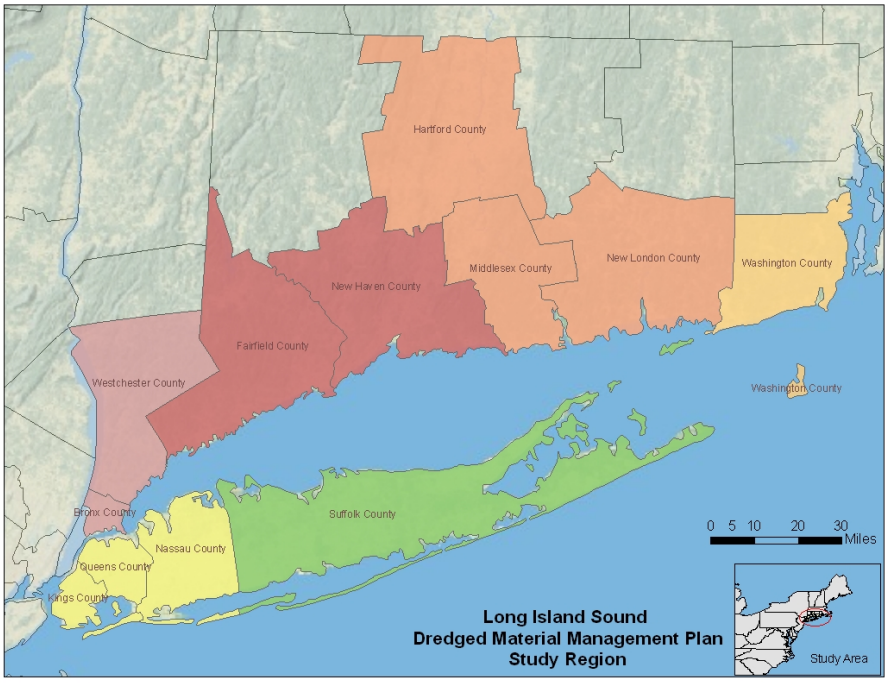
LONG ISLAND SOUND DREDGED MATERIAL MANAGEMENT PLAN: ECONOMIC DATA UPDATE

Contract No. DACW912WJ-09-D-0001-0015



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June 2010

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EXECUTIVE SUMMARY

This report has been prepared to support development of the Long Island Sound Dredged Material Management Plan (LIS DMMP). It utilizes input-output modeling to characterize the economic importance of navigation-dependent activities in Long Island Sound (LIS), and to estimate the regional economic impacts of the DMMP's No Action Alternative: i.e., no open-water disposal. The analysis models these impacts over a 20-year period, assuming a complete cessation in dredging activity during that time. The results of the analysis are summarized below.

The contribution of navigation-dependent activity to economic output in the LIS region is approximately $9.4 billion per year (see Table ES-1).[1] Navigation-dependent activity is estimated to contribute $5.5 billion per year to the region's gross state product (GSP), providing 55,720 jobs.[2] In addition, navigation-dependent activity accounts for an estimated $1.6 billion per year in federal and state tax revenues.[3] The contribution of navigation-dependent activity to GSP within the LIS region represents approximately 0.93 percent of the 12-county study area's overall contribution to GSP, or 0.38 percent of total 2007 GSP for Connecticut, New York and Rhode Island.[4]

The navigation-dependent economic activities evaluated in this report are marine transportation (including commercial shipping, scenic water transportation, and ship-building activities), commercial fishing, recreational boating, ferry-dependent tourism, and the activity associated with the U.S. Navy Submarine Base in New London, Connecticut. As shown in Figure ES-1, marine transportation provides the largest contribution to GSP, accounting for 59 percent of the total for all activities analyzed. Recreational boating accounts for an additional 22 percent, while the submarine base accounts for 17 percent. Commercial fishing and ferry-dependent tourism each account for approximately one percent of the contribution of navigation-dependent activities to GSP.

[1] Output is the value of industry production. See Section 1.1 for additional detail.
[2] GSP for a state is the sum of the value added for all industries in the state, or for this analysis, the LIS region. Value added is defined as the gross output of an industry less its intermediate inputs; therefore GSP is a subset of gross state output.
[3] The tax impacts reported here include all payments to government, and represent the sum of direct, indirect and induced taxes paid by employees, businesses, and households. As such, the tax impact measure overlaps somewhat with other measures of economic impact, (e.g., value added and output include payments made by industries to payroll taxes) and should not be added to these measures.
[4] U.S. Bureau of Economic Analysis, accessed at http://www.bea.gov/regional/gsp/action.cfm on May 20, 2010. BEA reports the following GSP figures for 2007 (billions of current dollars): Rhode Island, $46.7; Connecticut, $212.3; New York, $1,105.0. Input-output analysis using IMPLAN Version 3.0 estimates GSP within the 12-county study area to be $552.9 billion, approximately 41 percent of the three-state total.

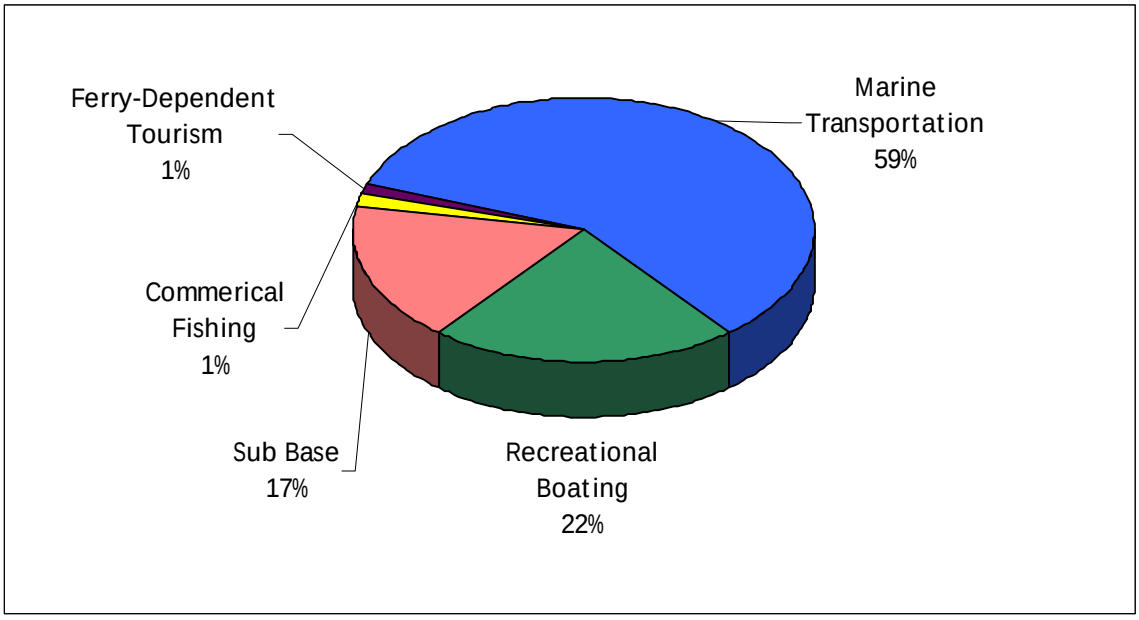

Figure ES-1. Relative Contribution of Navigation-Dependent Activities to Gross State Product within the Study Area

Table ES-1. Regional Economic Significance of Navigation-Dependent Activities (2009 dollars)[1]

Region[2]	Annual Output (millions)	GSP (millions)	Employment[3]	Annual Tax Revenues (millions)[4]
Rhode Island	$71.3	$26.1	487	$7.6
Eastern Connecticut	$4,278.4	$2,655.8	29,730	$688.4
Western Connecticut	$1,951.7	$1,130.1	9,681	$336.3
New York Mainland	$126.5	$80.7	1,018	$25.7
Western Long Island	$1,063.0	$564.5	4,557	$169.7
Eastern Long Island	$1,397.6	$723.5	8,518	$224.9
All Long Island Sound[5]	$9,381.9	$5,530.0	55,720	$1,592.2

1. All figures reported represent the sum of the direct (i.e., output of navigation-dependent industries themselves), indirect (i.e., output of other industries that supply goods and services to those industries), and induced impacts (i.e., changes in household consumption due to employment and income changes from direct and indirect effects) for each category.
2. Regions are defined as follows: Rhode Island--Washington County; Eastern Connecticut--Hartford, Middlesex, and New London Counties; Western Connecticut--Fairfield and New Haven Counties; New York Mainland--Westchester and Bronx Counties; Western Long Island--Kings, Queens, and Nassau Counties; and Eastern Long Island--Suffolk County. Note that Queens and Kings counties are included only for purposes of measuring indirect and induced effects. Navigation-dependent activity on waterways in these counties is not considered when measuring direct effects. Similarly, navigation-dependent activity on waterways in Washington County outside of Westerly and Block Island is not considered when measuring direct effects.
3. Employment is defined by the Bureau of Labor Statistics (BLS) as "the total number of persons on establishment payrolls employed full or part time who received pay for any part of the pay period that includes the 12th day of the month" (Accessed at http://www.bls.gov/ces/cescope.htm#3). Temporary and intermittent employees are included. Data exclude proprietors, those who are self-employed, unpaid family or volunteer workers, farm workers, and domestic workers. Because fishing employment is likely to be underestimated in BLS data, we utilize an alternative method (combining data on ex-vessel revenues in the commercial fishing sector with an estimate of output per worker) to estimate employment in this industry. Nonetheless, this estimate may be skewed, and employment, payroll, and output for the commercial fishing sector may be understated.
4. The tax impacts reported here include all payments to government, and represent the sum of direct, indirect and induced taxes paid by employees, businesses, and households. As such, the tax impact measure overlaps somewhat with other measures of economic impact (e.g., value added and output include payments made by industries to payroll taxes) and should not be added to these measures.
5. Note that due to leakage effects (i.e., economic activity across study regions that is not captured in the models run for each region but is captured in the larger LIS area model), the sum of the values reported for the six sub-regions is less than the activity reported for the study area as a whole. The difference varies from 3 to 9 percent, depending on the output measure.

As noted above, the LIS DMMP's No Action Alternative assumes the cessation of all dredging activity in LIS. The impacts of this alternative would accumulate over time, as shoaling continues and vessels lose access to harbors and waterways. As shown in Figure ES-2, impacts on marine transportation and recreational boating would account for the greatest loss in economic activity, together representing 93 percent of the estimated reduction in GSP. In addition, ferry-dependent tourism would be expected to bear a somewhat disproportionate impact, accounting for four percent of the estimated loss in annual GSP for the study region. Other impacts not quantified in this analysis include increased costs related to tidal delays for cargo traffic and an increased likelihood of vessel collisions and oil spills. In addition, loss of access to ports could cause commercial and recreational fishermen to abandon fishing altogether, which would have negative social and cultural impacts on the communities that rely on such activity.

As shown in Table ES-2, losses in annual GSP in the 20th year of the No Action Alternative are anticipated to be approximately $853 million, or approximately 15 percent of the current regional GSP from navigation-dependent economic activities.

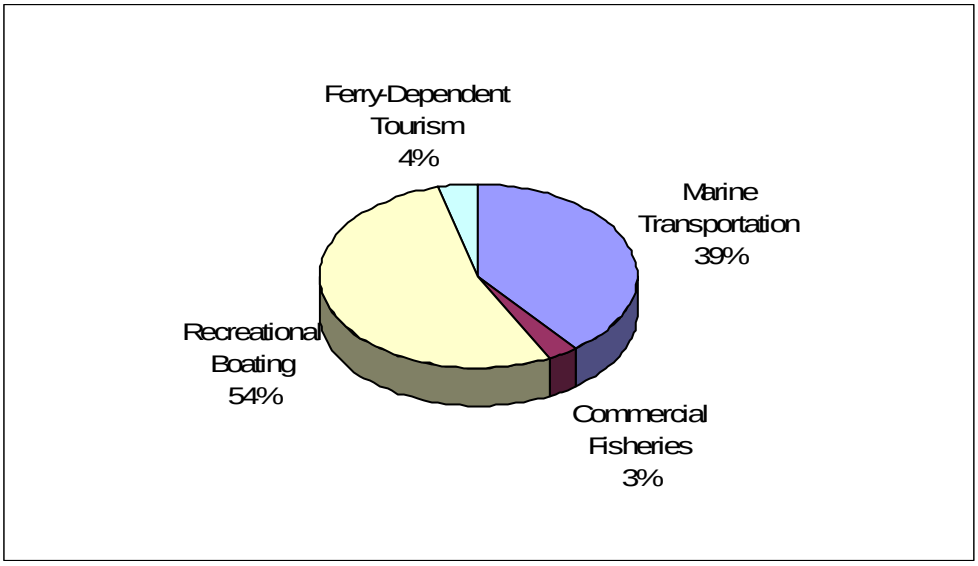

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Figure ES-2. Changes in Gross State Product in the 20th Year of Not Dredging: Distribution of Impacts by Economic Activity

Table ES-2. Regional Impacts in the 20th Year of the No Action Alternative (2009 dollars)[1]

Region[2]	Annual Output (millions)	Annual GSP (millions)	Annual Employment[3]	Annual Tax Revenues (millions)[4]
Rhode Island	-$41.4	-$12.5	-215	-$3.5
Eastern Connecticut	-$386.8	-$237.8	-3,525	-$71.9
Western Connecticut	-$338.1	-$209.8	-2,554	-$65.1
New York Mainland	-$57.9	-$36.9	-461	-$11.7
Western Long Island	-$450.4	-$232.6	-1,644	-$68.7
Eastern Long Island	-$108.6	-$68.5	-1,284	-$22.6
All Long Island Sound[5]	-$1,467.8	-$853.0	-9,655	-$262.5

1. All figures reported represent the sum of the direct (i.e., output of navigation-dependent industries themselves), indirect (i.e., output of other industries that supply goods and services to those industries), and induced impacts (i.e., changes in household consumption due to employment and income changes from direct and indirect effects) for each category.
2. Regions are defined as follows: Rhode Island--Washington County; Eastern Connecticut--Hartford, Middlesex, and New London Counties; Western Connecticut--Fairfield and New Haven Counties; New York Mainland--Westchester and Bronx Counties; Western Long Island--Kings, Queens, and Nassau Counties; and Eastern Long Island--Suffolk County. Note that Queens and Kings counties are included only for purposes of measuring indirect and induced effects. Navigation-dependent activity on waterways in these counties is not considered when measuring direct effects. Similarly, waterways in Washington County outside of Westerly and Block Island is not considered when measuring direct effects.
3. Employment is defined by the Bureau of Labor Statistics as "the total number of persons on establishment payrolls employed full or part time who received pay for any part of the pay period that includes the 12th day of the month" (Accessed at http://www.bls.gov/ces/cescope.htm#3). Temporary and intermittent employees are included. Data exclude proprietors, those who are self-employed, unpaid family or volunteer workers, farm workers, and domestic workers. Because fishing employment is likely to be underestimated in BLS data, we utilize an alternative method (combining data on ex-vessel revenues in the commercial fishing sector with an estimate of output per worker) to estimate employment in this industry. Nonetheless, this estimate may be skewed, and employment, payroll, and output for the commercial fishing sector may be understated.
4. The tax impacts include all payments to government, and represent the sum of direct, indirect and induced taxes paid by employees, businesses, and households. As such, tax impact measurements somewhat overlap with other measures and should not be summed (e.g., value added and output include payments made by industries to payroll taxes).
5. Note that due to leakage effects (i.e., economic activity across study regions that is not captured in the models run for each region but is captured in the larger LIS area model), the sum of the output, GSP, and annual tax revenue values reported for the six sub-regions is less than the activity reported for the study area as a whole. The difference in measured impacts of the No Action alternative vary from 5 to 8 percent, depending on the output measure. In the case of employment, however, the figures reported for the six regions sum to a value greater than that indicated for the LIS study area. This anomaly may result from independent specification of the regional purchase coefficients within each IMPLAN model (i.e., regional purchase coefficients for one or more sub-regions that are different than the regional purchase coefficient for the study area as a whole). In addition, the output per worker that IMPLAN specifies may be lower in some sub-regions, causing the model to estimate greater relative employment impacts within these regions than for the study area as a whole.

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1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

This report has been prepared to support development of the Long Island Sound Dredged Material Management Plan (LIS DMMP). Its purpose is to provide baseline information on the regional economic contribution of navigation-dependent activities in LIS, and to characterize the potential impacts of the No Action Alternative on these activities. The activities evaluated include marine transportation, commercial fishing, recreational boating, ferry-dependent tourism, and the activity associated with the U.S. Navy Submarine Base in New London, Connecticut. The analysis estimates the impact of these activities with respect to regional economic output, gross state product (GSP), employment, and tax revenues. These measures are defined as follows:

Output — Output represents the value of industry production. In the input-output model employed in this analysis (IMPLAN), outputs are annual production estimates for the year of the dataset (2007 in this case) and are in producer prices. For manufacturers, output is sales plus/minus the change in inventory. For service sectors, production is equal to sales. For retail and wholesale trades, output is equal to the gross margin and not gross sales.[5]

Gross State Product — GSP for a state is the sum of the value added for all industries in the state, or for this analysis, the LIS region. Value added is defined as the gross output of an industry less its intermediate inputs; therefore GSP is a subset of gross state output.[6] GSP is also the state counterpart to U.S. gross domestic product (GDP), the Bureau of Economic Analysis (BEA)'s "featured and most comprehensive measure" of the U.S. economy. Thus, of the four impact measures reported in this analysis, the contribution of navigation-dependent activity to GSP within the study area may be the most useful.

Employment — Full or part-time employment. Employment is defined by the Bureau of Labor Statistics as "the total number of persons on establishment payrolls employed full or part time who received pay for any part of the pay period that includes the 12th day of the month." Temporary and intermittent employees are included.[7]

Tax Revenues — All payments to government. Total tax revenues represent the sum of direct, indirect and induced taxes paid by employees, businesses, and households on the Federal, state, and local level. As such, tax impact

[5] IMPLAN glossary, May 2010. Accessed at http://implan.com.
[6] The input-output model employed in this analysis (IMPLAN) measures value added as the sum of employee compensation, proprieters income, other property income, and indirect business tax. IMPLANPro, User's Guide, Analysis Guide, and Data Guide, 2004; U.S. Bureau of Economic Analysis, accessed at www.bea.gov on November 3, 2009.
[7] Bureau of Labor Statistics, Current Employment Statistics. Accessed at http://www.bls.gov/ces/cescope.htm#3).

measurements somewhat overlap with other measures and should not be added with them.

Impacts are presented for the study area as a whole and for each of six sub-regions within the study area.

1.2 BACKGROUND

In June 2005, the U.S. Environmental Protection Agency (EPA) designated disposal sites in Long Island Sound (40 CFR 228.15(b)(4)) which initiated the development of a regional Dredged Material Management Plan (DMMP). Subsequent to the publication of the Designation Rule, EPA, the U.S. Army Corps of Engineers (USACE), and appropriate federal and state resource agencies agreed to partner in the development of the LIS DMMP. The LIS DMMP will evaluate all potential dredged material management alternatives, including open-water placement, beneficial use, upland placement, and innovative treatment technologies. The plan's assessment of these options will assist dredging proponents in developing alternatives analyses for dredging projects in the region.

As part of the LIS DMMP process, the USACE is conducting background studies to formulate alternatives for the management of dredged material anticipated to be generated from the present through a period of approximately twenty years from completion of the DMMP. Initial economic data collection and analyses were accomplished as part of the EPA 2004 Final Site Designation Environmental Impact Statement (EIS). This report serves to update that work, which was completed in 2001.

1.3 STUDY AREA

The study area for this project is defined as coastal and navigable tributary waters from Montauk Point, New York west across northern Long Island to the East River at Throgs Neck, then east through New York and Connecticut to the southern coast of Rhode Island at Westerly, and south across to Montauk Point. The area includes all navigable rivers, harbors and coastal waters on LIS proper in Connecticut and New York east of Throgs Neck to a line drawn from Westerly, RI south to Montauk Point. It also includes the waters of the Peconic Bay and Gardiners Bay shorelines in New York, the Fishers Island Sound shores of Connecticut, New York and Rhode Island, and the Block Island Sound shores of New York. The study area excludes New York Harbor, but does include USACE New York District projects east of Throgs Neck. The Connecticut River below the Hartford navigation project is included, as is the Thames River to Norwich, the Housatonic River to Derby, and the Peconic River to Riverhead, NY. All harbors and all port or navigation dependent facilities in this area, whether federal or not, are included in the study area. Figure 1 presents a map of the study area. Table 1 provides additional detail on the area's six sub-regions and associated waterways, as defined in this study.

1.4 OUTLINE OF REPORT

The remainder of the report is organized as follows:

- Section 2.0 develops estimates of the regional economic contribution of navigation dependent industries in LIS;
- Section 3.0 presents the estimated impacts of the No Action Alternative; and
- Appendices A, B and C provide additional detail regarding the development of the shoaling analysis and waterway-specific data.

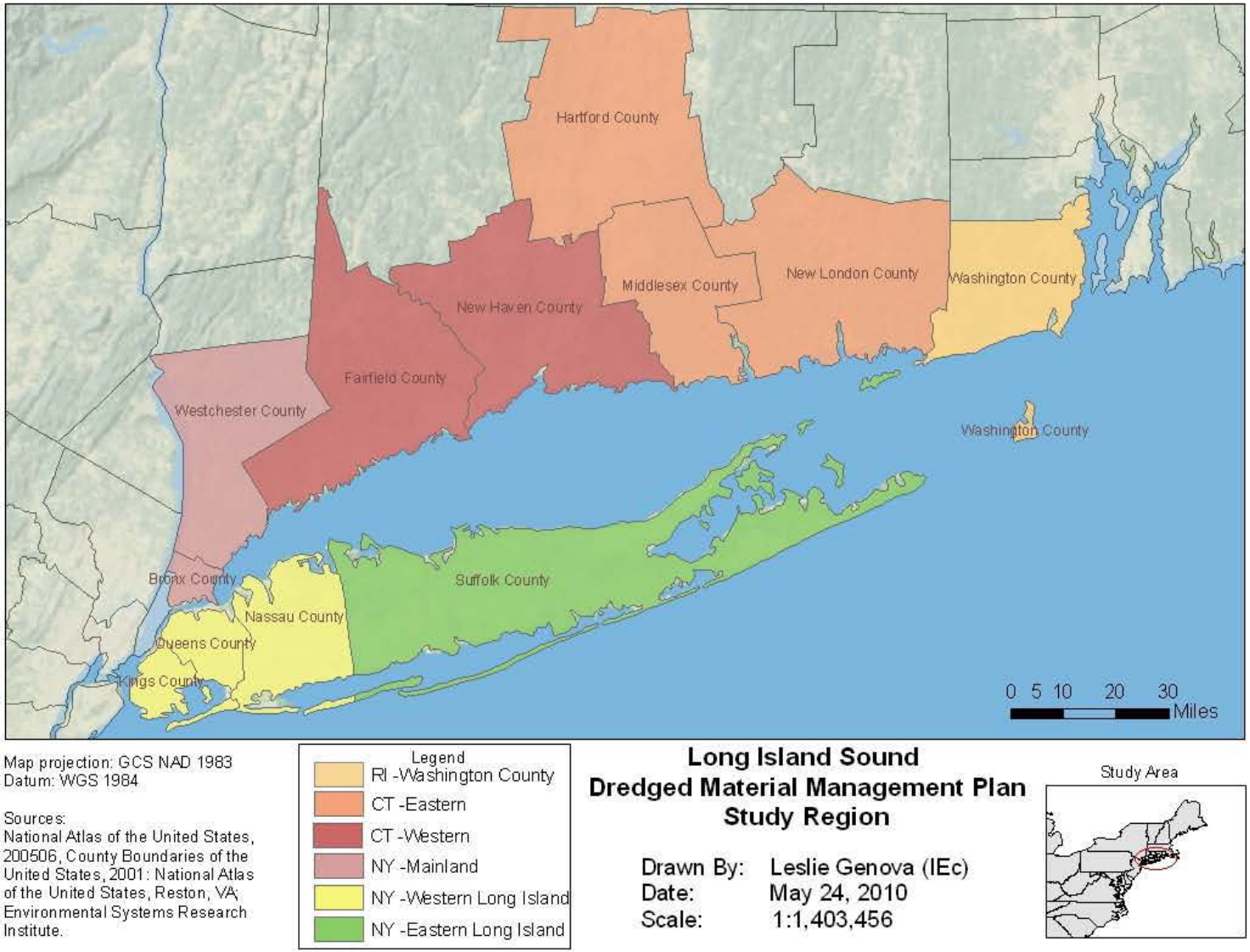


Figure 1. Map of the Study Area

Table 1. Definition of the Six Study Regions

State	Region	County	Waterway
Rhode Island	Rhode Island	Washington[1]	Harbor of Refuge Great Salt Pond Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[2]
Connecticut	Eastern Connecticut	New London	Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[2] Mystic River and Harbor Stonington Harbor New London Harbor Thames River Niantic Bay & Harbor Connecticut River Below Hartford[3]
		Hartford	Wethersfield Cove Connecticut River Below Hartford[3]
		Middlesex	Duck Island Harbor Patchogue River Eightmile River and Hamburg Cove Clinton Harbor North Cove, Old Saybrook Salmon River Cove Essex Cove Harbor Clinton/Westbrook Area[4] Connecticut River Below Hartford[3]
	Western Connecticut	New Haven	Branford Harbor Guilford Harbor Stony Creek Guilford/Branford Area[4] Housatonic River Milford Harbor New Haven Harbor Mill River Quinnipiac River West River New Haven Area[4]
		Fairfield	Bridgeport Harbor Johnsons Creek Poquonnock River Southport Harbor Yellowmill Channel Black Rock Harbor
			Greenwich Harbor Mianus River and Cos Cob Harbor Fivemile River Harbor Norwalk Harbor Westport Harbor & Saugatuck River

State	Region	County	Waterway
			Wilson Point Harbor
			Stamford Harbor
			Westcott Cove
New York	Mainland New York	Westchester	Echo Bay
			Mamaroneck Harbor
			New Rochelle Harbor
			Milton Harbor
			Port Chester Creek and Harbor
			Port Chester/Rye Area[4]
		Bronx	Eastchester Bay Area[4]
	Western Long Island	Nassau	Glen Cove
			Hempstead Harbor
			Manhasset Bay
			Oyster Bay/Cold Spring Harbor Area[4]
			Little Neck Bay
		Queens[5]	NA
		Kings[5]	NA
	Eastern Long Island	Suffolk	Hay (West) Harbor
			Mattituck Harbor
			Peconic River
			Great & Little Peconic Bay Area[4]
			Huntington & Northport Bay Area[4]
			Lake Montauk
			Port Jefferson Harbor
			Port Jefferson/Mount Sinai
			Smithtown Bay/Stony Brook
			Shelter Island/Gardner Bay Area[4]
			Greenport Harbor

1. Only Westerly and Block Island (New Shoreham) waterways are included when measuring direct effects in the Rhode Island region.
2. The Pawcatuck River, Little Narragansett Bay & Watch Hill Cove waterway lies between New London and Washington Counties, and hence is included in both counties.
3. The Connecticut River below Hartford intersects Hartford, Middlesex, and New London counties and hence is included in all three counties.
4. Areas examined that are outside of other listed waterways but which contain active marine facilities.
5. Queens and Kings counties are only included in the study area only for purposed of measuring indirect and induced effects. Navigation-dependent waterways in these counties is not considered when measuring direct effects.

2.0 REGIONAL ECONOMIC SIGNIFICANCE OF NAVIGATION-DEPENDENT ACTIVITIES

This section develops estimates of the regional economic significance of navigation-dependent activities in the LIS area. After outlining the general approach, the chapter presents the inputs to the regional economic model and results from the model.

2.1 APPROACH

Analysis of the regional economic significance of navigation-dependent activities in the LIS area entails three steps: (1) identifying categories of navigation-dependent economic activity; (2) gathering the most recent data available on output, employment, and payroll in associated industries; and (3) conducting an input-output analysis to estimate the regional economic contribution of these industries. These steps are further outlined below.

(1) Identify navigation-dependent activities in the study area. The analysis focuses on the following activities.

- *Marine Transportation (including deep-draft navigation).* The marine transportation industry in the study area (other than commercial fishing) is primarily comprised of commercial shipping activities (cargo vessels), but also includes ship building activities, as well as scenic water transportation and sightseeing (including chartered fishing services). Section 2.3.2 lists the North American Industry Classification System (NAICS) codes included in this sector.
- *Commercial Fishing and Seafood Industries.* The commercial fishing and seafood industry comprises fishing supplies and services, commercial fishing (including shellfishing), seafood processing and wholesaling, and retail and food service seafood sales.
- *Recreational Boating.* Recreational boating activity encompasses the use of outboard and inboard powered craft, stern-driven boats, powered and unpowered sailboats, personal watercraft, canoes, and kayaks.
- *Ferry-dependent tourism.* Ferries provide direct access from Connecticut to Long Island, including ferries from the mainland to Port Jefferson and Orient Point, New York. In addition, several islands in the study area are primarily accessed via ferry - Block Island and Shelter Island, in particular. Tourism expenditures by ferry passengers, in addition to ferry fares, contribute to the regional economy. The analysis of ferry-dependent tourism focuses on the impact of these expenditures in the study area.
- *Naval Submarine Base New London.* The most significant navigation-dependent entity not included in the above categories is the Naval Submarine Base New London in Eastern Connecticut. For the purposes of this analysis, it is categorized separately.

(2) Gather baseline data on output, employment, and payroll for associated industries within the study area. The analysis relies on established data sources to characterize current revenues, employment, and expenditures for navigation-

dependent industries, both within the study area as a whole and within each of its six regions. Section 2.2 provides additional detail on the data employed.

(3) Develop regional economic impact estimates for the LIS area and six study regions. To arrive at estimates of the economic contribution of navigation-dependent activities within the study area, baseline data on economic activity is analyzed using IMPLAN, a regional economic input-output model. Section 2.2 provides additional detail on this aspect of the analysis.

The process described above provides estimates of output, GSP (value added), employment, and tax revenue associated with each activity in each region within the study area.

2.2 INPUT-OUTPUT ANALYSIS

2.2.1 Background on the IMPLAN Model

As noted above, the analysis uses IMPLAN[8] to estimate the total regional economic effects of navigation-dependent activities in the study area. IMPLAN is commonly used by state and federal agencies for policy planning and evaluation purposes. The model draws upon data from several federal and state agencies, including the Bureau of Economic Analysis and the Bureau of Labor Statistics. To group related industries into sectors, IMPLAN utilizes the categories defined by the U.S. Office of Management and Budget's North American Industry Classification System (NAICS). IMPLAN translates initial changes in expenditures into changes in demand for inputs by affected industries. These effects can be described as direct, indirect, or induced, depending on the nature of the change.

- **Direct effects** represent changes in output[9] attributable to a change in demand or a supply shock. These are specified initially by the modeler (e.g., the change in recreation expenditures on goods and services, by industry sector).
- **Indirect effects** are changes in the output of industries that supply goods and services to those that are directly affected by the initial change in expenditures.
- **Induced effects** reflect changes in household consumption arising from changes in employment and associated income (which in turn are the result of direct and indirect effects).

Direct, indirect, and induced effects are calculated for all industries and are aggregated to determine the regional economic contribution of navigation-dependent activity in the LIS study area.

[8] The IMPLAN model is owned and maintained by the Minnesota IMPLAN Group, Inc. (MIG). Information in this section is compiled in part from: *IMPLAN Professional, User Guide, Analysis Guide, Data Guide, and Impact Analysis Software,* Minnesota IMPLAN Group, Inc., 1999-2004.

[9] Output is the value of all goods and services produced.

2.2.2 Modeling Parameters and Inputs

For this analysis, seven IMPLAN models were created: one for each study region and one for the entire LIS area. Each model was run separately. Note that the sum of the results for the six study regions is less than the results for the entire LIS area. This difference is attributable to "leakage" from the study region models (i.e., economic activity across study regions that is not captured in the regional models but is captured in the larger LIS area model). In general, the smaller the study area, the greater the leakage.

The analysis utilized IMPLAN version 3.0, with 2007 data packages for New York, Connecticut, and Rhode Island. This version of the data and model classifies all industries into 440 IMPLAN sectors, which represent aggregations of NAICS codes. This analysis utilized Social Account Matrix, or "Type SAM," multipliers (multipliers that take into account social accounts, or non-industry transactions such as payments made between households and households, and households and governments) to estimate induced economic impacts.[10] The analysis utilized a combination of inputs to the model. These are summarized in Table 2.

Table 2. Summary of IMPLAN Inputs by Industry Sector

Industry Sector	Model Input
Marine Transportation	Employment
Commercial Fishing	Ex-vessel value of fish landed (industry production value)
Recreational boating	Expenditures, distributed to affected industries
Ferry-dependent tourism	Expenditures, distributed to affected industries
Naval Submarine Base	Payroll/Output

Section 2.3 provides additional detail on the data used as inputs to the model. Several other modeling details are summarized below:

- To assure consistency with the IMPLAN dataset, monetary inputs were adjusted to 2007 dollars, as necessary, using the Bureau of Economic Analysis Implicit Price Deflator for GDP.[11] Model outputs were then inflated to 2009 dollars.
- Industries were assigned to IMPLAN sectors using schemes recommended by the developers of IMPLAN or precedents established in similar studies.[12] Additional

[10] "Type SAM" multipliers account for direct, indirect, and induced effects, where the induced effect is based on information in the social account matrix within IMPLAN. This relationship accounts for social security and income tax leakage, institution savings, and commuting. It also accounts for inter-institutional transfers.

[11] Bureau of Economic Analysis, National Income and Product Accounts Table, Table 1.1.9. Implicit Price Deflators for Gross Domestic Product, Last Revised on October 29, 2009, accessed at http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=13&Freq=Qtr&FirstYear=2007&LastYear=2009 on November 3, 2009.

[12] In particular, see: Donahue Institute. 2006. *An Assessment of the Coastal and Marine Economies of Massachusetts*. Massachusetts Office of Coastal Zone Management; Connelly, N.A., T.L. Brown, and D.L. Kay. 2004. *Recreational Boating Expenditures in 2003 in New York State and Their Economic Impacts*. Prepared for New York Sea Grant, a joint program of the State University of New York and Cornell University.

detail on the mapping of NAICS codes to IMPLAN codes is provided in Section 2.3.

- The IMPLAN model utilizes producer prices. Thus, in cases where expenditures by consumers on commodities serve as input (e.g., recreational boating activities), "margins" representing the difference between producer and consumer prices were applied. By applying margins to commodity purchases (e.g. boat purchases), the model assigns expenditures to the appropriate sector.

2.2.3 Limitations to IMPLAN

There are two important caveats relevant to the interpretation of IMPLAN model estimates, both generally and within the context of this analysis. The first is that the model is static in nature and measures only those effects resulting from a specific policy change (or the functional equivalent specified by the modeler) at one point in time. Thus, IMPLAN does not account for subsequent adjustments that may occur, such as the re-employment of workers displaced by the original policy change. In this analysis, this caveat implies that the long-run net output and employment effects resulting from cessation or delay of dredging activities in LIS would be smaller than the model suggests.

A second caveat to the IMPLAN analysis relates to the underlying data. The IMPLAN analysis relies upon input/output relationships derived from 2007 data, the most recent data available at the time of this analysis. The results do not reflect changes in the regional economy that may have occurred since 2007. The magnitude or nature of any such changes is unknown.

2.3 MODEL INPUTS

2.3.1 Introduction

This section presents the specific inputs for each study region and economic sector. As described above, the inputs vary across sectors.

2.3.2 Marine Transportation

2.3.2.1 Approach and Data Sources

The analysis of the marine transportation sector uses 2008 employment and employee compensation data from the U.S. Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages program (QCEW).[13] The QCEW functions as a "near census" of employment and wage data by NAICS code at the national, state, and county levels.[14] This source covers about 90 percent of employment in the United States. It excludes farm employment, the military, railroads, and self-employment. The QCEW reports

[13] U.S. Department of Labor, Bureau of Labor Statistics. Quarterly Census of Employment and Wages. Accessed at http://www.bls.gov/cew/#databases on October 20, 2009.
[14] The data fall short of a full census due to disclosure restrictions designed to protect the identity of employers who participate in the census. U.S. Department of Labor, Bureau of Labor Statistics. Quarterly Census of Employment and Wages Overview. Accessed at http://www.bls.gov/cew/cewover.htm on November 9, 2009.

employment by place of work, not by place of residence. For this analysis, industries that comprise the marine transportation sector are identified by referencing available studies of marine economies, including the National Ocean Economics Program (NOEP)'s "State of the U.S. Ocean and Ocean Economies"(2009), the University of Massachusetts Donahue Institute Report, "An Assessment of the Coastal and Marine Economies of Massachusetts" (2006), and the previous report on the Economic Significance of Navigation-Dependent Industries conducted for the USACE (2001).[15] BLS data were downloaded from an online module for each NAICS code considered to comprise the marine transportation sector.

While most QCEW data were available for 2008 (the most recent complete year), BLS suppresses some figures due to disclosure restrictions designed to protect the identity of employers who participate in the census. For the LIS study area, data for target industries were sometimes not available at the county level. In particular, figures from Electric Boat, a division of General Dynamics, one of the largest employers in the State of Connecticut, were excluded from reported county data due to the small number of reporting ship-building entities in the sector. In this case, total employment estimates for Electric Boat were acquired from D&B Dun's Market Identifiers (File 516 Database), and verified by contacting Electric Boat directly.[16] For other cases where BLS does not report data, the analysis employs an extrapolation technique to obtain county-level values. The extrapolation is based on the ratio of values reported for target five- and six-digit NAICS codes and parent (fewer digit) industry codes at the statewide level, applying these ratios to available data at the county level.

A large volume of marine transportation activity occurs on the south side (i.e., the Atlantic Ocean side) of Long Island or is associated with ports that are outside the study area. Thus, the aggregated employment and payroll data for counties in New York include marine transportation activity that occurs outside LIS. To account for this, the analysis weights port-specific data based on the number of vessel landings to apportion employment and payroll to ports within and outside the study area.[17] This adjustment reduces the likelihood of over-estimating the economic importance of marine transportation activities within LIS. A similar adjustment was made to remove marine transportation activity that occurs in parts of Washington County, RI, that are outside the study area.

[15] National Ocean Economics Program. Accessed at http://www.oceaneconomics.org/NationalReport/ on October 5, 2009; Donahue Institute. 2006. *An Assessment of the Coastal and Marine Economies of Massachusetts*. Massachusetts Office of Coastal Zone Management; ENSR International, LIS, Dredged Material Disposal EIS: Economic Significance of Navigation-Dependent Industries, conducted for the Army Corps, 2001.
[16] "Company Profile: Electric Boat Corp." Dun and Bradstreet. D&B Dun's Market Identifiers (File 516 Database), 2010. Verified through personal communication with Electric Boat on March 18, 2010.
[17] Data on vessel landings by port were obtained from a USACE Source 2007 Waterborne Commerce of the United States.

2.3.2.2 NAICS Codes Included

The marine transportation sector within the study area is primarily comprised of commercial shipping (cargo vessels) and passenger ferry vessels, scenic water transportation and sightseeing, chartered fishing activities, and tugboat operations. The analysis also includes ship building and repairing as part of the marine transportation sector. Table 3 provides NAICS definitions for the industries included in this sector. Table 4 presents data on total employment for each NAICS code within the six regions.

Table 3. NAICS Codes and Descriptions for Industries within the Marine Transportation Sector

NAICS Code	Industry	NAICS Description
483	Water Transportation	Industries in the Water Transportation subsector provide water transportation of passengers and cargo using watercraft, such as ships, barges, and boats. The subsector is composed of two industry groups: (1) one for deep sea, coastal, and Great Lakes transportation; and (2) one for inland water transportation. This split typically reflects the difference in equipment used. Scenic and sightseeing water transportation services are not included in this subsector but are included in Subsector 4872.
4872	Scenic and Sightseeing Transportation, Water	This industry comprises establishments primarily engaged in providing scenic and sightseeing transportation on water. The services provided are usually local and involve same-day return to place of origin. Charter boat fishing is included in this industry.
4883	Support Activities for Water Transportation	This industry comprises establishments primarily engaged in operating ports, harbors (including docking and pier facilities), or canals. This subsector includes harbor tugboat services and marine cargo handling, among a wide array of services.
532411	Commercial Air, Rail, and Water Transportation Equipment Rental and Leasing	This industry comprises establishments primarily engaged in renting or leasing off-highway transportation equipment without operators, such as steamships and tugboats, as well as aircraft and railroad cars.
336611	Ship Building and Repairing	This industry comprises establishments primarily engaged in operating a shipyard. Shipyards are fixed facilities with drydocks and fabrication equipment capable of building a ship, defined as watercraft typically suitable or intended for other than personal or recreational use. Activities of shipyards include the construction of ships, their repair, conversion and alteration, the production of prefabricated ship and barge sections, and specialized services, such as ship scaling.
541330	Engineering and Architectural Services	This industry comprises establishments primarily engaged in applying physical laws and principles of engineering in the design, development, and utilization of machines, materials, instruments, structures, processes, and systems. The assignments undertaken by these establishments may involve any of the following activities: provision of advice, preparation of feasibility studies, preparation of preliminary and final plans and designs, provision of technical services during the construction or installation phase, inspection and evaluation of engineering projects, and related services. This industry is only included for a portion of Electric Boat employment that was specifically identified as falling in this sector.

Source: U.S. Census Bureau, North American Industrial Classification System. Accessed at http://www.census.gov/cgi-bin/sssd/naics/naicsrch on October 20, 2009.
Note: For the purposes of this analysis, marinas and boat building are included in the recreational boating sector.

Table 4. Direct Employment in the Marine Transportation Sector (Average Jobs in 2008)

Region	Industry NAICS Code						Total[1]
	483	4872	4883	532411	336611	541330[4]	
Rhode Island[2]	0	6	61	0	0	0	66
Eastern Connecticut[2]	0	38	51	0	4,238	3,950	8,277
Western Connecticut[2]	699	0	115	0	52	0	866
New York Mainland[3]	8	1	1	0	1	0	11
Western Long Island[3]	511	27	86	4	36	0	665
Eastern Long Island[3]	701	29	125	8	42	0	905
Total LIS[1]	1,919	100	439	12	4,369	3,950	10,790

Source: U.S. Department of Labor, Bureau of Labor Statistics. Quarterly Census of Employment and Wages. Accessed at http://www.bls.gov/cew/#databases on October 20, 2009.

1. Values may not sum to reported totals due to rounding.
2. All 2008 employment within relevant counties is reported. In cases where data for target industries were not available at the county level, the analysis assigns a pro-rated share of statewide employment, based on the ratio of values reported statewide for five- and six-digit NAICS codes and their parent (fewer digit) industries.
3. The analysis employs data on vessel landings by port to account for economic activity in New York that is likely not occurring on LIS.
4. The analysis includes employment for NAICS code 541330 only as it applies to Electric Boat.

2.3.3 Commercial Fishing

Fishing employment is not well-documented in federal data sources. Commercial fish harvesters are considered to be self-employed unless they work for a legal entity such as a corporation that is covered by federal laws.[18] As a result, most commercial fish harvesters are exempted by law from coverage in the data series used to measure other employment. Because IMPLAN is built from federally reported data sources, the model is likely to underestimate employment in the fishing sector, as well as the sector's output.

In an attempt to address this limitation, the analysis uses data on the ex-vessel value of commercial fishing landings to estimate the economic impacts of the industry in the study area. These data were provided by the National Marine Fisheries Service (NMFS) for 2006 through 2008.[19] The data include ex-vessel values for finfish and shellfish landings reported at 77 ports within the study area. Note that, due to data limitations, these figures may understate shellfish landings in state-managed fisheries.

Due to incomplete reporting of 2008 data by port, the analysis relies solely on data for 2006 and 2007 to calculate the average annual ex-vessel value of commercial fishing landings within the study area. Table 5 presents these values by region.

[18] National Ocean Economics Program. Accessed at http://www.oceaneconomics.org/NationalReport/ on October 5, 2009.
[19] Electronic communication with Scott Steinback at National Marine Fisheries Service on October 21, 2009.

Table 5. Ex-Vessel Values of Landed Fish in LIS Ports: Annual Average for 2006-2007 (Millions of 2009 dollars)

Region	Ex-vessel Value
Rhode Island	$0.5
Eastern Connecticut	$15.8
Western Connecticut	$25.6
New York Mainland	$0.01
Western Long Island	$0.8
Eastern Long Island	$37.3
Total LIS	**$80.0**

Source: National Marine Fisheries Service (NMFS).
Notes:
1. Landings were reported for 77 ports in LIS.
2. Landings values for Connecticut that NMFS does not assign to a specific port are apportioned to the Eastern Connecticut and Western Connecticut regions based on the weighted average of the regions' reported ex-vessel landings in 2006 and 2007. The analysis employs a similar approach for New York; however, the analysis excludes half of the not-specified landings values in order to account for commercial fishing activity that may occur in other areas of New York State (e.g., the south shore of Long Island or the Great Lakes).
3. Note that the study area excludes Point Judith, Rhode Island, a nearby port that is one of the nation's largest commercial fishing centers.

2.3.4 Recreational Boating

2.3.4.1 Approach and Data Sources

The analysis of the recreational boating sector is based on estimates of recreational boating activity and associated expenditures within the study area. To estimate the number of recreational boaters in the study area, the analysis uses boat registration data provided by the state governments of Rhode Island, Connecticut, and New York, as well as registration data managed by the U.S. Coast Guard.[20] Rhode Island and Connecticut provided registration data at the town level, while New York provided registration data at the county level. To develop estimates of annual expenditures per individual boater, the analysis relies on a New York Sea Grant study by Connelly et al. (2004).[21] The authors of that study surveyed over 2,000 owners of recreational boats in New York State and used the data they collected to estimate statewide expenditures on recreational boating,

[20] Connecticut boat registration data were provided by the Connecticut Department of Environmental Protection, Boating Division, Marine Headquarters on October 14, 2009. Rhode Island registration data were provided by the Rhode Island Department of Environmental Management, Office of Boat Registration and Licensing on October 29, 2009. New York registration data were obtained from the New York State Office of Parks, Recreation and Historic Preservation's 2008 Recreational Boating Report, accessed at http://nysparks.state.ny.us/recreation/boating/resources.aspx on October 20, 2009. Data from the U.S. Coast Guard's Marine Safety Information System database were provided by the U.S. Department of Commerce, National Technical Information Service on October 25, 2009.

[21] Connelly, N.A., T.L. Brown, and D.L. Kay. 2004. *Recreational Boating Expenditures in 2003 in New York State and Their Economic Impacts*. Prepared for New York Sea Grant, a joint program of the State University of New York and Cornell University.

including both trip-related expenditures and expenditures related to purchasing and maintaining a boat.

2.3.4.2 Estimating the Number of Recreational Boaters

Because of differences in the data provided by the state governments, the analysis uses different approaches to estimate the number of recreational boaters in each region of the study area. For Rhode Island, the analysis assumes that all boats registered in Westerly and Block Island would be used in LIS. For Connecticut, the analysis assumes that all boats registered in the counties included in the study area would be used in LIS. For New York State, the analysis adjusts the county-level registration numbers to exclude boats that might primarily be used in waters other than LIS, such as the Hudson River (for boats registered in Westchester County) or the Atlantic Ocean waters other than LIS. In order to make this adjustment, the analysis obtained registration data from the U.S. Coast Guard (USCG) that included a subset of about two percent of all boats registered in the New York State counties included in the study area. Using hailing port information included in the Coast Guard registration data, the analysis estimated the percentage of USCG-registered boats that would be used in LIS in each county and applied that percentage to the total number of boats registered in each county, according to state registration data. Table 6 presents the estimated number of recreational boats used in LIS for each county in the study area.

Table 6. Number of Registered Recreational Boats Used in LIS by County and Region (in 2008-2009)

Region	County	Number of Registered Boaters
Rhode Island	Washington	1,504
Eastern Connecticut	Middlesex	10,784
	Hartford	19,580
	New London	15,234
Western Connecticut	Fairfield	23,953
	New Haven	19,765
New York Mainland	Westchester	7,914
	Bronx	1,755
Western Long Island	Nassau	14,511
Eastern Long Island	Suffolk	36,954
Total LIS		**151,954**

Sources:
Connecticut: Registrations by town as of December 2008; Connecticut Department of Environmental Protection, Boating Division, Marine HQ, contacted on October 14, 2009.
Rhode Island: Registrations by town as of October 27, 2009; Rhode Island Department of Environmental Management, Office of Boat Registration and Licensing, contacted on October 29, 2009.
New York: Registrations by county for 2008; New York State Office of Parks, Recreation and Historic Preservation's 2008 Recreational Boating Report, accessed at http://nysparks.state.ny.us/recreation/boating/resources.aspx on October 20, 2009. The percentage of registrations by county that fell within the study area was estimated using data from the U.S. Coast Guard's Marine Safety Information System database, obtained on October 25, 2009.

2.3.4.3 Expenditures per Boater

The authors of the Sea Grant study estimated annual trip- and non-trip-related expenditures per boater both for New York State as a whole and by region and water body. In order to develop expenditure estimates that best represent recreational boating practices in the LIS study area, this analysis uses the Sea Grant study's trip-related expenditure estimates for recreational boaters in LIS, coupled with non-trip-related expenditure estimates for boaters living in Long Island and the New York City area.[22] Trip-related expenditures include expenditures on fuel, food at grocery stores and restaurants, boat launching and mooring fees, and lodging. Non-trip-related expenditures include boat purchase and loan payments, fees for winterization and storage, and purchases of fishing, waterskiing, and scuba diving equipment. Tables 7 and 8 present these estimates of average annual expenditures per boater, organized by expenditure category. Table 9 shows how the analysis maps these expenditure categories to the industry categories and codes used to enter expenditure data into IMPLAN.

Table 7. Average Annual Trip-Related Expenditures per Recreational Boater, 2003

Expenditure Category	Annual Expenditure (2009 dollars)
Grocery & convenience-type stores	$97
Gas stations	$295
Bait & tackle shops	$111
All other retail purchases	$68
Marinas & yacht clubs	$763
Boat launching & mooring fees	$158
Entertainment & all other expenses	$44
Lodging	$56
Restaurants and bars	$217
Tournament fees	$8
Total Annual Expenditures	**$1,817**

Source: Connelly, N.A., T.L. Brown, and D.L. Kay. 2004. *Recreational Boating Expenditures in 2003 in New York State and Their Economic Impacts*. Prepared for New York Sea Grant, a joint program of the State University of New York and Cornell University.

[22] The Sea Grant study noted large regional variation in both the nature and magnitude of boating expenditures. As one example, boaters in LIS reported spending about twice the statewide average on boat launching and mooring fees.

Table 8. Average Annual Non-Trip-Related Expenditures per Recreational Boater, 2003

Expenditure Category	Annual Expenditure (2009 dollars)
Boat purchase	$7,286
Boat equipment	$652
Boating clothing	$78
Electronics (purchase and repair)	$391
Fishing equipment	$237
Water skiing & scuba diving equipment	$40
Loan payments	$684
Insurance	$430
Seasonal slip & mooring rental	$863
Winterization & storage	$764
Misc. marina services	$445
Hull repair and bottom paint	$208
Engine maintenance and repair	$373
Total Annual Expenditures	**$12,453**

Source: Connelly, N.A., T.L. Brown, and D.L. Kay. 2004. *Recreational Boating Expenditures in 2003 in New York State and Their Economic Impacts*. Prepared for New York Sea Grant, a joint program of the State University of New York and Cornell University.

Table 9. IMPLAN Codes Associated with Recreational Boating-Related Expenditure Categories

Expenditure Category	Code	Code Description
Trip-Related Expenditures		
Grocery & convenience-type stores	324	Grocery/deli
Gas stations	326	Gasoline stations
Bait & tackle shops	328	Fishing supply
All other retail purchases	330	Retail-misc
Marinas & yacht clubs	410	Other amusement and recreation industries
Boat launching & mooring fees	410	Other amusement and recreation industries
Entertainment & all other expenses	410	Other amusement and recreation industries
Lodging	411	Hotels
Restaurants and bars	413	Food services and drinking establishments
Tournament fees	413	Civic social, professional, and similar organizations
Non-Trip-Related Expenditures		
Boat purchase	320	Retail – Motor vehicle and parts
Boat equipment	320	Retail – Motor vehicle and parts
Boating clothing	327	Retail – Clothing and clothing accessories
Electronics (purchase and repair)	328	Retail – Sporting goods hobby book and music
Fishing equipment	328	Retail – Sporting goods hobby book and music
Water skiing & scuba diving equipment	328	Retail – Sporting goods hobby book and music
Loan payments	355	Nondepository credit intermediation and related activities
Insurance	358	Insurance agencies, brokerages, and related activities
Seasonal slip & mooring rental	410	Other amusement and recreation industries
Winterization & storage	410	Other amusement and recreation industries
Misc. marina services	410	Other amusement and recreation industries
Hull repair and bottom paint	410	Other amusement and recreation industries
Engine maintenance and repair	418	Personal and household goods repair and maintenance

2.3.5 Ferry Tourism

2.3.5.1 Approach and Data Sources

As with the recreational boating sector, the analysis prepares inputs to the IMPLAN model for ferry-dependent tourism by estimating total annual expenditures in this sector, calculated by multiplying the total number of ferry-dependent tourists by the average expenditure per person-trip. To estimate the number of ferry-dependent tourists, the analysis uses ferry ridership data from the Bureau of Transportation Statistics' TranStats

database.[23] The analysis uses average tourism-related expenditure estimates generated by a study by the Donahue Institute of the University of Massachusetts on the economic significance of coastal and marine activities in Massachusetts.[24]

2.3.5.2 Estimating the Number of Ferry Tourist Trips

Using ridership data from the Bureau of Transportation Statistics, the analysis selects ferry lines that operate within LIS and serve tourist destinations, such as Block Island, Shelter Island, and beaches in Connecticut and Long Island. Table 10 presents the estimated number of tourist trips using ferries to destinations in each region within the study area.[25] For purposes of this analysis, expenditures made by riders of ferries are assumed to take place in the region where the tourist destination is located.

[23] Data on ferry operators, routes, and annual riders were obtained from the TranStats website, available at http://www.transtats.bts.gov/DL_SelectFields.asp?Table_ID=1178&DB_Short_Name=Ferry%20Census. Accessed October 21, 2009.
[24] Donahue Institute. 2006. *An Assessment of the Coastal and Marine Economies of Massachusetts*. Massachusetts Office of Coastal Zone Management.
[25] The analysis recognizes that many riders on ferries serving tourist destinations will not be tourists. In the absence of information indicating what percentage of ferry riders engage in tourist activity, the analysis assumes that all passengers on ferries serving tourist destinations are tourists. This will overstate the ferry-dependent tourist estimates to some degree.

Table 10. Estimate of Tourism-Related Ferry Ridership in LIS, by Segment and Region, 2008

Region	Ferry Segment Name	Number of Person-Trips[1]
Rhode Island	Montauk (NY) – Block Island (RI)	7,800[2]
	New London (CT) – Block Island (RI)	30,427
	Point Judith (RI) – Block Island, Old Harbor (RI)	153,693
	Newport, Perrotti Park (RI) – Block Island, Old Harbor (RI)	1,601
Eastern Connecticut	Chester (CT) – Hadlyme (CT)	2,118
	Rocky Hill (CT) – South Glastonbury (CT)	4,299
Western Connecticut	Bridgeport (CT) – Port Jefferson (NY)	300,000[3]
	Arch Street, Greenwich (CT) – Little Captain Island, Greenwich (CT)	14,702
	Arch Street, Greenwich (CT) – Little Captain Island, Greenwich (CT)	1,711
New York Mainland	n/a	0
Western Long Island	n/a	0
Eastern Long Island	New London, State Street (CT) – Fishers Island (NY)	79,500
	Greenport, Long Island (NY) – Shelter Island Heights, Long Island (NY)	172,500[4]
	North Haven (NY) – Shelter Island (NY)	172,500[5]
	New London, Ferry Street (CT) – Orient Point (NY)	547,200[6]
	Montauk (NY) – Martha's Vineyard (MA)	49[2]
	Montauk (NY) – New London (CT)	1,278[2]
Total		**1,489,378**

Sources: Unless otherwise noted, data on the number of one-way tickets sold per year were obtained from the Research and Innovative Technology Administration, Bureau of Transportation Statistics. National Census of Ferry Operators database. Accessed at http://www.transtats.bts.gov on October 22, 2009.

Notes:

1. Person-trip values are derived by dividing the number of one-way tickets by two.
2. Estimate obtained through personal communication with Viking Star, Inc. on October 30, 2009.
3. Estimate obtained through personal communication with Bridgeport & Port Jefferson Steamboat Company on April 29, 2010.
4. Estimate obtained through personal communication with North Ferry Company, Inc. on October 30, 2009.
5. Estimate obtained through personal communication with South Ferry Company, Inc. on October 30, 2009 and April 1, 2010.
6. Estimate obtained through personal communication with Cross Sound Ferry Services, Inc. on November 5, 2009 and April 29, 2010.

2.3.5.3 Expenditures per Trip

The Donahue report mentioned above developed estimates of average expenditures made by daytrip and overnight visitors to beaches in Massachusetts in 2004. The LIS analysis uses weighted-average estimates of tourist expenditures, based on the distribution of daytrip and overnight visitors in the Donahue study. Table 11 presents these per-person trip estimates, organized by expenditure category. Table 12 shows how the analysis maps these tourism-related expenditure categories to IMPLAN industry codes.

Table 11. Beach Tourism Expenditures per Person-Trip, 2004

Expenditure Category	Expenditure (2009 dollars)
Gas and auto	$8.96
Beach-related lodging	$19.69
Parking and entrance fees	$1.37
Food and drink from stores	$10.33
Restaurants	$13.45
Equipment rental	$2.27
Beach sporting goods	$0.78
Incidentals	$2.99
Total	**$59.84**
Source: Donahue Institute. 2006. *An Assessment of the Coastal and Marine Economies of Massachusetts*. Massachusetts Office of Coastal Zone Management.	

Table 12. IMPLAN Codes Associated with Tourism-Related Expenditure Categories

Expenditure Category	Code	Code Description
Gas and auto	326	Gasoline stations
Beach-related lodging	411	Hotels
Parking and entrance fees	410	Other amusement and recreation industries
Food and drink from stores	324	Grocery/deli
Restaurants	413	Food services and drinking places
Equipment rental	328	Retail – Sporting goods hobby book and music
Beach sporting goods	328	Retail – Sporting goods hobby book and music
Incidentals	330	Retail – misc

2.3.6 Naval Submarine Base New London

2.3.6.1 Approach and Data Sources

The U.S. Navy's submarine base in New London, Connecticut is a significant contributor to regional employment in Long Island Sound. The New London facility is the Navy's first submarine base and considered the home of the submarine force. The Navy reports that "every officer and nearly every enlisted Sailor in the submarine force will be assigned here at least one time during a military career."[26] The base employs 7,900

[26] Naval Submarine Base New London, http://www.cnic.navy.mil/newlondon/index.htm

military personnel.[27] To capture the economic impact of this navigation-dependent facility, the analysis employs an estimate of military and civilian payroll at the base. The Navy reports this figure as $452 million per year.[28] Using average Federal military defense spending patterns, the analysis estimates total output demand generated by the base to be $982 million annually. The IMPLAN model is then used to estimate the impact of this demand on the regional economy.

2.4 REGIONAL ECONOMIC SIGNIFICANCE OF NAVIGATION-DEPENDENT ACTIVITIES BY SECTOR

This section presents estimates of the regional economic and employment impacts associated with navigation-dependent activities in LIS. As described in section 2.2, the analysis utilizes the IMPLAN model to arrive at these estimates. For each sector, the analysis presents total impacts by region.

2.4.1 Marine Transportation

Table 13 presents the results of the IMPLAN modeling conducted for the marine transportation sector. This sector as defined is the largest navigation-dependent sector, accounting for $3.2 billion in GSP (2009 dollars) and 26,626 jobs.

Table 13. Regional Economic Significance of Marine Transportation in LIS, 2009 dollars

Region	Output (millions)	GSP (millions)	Employment	Taxes (millions)
Rhode Island	$45.2	$10.4	170	$2.7
Eastern Connecticut	$2,485.7	$1,375.5	15,256	$360.3
Western Connecticut	$1,349.2	$742.5	4,190	$212.0
New York Mainland	$16.5	$10.2	90	$3.1
Western Long Island	$880.8	$449.4	2,956	$131.8
Eastern Long Island	$889.3	$397.5	2,789	$118.0
All Long Island Sound	$6,025.5	$3,238.1	26,626	$920.6

Sources: IEc IMPLAN analysis. Input data from U.S. Department of Labor, Bureau of Labor Statistics. Quarterly Census of Employment and Wages. Accessed at http://www.bls.gov/cew/#databases on October 20, 2009.

2.4.2 Commercial Fisheries

Table 14 presents the results of the IMPLAN modeling conducted for the commercial fishing sector. This sector shows a modest contribution to GSP ($82.7 million in 2009 dollars) and employment (1,632). As discussed above, however, employment and

[27] Naval Submarine Base New London, Accessed at http://www.cnic.navy.mil/newlondon/index.htm.
[28] Ibid.

earnings for this industry are not well captured in the standard IMPLAN model and are likely underrepresented here.

Table 14. Regional Economic Significance of Commercial Fisheries in LIS, 2009 dollars

Region	Output (millions)	GSP (millions)	Employment	Taxes (millions)
Rhode Island	$0.5	$0.4	8	$0.1
Eastern Connecticut	$21.0	$16.9	328	$3.6
Western Connecticut	$34.0	$26.6	587	$5.7
New York Mainland	$0.0	$0.0	0	$0.0
Western Long Island	$1.1	$0.8	32	$0.2
Eastern Long Island	$43.9	$35.1	1,334	$8.3
All Long Island Sound	$106.3	$82.7	1,632[1]	$18.8

Source: IEc IMPLAN analysis, based on NMFS ex-vessel value of fish landings for 2006-2007.
1. Note that, in this case, the employment figures reported for the six regions sum to a value greater than that indicated for the LIS study area. This anomaly may result from independent specification of the regional purchase coefficients within each IMPLAN model (i.e., regional purchase coefficients for one or more sub-regions that are different than the regional purchase coefficient for the study area as a whole). In addition, the output per worker that IMPLAN specifies may be lower in some sub-regions, causing the model to estimate greater relative employment impacts within these regions than for the study area as a whole.

2.4.3 Recreational Boating

Table 15 presents the results of the IMPLAN modeling conducted for the recreational boating sector. This sector as defined is the second largest navigation-dependent sector, accounting for $1.2 billion in GSP (2009 dollars) and 16,463 jobs.

Table 15. Regional Economic Significance of Recreational Boating in LIS, 2009 dollars

Region	Output (millions)	GSP (millions)	Employment	Taxes (millions)
Rhode Island	$14.6	$9.0	167	$2.8
Eastern Connecticut	$551.5	$342.7	5,216	$105.8
Western Connecticut	$545.3	$347.0	4,687	$114.1
New York Mainland	$110.0	$70.5	928	$22.6
Western Long Island	$181.1	$114.3	1,569	$37.8
Eastern Long Island	$402.2	$253.7	3,746	$85.7
All Long Island Sound	$1,901.5[1]	$1,199.0	16,463	$389.1

Source: IEc IMPLAN analysis. Input data are based on the following: **Connecticut**: Registrations by town as of December 2008; Connecticut Department of Environmental Protection, Boating Division, Marine HQ, contacted on October 14, 2009; **Rhode Island**: Registrations by town as of October 27, 2009; Rhode Island Department of Environmental Management, Office of Boat Registration and Licensing, contacted on October 29, 2009; **New York**: Registrations by county for 2008; New York State Office of Parks, Recreation and Historic Preservation's 2008 Recreational Boating Report, accessed at http://nysparks.state.ny.us/recreation/boating/resources.aspx on October 20, 2009; U.S. Coast Guard's Marine Safety Information System database, obtained on October 25, 2009. Expenditure data based on Connelly, N.A., T.L. Brown, and D.L. Kay. 2004. *Recreational Boating Expenditures in 2003 in New York State and Their Economic Impacts*. Prepared for New York Sea Grant, a joint program of the State University of New York and Cornell University.

2.4.4 Ferry-Dependent Tourism

Table 16 presents the results of the IMPLAN modeling conducted for tourists traveling by ferry in LIS. This sector accounts for about one percent of the estimated GSP produced by navigation-dependent activities ($66 million in 2009 dollars) and 1,049 jobs.

Table 16. Regional Economic Significance of Ferry-Dependent Tourism in LIS, 2009 dollars

Region	Output (millions)	GSP (millions)	Employment	Taxes (millions)
Rhode Island	$11.0	$6.3	142	$2.0
Eastern Connecticut	$0.5	$0.3	5	$0.1
Western Connecticut	$23.3	$14.0	217	$4.5
New York Mainland	$0.0	$0.0	0	$0.0
Western Long Island	$0.0	$0.0	0	$0.0
Eastern Long Island	$62.2	$37.2	649	$12.9
All Long Island Sound	$110.4	$66.0	1,049	$21.5

Source: IEc IMPLAN analysis. Input data are based on 2008 ferry ridership, available from TranStats, http://www.transtats.bts.gov/DL_SelectFields.asp?Table_ID=1178&DB_Short_Name=Ferry%20Census. Accessed October 21, 2009.

2.4.5 Naval Submarine Base New London

Table 17 presents the results of the IMPLAN modeling conducted for the New London Submarine Base. This sector accounts for 17 percent of the estimated GSP produced by navigation-dependent activities ($944 million in 2009 dollars) and 9,950 jobs in the LIS region.

Table 17. Regional Economic Significance of the New London Submarine Base, 2009 dollars

Region	Output (millions)	GSP (millions)	Employment	Taxes (millions)
Eastern Connecticut	$1,219.7	$920.4	8,925	$218.6
All Long Island Sound	$1,238.2	$944.2	9,950	$242.2

2.5 SUMMARY

This section summarizes the economic impacts of the navigation-dependent activities by region and sector. Table 18 and Figure 2 present information on each sector's contributions to total economic output. Table 19 and Figure 3 present information on the contribution of each sector to GSP. Table 20 and Figure 4 present information on employment. Table 21 presents information on tax impacts. As the tables show, marine transportation, recreational boating, and the Naval Submarine Base account for the majority of the impact of navigation-dependent activities on regional output, GSP, employment, and tax revenue. Of the six regions examined, the economic impacts of navigation-dependent activities are the largest in Eastern and Western Connecticut.

Table 18. Regional Economic Significance of Navigation-Dependent Industries – Output (millions)

Region	Marine Transportation	Commercial Fishing	Recreational Boating	Ferry Tourism	Sub Base	Total
Rhode Island	$45.2	$0.5	$14.6	$11.0	$0.0	$71.3
Eastern Connecticut	$2,485.7	$21.0	$551.5	$0.5	$1,219.7	$4,278.4
Western Connecticut	$1,349.2	$34.0	$545.3	$23.3	$0.0	$1,951.7
New York Mainland	$16.5	$0.0	$110.0	$0.0	$0.0	$126.5
Western Long Island	$880.8	$1.1	$181.1	$0.0	$0.0	$1,063.0
Eastern Long Island	$889.3	$43.9	$402.2	$62.2	$0.0	$1,397.6
All Long Island Sound	$6,025.5	$106.3	$1,901.5	$110.4	$1,238.2	$9,381.9

Source: IEc IMPLAN analysis.

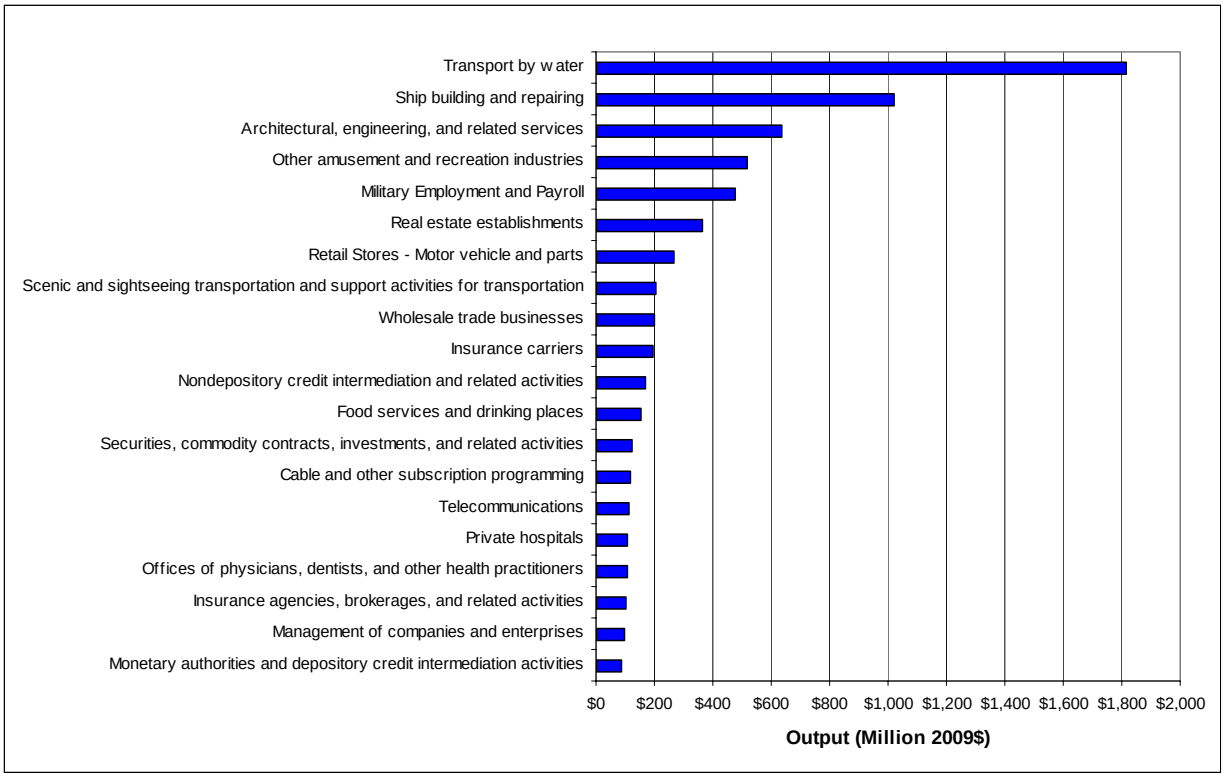


Figure 2. Regional Economic Significance of Navigation-Dependent Industries: Top 20 Industries by Output

Source: IEc IMPLAN analysis.

Table 19. Regional Economic Significance of Navigation-Dependent Industries – GSP (millions)

Region	Marine Transportation	Commercial Fishing	Recreational Boating	Ferry Tourism	Sub Base	Total
Rhode Island	$10.4	$0.4	$9.0	$6.3	$0.0	$26.1
Eastern Connecticut	$1,375.5	$16.9	$342.7	$0.3	$920.4	$2,655.8
Western Connecticut	$742.5	$26.6	$347.0	$14.0	$0.0	$1,130.1
New York Mainland	$10.2	$0.0	$70.5	$0.0	$0.0	$80.7
Western Long Island	$449.4	$0.8	$114.3	$0.0	$0.0	$564.5
Eastern Long Island	$397.5	$35.1	$253.7	$37.2	$0.0	$723.5
All Long Island Sound	$3,238.1	$82.7	$1,199.0	$66.0	$944.2	$5,530.0

Source: IEc IMPLAN analysis.

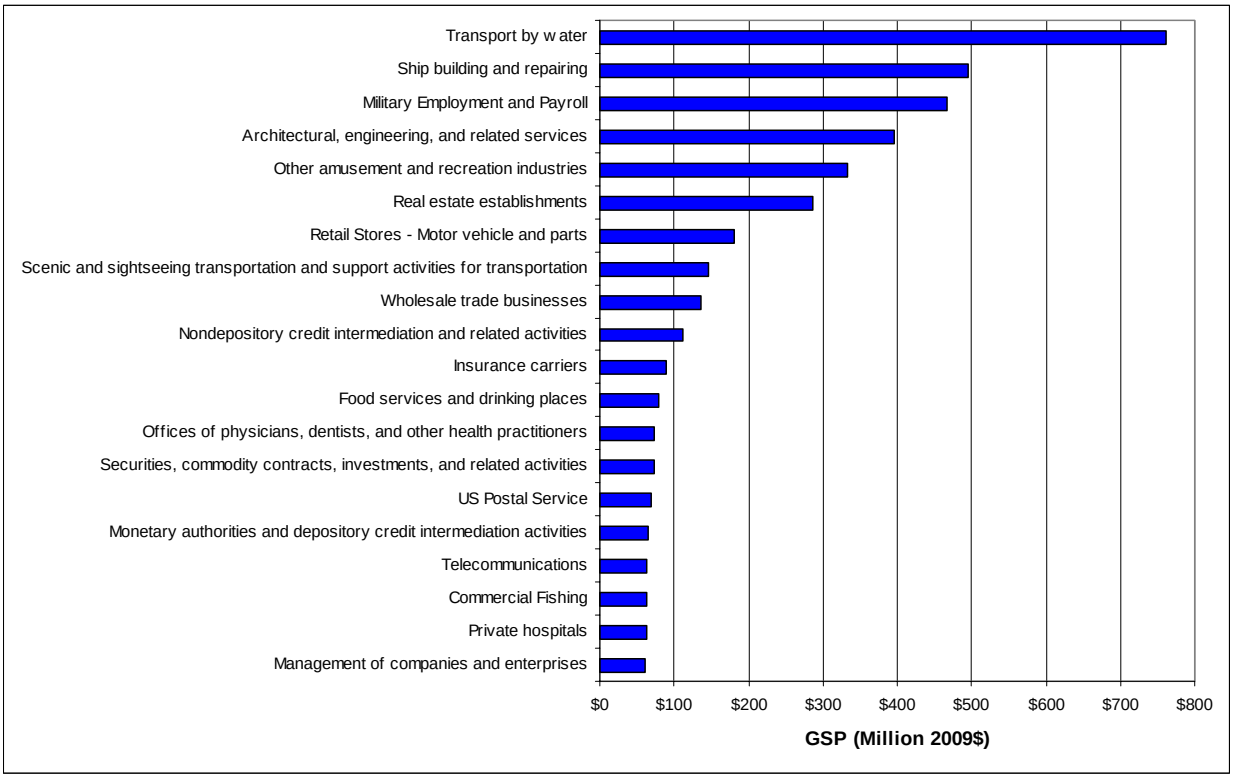


Figure 3. Regional Economic Significance of Navigation-Dependent Industries: Top 20 Industries by GSP

Source: IEc IMPLAN analysis.

Table 20. Regional Economic Significance of Navigation-Dependent Industries – Employment

Region	Marine Transportation	Commercial Fishing	Recreational Boating	Ferry Tourism	Sub Base	Total
Rhode Island	170	8	167	142	0	487
Eastern Connecticut	15,256	328	5,216	5	8,925	29,730
Western Connecticut	4,190	587	4,687	217	0	9,681
New York Mainland	90	0	928	0	0	1,018
Western Long Island	2,956	32	1,569	0	0	4,557
Eastern Long Island	2,789	1,334	3,746	649	0	8,518
All Long Island Sound	26,626	1,632	16,463	1,049	9,950	55,720

Source: IEc IMPLAN analysis.

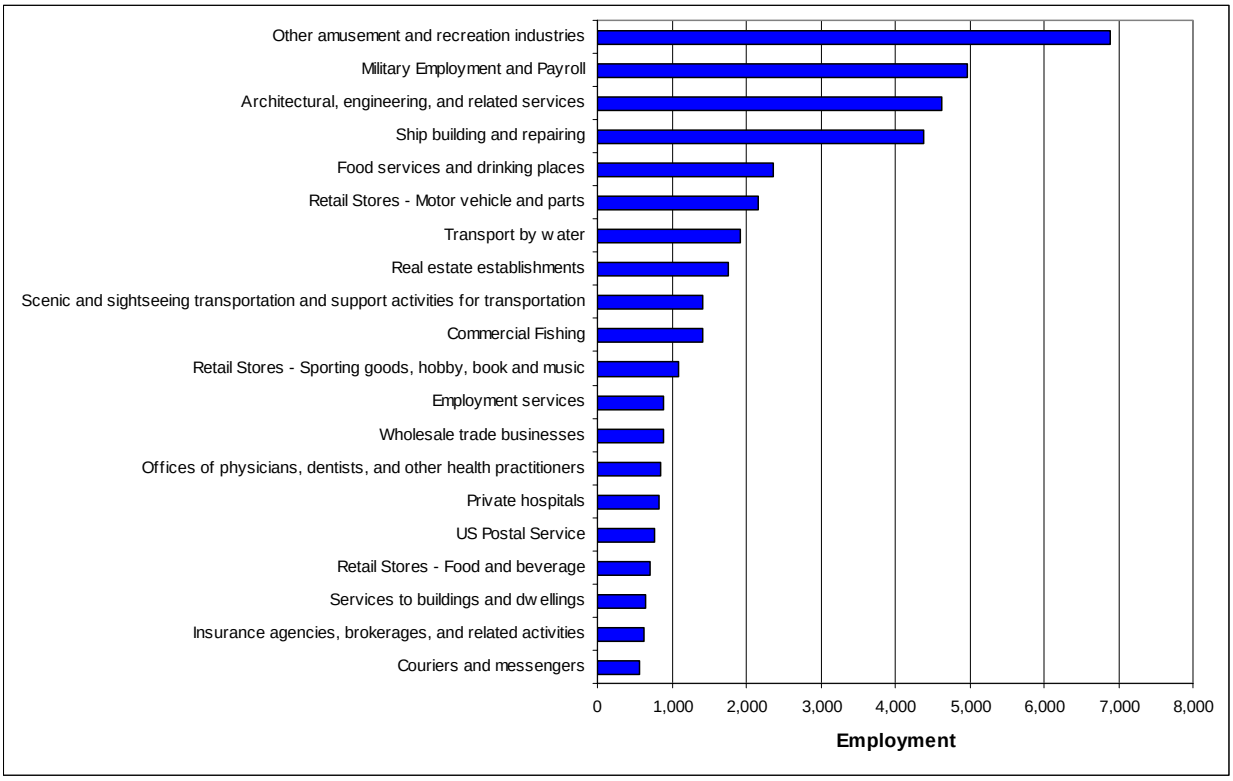


Figure 4. Regional Economic Significance of Navigation-Dependent Industries: Top 20 Industries by Employment

Source: IEc IMPLAN analysis.

Table 21. Regional Economic Significance of Navigation-Dependent Industries – Taxes (millions)

Region	Marine Transportation	Commercial Fishing	Recreational Boating	Ferry Tourism	Sub Base	Total
Rhode Island	$2.7	$0.1	$2.8	$2.0	$0.0	$7.6
Eastern Connecticut	$360.3	$3.6	$105.8	$0.1	$218.6	$688.4
Western Connecticut	$212.0	$5.7	$114.1	$4.5	$0.0	$336.3
New York Mainland	$3.1	$0.0	$22.6	$0.0	$0.0	$25.7
Western Long Island	$131.8	$0.2	$37.8	$0.0	$0.0	$169.7
Eastern Long Island	$118.0	$8.3	$85.7	$12.9	$0.0	$224.9
All Long Island Sound	$920.6	$18.8	$389.1	$21.5	$242.2	$1,592.2

Source: IEc IMPLAN analysis.

3.0 ANALYSIS OF ECONOMIC IMPACTS OF NO ACTION ALTERNATIVE

For the purposes of this analysis, the No Action Alternative is a "no open water disposal" scenario. The analysis assumes that the lack of open water disposal sites precludes dredging within the study area. The resulting increase in shoaling is assumed to curtail navigation-dependent economic activity in harbors and waterways along LIS. The analysis forecasts this impact on a harbor-by-harbor or waterway-by-waterway basis, taking into account the differing requirements for access by vessels in the marine transportation, commercial fishing, recreational boating, and ferry sectors, as well as requirements for Navy vessels at the New London submarine base. It forecasts the potential loss of economic activity in five-year increments over a 20-year period, examining impacts on regional output, GSP, employment, and tax revenues.

3.1 APPROACH

To determine the regional economic impacts of the No Action Alternative, the analysis employs the following approach:

1) **Apportion baseline economic activity to harbors/waterways**. It is necessary to characterize economic activity at the waterway level in order to estimate the impacts of shoaling on specific harbors. Whenever possible, the analysis relies on waterway- or harbor-specific data to characterize the distribution of navigation-dependent activity within LIS. If such information is unavailable, the analysis employs simplified assumptions to disaggregate the data.
2) **Classify vessel types by draft**. Using available data from the Coast Guard, the USACE, the Bureau of Transportation Statistics, and the U.S. Navy the analysis develops distributions of vessel drafts for marine transportation, commercial fishing, recreational, ferry, and Navy vessels within LIS. This information is used to indicate the depths at which vessel access to harbors and waterways will be limited by shoaling.

3) **Estimate shoaling impacts on economic activity**. Appendix A presents an analysis of current navigation conditions and shoaling rates for waterways in the study area. This information, combined with the data on vessel drafts from Step 2, provides the basis for estimating the percent of vessels for each industry in each waterway that will be unable to gain access in Years 5, 10, 15, and 20 of the No Action Alternative.
4) **Estimate regional economic impacts**. To estimate the economic impacts of the No Action Alternative, the analysis assumes that when a limiting depth is reached for a particular type and draft of vessel in a specific waterway or harbor, all economic activity associated with that vessel is curtailed. Thus, the next step is to multiply the baseline regional economic data for each waterway (Step 1) by the expected percent of vessels for which access will be precluded by shoaling over time (Step 3). The results represent the estimated amount of economic activity that would be curtailed as shoaling decreases channel depth in each waterway under the No Action Alternative. The estimates for individual waterways are then summed to provide regional totals.
5) **Consider other types of impacts**. The analysis qualitatively discusses a range of other impacts, including the potential for additional delays in accessing ports while vessels wait for favorable tides, the increased risk of vessel collisions, the increased potential for oil spills, and the potential for commerce to shift to other modes of transport. In addition, the analysis of potential impacts to recreational boating and commercial fishing includes a short discussion of potential economic, social, and quality of life impacts on the affected populations.

The following sections discuss the analytic steps described above in greater detail, and present the resulting regional impacts of the No Action Alternative by study region. Appendices A, B and C provide additional detail regarding the development of the shoaling analysis, as well as waterway-specific data.

3.2 ALLOCATION OF BASELINE ECONOMIC ACTIVITY TO WATERWAYS

The first step towards analyzing the No Action Alternative is to allocate the baseline data on regional economic activity (developed in Section 2.0) to particular waterways. This enables a more detailed investigation of the impact of shoaling within each waterway on the regional economy. Because economic information is frequently reported at a broader level (e.g., county), the analysis relies on the following metrics to allocate measures of baseline activity to particular waterways:

- For marine transportation, the volume of inbound vessel cargo by waterway/harbor (as specified in Waterborne Commerce of the United States);[29]
- For commercial fishing, the ex-vessel value of landings by port;[30]

[29] U.S. Army Corps of Engineers, Institute for Water Resources. "Waterborne Commerce of the United States. Calendar Year 2007. Part 1 - Waterways and Harbors Atlantic Coast." Accessed at http://www.iwr.usace.army.mil/ndc/data/datawcus.htm on November 20, 2009.
[30] List of ports and ex-vessel values provided by Scott Steinback, National Marine Fisheries Service, on October 21, 2009.

- For recreational boating, the number of recreational boat slips and moorings by waterway/harbor;[31] and
- For ferry tourism, the number of person-trips to tourist destinations on waterways in the study area.[32]

3.2.1 Marine Transportation

The analysis allocates baseline economic activity within the marine transportation sector to waterways/harbors based on the distribution of inbound vessel cargo to waterways/harbors within the study area. Inbound cargo data were obtained from a USACE report, Waterborne Commerce of the United States.[33] This document provides detailed statistics on foreign and domestic commodities and vessel traffic within waterways and canals in the United States. Table 22 presents the volume of landed cargo for each waterway/harbor within the study area. It also shows the estimated contribution of marine transportation activity within each waterway to GSP.

3.2.2 Commercial Fishing

The analysis employs data on the ex-vessel value of commercial fish landings to characterize the baseline distribution of commercial fishing activity. Ex-vessel landings values were reported at 77 ports within the study area. These data were provided by the National Marine Fisheries Service (NMFS) for years 2006 through 2008.[34]

In some cases, ex-vessel values reported by NMFS were not assigned to specific ports, but rather to more general state- or county-wide regions. The analysis apportions these values to waterways/harbors based on the share of reported landings attributed to each waterway/harbor. Table 23 presents the resulting distribution of ex-vessel revenues by waterway within the study region.

3.2.3 Recreational Boating

The analysis employs the distribution of vessel slips and moorings at marine facilities throughout the area to allocate baseline recreational boating activity to particular waterways/harbors. The primary source for data on slips and moorings was "Embassy Cruising Guides: LIS to Cape May, NJ," (Embassy Guide) published by Maptech, Inc. in 2008.[35] Marine facilities were identified using the Marine Facilities Table in each chapter of the guide.[36] The location of marine facilities with respect to federal navigation

[31] Maptech, Inc. "Embassy Cruising Guides: Long Island Sound to Cape May, NJ," Eleventh Edition. 2008.
[32] Research and Innovative Technology Administration, Bureau of Transportation Statistics. National Census of Ferry Operators database. Accessed at http://www.transtats.bts.gov on October 22, 2009.
[33] U.S. Army Corps of Engineers, Institute for Water Resources. "Waterborne Commerce of the United States. Calendar Year 2007. Part 1 - Waterways and Harbors Atlantic Coast." Accessed at http://www.iwr.usace.army.mil/ndc/data/datawcus.htm on November 20, 2009.
[34] Electronic communication with Scott Steinback at National Marine Fisheries Service on October 21, 2009.
[35] Maptech, Inc. "Embassy Cruising Guides: Long Island Sound to Cape May, NJ," Eleventh Edition. 2008.
[36] Information on the number of slips and moorings reported in the Embassy Guide provided by facilities on a voluntary basis in response to Maptech's request. In some instances, the data are incomplete. For the

channels was discerned using the Marine Facility Locators and the National Oceanic and Atmospheric Administration (NOAA) charts provided in the guide. Table 24 presents the total number of slips and moorings located in each waterway within the study area.

purposes of the analysis, however, the data are assumed to be sufficiently representative and were incorporated without adjustment.

Table 22. Allocation of Marine Transportation Activity to Waterways

Region	County	Waterway[1]	Inbound Freight Cargo (1,000 Short Tons)[2]	Regional Share	Regional Economic Impact (GSP)
Rhode Island	Washington	Great Salt Pond	6	100%	$10,400,000
Regional Total					*$10,400,000*
Eastern Connecticut	New London	New London Harbor	11,359	96.6%	$1,330,000,000
		Thames River	356	3.02%	$41,600,000
		Connecticut River Below Hartford[3]	16	0.134%	$1,840,000
	Hartford	Connecticut River Below Hartford[3]	16	0.134%	$1,840,000
	Middlesex	Connecticut River Below Hartford[3]	16	0.134%	$1,840,000
Regional Total					*$1,380,000,000*
Western Connecticut	New Haven	New Haven Harbor	5,390	51.6%	$383,000,000
	Fairfield	Bridgeport Harbor	4,294	41.1%	$305,000,000
		Norwalk Harbor	163	1.56%	$11,600,000
		Stamford Harbor	604	5.78%	$42,900,000
Regional Total					*$742,000,000*
Mainland New York	Westchester	Port Chester/Rye Area	55	10.9%	$1,110,000
	Bronx	Eastchester Bay Area	453	89.1%	$9,080,000
Regional Total					*$10,200,000*
Western Long Island	Nassau	Glen Cove	52	6.60%	$29,700,000
		Hempstead Harbor	592	74.6%	$335,000,000
		Oyster Bay/Cold Spring Harbor Area	149	18.8%	$84,500,000
Regional Total					*$449,000,000*
Eastern Long Island	Suffolk	Port Jefferson Harbor	792	100%	$397,000,000
Regional Total					*$397,000,000*

Source: U.S. Army Corps of Engineers, Institute for Water Resources. "Waterborne Commerce of the United States. Calendar Year 2007. Part 1 - Waterways and Harbors Atlantic Coast." Accessed at http://www.iwr.usace.army.mil/ndc/data/datawcus.htm on November 20, 2009.

Notes:

1. Table presents data for only those waterways in which shipping cargo data were reported. See Table 1 for complete list of waterways.
2. A short ton equals 2,000 pounds. Tonnage figures are rounded to the nearest 1,000 tons.
3. Waterway spans three counties. Due to a lack of more specific information, inbound cargo is distributed evenly over these counties.

Table 23. Allocation of Commercial Fishing Activity to Waterways

Region	County	Waterway[1]	Ports[2]	Ex-Vessel Landings Value	Regional Share	Regional Economic Impact (GSP)
Rhode Island	Washington	Harbor of Refuge	New Shoreham	$136,147	27.5%	$121,000
		Great Salt Pond	New Shoreham	$136,147	27.5%	$121,000
		Pawcatuck River, Little Narragansett Bay & Watch Hill Cove	Westerly	$222,055	44.9%	$198,000
Regional Total						*$441,000*
Eastern Connecticut	New London	Pawcatuck River, Little Narragansett Bay & Watch Hill Cove	Pawcatuck	$147	0.000933%	$158
		Mystic River and Harbor	Mystic, Noank	$253,143	1.60%	$270,000
		Stonington Harbor	Stonington	$9,459,525	59.8%	$10,100,000
		New London Harbor	New London	$4,845,665	30.7%	$5,170,000
		Thames River	Groton, Lyme, Montville, Norwich	$792,295	5.01%	$846,000
		Niantic Bay & Harbor	East Lyme, Niantic, Waterford	$173,911	1.10%	$186,000
		Connecticut River Below Hartford	Old Lyme	$17,446	0.110%	$18,600
	Hartford	Wethersfield Cove	Whethersfield	$20	0.000129%	$22
		Connecticut River Below Hartford	Glastonbury, Rocky Hill	$8,945	0.0566%	$9,550
	Middlesex	Duck Island Harbor	Westbrook	$15,919	0.101%	$17,000
		Patchogue River	Westbrook	$15,919	0.101%	$17,000
		Eightmile River and Hamburg Cove	Essex	$46	0.000293%	$50
		Clinton Harbor	Clinton	$73,882	0.467%	$78,900
		North Cove, Old Saybrook	Old Saybrook	$142,417	0.901%	$152,000
		Salmon River Cove	Haddam	$340	0.00215%	$363
		Essex Cove Harbor	Essex	$46	0.000293%	$50
		Connecticut River Below Hartford	Chester, Cromwell, Deep River, East Haddam, East Hampton, Essex, Haddam, Middletown, Portland	$6,230	0.0394%	$6,650
Regional Total						*$16,900,000*
Western Connecticut	New Haven	Branford Harbor	Branford	$1,269,861	4.96%	$1,320,000
		Guilford Harbor	Guilford	$4,553,728	17.8%	$4,730,000
		Stony Creek	Branford	$1,269,861	4.96%	$1,320,000
		Guilford/Branford Area	Madison	$1,538	0.00601%	$1,600
		Housatonic River	Derby, Stratford	$858,013	3.35%	$891,000
		Milford Harbor	Milford	$915,367	3.58%	$951,000
		New Haven Harbor	New Haven	$1,799,928	7.03%	$1,870,000
		Quinnipiac River	New Haven	$1,799,928	7.03%	$1,870,000
		West River	Hamden, West Haven	$105,617	0.413%	$110,000
		New Haven Area	East Haven	$1,042,561	4.07%	$1,080,000
	Fairfield	Bridgeport Harbor	Bridgeport	$4,276,938	16.7%	$4,440,000
		Southport Harbor	Fairfield	$173	0.000674%	$179
		Greenwich Harbor	Greenwich	$608,187	2.38%	$632,000

Region	County	Waterway[1]	Ports[2]	Ex-Vessel Landings Value	Regional Share	Regional Economic Impact (GSP)
		Fivemile River Harbor	Darien	$3,521,210	13.8%	$3,660,000
		Norwalk Harbor	Norwalk	$2,193,915	8.57%	$2,280,000
		Westport Harbor & Saugatuck River	Westport	$612,783	2.39%	$637,000
		Stamford Harbor	Stamford	$770,788	3.01%	$801,000
Regional Total						*$26,600,000*
Mainland New York[3]	Bronx	Eastchester Bay Area	City Island, Other Bronx	$1,983	100%	$1,940
Regional Total						*$1,945*
Western Long Island	Nassau	Glen Cove	Glen Cove	$151,417	18.2%	$154,000
		Manhasset Bay	Port Washington	$378,543	45.5%	$386,000
		Oyster Bay/Cold Spring Harbor Area	Oyster Bay	$302,834	36.4%	$309,000
Regional Total						*$849,000*
Eastern Long Island	Suffolk	Mattituck Harbor	Mattituck	$992,859	2.66%	$935,000
		Peconic River	South Jamesport, Riverhead, Hampton Bays, New Suffolk	$9,667,695	25.9%	$9,110,000
		Lake Montauk	Montauk	$24,894,715	66.7%	$23,400,000
		Port Jefferson/Mount Sinai	Mount Sinai	$823	0.00221%	$775
		Greenport Harbor	Amagansett, East Hampton, East Marion, Greenport, Orient, Sag Harbor, Shelter Island, Southold	$1,756,117	4.71%	$1,650,000
Regional Total						*$35,100,000*

Source: Electronic communication with Scott Steinback at National Marine Fisheries Service on October 21, 2009.
Notes:
1. Table presents data for only those waterways in which ex-vessel landings were reported. See Table 1 for complete list of waterways.
2. Ex-vessel landings values represent port-level data. In cases where ports span multiple waterways, ex-vessel landings values are apportioned equally across waterways.
3. No ex-vessel landings were reported within Westchester County, New York.

Table 24. Allocation of Recreational Boating Activity to Waterways

Region	County	Waterway[1]	Slips and Moorings	Regional Share	Regional Economic Impact (GSP)
Rhode Island	Washington	Harbor of Refuge	38	4.33%	$389,000
		Great Salt Pond	400	45.6%	$4,090,000
		Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[2]	440	50.1%	$4,500,000
Regional Total					*$8,980,000*
Eastern Connecticut[3]	New London	Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[2]	206	1.87%	$6,420,000
		Mystic River and Harbor	2,794	25.4%	$87,100,000
		Stonington Harbor	273	2.48%	$8,510,000
		New London Harbor	675	6.14%	$21,000,000
		Thames River	287	2.61%	$8,940,000
		Niantic Bay & Harbor	520	4.73%	$16,200,000
	Middlesex	Patchogue River	1,221	11.1%	$38,000,000
		Clinton Harbor	1,018	9.26%	$31,700,000
		North Cove, Old Saybrook	803	7.30%	$25,000,000
		Essex Cove Harbor	413	3.76%	$12,900,000
		Clinton/Westbrook Area	1,125	10.2%	$35,100,000
		Connecticut River Below Hartford	1,663	15.1%	$51,800,000
Regional Total					*$343,000,000*
Western Connecticut	New Haven	Branford Harbor	826	13.1%	$45,600,000
		Guilford Harbor	350	5.57%	$19,300,000
		Guilford/Branford Area	230	3.66%	$12,700,000
		Housatonic River	189	3.01%	$10,400,000
		Milford Harbor	520	8.28%	$28,700,000
		New Haven Harbor	128	2.04%	$7,070,000
		Quinnipiac River	172	2.74%	$9,500,000
	Fairfield	Bridgeport Harbor	25	0.398%	$1,380,000
		Bridgeport Area*	44	0.700%	$2,430,000
		Black Rock Harbor	525	8.36%	$29,000,000
		Greenwich Harbor	70	1.11%	$3,870,000
		Mianus River and Cos Cob Harbor	491	7.82%	$27,100,000
		Fivemile River Harbor	230	3.66%	$12,700,000
		Norwalk Harbor	694	11.0%	$38,300,000
		Westport Harbor & Saugatuck River	634	10.1%	$35,000,000
		Wilson Point Harbor	100	1.59%	$5,520,000
		Stamford Harbor	881	14.0%	$48,700,000
		Westcott Cove	173	2.75%	$9,560,000
Regional Total					*$347,000,000*
Mainland New York	Westchester	Mamaroneck Harbor	640	33.0%	$23,300,000
		New Rochelle Harbor	787	40.6%	$28,600,000
		Port Chester Creek and Harbor	101	5.21%	$3,670,000
	Bronx	Eastchester Bay Area	410	21.2%	$14,900,000
Regional Total					*$70,500,000*

Region	County	Waterway[1]	Slips and Moorings	Regional Share	Regional Economic Impact (GSP)
Western Long Island	Nassau	Glen Cove	632	26.4%	$30,200,000
		Hempstead Harbor	256	10.7%	$12,200,000
		Manhasset Bay	860	36.0%	$41,100,000
		Oyster Bay/Cold Spring Harbor Area	496	20.7%	$23,700,000
		Little Neck Bay	148	6.19%	$7,070,000
Regional Total					*$114,000,000*
Eastern Long Island	Suffolk	Hay (West) Harbor	5	0.0673%	$171,000
		Mattituck Harbor	220	2.96%	$7,510,000
		Peconic River	166	2.24%	$5,670,000
		Great & Little Peconic Bays	388	5.22%	$13,300,000
		Huntington & Northport Bay Area	2,411	32.5%	$82,300,000
		Lake Montauk	964	13.0%	$32,900,000
		Port Jefferson Harbor	360	4.85%	$12,300,000
		Port Jefferson/Mount Sinai	583	7.85%	$19,900,000
		Smithtown Bay/Stony Brook	355	4.78%	$12,100,000
		Shelter Isl./Gardiner's Bay	800	10.8%	$27,300,000
		Greenport Harbor	1,175	15.8%	$40,100,000
Regional Total					*$254,000,000*

Source: Maptech, Inc. "Embassy Cruising Guides: Long Island Sound to Cape May, NJ," Eleventh Edition. 2008.

Notes:

1. Table presents data for only those waterways in which slips and moorings data were reported. See Table 1 for complete list of waterways.
2. Waterways span multiple counties and/or regions. Slip and mooring data are assigned according to marine facility-level information.
3. No slips or moorings were reported in Hartford County, Connecticut.

3.2.4 Ferry-Dependent Tourism

To apportion economic data for ferry-dependent tourism among the waterways in the study area, the analysis assigns each of the 15 ferry segments listed in Table 11 to the waterway nearest the tourist destination. Using annual person-trips as a proxy for economic activity related to ferry-dependent tourism, the analysis divides the nearly 2.7 million person-trips in the study area among seven waterways, as shown in Table 25.

Table 25. Allocation of Ferry Tourism Activity to Waterways

Region	County	Waterway	Person-Trips[1]	Regional Share	Regional Economic Impact (GSP)
Rhode Island	Washington	Block Island Harbor of Refuge	193,521[2]	100%	$6,330,000
Regional Total					*$6,330,000*
Eastern Connecticut	Hartford	Connecticut River Below Hartford	6,417	100%	$270,000
Regional Total					*$270,000*
Western Connecticut	Fairfield	Bridgeport Harbor	300,000[3]	94.8%	$13,300,000
		Greenwich Harbor	16,413	5.19%	$728,000
Regional Total					*$14,00,000*
Eastern Long Island	Suffolk	Fishers Island	79,500	8.17%	$3,040,000
		Lake Montauk	1,328[2]	0.136%	$50,800
		Shelter Island	892,200[4]	91.7%	$34,100,000
Regional Total					*$37,200,000*

Source: Passenger data were obtained from the Research and Innovative Technology Administration, Bureau of Transportation Statistics. National Census of Ferry Operators database. Accessed at http://www.transtats.bts.gov on October 22, 2009

1. Person-trip values are derived by dividing the number of one-way tickets by two.
2. Estimate obtained through personal communication with Viking Star, Inc. on October 30, 2009.
3. Estimate obtained through personal communication with Bridgeport & Port Jefferson Steamboat Company on April 29, 2010.
4. Estimate obtained through personal communication with North Ferry Company, Inc. on October 30, 2009, with South Ferry Company, Inc. on October 30, 2009 and April 1, 2010, and with Cross Sound Ferry Services, Inc. on November 5, 2009 and April 29, 2010.

3.2.5 Naval Submarine Base New London

The Naval Submarine Base New London is located on the Thames River in the Eastern Connecticut Region. The navigation-dependent activity associated with the base is assigned to the Thames River.

3.3 VESSEL TYPES BY DRAFT

This section presents the distribution of vessel drafts for the recreational boating, commercial fishing, and marine transportation sectors in LIS. This information is used to indicate the depths at which vessel access to harbors and waterways will be limited by shoaling under the No Action Alternative.

Data on recreational and commercial fishing vessel drafts in LIS were obtained from a database of vessels registered with the U.S. Coast Guard.[37] For the commercial fishing industry, this source provided a sample of 399 vessels with drafts ranging from 2.3 to 14.5 feet, with a median draft of six feet. For the recreational boating industry, this source provided a sample of 12,309 vessels with drafts ranging from 0.9 to 57.0 feet; the median draft for these vessels was 6.1 feet.

For the marine transportation industry, the analysis uses cargo capacity, rather than the number of registered vessels, to determine the distribution of vessel drafts. By using cargo capacity as a metric, the analysis focuses on the likely volume of cargo that would be affected by excluding vessels of a particular depth from a harbor. Vessel draft data for marine transportation vessels were obtained from a database of vessel characteristics in LIS compiled for the USACE Institute for Water Resources.[38] For the marine transportation industry, this source provided a sample of 311 vessels with drafts ranging from 3 to 41 feet. Based on the distribution of vessels by cargo capacity, the median vessel has a draft of 21 feet.

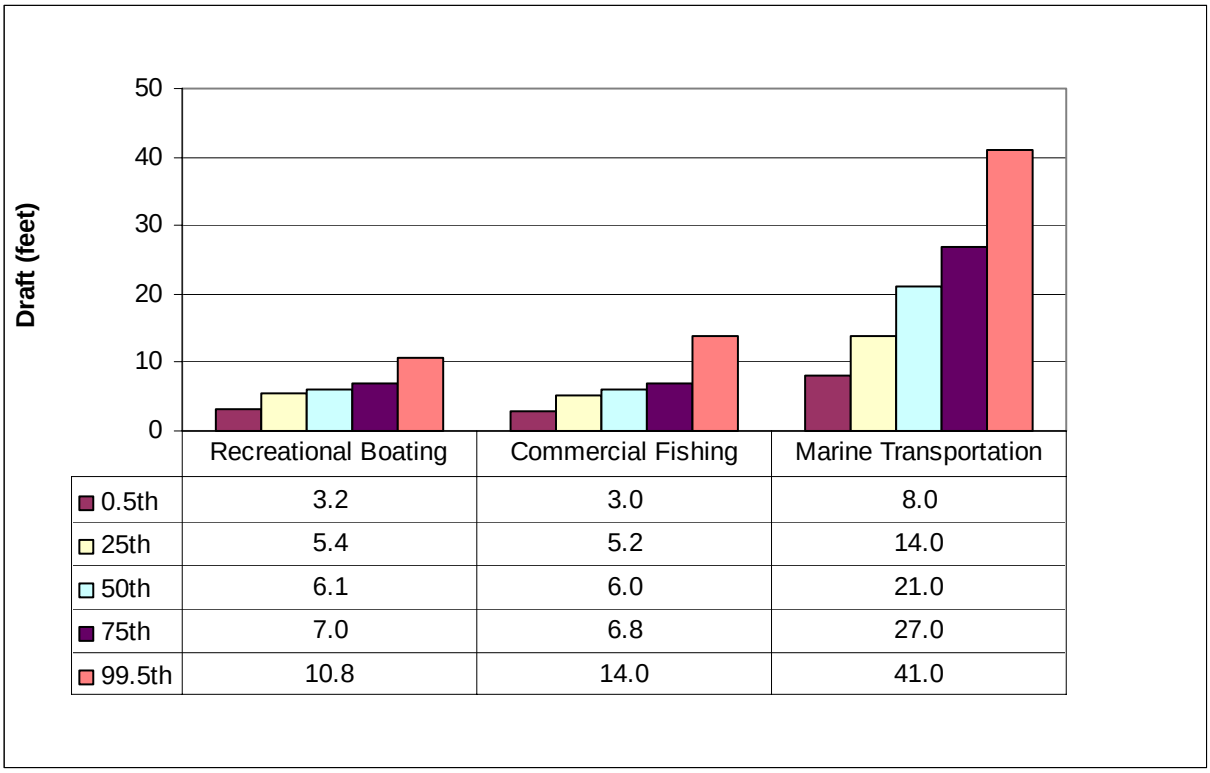
Figure 5 presents the distribution of vessel drafts for the three sectors discussed above, showing the 25th, median (50th), and 75th percentile drafts (in feet), along with the minimum and maximum drafts (represented by the 0.5th and 99.5th percentiles, in order to remove outliers).

The analysis also employs information on the draft of ferries to characterize their navigational access requirements. In this case, however, it does not rely on general information on the distribution of vessel drafts. Instead, it characterizes access requirements based on the average loaded draft for vessels in the particular ferry lines that serve each waterway where ferry-dependent tourism takes place. Ferry vessels in LIS vary in draft from 4.0 to 11.5 feet.[39]

For the Naval Submarine Base New London, the Navy provided information on submarine drafts and dredging activity[40]. The submarines at the base have a typical draft of 36 feet when running at the surface. In addition, the Navy typically dredges the pier berths where the submarines dock down to 38 feet to allow for inspection by divers. The

[37] U.S Coast Guard Office of Information Resources, "Merchant Vessels of the United States," October, 2009. Distributed on CD by the National Technical Information Service on October 25, 2009.
[38] Data from the USACE Navigation Data Center are available at http://www.ndc.iwr.usace.army.mil/data/datavess.htm, accessed November 15, 2009.
[39] Research and Innovative Technology Administration, Bureau of Transportation Statistics. National Census of Ferry Operators database. Accessed at http://www.transtats.bts.gov on October 22, 2009.
[40] Peter Blair, Public Affairs Office, Naval Submarine Base New London, March 22, 2010.

analysis uses this information to determine shoaling impacts on the Naval Submarine Base.



	Recreational Boating	Commercial Fishing	Marine Transportation
0.5th	3.2	3.0	8.0
25th	5.4	5.2	14.0
50th	6.1	6.0	21.0
75th	7.0	6.8	27.0
99.5th	10.8	14.0	41.0

Figure 5. Distribution of Vessel Drafts by Industry and Percentile

Sources: U.S. Coast Guard's Marine Safety Information System Database; U.S. Army Corps of Engineers Navigation Data Center Vessel Characteristics Report/Database, accessed at http://www.ndc.iwr.usace.army.mil/data/datavess.htm on November 15, 2009.

3.4 ANALYSIS OF SHOALING IMPACTS ON ECONOMIC ACTIVITY

3.4.1 Approach

Appendix A presents the shoaling analysis, which uses historical data on depth, dredging, and shoaling for facilities in each waterway to determine the rate at which channel depths will decrease over time. Appendix A develops distinct shoaling rates for different classes of facilities within waterways (e.g., Federal navigation channels, marinas, passenger transportation facilities). This analysis uses the facility and waterway-specific shoaling rates developed in Appendix A, in combination with information on the drafts of various vessels, to estimate the number of years until waterways in the study area become impassable.

The analysis uses the distribution of vessel drafts for each industry as a proxy for understanding the percentage of economic activity associated with each industry that will be excluded as shoaling progresses. It assumes that exclusion of a vessel from a port or

waterway will result in the curtailment of all economic activity associated with that vessel. The analysis examines impacts at four distinct points in time: 5, 10, 15, and 20 years after dredging is discontinued.

After calculating the percent of baseline annual economic activity in each waterway that is curtailed in each year, the reduction in regional economic activity attributable to the No Action Alternative is calculated for each industry by multiplying the percent of curtailed activity by the share of baseline activity assigned to each waterway (see Tables 22 through 25). The resulting estimates of total percent reductions in regional economic activity are presented below.

In some cases, the shoaling analysis suggests that some percentage of the vessels in a given industry cannot currently access particular harbors. For example, the shoaling analysis estimates that depths at the marinas in Peconic River, New York are currently less than 5.4 feet, the 25th percentile draft for all recreational vessels in LIS. This suggests that less than 25 percent of vessels in the LIS recreational fleet can currently enter these marinas. Rather than attribute these limitations to the No Action Alternative, the analysis adjusts the baseline distribution of recreational vessels for this harbor, assuming that all have a draft no greater than 5.4 feet. This paints a more realistic view of the fleet that currently utilizes this harbor. A full list of these "modified distributions" for vessel drafts and the waterways to which they are applied can be found in Appendix B.

For ferry-dependent tourism, the analysis determines the years in which waterways with ferry access will no longer be accessible based on the average vessel draft for each ferry operator. Once a waterway's channel depth becomes shallower than the draft specified, the analysis assumes that all vessels associated with that operator are precluded from entering harbors and, by extension, all economic activity is curtailed.

3.4.2 Limitation to Shoaling Impacts Analysis

A limitation to the method described above is that the analysis assumes, except where modified vessel distributions are applied, that each individual waterway is served by the full distribution of vessels, in terms of draft. In reality, vessel traffic may have a much less even distribution, with deeper draft vessels frequenting some waterways, while shallower draft vessels frequent others. Without precise data on the vessels that frequent each waterway, it is not possible to know the magnitude of any bias that may be introduced as a result of this assumption. By using modified distributions of vessel drafts for waterways where the current depth is less than the 75th, 50th, or 25th percentile of the vessels typically engaged in a particular economic activity, the analysis attempts to minimize any bias related to this assumption.

3.4.3 Results

Using the process described above, the analysis estimates the percentage of baseline economic activity (i.e., output, GSP, employment, and tax revenue) that will be curtailed in each waterway after 5, 10, 15, and 20 years of shoaling under the No Action

Alternative. Tables 26 through 30 summarize the estimated impact on each sector at the regional level. As Table 26 shows, the Rhode Island, New York Mainland, and Western Long Island regions see the largest percent reductions in economic activity in the marine transportation sector, with much smaller reductions in Western Connecticut and Eastern Long Island. In addition, most reductions in marine transportation activity appear to be caused by shoaling during the first ten years of the No Action Alternative. Five out of six regions in the study area are estimated to experience reductions in commercial fishing activity of 15 percent or more by year 15. As with the marine transportation sector, most losses in commercial fishing activity appear to be caused by shoaling during the first ten years of the No Action Alternative. By contrast, economic activity in the recreational boating sector is expected to decline steadily over the full 20-year period examined in this analysis.

The analysis does not anticipate any restrictions on vessel traffic activity at the Naval Submarine Base New London. The area around the facility was dredged in 2009, and recent information on dredged volumes, coupled with information on areal extent of dredging from post-dredge surveys[41] indicates a shoaling rate slow enough that the subs will be able to access the facility for the duration of the 20-year study period (see table A1, Thames River Naval Base Area shoaling rate estimate).

Finally, both Eastern Connecticut and Eastern Long Island Sound are expected to experience reductions in ferry-dependent tourism due to shoaling in the No Action Alternative. A detailed breakdown of impacts by waterway can be found in Appendix C.

Table 26. Reduction in Baseline Economic Activity in Years 5, 10, 15, and 20 of the No Action Alternative: Marine Transportation Sector

Region	Year 5	Year 10	Year 15	Year 20
Rhode Island	0.0%	0.0%	-25.0%	-75.0%
Eastern Connecticut	-1.8%	-1.8%	-1.8%	-1.9%
Western Connecticut	-6.2%	-7.0%	-7.0%	-7.0%
New York Mainland	-8.1%	-8.1%	-33.1%	-55.4%
Western Long Island	-30.0%	-48.6%	-48.6%	-48.6%
Eastern Long Island	0.0%	0.0%	0.0%	0.0%
All Long Island Sound	**-6.9%**	**-9.9%**	**-10.1%**	**-10.4%**

[41] Post-dredge surveys and dredge volume estimate provided by Richard Conant, New London Naval Submarine Base.

Table 27. Reduction in Baseline Economic Activity in Years 5, 10, 15, and 20 of the No Action Alternative: Commercial Fishing Sector

Region	Year 5	Year 10	Year 15	Year 20
Rhode Island	-44.9%	-44.9%	-44.9%	-44.9%
Eastern Connecticut	-2.3%	-2.8%	-17.8%	-18.2%
Western Connecticut	-43.8%	-50.0%	-55.2%	-55.2%
New York Mainland	0.0%	0.0%	0.0%	0.0%
Western Long Island	-40.9%	-52.3%	-63.4%	-63.4%
Eastern Long Island	-20.8%	-22.6%	-23.3%	-23.3%
All Long Island Sound	**-24.9%**	**-28.0%**	**-33.3%**	**-33.4%**

Table 28. Reduction in Baseline Economic Activity in Years 5, 10, 15, and 20 of the No Action Alternative: Recreational Boating Sector

Region	Year 5	Year 10	Year 15	Year 20
Rhode Island	-50.1%	-50.1%	-50.1%	-50.1%
Eastern Connecticut	-32.8%	-40.4%	-47.9%	-60.8%
Western Connecticut	-15.5%	-28.0%	-36.7%	-41.4%
New York Mainland	-30.5%	-40.4%	-43.0%	-44.3%
Western Long Island	0.0%	-2.7%	-2.7%	-12.0%
Eastern Long Island	-1.1%	-1.1%	-6.6%	-11.8%
All Long Island Sound	**-17.2%**	**-24.1%**	**-30.4%**	**-37.9%**

Table 29. Reduction in Baseline Economic Activity in Years 5, 10, 15, and 20 of the No Action Alternative: Ferry-Dependent Tourism

Region	Year 5	Year 10	Year 15	Year 20
Rhode Island	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	0.0%	0.0%	-100.0%	-100.0%
Western Connecticut	0.0%	0.0%	0.0%	0.0%
New York Mainland	*	*	*	*
Western Long Island	*	*	*	*
Eastern Long Island	0.0%	-56.2%	-56.2%	-82.1%
All Long Island Sound	**0.0%**	**-36.2%**	**-36.6%**	**-53.3%**
* No Economic Activity				

Table 30. Reduction in Baseline Economic Activity in Years 5, 10, 15, and 20 of the No Action Alternative: Sub Base[42]

Region	Year 5	Year 10	Year 15	Year 20
Eastern Connecticut	0.0%	0.0%	0.0%	0.0%

3.5 IMPACTS OF NO ACTION ALTERNATIVE ON REGIONAL ECONOMIC ACTIVITY

This section presents the regional economic impacts of the No Action Alternative. Note that a limitation to the current approach is that it assumes that all economic activity associated with vessels of a particular draft will be curtailed when that draft exceeds the depth of a given waterway. In reality, economic activity associated with these vessels may continue at other ports within LIS, by "lightering" vessels, by shifting to smaller vessels, or by altering the mode of transport (such as shipping cargo by truck or rail). Each of these behavioral changes would result in an increase in transportation costs within the study area; these impacts are not captured in this analysis. Moreover, these changes could lead to other impacts. For example, if cargo is shifted to smaller vessels with shallower drafts, increased vessel traffic would be expected; this might lead to an increase in the risk of collisions. Section 3.6 briefly discusses these impacts.

[42] The shoaling analysis (Appendix A) indicates that 40-ft draft vessels would be able to access the Sub Base facility for 29 years under the No-Action Scenario (see table A-1). Submarines used at the New London Base have a 36-ft draft.

3.5.1 Marine Transportation

Table 31 presents the results of the IMPLAN modeling conducted for the marine transportation sector. This sector as defined is the largest navigation-dependent sector in the study area. The impact of the No Action Alternative on this sector is estimated, by Year 20, to reduce GSP within the study area by approximately $336 million. Of this amount, loss of marine transportation activity in Western Long Island accounts for about 65 percent, with all of that loss attributable to shoaling during the first 10 years of the No Action Alternative. The total loss of GSP represents a 10 percent decline from the current regional economic contribution of this sector.

Table 31. Impacts of the No Action Alternative: Contribution of Marine Transportation to GSP (2009 dollars, millions)

Region	Year 5	Year 10	Year 15	Year 20
Rhode Island	$0	$0	-$3	-$8
Eastern Connecticut	-$25	-$25	-$25	-$26
Western Connecticut	-$46	-$52	-$52	-$52
New York Mainland	-$1	-$1	-$3	-$6
Western Long Island	-$135	-$218	-$218	-$218
Eastern Long Island	$0	$0	$0	$0
All Long Island Sound	**-$223**	**-$321**	**-$326**	**-$336**

3.5.2 Commercial Fisheries

Table 32 presents the results of the IMPLAN modeling conducted for the commercial fishing sector. The impact of the No Action Alternative on this sector is estimated, by Year 20, to reduce GSP within the study area by approximately $28 million. This represents a 33 percent decline from the current regional economic contribution of this sector.

3.5.3 Recreational Boating

Table 33 presents the results of the IMPLAN modeling conducted for the recreational boating sector. The impact of the No Action Alternative on this sector is estimated, by Year 20, to reduce GSP within the study area by $455 million. This represents a 38 percent decline from the sector's current contribution to regional economic activity.

Table 32. Impacts of the No Action Alternative: Contribution of Commercial Fishing to GSP (2009 dollars, millions)

Region	Year 5	Year 10	Year 15	Year 20
Rhode Island	$0	$0	$0	$0
Eastern Connecticut	$0	$0	-$3	-$3
Western Connecticut	-$12	-$13	-$15	-$15
New York Mainland	$0	$0	$0	$0
Western Long Island	$0	$0	-$1	-$1
Eastern Long Island	-$7	-$8	-$8	-$8
All Long Island Sound	**-$21**	**-$23**	**-$28**	**-$28**

Table 33. Impacts of the No Action Alternative: Contribution of Recreational Boating to GSP (2009 dollars, millions)

Region	Year 5	Year 10	Year 15	Year 20
Rhode Island	-$5	-$5	-$5	-$5
Eastern Connecticut	-$112	-$138	-$164	-$208
Western Connecticut	-$54	-$97	-$127	-$144
New York Mainland	-$21	-$28	-$30	-$31
Western Long Island	$0	-$3	-$3	-$14
Eastern Long Island	-$3	-$3	-$17	-$30
All Long Island Sound	**-$206**	**-$289**	**-$365**	**-$455**

3.5.4 Ferry-dependent Tourism

Table 34 presents the results of the IMPLAN modeling conducted for ferry-dependent tourism. The impact of the No Action Alternative on this sector is estimated, by Year 20, to reduce GSP within the study area by approximately $35 million. This represents a 53 percent decline from the sector's current contribution to GSP.

3.5.5 Naval Submarine Base New London

Table 35 presents the results of the IMPLAN modeling conducted for the in New London. No impacts on vessel traffic activity are expected over the 20-year time frame of this analysis.

Table 34. Impacts of the No Action Alternative: Contribution of Ferry-Dependent Tourism to GSP (2009 dollars, millions)

Region	Year 5	Year 10	Year 15	Year 20
Rhode Island	$0	$0	$0	$0
Eastern Connecticut	$0	$0	$0	$0
Western Connecticut	$0	$0	$0	$0
New York Mainland	*	*	*	*
Western Long Island	*	*	*	*
Eastern Long Island	$0	-$21	-$21	-$31
All Long Island Sound	**$0**	**-$24**	**-$24**	**-$35**

*No economic activity.

Table 35. Impacts of the No Action Alternative: Contribution of Sub Base to GSP (2009 dollars, millions)

Region	Year 5	Year 10	Year 15	Year 20
Eastern Connecticut	$0	$0	$0	$0

3.6 OTHER POTENTIAL ECONOMIC IMPACTS OF NO ACTION ALTERNATIVE

In addition to the negative regional economic impacts described above, the No Action Alternative could also lead to economic impacts not readily quantified in the context of a regional economic analysis. Such impacts include potential costs related to tidal delays for cargo traffic and an increased likelihood of vessel collisions and oil spills. In addition, social and cultural impacts on commercial and recreational fishermen could result from the loss of access to ports. This section describes these potential impacts.

3.6.1 Tidal Delays

As channel depths decrease, some vessels may lose access to a waterway; others may only have access during high tide. Delays incurred while awaiting favorable tides would result in additional costs to marine transportation and commercial fishing operators, including labor and fuel costs. Commercial fishing vessels would run additional risks associated with spoilage of catch. Tidal delays would also restrict traffic to specific time periods. These vessel transit restrictions would result in increased congestion in channels and harbors, and could result in additional delays at ports due to crowding. Such congestion could also lead to an increased likelihood of vessel collisions, groundings, and oil spills (see below).

It is possible that tidal delays could result in some operators choosing to re-route cargo to ports outside of LIS. While this behavior would reduce vessel traffic in LIS, it would also reduce revenues for area businesses, and would likely increase overall operator costs (assuming that the current LIS route is the most cost-efficient).

3.6.2 Potential for Increased Vessel Collisions, Groundings and Oil Spills

As noted above, the shoaling of waterways under the No Action Alternative could restrict channels, lead to the creation of in-water hazards, and promote greater congestion in channels and harbors. This in turn would increase the likelihood of accidents, including collisions and groundings. For example:

- Shoaling creates physical in-water hazards that can themselves cause groundings or collisions. Groundings of commercial ships already comprise one-third of all commercial maritime accidents.[43]

- A key factor influencing the likelihood of ship accidents is a vessel operator's knowledge of a waterway.[44] Waterway and ship channel shoaling would change waterway conditions unpredictably, adding to the likelihood of collisions and groundings.

- Restrictions on vessel traffic to particular tidal periods or to narrower ship channels would increase crowding, and thus increase the likelihood of vessel collisions and oil spills. The number and frequency of ship arrivals has been identified as one of the key factors influencing the likelihood of ship accidents.[45]

- To accommodate shallower ports and channels, some operators may choose to shift shipping methods from one large vessel to several smaller vessels. Alternatively, operators may choose to run vessels below capacity and increase trip frequency.[46] Either of these methods would likely result in an increase in the number of vessels in area channels and harbors, further increasing congestion and the likelihood of vessel collisions.

[43] Lin, S., H. L. Kite-Powell, N. M. Patrikalakis. 1998. Physical Risk Analysis of Ship Grounding. Design Laboratory Memorandum 98-10.
[44] Briggs, Michael J., et al. Probability assessment for deep-draft navigation channel design. Coastal Engineering. Volume 48, Issue 1, March 2003, Pages 29-50; Kite-Powell, H.L. N. Patrikalakis, D. Jin, et al. Formulation of a Model for Ship Transit Risk: Final Project Report.
[45] *Kite-Powell, H.L. N. Patrikalakis, D. Jin, et al.* Formulation of a Model for Ship Transit Risk: Final Project Report.
[46] A common practice for barge operators running in areas experiencing siltation is to run below capacity to avoid risk of grounding. For example, on the Cuyahoga River, Ohio, operators have been lightening loads to avoid groundings. Miller, Jay. "Lightening the Load.". *Crain's Cleveland Business*; 10/8/2007, Vol. 28 Issue 40. 2 pgs

3.6.3 Other Potential Economic, Social, and Quality Of Life Impacts on Affected Fishing and Recreational Boater Populations

The National Marine Fisheries Service (NMFS) has identified 19 communities with ties to commercial and/or recreational fisheries in the LIS study area. Table 36 identifies these communities.[47] If channel and harbor shoaling results in reduced access to fishing ports, these fishing communities could be negatively affected.

NMFS examined a number of demographic characteristics of these communities, including median household income, race, education, language spoken at home, and percent of population over 16 in the workforce, to determine the current state and likely resiliency of these communities. NMFS found that LIS fishing communities have a lower percent of families living in poverty, and a higher median income than the U.S. as a whole. This is likely due, in part, to NMFS' use of town-of-port level data for its assessment, which captures a number of areas with very high median household incomes, (e.g., Darien, Connecticut, which has a median household income of $186,000). While these data are unlikely to be indicative of the income of commercial fishermen in the study area, they indicate that LIS fishing communities as a whole are likely to be more economically resilient than fishing communities elsewhere, and thus may be better able to withstand adverse impacts on the commercial fishing sector. As noted below, however, the nature of the impacts on those within the commercial fishing sector could be severe.

Table 36. Fishing Communities in the LIS Study Area

Region	Fishing Communities
Rhode Island	Block Island
Eastern Connecticut	Groton, New London, Portland, Stonington, Waterford
Western Connecticut	Branford, Bridgeport, Darien, East Haven, New Haven, Norwalk
New York Mainland	City Island, Bronx (New York City)
Western Long Island	Queens (New York City)
Eastern Long Island	Amagansett, Greenport, Mattituck, Montauk
Source: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Fishing Communities of the United States 2006. May 2009. Accessed at http://www.st.nmfs.noaa.gov/st5/publication/fisheries_communities.html on January 13, 2010.	

Current or expected profit from a specific fishery relative to the employment alternatives available to commercial fishermen is likely to be the major determinant of a decision to enter or exit the fishery.[48] Moreover, research suggests that in most fisheries, the two most important variable inputs in the short-run production function are labor and fuel.

A study of the social and cultural aspects of the multi-species groundfish fishery in New England and the Mid-Atlantic Region found that when faced with fishing area closures,

[47] U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Fishing Communities of the United States 2006. May 2009. Accessed at http://www.st.nmfs.noaa.gov/st5/publication/fisheries_communities.html on January 13, 2010.
[48] H. Scott Gordon. "The Economic Theory of a Common-Property Resource: The Fishery" *Journal of Political Economy* 62, 2 (April 1954): 124-142.

"most fishers have adjusted by experimenting with new fisheries, dealing with reduced incomes by rotating or laying off crew (keeping individual shares stable), supplementing incomes with casual shore employment or with the labor of their spouses, or curtailing consumption practices. Those who have moved into shore-based jobs have tended to take positions that are related to fishing or to seafaring (e.g., working marine repair or piloting passenger or cargo vessels)."[49] While the future behavior of fishermen in response to increased port and harbor shoaling is unknown, impacts on operating costs are a major concern. In particular, the additional time spent seeking a place to land catch, obtain needed supplies and services, or untangle from mooring rafts would detract from time available for fishing. These impacts could prove significant enough to cause some to abandon the industry.

In the most extreme case, if a commercial fisherman's home port becomes inaccessible due to shoaling, it may prove difficult for that individual to relocate to another port. Absent nearby alternatives, port closures would likely cause some fishermen to leave the industry altogether. To the extent that fishermen are forced to exit the industry, negative social impacts could be expected.

3.7 SUMMARY

This section summarizes the economic impacts of the No Action Alternative in Year 20. As discussed above, the LIS DMMP's No Action Alternative assumes the cessation of all dredging activity in LIS. Table 37 presents information on losses of total economic output. Table 38 presents information on losses to GSP. Table 39 presents information on employment losses. Table 40 presents information on tax impacts. As shown, the impacts of this alternative would accumulate over time, as shoaling continues and vessels lose access to harbors and waterways. In particular, impacts on marine transportation and recreational boating would account for the greatest loss in economic activity, together representing 93 percent of the estimated reduction in GSP after 20 years. Eastern and Western Connecticut, as well as Western Long Island, are expected to bear the largest impacts in terms of GSP, each experiencing over $200 million in reduced GSP after 20 years.

[49] U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. "An Appraisal of the Social and Cultural Aspects of the Multispecies Groundfish Fishery in New England and the Mid-Atlantic Regions." 1996. Accessed at http://www.nefsc.noaa.gov/read/socialsci/cultural-aspects/50-DGNF-5-00008.pdf on January 15, 2010.

Table 37. Impact of the No Action Alternative on Regional Output, Year 20 (2009 dollars, millions)

Region	Marine Transportation	Commercial Fishing	Recreational Boating	Ferry Tourism	Sub Base	Total
Rhode Island	-$34	$0	-$7	$0	$0	-$41
Eastern Connecticut	-$47	-$4	-$335	$0	$0	-$387
Western Connecticut	-$94	-$19	-$226	$0	$0	-$338
New York Mainland	-$9	$0	-$49	$0	$0	-$58
Western Long Island	-$428	-$1	-$22	$0	$0	-$450
Eastern Long Island	$0	-$10	-$47	-$51	$0	-$109
All Long Island Sound	**-$651**	**-$36**	**-$723**	**-$59**	**$0**	**-$1,468**

Table 38. Impact of the No Action Alternative on GSP, Year 20 (2009 dollars, millions)

Region	Marine Transportation	Commercial Fishing	Recreational Boating	Ferry Tourism	Sub Base	Total
Rhode Island	-$8	$0	-$5	$0	$0	-$12
Eastern Connecticut	-$26	-$3	-$208	$0	$0	-$238
Western Connecticut	-$52	-$15	-$144	$0	$0	-$210
New York Mainland	-$6	$0	-$31	$0	$0	-$37
Western Long Island	-$218	-$1	-$14	$0	$0	-$233
Eastern Long Island	$0	-$8	-$30	-$31	$0	-$69
All Long Island Sound	**-$336**	**-$28**	**-$455**	**-$35**	**$0**	**-$853**

Table 39. Impact of the No Action Alternative on Employment, Year 20

Region	Marine Transportation	Commercial Fishing	Recreational Boating	Ferry Tourism	Sub Base	Total
Rhode Island	-128	-3	-84	0	$0	-215
Eastern Connecticut	-289	-59	-3,172	-5	$0	-3,525
Western Connecticut	-291	-324	-1,939	0	$0	-2,554
New York Mainland	-50	0	-411	0	$0	-461
Western Long Island	-1,437	-20	-188	0	$0	-1,644
Eastern Long Island	0	-310	-440	-533	$0	-1,284
All Long Island Sound	**-2,296**	**-512[1]**	**-6,290**	**-557**	**$0**	**-9,655[1]**

1. Note that, in this case, the employment and total figures reported for the six regions sum to a value greater than that indicated for the LIS study area. This anomaly may result from independent specification of the regional purchase coefficients within each IMPLAN model (i.e., regional purchase coefficients for one or more sub-regions that are different than the regional purchase coefficient for the study area as a whole). In addition, the output per worker that IMPLAN specifies may be lower in some sub-regions, causing the model to estimate greater relative employment impacts within these regions than for the study area as a whole.

Table 40. Impact of the No Action Alternative on State and Federal Tax Revenues, Year 20 (2009 dollars, millions)

Region	Marine Transportation	Commercial Fishing	Recreational Boating	Ferry Tourism	Sub Base	Total
Rhode Island	-$2	$0	-$1	$0	$0	-$4
Eastern Connecticut	-$7	-$1	-$64	$0	$0	-$72
Western Connecticut	-$15	-$3	-$47	$0	$0	-$65
New York Mainland	-$2	$0	-$10	$0	$0	-$12
Western Long Island	-$64	$0	-$5	$0	$0	-$69
Eastern Long Island	$0	-$2	-$10	-$11	$0	-$23
All Long Island Sound	**-$99**	**-$6**	**-$145**	**-$12**	**$0**	**-$262**

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APPENDIX A SHOALING ANALYSIS

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Woods Hole Group estimated shoaling rates for harbors and channels within the project area in order to determine the projected dredging needs and the time remaining before navigation is limited. Shoaling rates were derived for both federally maintained channels, and those that are not maintained by the U.S. Army Corps of Engineers (USACE). For federally maintained channels, this analysis relied upon historical USACE dredge records including dredging dates and volumes, as well as the future dredging needs MS Access database (lis_navdepfacilities-Sep09.mdb) for Long Island Sound provided by the USACE. From this information, detailed shoaling rates were determined. For non-federal channels and dredge areas, Woods Hole Group utilized information from the most recent Long Island Sound Dredging Needs Survey (also included in the provided database), as available. This involved using the estimates of future dredging needs (projected dredging volumes) from the survey to derive shoaling rates over a 30 year time horizon. Non-federal dredge areas that had no available information were excluded from the shoaling rate analysis.

The shoaling analysis produced estimates of shoaling rates for each channel, and the year in which the studied channels will become impassable to vessels of various drafts. The method used for estimating shoaling in federal channels was different from that of non-federal channels, since more detailed historic information was available for the federally-maintained navigational channels. The methods used in the analyses of both the federal and non-federal facilities are further detailed below.

Federal Facilities

In conducting the shoaling analysis for federal facilities, several parameters were quantified. These parameters were computed using USACE conditional surveys, USACE historical dredging records, NOAA tidal benchmarks, NOAA navigational GIS layers, and the aforementioned USACE future dredging needs database. Specifically, the parameters used in the shoaling analysis are defined as:

- **Required maintenance dredging** – Volumetric rate (cy/year) determined from projected future dredging needs for next 30 years. These rates were compared with historical dredging records to come up with a characteristic rate for each facility.

- **Areas of maintenance dredging** – The areas of the Federal Navigational Projects were determined using USACE conditional surveys. These areas were verified using GIS navigational layers from NOAA. Conditional surveys were then examined to identify the percentage of the navigation project area where shoaling and subsequent maintenance dredging would occur. These areas were identified in the most recent conditional surveys as the portions of the channel that were higher in elevation and above the authorized depth for the channel. If the most recent conditional survey was characterized as a post-dredge survey, the previous conditional survey was used. If the conditional survey was a post-dredge survey, and no other conditional survey was available for the navigation project, it

was assumed that 50% of the entire project area required maintenance dredging.

If no conditional survey was available for the federal facility, the total project area was determined using GIS navigational layers from NOAA. It was then assumed for these facilities that 50 percent of the entire project area required maintenance dredging. The Wilson Point Harbor, CT Federal Navigational Project represented an exception where 100 percent of the entire project area was assumed to require maintenance, based on conversations with the USACE New England District (Dec. 10, 2009 conference call with M. Habel and E. O'Leary).

- **Shoaling Rate** - The shoaling rate in ft/year was then computed by dividing the volumetric rate of required maintenance dredging (cy/year) by the estimated area.

- **Controlling Depth** – For the Federal Navigational Projects, where conditional surveys were available, the controlling depths for the projects were established. The controlling depth was determined by taking the minimum depth that existed within the navigation project at the time of the conditional survey. In some instances, however, this minimum depth only existed on one side or within a small portion of the channel and 50 to 75 percent of the channel had a greater depth. For these cases, a consideration was made as to the types of vessels that might navigate the waterway and the typical breadths for these types of vessels (i.e. recreational vessels with an average beam of less than 15 feet or larger commercial transport vessels which can have a beam of 75 feet, or more[50]). If a portion of the channel had a width sufficient to accommodate these types of vessels and had a depth greater than the minimum depth, the controlling depth was then adjusted to be the depth within this portion of the channel.

- **Year of Last Condition Survey** – Year when the most recent condition survey was conducted.

- **Year Last Dredged** – Year when the Federal Navigation Project was last dredged. This information was obtained from the 'FNP Future Dredging Needs' table in the MS Access database provided by the USACE. If any of the facilities' conditional surveys were characterized as post-dredge surveys and showed that dredging occurred more recently than the database indicated, it was assumed that the year last dredged was the same year in which the conditional survey was conducted.

[50] Based on 2007 WTLUS (USACE, 2008)

- **Years Before Impassable to Vessels at MHW** – In order to determine when each waterway/navigational project would become impassable to vessels of a certain draft, the computed shoaling rate (ft/year) was used in conjunction with a specified depth and time when that depth was available in the waterway. The general formula for computing the number of years before becoming impassable is given by the expression:

$$N = \frac{(h + rn) - (d + 1)}{S} - (2009 - yr)$$

where:

N	= number of years before waterway is impassable,
h	= water depth referenced to MLLW in feet,
rn	= difference between MHW and MLLW in feet,
d	= draft of vessel in feet,
S	= shoaling rate in ft/year,
yr	= starting year when waterway was at depth h.

The expression above also takes into account an assumed 1-foot of keel clearance is required in evaluating the number of years before the channel/waterway becomes impassable to vessels of a certain draft. For all facilities, the difference between MHW and MLLW was obtained from the nearest NOAA tidal benchmark. Based on the information that was available for each federal facility, three different methodologies were used in determining the number of years it would take for the facility to become impassable if no further maintenance dredging (no action) were to occur:

a. For facilities where a conditional survey was available, the controlling depth and year when the conditional survey was conducted were utilized as *h* and *yr*, respectively.
b. For facilities where no conditional survey was available, the authorized channel depth and year last dredged were utilized as *h* and *yr*, respectively. Five (5) federal navigational projects fit into this category including: 1) Essex Cove Harbor, CT, 2) Salmon River Cove, CT, 3) Wethersfield Cove, CT, 4) New Rochelle Harbor, NY, and 5) Little Neck Bay, NY.
c. For facilities where no conditional survey was available and the last dredging year was unknown, the authorized channel depth and 2009 were utilized as *h* and *yr*, respectively. This assumes that at the current date these facilities are at their authorized depth. Two (2) federal navigational projects fit into this category including: 1) Hempstead Harbor, NY and 2) Echo Bay, NY.

Non-Federal Facilities

The non-federal channels were analyzed using a different methodology from that used for the federal facilities. The non-federal channels were first divided into two categories for this analysis.

1) First, all non-federal facilities that lie within federally maintained waterways were grouped by waterway and then into categories based on their nature of use. The different nature of uses included:

    1. Marina
    2. Boat Building/Repair
    3. Commercial Fishing
    4. Freight Transportation
    5. Passenger Transportation
    6. Tug/Towing Services
    7. Retail Services
    8. Other

    The facilities were classified into these categories based on the most recent Long Island Sound Dredging Needs Survey (included in the USACE provided MS Access database). Average shoaling rates were then determined for each nature of use category represented by non-federal facilities, within each federally maintained waterway.

2) Second, the remaining non-federal facilities within the overall Dredge Center (independent of waterway) were also grouped by the nature of use, and average shoaling rates were determined for each usage type.

Estimates of shoaling rates and the number of years before facilities become impassable to vessels of certain drafts were determined using information provided in the survey responses. For non-federal channels that did not respond to the dredging needs survey, it was initially proposed to search out state and local permit applications to determine potential shoaling rates for these additional non-federal facilities. However, after discussions with the USACE Project Team, it was deemed to be a time-consuming process and the non-federal facilities that did not respond to the survey were excluded from the analysis. In addition, there were cases in that the non-federal entity responded to the survey, but did not include the required data to estimate the shoaling rate and/or the number of years before becoming impassable.

The parameters involved in the analysis of non-federal facilities are further detailed as:

1) **Required maintenance dredging** – Volumetric rate (cy/year) determined from projected future dredging needs for next 30 years.

2) **Areas of maintenance dredging** – The total areas of the non-federal facilities were determined by measuring each facility's spatial extent in Google Earth. These areas were quantified including any slips, berthing facilities, and channels that were determined to be critical to operation of the facility.

3) **Shoaling Rate** - The shoaling rate in ft/year was then computed by dividing the volumetric rate of required maintenance dredging (cy/year) by the estimated area.

4) **Authorized Depth** – For the non-federal facilities, the dredge depth provided in the survey responses was considered to be the authorized depth for the facilities.

5) **Years Before Impassable to Vessels at MHW** – In order to determine when each facility would become impassable to vessels of a certain depth, the same expression used for the federal facilities was employed.

   Based on the information that was available for the non-federal facilities, it was assumed that the facilities were at their authorized dredge depth in the current year. Therefore the authorized channel depth and 2009 were utilized as *h* and *yr*, respectively, in the expression used to determine the number of years it would take for the facility to become impassable, if no further maintenance dredging (no action) were to occur.

Shoaling Analysis Results

The results from the shoaling analysis of both federal and non-federal facilities are shown in Table A-1. The facilities are grouped by 'Dredge Center' and then by 'Waterway'. The federal and non-federal facilities are identified by the 'Source' column. For the non-federal facilities, there are columns to identify the nature of use category ('Nature of Use'), the number of facilities that responded to the Long Island Sound Dredging Needs Survey ('# of Facilities Responded') and the number of facilities that responded with sufficient data for the analysis ('# of Facilities with Data'). A series of columns labeled as 'Years Before Impassable at MHW to Vessels having Drafts of (in Feet)' identify the number of years that each federal facility/group of non-federal facilities become impassable at MHW to vessels having drafts between 5 and 40 feet, at 5-foot increments. In some cases, the facilities are impassable today and they are listed as such. In other cases, there were no data to conduct an analysis for the non-federal facilities and this nature of use category was listed as being dependent on the Federal Navigation Project. The last column serves to identify those cases where the non-federal facilities are dependent on the Federal Navigation Project either because no data was available, or because the Federal Project is shown to be impassable prior to the non-federal facilities.

A number of assumptions were made in conducting this analysis. The assumptions include:

- For federal facilities where no conditional surveys were available to identify areas of shoaling, or areas requiring maintenance dredging, it was assumed that 50% of the entire project area required maintenance dredging. Exceptions were given to facilities for which the USACE New England District provided more information on areas requiring maintenance.
- Although it is known that shoaling rates vary with time and the channel depth, the computed shoaling rates were assumed to be constant rates, both spatially and temporally, in determining the number of years before facilities become impassable to vessels. In order to determine dynamic shoaling rates, more comprehensive physical processes analysis would be required.
- For federal facilities where no conditional survey was available and the year last dredged was unknown, it was assumed that at the current date these facilities are at their authorized depth.
- Vessels were assumed to require 1 foot of keel clearance in order to safely navigate a channel.
- For all non-federal facilities, it was assumed that at the current date these facilities are at their authorized dredge depth.
- The non-federal facilities were first categorized by waterway and then by their nature of use. If the facilities in one of these categories did not provide the required data in the Long Island Sound Dredging Needs Survey to estimate shoaling rates, it was assumed that this category of facilities was dependent on the Federal Navigation Channel.

In looking at the results of the analysis in Table A-1, a total of 79 federal facilities were evaluated. Five (5) of these facilities are not Federal Navigation Projects, but are rather other U.S. Government facilities, such as the U.S. Coast Guard Academy located along the Thames River, CT. In some cases a Federal Navigation Project consists of multiple channels having different authorized depths, such as New London Harbor, CT. Therefore, out of the 74 Federal Navigation channels evaluated, 56 federal waterways are represented. The results show that out of the 74 federal channels evaluated, 11 (15%) are shown to be impassable today at MHW to vessels having 5-foot drafts.

In looking at the non-federal facility results, a total of 440 non-federal facilities responded to the Long Island Sound Dredging Needs Survey and are represented in the analysis. Half of these facilities (220) provided enough data in the survey responses in order to compute a shoaling rate and estimate when the facilities would become impassable to vessels of certain drafts. The 440 non-federal facilities were classified by dredge center, waterway, and then by nature of use, which resulted in 147 separate groups of non-federal facilities evaluated, as shown in Table A-1.

Out of these 147 groups of non-federal facilities, 55 lacked data to conduct an analysis. 38 of the 55 groups lacking data are located within federal waterways. These 38 groups were then listed as being dependent on the Federal Navigation Project. In addition, out of the remaining 92 groups of non-federal facilities which had sufficient data to conduct a shoaling analysis, 34 of these groups were listed as being dependent on the Federal Navigation Project, because the federal waterway is shown to be impassable prior to the

non-federal facilities. One group of non-federal facilities (consisting of one marina facility, located in the Peconic River, NY) is shown to be impassable today at MHW to vessels having 5-foot drafts.

Table A-1. Results of Shoaling Analysis

Dredge Center	Waterway	Source	Nature of Use	# of Facilities Responded	# of Facilities with Data	Shoaling Rate (cy/yr)	Shoaling Rate (ft/yr)	Auth. Depth (ft, MLLW)	Controlling Depth (ft, MLLW)	Date of Last Condition Survey	Year Last Dredged	5	10	15	20	25	30	40	Dependent on Fed Fac.
Block Island Area	**Block Island Harbor of Refuge, RI**	**Federal Navigation Projects**				4000	0.22	15	13	2008	2006	44	22						
		Non-Federal Facilities	Marina	1	1	400	0.20	15				60	35	10					✓
			Passenger Transportation	1	0							Dependent on Federal Navigation Channel							✓
	Great Salt Pond, Block Island, RI	**Federal Navigation Projects**				2000	0.14	18	14	2009	2004	78	43	7					
		Non-Federal Facilities	Marina	4	0							Dependent on Federal Navigation Channel							✓
			Boat Building/Repair	1	1	200	0.30	6				10							
Bridgeport Area	**Black Rock Harbor, CT**	**Federal Navigation Projects**				13500	0.14	18	9.1	2003	1982	66	30						
		Non-Federal Facilities	Marina	5	1	875	0.15	6				47	13						
			Freight Transportation	2	0							Dependent on Federal Navigation Channel							✓
			Other	2	0							Dependent on Federal Navigation Channel							✓
	Bridgeport Harbor, CT	**Federal Navigation Projects**				25000	0.06	35	27.4	2006	1960	470	387	304	220	137	54		
		Non-Federal Facilities	Marina	4	1	667	0.20	14				75	50	25	0				
			Boat Building/Repair	1	1	2000	0.51	18				37	27	18	8				
			Commercial Fishing	3	1	300	0.19	6				37	11						
			Freight Transportation	2	2	1000	0.25	33.5				138	118	98	78	58	38		
			Passenger Transportation	1	0							Dependent on Federal Navigation Channel							✓
			Other	3	2	4400	0.40	32				83	70	58	45	33	20		
	Johnsons Creek (subproject to Bridgeport)	**Federal Navigation Project**	**15-foot Channel**			1475	0.14	15	10.7	2003	1963	78	42	6					
			9-foot Channel			1475	0.14	9	9	2003	1963	65	30						
	Poquonnock River (subproject to Bridgeport)	**Federal Navigation Projects**				2700	0.14	18	11.1	2003	1945	80	45	9					
	Southport Harbor, CT	**Federal Navigation Projects**				2000	0.07	9	8.8	2005	2005	137	66						
		Non-Federal Facilities	Marina	1	0							Dependent on Federal Navigation Channel							✓
	Yellowmill Channel (subproject to Bridgeport)	**Federal Navigation Projects**				2750	0.12	18	13.3	2003	1952	63	22						
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	1	1	2600	0.22	6				32	9						
Clinton/Westbrook Area	**Clinton Harbor, CT**	**Federal Navigation Projects**				7300	0.38	8	0.3	2005	2000	Impassable today							
		Non-Federal Facilities	Marina	5	5	2131	0.42	6.2				12	0						✓
			Retail Services	1	1	10000	0.36	5				11							✓
	Duck Island Harbor, CT	**Federal Navigation Projects**				46000	0.44	16	3.2	2004	1949	Impassable today							
	Patchogue River, CT	**Federal Navigation Projects**				4000	0.21	8	3.5	2008	1998	Impassable today							
		Non-Federal Facilities	Marina	4	4	2708	0.43	7.75				7							✓
			Boat Building/Repair	1	0							Dependent on Federal Navigation Channel							✓
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	6	3	380	0.17	5.33				3							
			Retail Services	2	0														
Connecticut River	**Connecticut River BELOW HARTFORD, CT**	**Federal Navigation Projects**				11350	0.09	15	9.8	2004	2002	76	21						
		Non-Federal Facilities	Marina	17	7	1121	0.19	7.86				28	2						
			Boat Building/Repair	4	3	972	0.20	7.33				24							
			Passenger Transportation	3	2	500	0.45	8				12	1						
			Other	3	1	2500	0.14	16				96	61	25					✓
	Eightmile River and Hamburg Cove, CT	**Federal Navigation Projects**				2000	0.14	8	4	2002	1911	4							
		Non-Federal Facilities	Marina	1	1	60	0.03	7				150							✓
			Retail Services	1	1	533	0.40	6				9							✓
	Essex Cove Harbor (channel), CT	**Federal Navigation Projects**				2450	0.07	10	NA	NA	1976	74	3						
		Non-Federal Facilities	Marina	6	4	2892	0.35	7.5				14	0						
			Boat Building/Repair	1	0							Dependent on Federal Navigation Channel							✓
	North Cove (channel), Old Saybrook, CT	**Federal Navigation Projects**				21265	0.76	8	8	2009	2009	7	1						
		Non-Federal Facilities	Marina	3	3	3822	0.52	6.67				8							✓
	Salmon River Cove, CT	**Federal Navigation Projects**				250	0.04	15	NA	NA	1903	189	64						
	Wethersfield Cove, CT	**Federal Navigation Projects**				50	0.001	6	NA	NA	1987	1978							
		Non-Federal Facilities	Marina	2	1	11500	0.25	6				8							
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	3	3	78	0.10	3.67				12							
Eastchester Bay Area	**East Chester Creek**	**Federal Navigation Projects**				6750	0.14	8	1.1	2009	NA	19							
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	9	0														
			Boat Building/Repair	4	0														
			Commercial Fishing	1	0														
			Freight Transportation	2	1	273	0.09	6				84	28						
Fishers Island	**Hay (WEST) Harbor, NY**	**Federal Navigation Projects**				1250	0.31	14	11.5	2002	1930	19	3						
		Non-Federal Facilities	Marina	2	2	267	0.05	7				71							✓
			Boat Building/Repair	1	1	2	0.01	7				353							✓
	Outside of Federal Navigation Channel	Non-Federal Facilities	Passenger Transportation	1	1	1040	0.21	10				31	7						
Fishers Island Sound/Little Narragansett B	**Mystic River and Harbor, CT**	**Federal Navigation Project**	**15-foot Channel**			4000	0.05	15	10	2006	1957	131	31						
			12-foot Channel			4000	0.04	12	7.8	2006	1957	110							
		Non-Federal Facilities	Marina	13	9	944	0.12	7.2				33							
			Boat Building/Repair	3	1	333	0.04	12				218	93						✓
			Retail Services	1	0							Dependent on Federal Navigation Channel							✓
	Pawcatuck River, Little Narragansett Bay & Watch Hill Cov	**Federal Navigation Projects**				4000	0.05	10	-7.8	2007	1944	Impassable today							
		Non-Federal Facilities	Marina	10	4	178	0.04	6.75				87							✓
			Boat Building/Repair	1	1	200	0.14	6				19							✓
	Stonington Harbor, CT	**Federal Navigation Project**	**12-foot Channel**			2500	0.08	12	11.5	2000	1985	94	31						
			10-foot Channel			2500	0.08	10	9	2000	1985	63	0						
		Non-Federal Facilities	Marina	8	2	1075	0.24	8				20							
Great & Little Peconic Bays	**Mattituck Harbor**	**Federal Navigation Projects**				650	0.17	7	6.4	2008	2004	33	3						
		Non-Federal Facilities	Marina	1	0							Dependent on Federal Navigation Channel							✓
			Boat Building/Repair	1	0							Dependent on Federal Navigation Channel							✓
	Peconic River, NY	**Federal Navigation Projects**				333	0.02	9	4.5	2001	NA	66							
		Non-Federal Facilities	Marina	2	1	67	0.03	3				Impassable today							
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	12	6	411	0.06	5				33							
			Boat Building/Repair	1	0														
Greenwich Area	**Greenwich Harbor, CT**	**Federal Navigation Projects**				3500	0.04	12	7.1	2007	1968	211	86						
		Non-Federal Facilities	Marina	3	1		0.28	6				26	9						
			Passenger Transportation	2	0							Dependent on Federal Navigation Channel							✓
	Mianus River and Cos Cob Harbor, CT	**Federal Navigation Projects**				2500	0.30	6	-1.1	2003	1985	Impassable today							
		Non-Federal Facilities	Marina	6	5	914	0.14	7.2				61	26						✓
			Boat Building/Repair	2	0							Dependent on Federal Navigation Channel							✓
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	4	2	1996	0.40	6				19	6						
			Boat Building/Repair	1	0														

Dredge Center	Waterway	Source	Nature of Use	# of Facilities Responded	# of Facilities with Data	Shoaling Rate (cy/yr)	Shoaling Rate (ft/yr)	Auth. Depth (ft, MLLW)	Controlling Depth (ft, MLLW)	Date of Last Condition Survey	Year Last Dredged	5	10	15	20	25	30	40	Dependent on Fed Fac.
Guilford/Branford Area	**Branford Harbor, CT**	**Federal Navigation Projects**				8400	0.56	8.5	7	2001	1990	3							
		Non-Federal Facilities	Marina	4	3	800	0.19	8.5				39	13						✓
			Boat Building/Repair	1	1	600	0.20	6				25	0						✓
	Guilford Harbor, CT	**Federal Navigation Projects**				5437	0.21	6	3.1	2004	1994	Impassable today							
		Non-Federal Facilities	Marina	1	0							Dependent on Federal Navigation Channel							✓
			Commercial Fishing	1	0							Dependent on Federal Navigation Channel							✓
	Stony Creek, Branford, CT	**Federal Navigation Projects**				2600	0.23	6	3	2001	1995	Impassable today							
		Non-Federal Facilities	Marina	2	2	2633	0.81	8				6	0						✓
			Passenger Transportation	1	0							Dependent on Federal Navigation Channel							✓
			Retail Services	1	0							Dependent on Federal Navigation Channel							✓
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	3	1	2000	0.25	8				20	0						
			Boat Building/Repair	4	1	467	0.22	5				10							
			Retail Services	2	0														
Hempstead Harbor Area	**Glen Cove**	**Federal Navigation Projects**				700	0.10	8	2.1	2008	2000	35							
		Non-Federal Facilities	Marina	1	1	1667	0.06	8				158	75						✓
	Hempstead Harbor, NY	**Federal Navigation Projects**				333	0.04	7	NA	NA	NA	213	88						
		Non-Federal Facilities	Marina	1	0							Dependent on Federal Navigation Channel							✓
			Boat Building/Repair	1	1	1333	0.15	8				63	30						
			Freight Transportation	1	1	700	0.07	8				136	64						
			Passenger Transportation	1	0							Dependent on Federal Navigation Channel							✓
			Other	1	0							Dependent on Federal Navigation Channel							✓
Housatonic River/Milford Area	**Housatonic River, CT (18-foot channel)**	**Federal Navigation Projects**				6850	0.05	18	6.8	2005	1976	62							
	Housatonic River, CT (7-foot channel)	**Federal Navigation Projects**				2000	0.07	7	2.5	2005	1976	Impassable today							
		Non-Federal Facilities	Marina	7	4	793	0.15	5.25				11							✓
	Milford Harbor, CT	**Federal Navigation Projec**	**10-foot Channel**			5475	0.21	10	8.6	2008	1988	45	21						
			8-foot Channel				0.21	8	6.7	2008	1988	34	10						
		Non-Federal Facilities	Marina	4	2	1333	0.35	8.5				26	12						✓
			Boat Building/Repair	2	2	1087	0.29	8.5				32	14						✓
Huntington & Northport Bay Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	12	6	211	0.08	4				69	6						
			Boat Building/Repair	1	0														
Mamaroneck Area/New Rochelle Area	**Echo Bay, NY**	**Federal Navigation Projects**				333	0.07	8.5	NA	NA	NA	144	72	1					
	Mamaroneck Harbor	**Federal Navigation Projec**	**10-foot Channel**			5400	0.17	10	9.5	2009	1999	65	36	6					
			6-foot Channel			5400	0.17	6	8.4	2009	1999	59	29						
		Non-Federal Facilities	Marina	4	1	2833	0.37	10				31	18	4					
			Boat Building/Repair	3	3	920	0.27	8.33				37	18						
	New Rochelle Harbor	**Federal Navigation Projects**				2750	0.42	13.5	NA	NA	1971	Impassable today							
		Non-Federal Facilities	Marina	3	2	667	0.06	7.5				151	68						✓
			Boat Building/Repair	1	1	1600	0.14	12				97	61	25					✓
			Retail Services	1	0							Dependent on Federal Navigation Channel							✓
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	2	0														
Manhasset & Little Neck Bays	**Little Neck Bay**	**Federal Facility**	**Yocum Sailing Center, US Merchant Marine Academy**			3600	0.41	11				31	18	6					
	Little Neck Bay	**Federal Navigation Projects**				15000	0.01	11	NA	NA	1970	1218	718	218					
		Non-Federal Facilities	Marina	2	0							Dependent on Federal Navigation Channel							✓
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	12	4	2096	0.24	7.75				39	18						
Montauk	**Lake Montauk, NY**	**Federal Navigation Projects**				500	0.04	12	12.5	2009	NA	217	92						
		Non-Federal Facilities	Marina	4	1	5000	0.20	12				41	16						
			Boat Building/Repair	1	1	500	0.06	6				36							
			Commercial Fishing	2	0							Dependent on Federal Navigation Channel							✓
			Passenger Transportation	1	0							Dependent on Federal Navigation Channel							✓
New Haven Area	**New Haven Harbor**	**Federal Facility**	**U.S. Coast Guard Sector Long Island Sound**			500	0.09												
	Mill River (subproject to New Haven Hbr)	**Federal Navigation Projects**				6070	0.21	12	0.6	2000	1974	Impassable today							
	New Haven Harbor, CT	**Federal Navigation Projects**				149000	0.38	35	32.9	2008	2004	87	73	60	47	34	21		
		Non-Federal Facilities	Marina	10	8	2221	0.20	16.50				85	60	35	9				
			Boat Building/Repair	1	1	400	0.13	6				49	11						
			Commercial Fishing	2	2	1967	0.34	24.5				73	59	44	29	14			
			Freight Transportation	10	8	2108	0.22	28.25				130	108	85	62	39	17		✓
			Other	1	1	1300	0.07	26				377	306	234	163	91	20		✓
	Quinnipiac River (subproject to New Haven Hbr)	**Federal Navigation Projec**	**18-foot Channel**			5700	0.11	18	15.7	2000	1967	137	92	46	1				
			16-foot Channel			5700	0.11	16	11.7	2000	1967	101	56	10					
			12-foot Channel			5700	0.11	12	12	2000	1967	104	58	13					
		Non-Federal Facilities	Marina	2	0							Dependent on Federal Navigation Channel							✓
			Commercial Fishing	1	0							Dependent on Federal Navigation Channel							✓
	West River (subproject to New Haven Hbr)	**Federal Navigation Projec**	**12-foot Channel**			7365	0.32	12	8.1	2008	1977	26	10						
			8-foot Channel			7365	0.32	8	7	2008	1977	22	7						
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	1	0														

												Years Before Impassable at MHW to Vessels having Drafts of (in Feet)							
Dredge Center	**Waterway**	**Source**	**Nature of Use**	**# of Facilities Responded**	**# of Facilities with Data**	**Shoaling Rate (cy/yr)**	**Shoaling Rate (ft/yr)**	**Auth. Depth (ft, MLLW)**	**Controlling Depth (ft, MLLW)**	**Date of Last Condition Survey**	**Year Last Dredged**	**5**	**10**	**15**	**20**	**25**	**30**	**40**	**Dependent on Fed Fac.**
New London Area	**New London Harbor**	**Federal Facility**	**U.S. Coast Guard Station, New London**			200	0.07	10				97	25						
	Thames River	**Federal Facility**	**Naval Submarine Base, New London**			5000	0.06	40				613	529	446	363	279	196	29	
	Thames River	**Federal Facility**	**U.S. Coast Guard Academy**			5500	0.23	20				73	51	29	8				
	New London Harbor, CT	**Federal Navigation Projec**	**40-foot Channel**			13801	0.10	40	40	2007	1986	366	316	266	216	166	116		
			36-foot Channel			13801	0.10	36	36	2007	1986	326	276	226	176	126	76		
			23-foot Channel			13801	0.10	23	20.2	2007	1986	168	118	68	18				
		Non-Federal Facilities	Marina	12	2	1400	0.11	8.5				48	2						
			Boat Building/Repair	1	1	1480	0.03	45				1392	1225	1059	892	725	559	167	✓
			Commercial Fishing	1	0							Dependent on Federal Navigation Channel							✓
			Freight Transportation	3	2	1833	0.08	37.5				428	366	303	241	178	116		✓
			Passenger Transportation	2	2	833	0.14	15				84	48	13					
			Tug/Towing Services	1	1	417	0.21	15				56	32	8					
			Retail Services	1	1	149	0.05	10				135	35						
			Other	1	0							Dependent on Federal Navigation Channel							✓
	Thames River, CT	**Federal Navigation Projec**	**25-foot Channel**			10000	0.03	25	16.5	2006	1966	439	272	106					
			20-foot Channel			10000	0.03	20	20	2006	1966	556	389	222	56				
		Non-Federal Facilities	Marina	3	1	667	0.26	8				18							
			Boat Building/Repair	2	1	3675	0.23	18				64	42	21					
			Commercial Fishing	1	0							Dependent on Federal Navigation Channel							✓
			Freight Transportation	1	0							Dependent on Federal Navigation Channel							✓
			Retail Services	1	0							Dependent on Federal Navigation Channel							✓
			Other	3	3	2800	0.21	24.67				102	78	54	31	7			
Niantic Area	**Niantic Bay & Harbor, CT**	**Federal Navigation Projec**	**8-foot Channel**			1000	0.05	8	5.3	2004	1970	36							
			6-foot Channel			1000	0.05	6	5.4	2004	1970	38							
		Non-Federal Facilities	Marina	8	6	1120	0.21	5.83				12							
			Retail Services	1	1	1500	0.23	6				12							
Norwalk Area	**Fivemile River Harbor, CT**	**Federal Navigation Projects**				2500	0.34	8	6.5	2006	1999	20	5						
		Non-Federal Facilities	Marina	1	0							Dependent on Federal Navigation Channel							✓
			Retail Services	1	0							Dependent on Federal Navigation Channel							✓
	Norwalk Harbor, CT	**Federal Navigation Projec**	**12-foot Channel**			20000	0.18	12	9.1	2009	2009	59	31	3					
			10-foot Channel			20000	0.18	10	5.3	2009	2009	38	10						
			6-foot Channel			20000	0.18	6	6	2009	2009	42	14						
		Non-Federal Facilities	Marina	12	8	1327	0.20	6.38				40	15						✓
			Boat Building/Repair	1	1	400	0.19	7				45	19						✓
			Commercial Fishing	3	3	481	0.25	9				42	22	2					✓
			Freight Transportation	1	1	250	0.24	10				48	27	6					✓
	Westport Harbor & Saugatuck River, CT	**Federal Navigation Projects**				1250	0.09	4	0.9	2001	1970	19							
		Non-Federal Facilities	Marina	2	2	1417	0.11	9				96	50	5					✓
	Wilson Point Harbor, CT	**Federal Navigation Projects**				2500	0.03	15	4.5	2004	1892	196	29						
		Non-Federal Facilities	Marina	4	3	417	0.25	6				30	10						
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	6	5	1860	0.26	7.4				34	15						
Oyster Bay/Cold Spring Harbor Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	5	3	667	0.17	4				33	4						
			Boat Building/Repair	1	0														
			Commercial Fishing	1	0														
			Freight Transportation	1	1	700	0.07	10				166	95	24					
			Retail Services	1	0														
Port Chester/Rye Area	**Milton Harbor**	**Federal Navigation Projects**				3000	0.12	6	-0.7	2008	1993	6							
		Non-Federal Facilities	Marina	3	1	2600	0.25	7				34	14						✓
	Port Chester Creek and Harbor	**Federal Navigation Projec**	**12-foot Channel**			13503	0.34	12	8.6	2009	1990	30	15	0					
			10-foot Channel			13503	0.34	10	6.2	2009	1990	23	8						
			3-foot Channel			13503	0.34	3	4.2	2009	1990	17	2						
		Non-Federal Facilities	Marina	2	2	1250	0.29	6.5				28	10						✓
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	2	0														
			Freight Transportation	1	0														
Port Jefferson/Mount Sinai	**Port Jefferson Harbor, NY**	**Federal Navigation Projects**				333	0.11	26	27	2007	NA	251	206	160	115	69	24		
		Non-Federal Facilities	Marina	1	0							Dependent on Federal Navigation Channel							✓
			Freight Transportation	1	0							Dependent on Federal Navigation Channel							✓
			Passenger Transportation	2	1	1680	0.29	12				44	27	10					
			Retail Services	1	0							Dependent on Federal Navigation Channel							✓
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	1	1	300	0.03	4				161							
Shelter Isl./Gardiner's Bay	**Greenport Harbor, NY**	**Federal Navigation Projects**				333	0.02	8	6.7	2009	NA	184							
		Non-Federal Facilities	Marina	1	0							Dependent on Federal Navigation Channel							✓
			Boat Building/Repair	3	2	1857	0.13	8				38							
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	20	9	772	0.20	8.17				26	1						
			Boat Building/Repair	3	3	194	0.07	6.33				47							
			Passenger Transportation	1	0														
			Retail Services	1	1	500	0.31	4				3							
Smithtown Bay/Stony Brook	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	4	4	7408	0.44	5.13				15	3						
			Boat Building/Repair	1	0														
Stamford Area	**Stamford Harbor, CT**	**Federal Navigation Projec**	**18-foot Channel**			5000	0.04	18	16.3	2008	1979	442	317	192	67				
			15-foot Channel			5000	0.04	15	11.7	2008	1979	327	202	77					
			12-foot Channel			5000	0.04	12	2.8	2008	1979	104							
		Non-Federal Facilities	Marina	6	2	1426	0.16	9.75				70	38	7					
	Westcott Cove, CT	**Federal Navigation Projects**				1400	0.19	8	1.3	1985	1978	Impassable today							
		Non-Federal Facilities	Marina	1	0							Dependent on Federal Navigation Channel							✓
	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	1	1	1333	0.11	6				67	22						

Additional Analysis Conducted for Non-Federal Facilities

To assist in the economic impact assessment of the No Action Alternative, the non-federal facilities were further analyzed to estimate the percentage of vessels that would not have access to the facilities at four distinct points in time: 5, 10, 15, and 20 years after dredging is discontinued.

In this analysis, the aforementioned 'Nature of Use' categories were assigned a vessel type. Table A-2 shows the vessel types assigned to the nature of use categories. Based on the distribution of vessel drafts for each vessel type (See Section 3.3 and Appendix B), the percentages of vessels that could navigate each facility were then determined over the next 20-years, at 5-year increments.

Table A-2. Assignment of Vessel Type to Nature of Use Categories

Nature of Use	Vessel Type
Marina	Recreational
Passenger Transportation	Ferries
Boat Building/Repair	Recreational
Commercial Fishing	Fishing
Freight Transportation	Commercial
Retail Services	Recreational
Tug/Towing Services	Commercial
Other	#N/A

For certain waterways, data suggested that freight transportation and/or commercial fishing took place, even though that nature of use was not represented in the list of non-federal facilities. In all such areas, additional analyses were conducted assuming that the economic activity was dependent on the federal navigation channel.

In some cases, a nature of use category exists outside of the federal navigation channel; however, no data were available to conduct a shoaling analysis. For these cases, depth and shoaling rate data from another economic activity in that same dredge center were utilized. As an example, for the freight transportation nature of use category located outside of the federal navigation channel in the Port Chester/Rye Area dredge center, there were no shoaling rate data available. Therefore, it was assumed that the depth and shoaling rate for the marina category located in the Port Chester Creek and Harbor waterway would also apply to the freight transportation activity.

Table A-3 shows the results of this analysis for the non-federal facilities grouped by waterway. Also shown in Table A-3 for each 'Nature of Use'/economic activity is the share of regional economic activity, as well as the share of regional activity at 5, 10, 15, and 20 years after dredging is discontinued.

Table A-3. Additional Analysis for Non-Federal Facilities.

							% of Vessels Passing after x Years				% Regional Economic Activity after x Years			
Region	Dredge Center	Waterway	Source	Nature of Use	Vessel Type	Share of Regional Economic Activity	5	10	15	20	5	10	15	20
Rhode Island	Block Island Area	Block Island Harbor of Refuge, RI	Non-Federal Facilities	Marina	Recreational	4.3%	100%	100%	100%	100%	4.3%	4.3%	4.3%	4.3%
Rhode Island	Block Island Area	Block Island Harbor of Refuge, RI	Non-Federal Facilities	Passenger Transportation	Ferries	100.0%					100.0%	100.0%	100.0%	100.0%
Rhode Island	Block Island Area	Great Salt Pond, Block Island, RI	Non-Federal Facilities	Marina	Recreational	45.6%	100%	100%	100%	100%	45.6%	45.6%	45.6%	45.6%
Rhode Island	Block Island Area	Great Salt Pond, Block Island, RI	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	75%	25%	25%	0.5%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Bridgeport Area	Black Rock Harbor, CT	Non-Federal Facilities	Marina	Recreational	8.4%	100%	100%	100%	100%	8.4%	8.4%	8.4%	8.4%
Western Connecticut	Bridgeport Area	Black Rock Harbor, CT	Non-Federal Facilities	Freight Transportation	Commercial	0.0%	75%	50%	50%	50%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Bridgeport Area	Black Rock Harbor, CT	Non-Federal Facilities	Other	#N/A	n/a								
Western Connecticut	Bridgeport Area	Bridgeport Harbor, CT	Non-Federal Facilities	Marina	Recreational	0.4%	100%	100%	100%	100%	0.4%	0.4%	0.4%	0.4%
Western Connecticut	Bridgeport Area	Bridgeport Harbor, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Bridgeport Area	Bridgeport Harbor, CT	Non-Federal Facilities	Commercial Fishing	Fishing	16.7%	100%	100%	100%	100%	16.7%	16.7%	16.7%	16.7%
Western Connecticut	Bridgeport Area	Bridgeport Harbor, CT	Non-Federal Facilities	Freight Transportation	Commercial	41.1%	100%	100%	100%	100%	41.1%	41.1%	41.1%	41.1%
Western Connecticut	Bridgeport Area	Bridgeport Harbor, CT	Non-Federal Facilities	Passenger Transportation	Ferries	97.3%					97.3%	97.3%	97.3%	97.3%
Western Connecticut	Bridgeport Area	Bridgeport Harbor, CT	Non-Federal Facilities	Other	#N/A	n/a								
Western Connecticut	Bridgeport Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	0.7%	100%	100%	100%	100%	0.7%	0.7%	0.7%	0.7%
Eastern Connecticut	Clinton/Westbrook Area	Clinton Harbor, CT	Non-Federal Facilities	Marina	Recreational	9.3%	0.5%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	Clinton/Westbrook Area	Clinton Harbor, CT	Non-Federal Facilities	Retail Services	Recreational	0.0%	0.5%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	Clinton/Westbrook Area	Patchogue River, CT	Non-Federal Facilities	Marina	Recreational	11.1%	0.5%	0.5%	0.5%	0.5%	0.1%	0.1%	0.1%	0.1%
Eastern Connecticut	Clinton/Westbrook Area	Patchogue River, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	0.5%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	Clinton/Westbrook Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	10.2%	25%	25%	1%	0.5%	2.6%	2.6%	0.1%	0.1%
Eastern Connecticut	Clinton/Westbrook Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Retail Services	Recreational	0.0%								
Eastern Connecticut	Connecticut River	Connecticut River BELOW HARTFORD, CT	Non-Federal Facilities	Marina	Recreational	15.1%	100%	100%	100%	75%	15.1%	15.1%	15.1%	11.3%
Eastern Connecticut	Connecticut River	Connecticut River BELOW HARTFORD, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	75%	50%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	Connecticut River	Connecticut River BELOW HARTFORD, CT	Non-Federal Facilities	Passenger Transportation	Ferries	100.0%					100.0%	100.0%	0.0%	0.0%
Eastern Connecticut	Connecticut River	Connecticut River BELOW HARTFORD, CT	Non-Federal Facilities	Other	#N/A	n/a								
Eastern Connecticut	Connecticut River	Eightmile River and Hamburg Cove, CT	Non-Federal Facilities	Marina	Recreational	0.0%	50%	25%	25%	25%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	Connecticut River	Eightmile River and Hamburg Cove, CT	Non-Federal Facilities	Retail Services	Recreational	0.0%	50%	25%	25%	25%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	Connecticut River	Essex Cove Harbor (channel), CT	Non-Federal Facilities	Marina	Recreational	3.8%	100%	75%	25%	0.5%	3.8%	2.8%	0.9%	0.0%
Eastern Connecticut	Connecticut River	Essex Cove Harbor (channel), CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	impassable today							
Eastern Connecticut	Connecticut River	North Cove (channel), Old Saybrook, CT	Non-Federal Facilities	Marina	Recreational	7.3%	75%	0.5%	0.5%	0.5%	5.5%	0.0%	0.0%	0.0%
Eastern Connecticut	Connecticut River	Wethersfield Cove, CT	Non-Federal Facilities	Marina	Recreational	0.0%	50%	25%	25%	0.5%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	Connecticut River	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	0.0%	50%	25%	25%	25%	0.0%	0.0%	0.0%	0.0%
New York Mainland	Eastchester Bay Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	21.2%	100%	100%	100%	100%	21.2%	21.2%	21.2%	21.2%
New York Mainland	Eastchester Bay Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
New York Mainland	Eastchester Bay Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Commercial Fishing	Fishing	100.0%	100%	100%	100%	100%	100.0%	100.0%	100.0%	100.0%
New York Mainland	Eastchester Bay Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Freight Transportation	Commercial	89.1%	100%	100%	75%	50%	89.1%	89.1%	66.9%	44.6%
Eastern Long Island	Fishers Island	Hay (WEST) Harbor, NY	Non-Federal Facilities	Marina	Recreational	0.1%	100%	100%	100%	75%	0.1%	0.1%	0.1%	0.1%
Eastern Long Island	Fishers Island	Hay (WEST) Harbor, NY	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	75%	0.0%	0.0%	0.0%	0.0%
Eastern Long Island	Fishers Island	Outside of Federal Navigation Channel	Non-Federal Facilities	Passenger Transportation	Ferries	4.3%					4.3%	4.3%	4.3%	0.0%
Eastern Connecticut	Fishers Island Sound/Little Narragansett Bay	Mystic River and Harbor, CT	Non-Federal Facilities	Marina	Recreational	25.4%	100%	100%	100%	75%	25.4%	25.4%	25.4%	19.1%
Eastern Connecticut	Fishers Island Sound/Little Narragansett Bay	Mystic River and Harbor, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	Fishers Island Sound/Little Narragansett Bay	Mystic River and Harbor, CT	Non-Federal Facilities	Retail Services	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	Fishers Island Sound/Little Narragansett Bay	Pawcatuck River, Little Narragansett Bay & Watch Hill Cove, RI	Non-Federal Facilities	Marina	Recreational	1.9%	impassable today							
Rhode Island	Fishers Island Sound/Little Narragansett Bay - RI	Pawcatuck River, Little Narragansett Bay & Watch Hill Cove, RI	Non-Federal Facilities	Marina	Recreational	50.1%	impassable today							
Eastern Connecticut	Fishers Island Sound/Little Narragansett Bay	Pawcatuck River, Little Narragansett Bay & Watch Hill Cove, RI	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	impassable today							
Eastern Connecticut	Fishers Island Sound/Little Narragansett Bay	Stonington Harbor, CT	Non-Federal Facilities	Marina	Recreational	2.5%	100%	100%	75%	25%	2.5%	2.5%	1.9%	0.6%
Eastern Long Island	Great & Little Peconic Bays	Mattituck Harbor	Non-Federal Facilities	Marina	Recreational	3.0%	100%	100%	100%	100%	3.0%	3.0%	3.0%	3.0%
Eastern Long Island	Great & Little Peconic Bays	Mattituck Harbor	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Eastern Long Island	Great & Little Peconic Bays	Peconic River, NY	Non-Federal Facilities	Marina	Recreational	2.2%	50%	50%	25%	25%	1.1%	1.1%	0.6%	0.6%
Eastern Long Island	Great & Little Peconic Bays	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	5.2%	100%	100%	75%	50%	5.2%	5.2%	3.9%	2.6%
Eastern Long Island	Great & Little Peconic Bays	Outside of Federal Navigation Channel	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%								
Western Connecticut	Greenwich Area	Greenwich Harbor, CT	Non-Federal Facilities	Marina	Recreational	1.1%	100%	100%	100%	75%	1.1%	1.1%	1.1%	0.8%
Western Connecticut	Greenwich Area	Greenwich Harbor, CT	Non-Federal Facilities	Passenger Transportation	Ferries	2.7%					2.7%	2.7%	2.7%	2.7%
Western Connecticut	Greenwich Area	Mianus River and Cos Cob Harbor, CT	Non-Federal Facilities	Marina	Recreational	7.8%	25%	0.5%	0.5%	0.5%	2.0%	0.0%	0.0%	0.0%
Western Connecticut	Greenwich Area	Mianus River and Cos Cob Harbor, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	25%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Greenwich Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	0.0%	100%	100%	75%	25%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Greenwich Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%								
Western Connecticut	Guilford/Branford Area	Branford Harbor, CT	Non-Federal Facilities	Marina	Recreational	13.1%	100%	25%	0.5%	0.5%	13.1%	3.3%	0.1%	0.1%
Western Connecticut	Guilford/Branford Area	Branford Harbor, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	25%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Guilford/Branford Area	Stony Creek, Branford, CT	Non-Federal Facilities	Marina	Recreational	0.0%	25%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Guilford/Branford Area	Stony Creek, Branford, CT	Non-Federal Facilities	Passenger Transportation	Ferries	0.0%								
Western Connecticut	Guilford/Branford Area	Stony Creek, Branford, CT	Non-Federal Facilities	Retail Services	Recreational	0.0%	25%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Guilford/Branford Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	3.7%	100%	100%	75%	25%	3.7%	3.7%	2.7%	0.9%
Western Connecticut	Guilford/Branford Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	50%	25%	25%	0.5%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Guilford/Branford Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Retail Services	Recreational	0.0%								

							% of Vessels Passing after x Years				% Regional Economic Activity after x Years			
Region	**Dredge Center**	**Waterway**	**Source**	**Nature of Use**	**Vessel Type**	**Share of Regional Economic Activity**	**5**	**10**	**15**	**20**	**5**	**10**	**15**	**20**
Western Long Island	Hempstead Harbor Area	Glen Cove	Non-Federal Facilities	Marina	Recreational	26.4%	100%	100%	100%	75%	26.4%	26.4%	26.4%	19.8%
Western Long Island	Hempstead Harbor Area	Hempstead Harbor, NY	Non-Federal Facilities	Marina	Recreational	10.7%	100%	75%	75%	50%	10.7%	8.0%	8.0%	5.4%
Western Long Island	Hempstead Harbor Area	Hempstead Harbor, NY	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Western Long Island	Hempstead Harbor Area	Hempstead Harbor, NY	Non-Federal Facilities	Freight Transportation	Commercial	74.6%	75%	50%	50%	50%	55.9%	37.3%	37.3%	37.3%
Western Long Island	Hempstead Harbor Area	Hempstead Harbor, NY	Non-Federal Facilities	Passenger Transportation	Ferries	0.0%								
Western Long Island	Hempstead Harbor Area	Hempstead Harbor, NY	Non-Federal Facilities	Other	#N/A	n/a								
Western Connecticut	Housatonic River/Milford Area	Housatonic River, CT (7-foot channel)	Non-Federal Facilities	Marina	Recreational	3.0%	25%	25%	25%	0.5%	0.8%	0.8%	0.8%	0.0%
Western Connecticut	Housatonic River/Milford Area	Milford Harbor, CT	Non-Federal Facilities	Marina	Recreational	8.3%	100%	100%	100%	100%	8.3%	8.3%	8.3%	8.3%
Western Connecticut	Housatonic River/Milford Area	Milford Harbor, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Eastern Long Island	Huntington & Northport Bay Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	32.5%	100%	100%	100%	100%	32.5%	32.5%	32.5%	32.5%
Eastern Long Island	Huntington & Northport Bay Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%								
New York Mainland	Mamaroneck Area/New Rochelle Area	Mamaroneck Harbor	Non-Federal Facilities	Marina	Recreational	33.0%	100%	100%	100%	100%	33.0%	33.0%	33.0%	33.0%
New York Mainland	Mamaroneck Area/New Rochelle Area	Mamaroneck Harbor	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
New York Mainland	Mamaroneck Area/New Rochelle Area	New Rochelle Harbor	Non-Federal Facilities	Marina	Recreational	40.6%	25%	0.5%	0.5%	0.5%	10.2%	0.2%	0.2%	0.2%
New York Mainland	Mamaroneck Area/New Rochelle Area	New Rochelle Harbor	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	25%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%
New York Mainland	Mamaroneck Area/New Rochelle Area	New Rochelle Harbor	Non-Federal Facilities	Retail Services	Recreational	0.0%	25%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%
New York Mainland	Mamaroneck Area/New Rochelle Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	0.0%								
Western Long Island	Manhasset & Little Neck Bays	Little Neck Bay	Non-Federal Facilities	Marina	Recreational	6.2%	100%	100%	100%	100%	6.2%	6.2%	6.2%	6.2%
Western Long Island	Manhasset & Little Neck Bays	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	36.0%	100%	100%	100%	100%	36.0%	36.0%	36.0%	36.0%
Eastern Long Island	Montauk	Lake Montauk, NY	Non-Federal Facilities	Marina	Recreational	13.0%	100%	100%	100%	100%	13.0%	13.0%	13.0%	13.0%
Eastern Long Island	Montauk	Lake Montauk, NY	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	75%	75%	75%	50%	0.0%	0.0%	0.0%	0.0%
Eastern Long Island	Montauk	Lake Montauk, NY	Non-Federal Facilities	Commercial Fishing	Fishing	66.7%	100%	100%	100%	100%	66.7%	66.7%	66.7%	66.7%
Eastern Long Island	Montauk	Lake Montauk, NY	Non-Federal Facilities	Passenger Transportation	Ferries	0.1%					0.1%	0.1%	0.1%	0.1%
Western Connecticut	New Haven Area	New Haven Harbor, CT	Non-Federal Facilities	Marina	Recreational	2.0%	100%	100%	100%	100%	2.0%	2.0%	2.0%	2.0%
Western Connecticut	New Haven Area	New Haven Harbor, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	New Haven Area	New Haven Harbor, CT	Non-Federal Facilities	Commercial Fishing	Fishing	7.0%	100%	100%	100%	100%	7.0%	7.0%	7.0%	7.0%
Western Connecticut	New Haven Area	New Haven Harbor, CT	Non-Federal Facilities	Freight Transportation	Commercial	51.6%	100%	100%	100%	100%	51.6%	51.6%	51.6%	51.6%
Western Connecticut	New Haven Area	New Haven Harbor, CT	Non-Federal Facilities	Other	#N/A	n/a								
Western Connecticut	New Haven Area	Quinnipiac River (subproject to New Haven Hbr)	Non-Federal Facilities	Marina	Recreational	2.7%	100%	100%	100%	100%	2.7%	2.7%	2.7%	2.7%
Western Connecticut	New Haven Area	Quinnipiac River (subproject to New Haven Hbr)	Non-Federal Facilities	Commercial Fishing	Fishing	7.0%	100%	100%	100%	100%	7.0%	7.0%	7.0%	7.0%
Western Connecticut	New Haven Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	0.0%								
Eastern Connecticut	New London Area	New London Harbor, CT	Non-Federal Facilities	Marina	Recreational	6.1%	100%	100%	100%	100%	6.1%	6.1%	6.1%	6.1%
Eastern Connecticut	New London Area	New London Harbor, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	New London Area	New London Harbor, CT	Non-Federal Facilities	Commercial Fishing	Fishing	30.7%	100%	100%	100%	100%	30.7%	30.7%	30.7%	30.7%
Eastern Connecticut	New London Area	New London Harbor, CT	Non-Federal Facilities	Freight Transportation	Commercial	63.6%	75%	75%	75%	75%	47.7%	47.7%	47.7%	47.7%
Eastern Connecticut	New London Area	New London Harbor, CT	Non-Federal Facilities	Passenger Transportation	Ferries	0.0%								
Eastern Connecticut	New London Area	New London Harbor, CT	Non-Federal Facilities	Tug/Towing Services	Commercial	0.0%	75%	75%	50%	50%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	New London Area	New London Harbor, CT	Non-Federal Facilities	Retail Services	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	New London Area	New London Harbor, CT	Non-Federal Facilities	Other	#N/A	n/a								
Eastern Connecticut	New London Area	Thames River, CT	Non-Federal Facilities	Marina	Recreational	2.6%	100%	100%	50%	25%	2.6%	2.6%	1.3%	0.7%
Eastern Connecticut	New London Area	Thames River, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	New London Area	Thames River, CT	Non-Federal Facilities	Commercial Fishing	Fishing	5.0%	100%	100%	100%	100%	5.0%	5.0%	5.0%	5.0%
Eastern Connecticut	New London Area	Thames River, CT	Non-Federal Facilities	Freight Transportation	Commercial	32.1%	100%	100%	100%	100%	32.1%	32.1%	32.1%	32.1%
Eastern Connecticut	New London Area	Thames River, CT	Non-Federal Facilities	Retail Services	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Eastern Connecticut	New London Area	Thames River, CT	Non-Federal Facilities	Other	#N/A	n/a								
Eastern Connecticut	Niantic Area	Niantic Bay & Harbor, CT	Non-Federal Facilities	Marina	Recreational	4.7%	75%	50%	25%	25%	3.5%	2.4%	1.2%	1.2%
Eastern Connecticut	Niantic Area	Niantic Bay & Harbor, CT	Non-Federal Facilities	Retail Services	Recreational	0.0%	75%	50%	25%	25%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Norwalk Area	Fivemile River Harbor, CT	Non-Federal Facilities	Marina	Recreational	3.7%	100%	100%	100%	50%	3.7%	3.7%	3.7%	1.8%
Western Connecticut	Norwalk Area	Fivemile River Harbor, CT	Non-Federal Facilities	Retail Services	Recreational	0.0%	100%	100%	100%	50%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Norwalk Area	Norwalk Harbor, CT	Non-Federal Facilities	Marina	Recreational	11.0%	100%	100%	100%	100%	11.0%	11.0%	11.0%	11.0%
Western Connecticut	Norwalk Area	Norwalk Harbor, CT	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Western Connecticut	Norwalk Area	Norwalk Harbor, CT	Non-Federal Facilities	Commercial Fishing	Fishing	8.6%	100%	100%	100%	100%	8.6%	8.6%	8.6%	8.6%
Western Connecticut	Norwalk Area	Norwalk Harbor, CT	Non-Federal Facilities	Freight Transportation	Commercial	1.6%	75%	25%	25%	25%	1.2%	0.4%	0.4%	0.4%
Western Connecticut	Norwalk Area	Westport Harbor & Saugatuck River, CT	Non-Federal Facilities	Marina	Recreational	10.1%	75%	75%	50%	50%	7.6%	7.6%	5.0%	5.0%
Western Connecticut	Norwalk Area	Wilson Point Harbor, CT	Non-Federal Facilities	Marina	Recreational	1.6%	100%	100%	100%	100%	1.6%	1.6%	1.6%	1.6%
Western Connecticut	Norwalk Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%

							% of Vessels Passing after x Years				% Regional Economic Activity after x Years			
Region	**Dredge Center**	**Waterway**	**Source**	**Nature of Use**	**Vessel Type**	**Share of Regional Economic Activity**	**5**	**10**	**15**	**20**	**5**	**10**	**15**	**20**
Western Long Island	Oyster Bay/Cold Spring Harbor Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	20.7%	100%	100%	100%	100%	20.7%	20.7%	20.7%	20.7%
Western Long Island	Oyster Bay/Cold Spring Harbor Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%								
Western Long Island	Oyster Bay/Cold Spring Harbor Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Commercial Fishing	Fishing	36.3%	100%	100%	100%	100%	36.3%	36.3%	36.3%	36.3%
Western Long Island	Oyster Bay/Cold Spring Harbor Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Freight Transportation	Commercial	18.8%	75%	75%	75%	75%	14.1%	14.1%	14.1%	14.1%
Western Long Island	Oyster Bay/Cold Spring Harbor Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Retail Services	Recreational	0.0%								
New York Mainland	Port Chester/Rye Area	Milton Harbor	Non-Federal Facilities	Marina	Recreational	0.0%	50%	25%	25%	25%	0.0%	0.0%	0.0%	0.0%
New York Mainland	Port Chester/Rye Area	Port Chester Creek and Harbor	Non-Federal Facilities	Marina	Recreational	5.2%	100%	100%	50%	25%	5.2%	5.2%	2.6%	1.3%
New York Mainland	Port Chester/Rye Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	0.0%								
New York Mainland	Port Chester/Rye Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Freight Transportation	Commercial	10.9%	25%	25%	1%	1%	2.7%	2.7%	0.1%	0.1%
Eastern Long Island	Port Jefferson/Mount Sinai	Port Jefferson Harbor, NY	Non-Federal Facilities	Marina	Recreational	4.8%	100%	100%	100%	100%	4.8%	4.8%	4.8%	4.8%
Eastern Long Island	Port Jefferson/Mount Sinai	Port Jefferson Harbor, NY	Non-Federal Facilities	Freight Transportation	Commercial	100.0%	100%	100%	100%	100%	100.0%	100.0%	100.0%	100.0%
Eastern Long Island	Port Jefferson/Mount Sinai	Port Jefferson Harbor, NY	Non-Federal Facilities	Passenger Transportation	Ferries	0.0%								
Eastern Long Island	Port Jefferson/Mount Sinai	Port Jefferson Harbor, NY	Non-Federal Facilities	Retail Services	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Eastern Long Island	Port Jefferson/Mount Sinai	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	7.8%	100%	100%	100%	100%	7.8%	7.8%	7.8%	7.8%
Eastern Long Island	Shelter Isl./Gardiner's Bay	Greenport Harbor, NY	Non-Federal Facilities	Marina	Recreational	15.8%	100%	100%	100%	100%	15.8%	15.8%	15.8%	15.8%
Eastern Long Island	Shelter Isl./Gardiner's Bay	Greenport Harbor, NY	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%
Eastern Long Island	Shelter Isl./Gardiner's Bay	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	10.8%	100%	100%	100%	75%	10.8%	10.8%	10.8%	8.1%
Eastern Long Island	Shelter Isl./Gardiner's Bay	Outside of Federal Navigation Channel	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%	100%	100%	100%	75%	0.0%	0.0%	0.0%	0.0%
Eastern Long Island	Shelter Isl./Gardiner's Bay	Outside of Federal Navigation Channel	Non-Federal Facilities	Passenger Transportation	Ferries	95.7%					95.7%	63.1%	63.1%	30.9%
Eastern Long Island	Shelter Isl./Gardiner's Bay	Outside of Federal Navigation Channel	Non-Federal Facilities	Retail Services	Recreational	0.0%	25%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%
Eastern Long Island	Smithtown Bay/Stony Brook	Outside of Federal Navigation Channel	Non-Federal Facilities	Boat Building/Repair	Recreational	0.0%								
Western Connecticut	Stamford Area	Stamford Harbor, CT	Non-Federal Facilities	Marina	Recreational	14.0%	100%	100%	100%	100%	14.0%	14.0%	14.0%	14.0%
Western Connecticut	Stamford Area	Outside of Federal Navigation Channel	Non-Federal Facilities	Marina	Recreational	0.0%	100%	100%	100%	100%	0.0%	0.0%	0.0%	0.0%

APPENDIX B MODIFIED DISTRIBUTIONS FOR VESSEL DRAFTS

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The discussion of the shoaling analysis presented in section 3.4.1 of the report notes that the analysis identifies certain waterways where the current depth is estimated to be less than the 75th, 50th, or 25th percentile of vessel drafts in a given industry. As a result, some vessels cannot currently access these harbors and waterways. Rather than attributing the exclusion of these vessels to the No Action Alternative, the analysis modifies its assumptions about the drafts of the vessels that currently access these waterways. Table B-1 presents the full distribution of vessel drafts in the LIS study area for recreational boating, commercial fishing, and marine transportation, repeating data presented in Figure 5.[51] Tables B-2, B-3, and B-4 present the modified distributions used for waterways in which access is currently limited to vessels with shallower drafts. A modified distribution is employed whenever current access is limited to no more than 75 percent, 50 percent, or 25 percent of the vessels within the study area. For example, the distributions in Table B-4 would apply to the shallowest ports, where currently only 25 percent of vessels in a given industry can enter. In contrast, the distributions shown in Table B-2 would apply to relatively deeper ports, where 75 percent of the vessels can currently enter.

Table B-1. Distribution of Vessel Drafts for the LIS Study Area (feet)

Percentile	Recreational Boating	Commercial Fishing	Marine Transportation
25th	5.4	5.2	14.0
50th	6.1	6.0	21.0
75th	7.0	6.8	27.0

Table B-2. Distribution of Vessel Drafts for Waterways with a Current Depth no Greater than the 75th Percentile of the Full Distribution (feet)

Percentile	Recreational Boating	Commercial Fishing	Marine Transportation
25th	5.2	5.0	11.2
50th	5.8	5.7	16.9
75th	6.2	6.2	22.0

Table B-3. Distribution of Vessel Drafts for Waterways with a Current Depth no Greater than the Median of the Full Distribution (feet)

Percentile	Recreational Boating	Commercial Fishing	Marine Transportation
25th	5.0	4.5	10.8
50th	5.4	5.0	13.9
75th	5.8	5.5	16.9

[51] Note that this adjustment is not required for ferry-dependent tourism or the Naval Submarine Base New London, because waterway-specific information is used to characterize the required depth of vessels accessing each waterway for these two activities.

Table B-4. Distribution of Vessel Drafts for Waterways with a Current Depth no Greater than the 25th Percentile of the Full Distribution (feet)

Percentile	Recreational Boating	Commercial Fishing	Marine Transportation
25th	4.6	4.0	10.4
50th	5.0	4.7	10.8
75th	5.2	5.0	11.2

APPENDIX C ESTIMATED IMPACT OF NO ACTION ALTERNATIVE BY WATERWAY

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This appendix presents additional detail related to the impacts of shoaling on economic activity at the waterway level. Tables C-1a through C-1c present the following:

- A list of each waterway where marine transportation, commercial fishing, and recreational boating activities currently take place.
- The distribution of vessel drafts used to calculate the percent of economic activities in each waterway that is precluded as shoaling progresses.
- The number of years before the shoaling analysis estimates that the depth of each waterway will diminish to the point that a portion of economic activity in that waterway (25, 50, 75, or 100 percent) will be curtailed. Waterways where Appendix A indicates that the current depth of a waterway is insufficient to allow any economic activity are labeled "impassable today."
- The percent of economic activity that will be curtailed in each waterway after 5, 10, 15, and 20 years of shoaling.

For the Naval Submarine Base New London, the analysis assumes that all vessels will require a draft of 36 feet (with an additional two feet required for inspection by divers). The shoaling analysis for this area in the Thames River indicates that the area would be passable to 40-ft vessels for 29 years. Accordingly, Table C-1d indicates that no activity at the sub base would be curtailed over the 20-year study period. Because the analysis employed a waterway-specific method for ferry-dependent tourism, Table C-1 does not include that economic activity.

Tables C-2a through C-2e present, for each affected industry, the regional share of economic activity that the analysis allocates to each waterway - as shown in Tables 22-25 in the report - and the percent of regional activity that will be curtailed in each waterway after 5, 10, 15, and 20 years. The figures presented in these tables are developed by multiplying the percent of precluded economic activity for each waterway (from Table C-1) by the share of regional economic activity that is assumed to occur in each waterway. The regional totals listed in these tables correspond to the percent reductions in regional economic activity reported in Tables 26 through 30.

Table C-1a. Percent of Waterway Economic Activity Curtailed in the Marine Transportation Sector

Region	County	Waterway	Distribution of Vessel Drafts Employed[3]	Years Until X% of Waterway's Economic Activity is Curtailed				Percent of Waterway's Economic Activity Curtailed After X Years			
				25%	50%	75%	100%	5	10	15	20
Rhode Island	Washington	Great Salt Pond	25% Distribution	13	16	19	43	0%	0%	25%	75%
Eastern CT	New London	New London Harbor	75% Distribution	0	51	108	148	25%	25%	25%	25%
		Thames River	50% Distribution	45	145	249	375	0%	0%	0%	0%
		Connecticut River Below Hartford[1]	25% Distribution	0	0	0	20	75%	75%	75%	100%
	Hartford	Connecticut River Below Hartford[1]	25% Distribution	0	0	0	20	75%	75%	75%	100%
	Middlesex	Connecticut River Below Hartford[1]	25% Distribution	0	0	0	20	75%	75%	75%	100%
Western CT	New Haven	New Haven Harbor	Complete	30	46	64	80	0%	0%	0%	0%
	Fairfield	Bridgeport Harbor	Complete	50	74	102	126	0%	0%	0%	0%
		Norwalk Harbor	25% Distribution	4	6	8	27	25%	75%	75%	75%
		Stamford Harbor	Impassable Today	0	0	0	0	100%	100%	100%	100%
Mainland NY	Westchester	Port Chester/Rye Area[2]	25% Distribution	0	0	1	11	75%	75%	100%	100%
	Bronx	Eastchester Bay Area[2]	25% Distribution	15	19	24	62	0%	0%	25%	50%
Western LI	Nassau	Glen Cove	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Hempstead Harbor	50% Distribution	0	9	53	107	25%	50%	50%	50%
		Oyster Bay/Cold Spring Harbor Area[2]	50% Distribution	0	39	84	138	25%	25%	25%	25%
Eastern LI	Suffolk	Port Jefferson Harbor	Complete	53	108	171	226	0%	0%	0%	0%

Notes:
1. Waterway spans multiple counties and/or regions.
2. Economic activity takes place outside of the federal navigation channel. Dredge center names are used in lieu of waterway names.
3. Distributions are detailed in Appendix B.

Table C-1b. Percent of Waterway Economic Activity Curtailed in the Commercial Fishing Sector

Region	County	Waterway	Distribution of Vessel Drafts Employed[3]	Years Until X% of Waterway's Economic Activity is Curtailed				Percent of Waterway's Economic Activity Curtailed After X Years			
				25%	50%	75%	100%	5	10	15	20
Rhode Island	Washington	Harbor of Refuge	Complete	24	27	31	41	0%	0%	0%	0%
		Great Salt Pond	Complete	44	50	56	71	0%	0%	0%	0%
		Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[1]	Impassable Today	0	0	0	0	100%	100%	100%	100%
Eastern CT	New London	Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[1]	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Mystic River and Harbor	Complete	0	16	32	76	25%	25%	25%	50%
		Stonington Harbor	Complete	15	25	35	63	0%	0%	25%	25%
		New London Harbor	Complete	152	160	168	190	0%	0%	0%	0%
		Thames River	Complete	382	409	435	509	0%	0%	0%	0%
		Niantic Bay & Harbor	25% Distribution	0	0	6	33	50%	75%	75%	75%
		Connecticut River Below Hartford[1]	Complete	22	31	40	64	0%	0%	0%	0%
	Hartford	Wethersfield Cove	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Connecticut River Below Hartford[1]	Complete	22	31	40	64	0%	0%	0%	0%
	Middlesex	Duck Island Harbor	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Patchogue River	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Eightmile River and Hamburg Cove	25% Distribution	0	0	0	2	100%	100%	100%	100%
		Clinton Harbor	Impassable Today	0	0	0	0	100%	100%	100%	100%
		North Cove, Old Saybrook	Complete	0	1	2	5	75%	100%	100%	100%
		Salmon River Cove	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Essex Cove Harbor	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Connecticut River Below Hartford[1]	Complete	22	31	40	64	0%	0%	0%	0%
Western CT	New Haven	Branford Harbor	75% Distribution	0	1	2	5	75%	100%	100%	100%
		Guilford Harbor	50% Distribution	0	1	3	11	75%	75%	100%	100%
		Stony Creek	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Guilford/Branford Area[2]	Complete	13	16	20	28	0%	0%	25%	75%
		Housatonic River	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Milford Harbor	50% Distribution	1	3	6	13	50%	75%	100%	100%
		New Haven Harbor	Complete	68	70	73	79	0%	0%	0%	0%
		Quinnipiac River	Complete	94	101	108	128	0%	0%	0%	0%
		West River	75% Distribution	0	1	3	9	75%	100%	100%	100%
		New Haven Area[2]	Complete	68	70	73	79	0%	0%	0%	0%
	Fairfield	Bridgeport Harbor	Complete	27	32	36	47	0%	0%	0%	0%

Region	County	Waterway	Distribution of Vessel Drafts Employed[3]	Years Until X% of Waterway's Economic Activity is Curtailed				Percent of Waterway's Economic Activity Curtailed After X Years			
				25%	50%	75%	100%	5	10	15	20
		Southport Harbor	Complete	14	26	37	69	0%	0%	25%	25%
		Greenwich Harbor	75% Distribution	0	10	28	78	25%	50%	50%	50%
		Fivemile River Harbor	50% Distribution	0	1	3	8	75%	100%	100%	100%
		Norwalk Harbor	Complete	28	32	37	49	0%	0%	0%	0%
		Westport Harbor & Saugatuck River	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Stamford Harbor	Impassable Today	0	0	0	0	100%	100%	100%	100%
Mainland NY	Bronx	Eastchester Bay Area[2]	Complete	64	73	82	106	0%	0%	0%	0%
Western LI	Nassau	Glen Cove	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Manhasset Bay[2]	75% Distribution	2	4	7	15	50%	75%	100%	100%
		Oyster Bay/Cold Spring Harbor Area[2]	Complete	23	27	32	45	0%	0%	0%	0%
		Little Neck Bay	Impassable Today	0	0	0	0	100%	100%	100%	100%
Eastern LI	Suffolk	Mattituck Harbor	50% Distribution	0	2	5	14	50%	75%	100%	100%
		Peconic River	25% Distribution	0	0	0	42	75%	75%	75%	75%
		Lake Montauk	Complete	172	192	212	267	0%	0%	0%	0%
		Port Jefferson Harbor	Complete	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		Greenport Harbor	50% Distribution	10	35	60	138	0%	25%	25%	25%

Notes:
1. Waterway spans multiple counties and/or regions.
2. Economic activity takes place outside of the federal navigation channel. Dredge center names are used in lieu of waterway names.
3. Distributions are detailed in Appendix B.

Table C-1c. Percent of Waterway Economic Activity Curtailed in the Recreational Boating Sector

Region	County	Waterway	Distribution of Vessel Drafts Employed[3]	Years Until X% of Waterway's Economic Activity is Curtailed				Percent of Waterway's Economic Activity Curtailed After X Years			
				25%	50%	75%	100%	5	10	15	20
Rhode Island	Washington	Harbor of Refuge	Complete	36	40	44	54	0%	0%	0%	0%
		Great Salt Pond	Complete	64	71	76	92	0%	0%	0%	0%
		Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[1]	Impassable Today	0	0	0	0	100%	100%	100%	100%
Eastern CT	New London	Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[1]	Impassable Today	0	0	0	0	100%	100%	100%	100%
		Mystic River and Harbor	Complete	16	24	30	49	0%	0%	0%	25%
		Stonington Harbor	Complete	11	15	18	28	0%	0%	25%	75%
		New London Harbor	Complete	30	38	44	65	0%	0%	0%	0%
		Thames River	Complete	11	14	17	26	0%	0%	50%	75%
		Niantic Bay & Harbor	Complete	3	7	10	21	25%	50%	75%	75%
	Middlesex	Patchogue River	25% Distribution	0	0	0	4	100%	100%	100%	100%
		Clinton Harbor	25% Distribution	0	0	0	3	100%	100%	100%	100%
		North Cove, Old Saybrook	Complete	5	6	7	10	25%	100%	100%	100%
		Essex Cove Harbor	Complete	9	11	13	20	0%	25%	75%	100%
		Clinton/Westbrook Area[2]	50% Distribution	0	1	3	15	75%	75%	100%	100%
		Connecticut River Below Hartford	Complete	18	22	26	38	0%	0%	0%	25%
Western CT	New Haven	Branford Harbor	Complete	7	9	10	14	0%	75%	100%	100%
		Guilford Harbor	25% Distribution	0	1	3	11	75%	75%	100%	100%
		Guilford/Branford Area[2]	Complete	12	16	19	28	0%	0%	25%	75%
		Housatonic River	25% Distribution	0	0	0	16	75%	75%	75%	100%
		Milford Harbor	Complete	26	30	33	44	0%	0%	0%	0%
		New Haven Harbor	Complete	75	79	83	94	0%	0%	0%	0%
		Quinnipiac River	Complete	92	100	106	127	0%	0%	0%	0%
	Fairfield	Bridgeport Harbor	Complete	65	70	73	85	0%	0%	0%	0%
		Bridgeport Area[2]	Complete	23	27	30	40	0%	0%	0%	0%
		Black Rock Harbor	Complete	33	39	44	59	0%	0%	0%	0%
		Greenwich Harbor	Complete	19	23	25	33	0%	0%	0%	25%
		Mianus River and Cos Cob Harbor	25% Distribution	0	1	2	8	75%	100%	100%	100%
		Fivemile River Harbor	Complete	17	20	22	29	0%	0%	0%	50%
		Norwalk Harbor	Complete	27	32	36	49	0%	0%	0%	0%
		Westport Harbor & Saugatuck River	Complete	5	15	23	48	25%	25%	50%	50%

Region	County	Waterway	Distribution of Vessel Drafts Employed[3]	Years Until X% of Waterway's Economic Activity is Curtailed				Percent of Waterway's Economic Activity Curtailed After X Years			
				25%	50%	75%	100%	5	10	15	20
		Wilson Point Harbor	Complete	22	26	29	38	0%	0%	0%	0%
		Stamford Harbor	Complete	57	63	67	82	0%	0%	0%	0%
		Westcott Cove	Complete	4	8	12	24	25%	50%	75%	75%
Mainland NY	Westchester	Mamaroneck Harbor	Complete	26	28	30	36	0%	0%	0%	0%
		New Rochelle Harbor	75% Distribution	1	2	3	8	75%	100%	100%	100%
		Port Chester Creek and Harbor	Complete	11	14	16	22	0%	0%	50%	75%
	Bronx	Eastchester Bay Area[2]	Complete	62	72	79	105	0%	0%	0%	0%
Western LI	Nassau	Glen Cove	Complete	16	25	32	55	0%	0%	0%	25%
		Hempstead Harbor	75% Distribution	8	18	33	88	0%	25%	25%	50%
		Manhasset Bay[2]	Complete	31	34	37	47	0%	0%	0%	0%
		Oyster Bay/Cold Spring Harbor Area[2]	Complete	21	27	31	44	0%	0%	0%	0%
		Little Neck Bay	75% Distribution	37	77	137	357	0%	0%	0%	0%
Eastern LI	Suffolk	Hay (West) Harbor	Complete	19	22	25	32	0%	0%	0%	25%
		Mattituck Harbor	Complete	22	27	31	45	0%	0%	0%	0%
		Peconic River	25% Distribution	0	0	12	72	50%	50%	75%	75%
		Great and Little Peconic Bays[2]	75% Distribution	13	20	30	66	0%	0%	25%	50%
		Huntington & Northport Bay Area[2]	Complete	44	55	64	93	0%	0%	0%	0%
		Lake Montauk	Complete	31	35	39	50	0%	0%	0%	0%
		Port Jefferson Harbor	Complete	235	243	249	270	0%	0%	0%	0%
		Port Jefferson/Mount Sinai[2]	Complete	94	124	148	224	0%	0%	0%	0%
		Smithtown Bay/Stony Brook[2]	Complete	10	12	14	19	0%	0%	75%	100%
		Shelter Island/Gardiner's Bay[2]	Complete	16	20	24	35	0%	0%	0%	25%
		Greenport Harbor	Complete	84	129	164	279	0%	0%	0%	0%

Notes:
1. Waterway spans multiple counties and/or regions.
2. Economic activity takes place outside of the federal navigation channel. Dredge center names are used in lieu of waterway names.
3. Distributions are detailed in Appendix B.

Table C-1d. Percent of Waterway Economic Activity Curtailed at the New London Naval Submarine Base

Region	County	Waterway	Years Until 100 percent of Waterway's Economic Activity is Curtailed	Percent of Waterway's Economic Activity Curtailed After X Years			
				5	10	15	20
Eastern CT	New London	Thames River	37	0%	0%	0%	0%

Table C-2a. Reduction in Economic Activity Under the No Action Alternative: Marine Transportation Sector (Percent of Regional Total)

Region	County	Waterway	Regional Share of Economic Activity	Percent of Regional Economic Activity Curtailed After X Years			
				5	10	15	20
Rhode Island	Washington	Great Salt Pond	100.0%	0.0%	0.0%	-25.0%	-75.0%
Regional Total			***100.0%***	***0.0%***	***0.0%***	***-25.0%***	***-75.0%***
Eastern CT	New London	New London Harbor	96.6%	-1.5%	-1.5%	-1.5%	-1.5%
		Thames River	3.0%	0.0%	0.0%	0.0%	0.0%
		Connecticut River Below Hartford[1]	0.1%	-0.1%	-0.1%	-0.1%	-0.1%
	Hartford	Connecticut River Below Hartford[1]	0.1%	-0.1%	-0.1%	-0.1%	-0.1%
	Middlesex	Connecticut River Below Hartford[1]	0.2%	-0.1%	-0.1%	-0.1%	-0.2%
Regional Total			***100.0%***	***-1.8%***	***-1.8%***	***-1.8%***	***-1.9%***
Western CT	New Haven	New Haven Harbor	51.6%	0.0%	0.0%	0.0%	0.0%
	Fairfield	Bridgeport Harbor	41.1%	0.0%	0.0%	0.0%	0.0%
		Norwalk Harbor	1.6%	-0.4%	-1.2%	-1.2%	-1.2%
		Stamford Harbor	5.8%	-5.8%	-5.8%	-5.8%	-5.8%
Regional Total			***100.0%***	***-6.2%***	***-7.0%***	***-7.0%***	***-7.0%***
Mainland NY	Westchester	Port Chester/Rye Area[2]	10.9%	-8.1%	-8.1%	-10.8%	-10.8%
	Bronx	Eastchester Bay Area[2]	89.1%	0.0%	0.0%	-22.3%	-44.6%
Regional Total			***100.0%***	***-8.1%***	***-8.1%***	***-33.1%***	***-55.4%***
Western LI	Nassau	Glen Cove	6.6%	-6.6%	-6.6%	-6.6%	-6.6%
		Hempstead Harbor	74.6%	-18.6%	-37.3%	-37.3%	-37.3%
		Oyster Bay/Cold Spring Harbor Area[2]	18.8%	-4.7%	-4.7%	-4.7%	-4.7%
Regional Total			***100.0%***	***-30.0%***	***-48.6%***	***-48.6%***	***-48.6%***
Eastern LI	Suffolk	Port Jefferson Harbor	100.0%	0.0%	0.0%	0.0%	0.0%
Regional Total			***100.0%***	***0.0%***	***0.0%***	***0.0%***	***0.0%***

Notes:
1. Waterway spans multiple counties and/or regions.
2. Economic activity takes place outside of the federal navigation channel. Dredge center names are used in lieu of waterway names.

Table C-2b. Reduction in Economic Activity Under the No Action Alternative: Commercial Fishing Sector (Percent of Regional Total)

Region	County	Waterway	Regional Share of Economic Activity	Percent of Regional Economic Activity Curtailed After X Years			
				5	10	15	20
Rhode Island	Washington	Harbor of Refuge	27.5%	0.0%	0.0%	0.0%	0.0%
		Great Salt Pond	27.5%	0.0%	0.0%	0.0%	0.0%
		Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[1]	44.9%	-44.9%	-44.9%	-44.9%	-44.9%
Regional Total			***100.0%***	***-44.9%***	***-44.9%***	***-44.9%***	***-44.9%***
Eastern CT	New London	Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[1]	0.0%	0.0%	0.0%	0.0%	0.0%
		Mystic River and Harbor	1.6%	-0.4%	-0.4%	-0.4%	-0.8%
		Stonington Harbor	59.8%	0.0%	0.0%	-15.0%	-15.0%
		New London Harbor	30.7%	0.0%	0.0%	0.0%	0.0%
		Thames River	5.0%	0.0%	0.0%	0.0%	0.0%
		Niantic Bay & Harbor	1.1%	-0.6%	-0.8%	-0.8%	-0.8%
		Connecticut River Below Hartford[1]	0.1%	0.0%	0.0%	0.0%	0.0%
	Hartford	Wethersfield Cove	0.0%	0.0%	0.0%	0.0%	0.0%
		Connecticut River Below Hartford[1]	0.1%	0.0%	0.0%	0.0%	0.0%
	Middlesex	Duck Island Harbor	0.1%	-0.1%	-0.1%	-0.1%	-0.1%
		Patchogue River	0.1%	-0.1%	-0.1%	-0.1%	-0.1%
		Eightmile River and Hamburg Cove	0.0%	0.0%	0.0%	0.0%	0.0%
		Clinton Harbor	0.5%	-0.5%	-0.5%	-0.5%	-0.5%
		North Cove, Old Saybrook	0.9%	-0.7%	-0.9%	-0.9%	-0.9%
		Salmon River Cove	0.0%	0.0%	0.0%	0.0%	0.0%
		Essex Cove Harbor	0.0%	0.0%	0.0%	0.0%	0.0%
		Connecticut River Below Hartford[1]	0.1%	0.0%	0.0%	0.0%	0.0%
Regional Total			***100.0%***	***-2.3%***	***-2.8%***	***-17.8%***	***-18.2%***
Western CT	New Haven	Branford Harbor	5.0%	-3.7%	-4.9%	-4.9%	-4.9%
		Guilford Harbor	17.8%	-13.3%	-13.3%	-17.7%	-17.7%
		Stony Creek	5.0%	-5.0%	-5.0%	-5.0%	-5.0%
		Guilford/Branford Area[2]	0.0%	0.0%	0.0%	0.0%	0.0%
		Housatonic River	3.4%	-3.4%	-3.4%	-3.4%	-3.4%
		Milford Harbor	3.6%	-1.8%	-2.7%	-3.6%	-3.6%
		New Haven Harbor	7.0%	0.0%	0.0%	0.0%	0.0%

Region	County	Waterway	Regional Share of Economic Activity	Percent of Regional Economic Activity Curtailed After X Years			
				5	10	15	20
		Quinnipiac River	7.0%	0.0%	0.0%	0.0%	0.0%
		West River	0.4%	-0.3%	-0.4%	-0.4%	-0.4%
		New Haven Area[2]	4.1%	0.0%	0.0%	0.0%	0.0%
	Fairfield	Bridgeport Harbor	16.7%	0.0%	0.0%	0.0%	0.0%
		Southport Harbor	0.0%	0.0%	0.0%	0.0%	0.0%
		Greenwich Harbor	2.4%	-0.6%	-1.2%	-1.2%	-1.2%
		Fivemile River Harbor	13.8%	-10.3%	-13.7%	-13.7%	-13.7%
		Norwalk Harbor	8.6%	0.0%	0.0%	0.0%	0.0%
		Westport Harbor & Saugatuck River	2.4%	-2.4%	-2.4%	-2.4%	-2.4%
		Stamford Harbor	3.0%	-3.0%	-3.0%	-3.0%	-3.0%
Regional Total			***100.0%***	***-43.8%***	***-50.0%***	***-55.2%***	***-55.2%***
Mainland NY	Bronx	Eastchester Bay Area[2]	100.0%	0.0%	0.0%	0.0%	0.0%
Regional Total			***100.0%***	***0.0%***	***0.0%***	***0.0%***	***0.0%***
Western LI	Nassau	Glen Cove	18.2%	-18.2%	-18.2%	-18.2%	-18.2%
		Manhasset Bay[2]	45.5%	-22.7%	-34.1%	-45.2%	-45.2%
		Oyster Bay/Cold Spring Harbor Area[2]	36.4%	0.0%	0.0%	0.0%	0.0%
		Little Neck Bay	0.0%	0.0%	0.0%	0.0%	0.0%
Regional Total			***100.0%***	***-40.9%***	***-52.3%***	***-63.4%***	***-63.4%***
Eastern LI	Suffolk	Mattituck Harbor	2.7%	-1.3%	-2.0%	-2.6%	-2.6%
		Peconic River	25.9%	-19.4%	-19.4%	-19.4%	-19.4%
		Lake Montauk	66.7%	0.0%	0.0%	0.0%	0.0%
		Port Jefferson Harbor	0.0%	0.0%	0.0%	0.0%	0.0%
		Greenport Harbor	4.7%	0.0%	-1.2%	-1.2%	-1.2%
Regional Total			***100.0%***	***-20.8%***	***-22.6%***	***-23.3%***	***-23.3%***

Notes:
1. Waterway spans multiple counties and/or regions.
2. Economic activity takes place outside of the federal navigation channel. Dredge center names are used in lieu of waterway names.

Table C-2c. Reduction in Economic Activity Under the No Action Alternative: Recreational Boating Sector (Percent of Regional Total)

Region	County	Waterway	Regional Share of Economic Activity	Percent of Regional Economic Activity Curtailed After X Years			
				5	10	15	20
Rhode Island	Washington	Harbor of Refuge	4.3%	0.0%	0.0%	0.0%	0.0%
		Great Salt Pond	45.6%	0.0%	0.0%	0.0%	0.0%
		Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[1]	50.1%	-50.1%	-50.1%	-50.1%	-50.1%
Regional Total			***100.0%***	***-50.1%***	***-50.1%***	***-50.1%***	***-50.1%***
Eastern CT	New London	Pawcatuck River, Little Narragansett Bay & Watch Hill Cove[1]	1.9%	-1.9%	-1.9%	-1.9%	-1.9%
		Mystic River and Harbor	25.4%	0.0%	0.0%	0.0%	-6.4%
		Stonington Harbor	2.5%	0.0%	0.0%	-0.6%	-1.9%
		New London Harbor	6.1%	0.0%	0.0%	0.0%	0.0%
		Thames River	2.6%	0.0%	0.0%	-1.3%	-2.0%
		Niantic Bay & Harbor	4.7%	-1.2%	-2.4%	-3.5%	-3.5%
	Middlesex	Patchogue River	11.1%	-11.0%	-11.0%	-11.0%	-11.0%
		Clinton Harbor	9.3%	-9.2%	-9.2%	-9.2%	-9.2%
		North Cove, Old Saybrook	7.3%	-1.8%	-7.3%	-7.3%	-7.3%
		Essex Cove Harbor	3.8%	0.0%	-0.9%	-2.8%	-3.7%
		Clinton/Westbrook Area[2]	10.2%	-7.7%	-7.7%	-10.2%	-10.2%
		Connecticut River Below Hartford	15.1%	0.0%	0.0%	0.0%	-3.8%
Regional Total			***100.0%***	***-32.8%***	***-40.4%***	***-47.9%***	***-60.8%***
Western CT	New Haven	Branford Harbor	13.1%	0.0%	-9.9%	-13.1%	-13.1%
		Guilford Harbor	5.6%	-4.2%	-4.2%	-5.5%	-5.5%
		Guilford/Branford Area[2]	3.7%	0.0%	0.0%	-0.9%	-2.7%
		Housatonic River	3.0%	-2.3%	-2.3%	-2.3%	-3.0%
		Milford Harbor	8.3%	0.0%	0.0%	0.0%	0.0%
		New Haven Harbor	2.0%	0.0%	0.0%	0.0%	0.0%
		Quinnipiac River	2.7%	0.0%	0.0%	0.0%	0.0%
	Fairfield	Bridgeport Harbor	0.4%	0.0%	0.0%	0.0%	0.0%
		Bridgeport Area[2]	0.7%	0.0%	0.0%	0.0%	0.0%
		Black Rock Harbor	8.4%	0.0%	0.0%	0.0%	0.0%
		Greenwich Harbor	1.1%	0.0%	0.0%	0.0%	-0.3%
		Mianus River and Cos Cob Harbor	7.8%	-5.9%	-7.8%	-7.8%	-7.8%
		Fivemile River Harbor	3.7%	0.0%	0.0%	0.0%	-1.8%
		Norwalk Harbor	11.0%	0.0%	0.0%	0.0%	0.0%

Region	County	Waterway	Regional Share of Economic Activity	Percent of Regional Economic Activity Curtailed After X Years			
				5	10	15	20
		Westport Harbor & Saugatuck River	10.1%	-2.5%	-2.5%	-5.0%	-5.0%
		Wilson Point Harbor	1.6%	0.0%	0.0%	0.0%	0.0%
		Stamford Harbor	14.0%	0.0%	0.0%	0.0%	0.0%
		Westcott Cove	2.8%	-0.7%	-1.4%	-2.1%	-2.1%
Regional Total			***100.0%***	***-15.5%***	***-28.0%***	***-36.7%***	***-41.4%***
Mainland NY	Westchester	Mamaroneck Harbor	33.0%	0.0%	0.0%	0.0%	0.0%
		New Rochelle Harbor	40.6%	-30.5%	-40.4%	-40.4%	-40.4%
		Port Chester Creek and Harbor	5.2%	0.0%	0.0%	-2.6%	-3.9%
	Bronx	Eastchester Bay Area[2]	21.2%	0.0%	0.0%	0.0%	0.0%
Regional Total			***100.0%***	***-30.5%***	***-40.4%***	***-43.0%***	***-44.3%***
Western LI	Nassau	Glen Cove	26.4%	0.0%	0.0%	0.0%	-6.6%
		Hempstead Harbor	10.7%	0.0%	-2.7%	-2.7%	-5.4%
		Manhasset Bay[2]	36.0%	0.0%	0.0%	0.0%	0.0%
		Oyster Bay/Cold Spring Harbor Area[2]	20.7%	0.0%	0.0%	0.0%	0.0%
		Little Neck Bay	6.2%	0.0%	0.0%	0.0%	0.0%
Regional Total			***100.0%***	***0.0%***	***-2.7%***	***-2.7%***	***-12.0%***
Eastern LI	Suffolk	Hay (West) Harbor	0.1%	0.0%	0.0%	0.0%	0.0%
		Mattituck Harbor	3.0%	0.0%	0.0%	0.0%	0.0%
		Peconic River	2.2%	-1.1%	-1.1%	-1.7%	-1.7%
		Great and Little Peconic Bays[2]	5.2%	0.0%	0.0%	-1.3%	-2.6%
		Huntington & Northport Bay Area[2]	32.5%	0.0%	0.0%	0.0%	0.0%
		Lake Montauk	13.0%	0.0%	0.0%	0.0%	0.0%
		Port Jefferson Harbor	4.8%	0.0%	0.0%	0.0%	0.0%
		Port Jefferson/Mount Sinai	7.8%	0.0%	0.0%	0.0%	0.0%
		Smithtown Bay/Stony Brook[2]	4.8%	0.0%	0.0%	-3.6%	-4.8%
		Shelter Island/Gardiner's Bay[2]	10.8%	0.0%	0.0%	0.0%	-2.7%
		Greenport Harbor	15.8%	0.0%	0.0%	0.0%	0.0%
Regional Total			***100.0%***	***-1.1%***	***-1.1%***	***-6.6%***	***-11.8%***

Notes:
1. Waterway spans multiple counties and/or regions.
2. Economic activity takes place outside of the federal navigation channel. Dredge center names are used in lieu of waterway names.

Table C-2d. Reduction in Economic Activity Under the No Action Alternative: Ferry-Dependent Tourism (Percent of Regional Total)

Region	County	Waterway	Regional Share of Economic Activity	Percent Regional Economic Activity Curtailed after X Years			
				5	10	15	20
Rhode Island	Washington	Block Island Harbor of Refuge	100.0%	0.0%	0.0%	0.0%	0.0%
Regional Total			***100.0%***	***0.0%***	***0.0%***	***0.0%***	***0.0%***
Eastern CT	Hartford	Connecticut River Below Hartford	100.0%	0.0%	0.0%	-100.0%	-100.0%
Regional Total			***100.0%***	***0.0%***	***0.0%***	***-100.0%***	***-100.0%***
Western CT	Fairfield	Bridgeport Harbor	94.8%	0.0%	0.0%	0.0%	0.0%
		Greenwich Harbor	5.2%	0.0%	0.0%	0.0%	0.0%
Regional Total			***100.0%***	***0.0%***	***0.0%***	***0.0%***	***0.0%***
Eastern LI	Suffolk	Fishers Island	8.2%	0.0%	0.0%	0.0%	-8.2%
		Lake Montauk	0.1%	0.0%	0.0%	0.0%	0.0%
		Shelter Island	91.7%	0.0%	-56.2%	-56.2%	-73.9%
Regional Total			***100.0%***	***0.0%***	***-56.2%***	***-56.2%***	***-82.1%***

Table C-2e. Reduction in Economic Activity Under the No Action Alternative: New London Submarine Base (Percent of Regional Total)

Region	County	Waterway	Regional Share of Economic Activity	Percent Regional Economic Activity Curtailed after X Years			
				5	10	15	20
Eastern CT	New London	Thames River	100.0%	0.0%	0.0%	0.0%	0.0%