

ECONOMIC IMPACT STUDY OF MARITIME INDUSTRIES IN CONNECTICUT



Prepared for:

**Connecticut Maritime Coalition, Inc.
P.O. Box 188
Stonington, CT 06378**

**Connecticut Department of Economic & Community Development
505 Hudson Street
Hartford, CT 06106**

Prepared by:

**Apex Companies, LLC
58H Connecticut Avenue
South Windsor, CT 06074**

**FXM Associates
53 County Road
Mattapoisett, MA 02739**

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1.1 Study Purpose and Objectives	12
1.2 Scope of Work, Focus, and Methodology	12
1.2.1 Primary and Secondary Sources	13
1.3 Background and History	15
1.4 Report Organization	17
2.0 PLANNING CONTEXT	19
2.1 Connecticut Maritime Industry Stakeholder Interviews	19
2.2 National Marine Transportation System.....	25
2.3 Regional Waterborne Commerce.....	29
2.4 Connecticut Maritime Industry Strategies	30
2.5 Maintenance and Improvement Dredging	44
2.5.1 Currently Anticipated Dredging Projects.....	48
2.5.2 Details of Example Federal Dredge Project Needs	51
2.5.3 Details of Example Non-Federal Dredge Project Needs	55
3.0 PORT PROFILES	59
3.1 Port of Bridgeport.....	59
3.2 Port of New Haven	65
3.3 Port of New London.....	72
3.4 Norwalk Harbor	76
3.5 Port of Stamford	78
4.0 ECONOMIC IMPACTS OF EXISTING MARITIME INDUSTRIES	82
4.1 Overview of Connecticut's Maritime-dependent Industries.....	82
4.2 Analyses of the QCEW Data from the US Bureau of Labor Statistics	84
4.2.1 Water Transportation	84
4.2.2 Support Activities for Water Transportation	85
4.2.3 Scenic and Sightseeing Water Transportation	86
4.2.4 Ship and Boat Building	86
4.2.5 Boat Dealers	87
4.2.6 Marinas	88
4.2.7 Seafood Product Preparation and Packaging	89
4.2.8 Commercial Fishing	90
4.2.9 Aggregate Maritime-Dependent Sectors	90
4.3 Ameliorating Disclosure Issues in the QCEW Findings.....	91
4.4 Enhancing QCEW Findings to Include Information on Proprietors	94
4.5 Economic Impacts of Connecticut's Maritime-Dependent Industries.....	97
4.5.1 Impact Analysis.....	99
4.5.2 Economic Impact Analysis of Waterborne Cargo	101
5.0 IMPACTS OF NO DREDGING ON CONNECTICUT'S MARITIME ECONOMY	112
5.1 Overview of a "No Dredging" Scenario.....	112
5.2 Results from the U.S. Army Corps of Engineers Survey	113
5.3 Interpreting the Survey Results	114
5.4 Total Direct, Indirect and Induced Economic Effects.....	118
6.0 EXECUTIVE SUMMARY OF THE ECONOMIC ANALYSES	124
6.1 Methods and Sources.....	124
6.2 Summary Findings	126
7.0 POTENTIAL FUTURE ECONOMIC BENEFITS OF DREDGING	130
8.0 CONCLUSIONS	134

TABLES

Table ES-1 -	Economic and Tax Impacts of Connecticut's Maritime-related Industries, 2007
Table ES-2 -	Final Adjusted Revenue Losses Resulting from a Dredging Stoppage, by Sector
Table ES-3 -	Summary of Short Term Growth Potential
Table 2.1 -	Summary of Short Term Growth Potential
Table 2.2 -	Changes in Shipping over the Last ten Years
Table 2.3 -	Shipping M&A Volume Skyrockets
Table 2.4 -	Connecticut Non-Market Recreational Use of Long Island Sound
Table 2.5 -	Economic Impact of Connecticut Maritime Sectors from 2000
Table 2.6 -	Changes in Economic Variables as a Consequence of Employment
Table 2.7 -	Changes in Secondary Employment and Output of Connecticut Ports
Table 2.8 -	Average Changes in Tax Revenue in Nominal Dollars
Table 2.9 -	Economic Impact of Connecticut's Ports
Table 2.10 -	Annual Boardings on Passenger and Auto Ferries (2000)
Table 2.11 -	Travel Expenditure Patterns of Marina Visitors
Table 2.12 -	Southeastern Connecticut Regional Industry Maritime Cluster Profile
Table 2.13 -	Economic Impact of Recreational Boating in Connecticut
Table 2.14 -	Maritime Industry Cluster Employment and Establishments, 2005
Table 2.15 -	Connecticut Navigation-Dependent Facilities
Table 2.16 -	Non-federal Facilities – Maintenance Dredge Needs (30 years)
Table 4.1 -	Water Transportation Jobs and Wages
Table 4.2 -	Support Activities for Water Transportation: Jobs and Wages
Table 4.3 -	Scenic and Sightseeing Water Transportation: Jobs and Wages
Table 4.4 -	Ship and Boat Building: Jobs and Wages
Table 4.5 -	Boat Dealers: Jobs and Wages
Table 4.6 -	Marinas: Jobs and Wages
Table 4.7 -	Seafood Product Preparation and Packaging: Jobs and Wages
Table 4.8 -	Fishing, Hunting and Trapping: Jobs and Wages
Table 4.9a -	Maritime Dependent Industries: Jobs
Table 4.9b -	Maritime Dependent Industries: Wages
Table 4.10 -	Maritime Dependent Industries: Jobs and Wages, 2007
Table 4.11 -	Proprietors' Share of State Aggregate Worker Earnings by Industry in Connecticut, 2007
Table 4.12 -	Maritime-Dependent Industries in Connecticut: Total Jobs and Worker Earnings, 2007
Table 4.13 -	Cargo Shipments through Connecticut Ports by Commodity, 2007
Table 4.14 -	2007 Cargo Shipment Tonnages through Connecticut Ports by Port
Table 4.15 -	Economic and Tax Impacts of Connecticut's Waterborne Cargo, 2007
Table 4.16 -	Economic and Tax Impacts of Connecticut's Non-cargo Maritime Industry, 2007
Table 4.17 -	Economic and Tax Impacts of Connecticut's Maritime Tourism, 2007
Table 4.18 -	Economic and Tax Impacts of Connecticut's Maritime-related Industries, 2007
Table 5.1 -	Survey Sample by Sector of Connecticut's Maritime Industry
Table 5.2 -	Survey Results of Revenue Losses Resulting from a Dredging Stoppage, by Sector
Table 5.3 -	Adjusted Revenue Losses Resulting from a Dredging Stoppage, by Sector
Table 5.4 -	Maritime-Dependent Industries in Connecticut: Total Jobs and Worker Earnings, 2007
Table 5.5 -	Final Adjusted Revenue Losses Resulting from a Dredging Stoppage, by Sector
Table 5.6 -	Economic and Tax Loss to Connecticut's Economy of Not Dredging through 2012
Table 5.7 -	Economic and Tax Loss to Connecticut's Economy of Not Dredging through 2017
Table 5.8 -	Economic and Tax Loss to Connecticut's Economy of Not Dredging through 2027
Table 5.9 -	Economic and Tax Loss to Connecticut's Economy of Not Dredging through 2037
Table 7.1 -	CMC Summary of Future Benefits from Initial Investment

APPENDICES

- Appendix A: EIS Maritime Industry Contact Interview Log and Interviews
- Appendix B: Strategic Economic Documents Reviewed
- Appendix C: USACE Dredge Needs Summary Tables
- Appendix D: Technical Details on the I-O Model

EXECUTIVE SUMMARY

The Maritime Industry in Connecticut is a crucial component of the State's economic and cultural identity. Maritime commerce has played a key role in the State's development. Now the maritime industry, with growth potential in the commercial, transportation, recreational, and naval commerce business sectors, is positioned to be one of the State's driving economic engines into the future. The purpose of this report is to assess the contribution Maritime and related industries make to the overall State economy and to estimate the effect that dredging projects might have on the performance of Maritime Industries and consequently to the overall State economy.

In terms of economic potential, Connecticut is one of just 12 states with 3 or more of the 105 largest deepwater ports in the country, each with \$100 million or more in annual foreign trade. This resource represents a potential competitive advantage for Connecticut to connect with the global economy. Ninety-five percent of the volume of all overseas trade enters or leaves the United States through a deepwater port by ship. Nationwide, this represents nearly \$1 trillion in commerce and creates employment for more than 13 million people¹. It is forecast that between 2010 and 2020 the volume of waterborne freight will increase by 43 percent domestically and 67 percent internationally.

With its three deepwater ports, Connecticut has a natural advantage envied by surrounding states. Although Connecticut shares Long Island Sound with New York, commercially Connecticut is much more dependent on Long Island Sound for the movement of goods, fuel, and people. Over 90 percent of the shipping entering Long Island Sound will call on Connecticut's ports. Examples of the interdependence and impact of the maritime industry are numerous. As provided in the 2001 Connecticut Center for Economic Analysis study, the Bureau of Labor Statistics indicated that in 1998 Connecticut had 120,000 jobs in steel consuming industries. Were it not for Connecticut's seaports, many of these jobs would be lost because of higher costs for firms that employ them. Construction materials for highways such as asphalt and concrete and construction materials such as lumber and steel also arrive through our seaports. The employment in these sectors is, therefore, dependent on Connecticut's

¹ Yim, Joan and Parsons Brinkerhoff, "Connecticut's Ports: Transportation Centers for People and Goods – Executive Summary", Connecticut Maritime Coalition, May 2002.

seaports. Similarly, in the manufacturing sector, steel industries are among the leading port users in Connecticut².

Clearly, as more freight and fuels are delivered by ship to Connecticut's ports, a proportional decrease in trucks traffic on the already severely constricted Interstate 95 will occur. This is because one medium size tanker (300,000 bbls) represents 1,600 tanker trucks. Conversely, delays in port infrastructure improvements, including dredging, will decrease the economic vitality of our ports and add to Connecticut's transportation dilemmas.

Economic Impacts of the Maritime Industry in 2007

- Connecticut's maritime-dependent industries, their suppliers and related economic activity (total direct, indirect, and induced effects) accounted for over \$5 billion in business output within the State of Connecticut; more than 30,000 jobs; approximately \$1.7 billion in household income; and \$2.7 billion in State GDP. A breakdown of these effects by major economic sector is shown in **Table ES-1** below.
- As a consequence of these direct, indirect, and induced economic effects within the statewide economy, maritime industries annually account for over \$56 million in taxes paid to local communities, \$54 million in State tax revenues, and over \$224 million in Federal tax revenues.
- Wages within Connecticut's maritime-dependent industries averaged nearly \$63,000 per year per job in 2007. This average wage is 15 percent higher than the average wage of \$55,000 reported for all jobs in Connecticut in 2007.

² *Economic Impact of Connecticut's Deepwater Ports, Connecticut Center for Economic Analysis, University of Connecticut, May 2001.*

Table ES-1 - Economic and Tax Impacts of Connecticut's Maritime-related Industries, 2007

	Economic Component			
	Output (000 \$)	Employment (jobs)	Income (000\$)	Gross Domestic Product (000\$)
I. TOTAL EFFECTS (Direct and Indirect/Induced)				
1. Agriculture	1,406.3	27.4	227.9	265.1
2. Agri. Serv., Forestry, & Fish	40,210.9	228.8	10,963.3	35,973.4
3. Mining	528.4	1.8	116.7	433.7
4. Construction	44,446.2	106.9	6,100.0	13,554.0
5. Manufacturing	1,911,740.0	10,353.1	665,956.7	984,703.8
6. Transport. & Public Utilities	1,788,927.1	8,212.8	475,790.1	1,005,483.6
7. Wholesale	120,301.2	674.9	48,920.8	52,076.2
8. Retail Trade	365,254.1	4,833.1	127,118.3	213,119.1
9. Finance, Ins., & Real Estate	293,327.1	948.5	98,738.8	192,412.2
10. Services	451,361.5	5,020.1	215,905.2	227,558.9
Private Subtotal	5,017,502.8	30,407.4	1,649,837.6	2,725,580.2
11. Government	31,107.9	174.7	9,753.1	16,438.7
Total Effects (Private and Public)	5,048,610.7	30,582.1	1,659,590.7	2,742,019.0
II. DISTRIBUTION OF EFFECTS/MULTIPLIER				
1. Direct Effects	3,603,842.3	20,326.3	1,167,478.8	2,033,633.2
2. Indirect and Induced Effects	1,444,768.5	10,255.7	490,780.7	745,545.7
3. Total Effects	5,048,610.7	30,582.1	1,683,658.2	2,742,019.0
4. Multipliers (3/1)	1.401	1.505	1.442	1.348
III. COMPOSITION OF GROSS STATE PRODUCT				
1. Wages--Net of Taxes				1,508,563.0
2. Taxes				334,577.4
a. Local				56,112.9
b. State				54,067.3
c. Federal				224,397.2
General				150,998.2
Social Security				73,399.1
3. Profits, dividends, rents, and other				898,878.6
4. Total Gross State Product (1+2+3)				2,742,019.0
IV. TAX ACCOUNTS				
		Business	Household	Total
1. Income --Net of Taxes		1,508,563.0	1,496,993.9	--
2. Taxes		334,577.4	351,386.3	685,963.7
a. Local		56,112.9	46,719.0	102,831.9
b. State		54,067.3	48,876.1	102,943.3
c. Federal		224,397.2	255,791.2	480,188.5
General		46,463.1	255,791.2	302,254.3
Social Security		177,934.2	--	177,934.2
EFFECTS PER MILLION DOLLARS OF INITIAL EXPENDITURE				
Employment (Jobs)				8.4
Income				463,679.2
State Taxes				28,350.6
Local Taxes				28,319.9
Gross State Product				755,151.6
INITIAL EXPENDITURE IN DOLLARS				3,631,084,282.6

Source: R/ECON™ Input-Output Model and FXM Associates

Economic Impact and the Potential Effects of *Not* Dredging

For the assessment of potential economic effects of dredging, the findings of a recent (2008) survey conducted by the United States Army Corps of Engineers (USACE) of nearly 300 water-dependent and related industries in coastal communities within Connecticut was utilized.

Currently, maintenance dredging of Connecticut's harbors to depths adequate to support existing industry operations, not including Federal navigation channels, is estimated at about \$82 million. The approximately \$15 million in incremental local and State tax revenues that would be gained by this dredging would pay off such costs in about 5 years and may prevent some of the significant future year losses estimated by respondents to the USACE survey, as well as help capture additional tax revenues based on the additional sales opportunities reported by the industry respondents directly interviewed for this Study.

Data in **Table ES-2** below shows the estimate of revenue losses based on the 2008 USACE survey.³

Table ES-2 Final Adjusted Revenue Losses Resulting from a Dredging Stoppage, by Sector

NAICS	Sector	2008-2012	2013-2017	2018-2027	2028-2037
114	Fishing	-36.7%	-41.7%	-50.0%	-58.3%
33661	Ship & boat building and repairing	-21.0%	-24.6%	-32.7%	-44.8%
441222	Boat dealers (coastal counties only)	-22.9%	-22.9%	-22.9%	-22.9%
48	Water transportation	-13.3%	-21.2%	-27.3%	-31.8%
71393	Marinas (coastal counties only)	-16.5%	-22.3%	-34.3%	-42.7%

The USACE survey polled businesses as to how failure to provide adequate maintenance and new dredging would affect their business sales over various periods: 1-5 years (2009-2013), 6-10 years (2014-2018), 11-20 years (2019-2028), and 21-30 years (2029-2038).

- By 2012, lack of effective maintenance and new dredging could cost the State of Connecticut economy \$726 million in business output, 4,800 jobs, and \$256 million in household income annually. These economic losses would also mean a loss of \$7.3 million in local tax revenues, \$7.8 million in State tax revenues, and \$34 million in Federal tax revenues.

³ In an attempt to properly represent industry-wide effects, the consultant team adjusted the raw data on reported sales losses in one USACE survey question to account for businesses in the same NAICS industry who responded in another survey question that dredging would not affect their sales.

- By 2037, lack of dredging could cost the Connecticut economy over \$1.5 billion in business output, over 10,000 jobs, and \$550 million in household income annually. Corresponding fiscal losses would include over \$15 million in local tax revenues, \$14 million in State tax revenues, and over \$72 million in lost Federal tax revenues.
- By 2012, the potential loss of 4,800 jobs without dredging would reduce employment within the Connecticut economy attributable to maritime industries by about 15 percent compared to the baseline 2007 number of jobs. By 2037, potential job losses without dredging could reduce maritime industries and related jobs in Connecticut by one-third (34 percent). Similar proportional losses would occur in household income and in state and local tax revenues throughout Connecticut, as shown in the subsequent graphs.

The Voice of the Maritime Industry – Direct Interviews with Stakeholders

The maritime industry has a long and proud tradition in the State of Connecticut with voices steeped in the heritage of the Ports and Harbors that distinguish the waters edge from Greenwich to Stonington and along small and large rivers that cross the Connecticut landscape. Capturing these voices was a key aspect of the Study such that they provided a real and timely sense of the concerns, issues, and opportunities that lay before this important and historic sector of Connecticut's economy. Whether in formal or informal venues, maritime stakeholders were willing to share with the consultant team their important insights and vision for the future.

Thirty-six interviews were conducted during the Study with a cross section of businesses, trade groups, public sector officials, and others with knowledge and expertise within the maritime industries of Connecticut. These groups, as a whole, believed that dredging and infrastructure improvement are required to maintain and preserve their businesses and the maritime industry as a whole. Further, and very importantly, dredging and infrastructure improvement was considered critical to the growth of their specific businesses and also for attracting new maritime related industries to Connecticut resulting in a stronger Connecticut economy.

Table ES-3 below provides a summary of short-term growth potential based on timely implementation of dredging as provided by maritime sector stakeholders during the interview program. As shown in the table, cargo and non-cargo related stakeholders cited increases in their businesses from 5 to 30 percent with the majority of respondents indicating growth between 25 and 30 percent, while the recreational/tourism related stakeholders cited potential

increases in their businesses from 10 to 50 percent with the most significant impact associated with the recreational/marina component.

Table ES-3 - Summary of Short Term Growth Potential

Maritime Groups	Percent Economic Increase
Cargo	5-30%
Non-Cargo	25-30%
Recreational / Tourism	10-50%

Salient points that were consistently raised during the interview process included the following:

- Interviewees believed that a concerted effort and commitment from local and State governments to maintain and expand the "working " ports was critical, and in the longer term, would provide for the significant opportunities resulting from the more regional, national and international maritime marketplace.
- Significant retraction of the industry could be expected without timely and cost-effective dredging and infrastructure improvements with some of the industry stakeholders estimating a potential 25 percent reduction to their business over the next 5 years should dredging in deep water ports not be performed. Conversely, timely and cost-effective available dredging would result in significant economic growth.
- Major concerns were raised related to the timeliness of dredge permit acquisition and associated dredging costs. Maintenance and improvement dredging and infrastructure improvements should be thought of as an on-going activity due to constant sedimentation and natural erosion and degradation of structures in deepwater ports. Dredging disposal costs are also affected by the type and concentration of contaminants found in the sediments. In particular, significant planning is currently being conducted by the USACE and Connecticut Department of Environmental Protection (CTDEP) to identify and manage potentially contaminated dredge sediments in Long Island as well as beneficial re-use at upland sites.
- Public policy should allow for Connecticut maritime industry to compete fairly in the market place and create a situation that does not place Connecticut's industry at a distinct disadvantage. One such condition that was mentioned frequently was the State's tax policy relative to neighboring states.
- The municipal stakeholders stressed interest in job growth and economic development along the shoreline. The general consensus among this group believes that investment in dredging and infrastructure would provide sustainable job growth in their districts. The

municipal sector was also concerned with the regulatory process and, as such, with the timeliness and costs of dredging in their respective regions.

- The educational sector believes that investment in dredging and infrastructure is a key component for sustainable job growth in the maritime community and that their mission is to prepare (educate) a workforce to fill new job openings in the Maritime environment.

Comparison to Prior Studies

The emphasis, by voices across the spectrum of the maritime industry, on strategic implementation of infrastructure / dredging projects to facilitate economic growth is consistent with the numerous reports and literature reviewed as part of this Study.

Most recently, in the Fall of 2009, the State announced the release of the State's first-ever Economic Strategic Plan, a detailed, statewide blueprint for keeping and growing jobs, making the State more business-friendly and investing in the infrastructure and technology that will keep Connecticut competitive in the 21st Century. This plan articulates a vision for Connecticut in which the economic growth opportunities are tied to Connecticut's unique setting, and in part, the availability of efficient transportation system. The Economic Strategic Plan emphasizes the importance of Connecticut's maritime industries, citing data from previously completed economic impact studies, and notes that Connecticut's ports have limited land for cargo storage space and, consequently, continue to miss opportunities for sea transportation business. As such, it stipulates that seaports need capital investment to expand storage capacity and to increase intermodal connections between water, highway and rails. In addition, the report states that the State's maritime advantage is literally eroding as silt collects in deepwater ports. Without dredging, port channels grow shallower and larger ships cannot safely enter ports to offload goods and, as a result, cargo will need to be transported by alternative methods, most likely over highways, thus increasing congestion, maintenance, and pollution.

Conclusions

The results of this Study clearly support other authors and sources that suggest that the Maritime Industry Sector of the Connecticut economy is important to the State. This fact has been recognized at the highest levels within the State, where it has been asserted that the Connecticut Maritime Industries, which are so positively tied to the State's unique heritage,

distinctive physical setting, and geographic location, represent key elements of the State's economic growth opportunities in the future⁴.

The Maritime Industry, canvassed as part of this Study (as well as other reviewed surveys), has indicated, however, that it faces significant hurdles that threaten to dampen (or even reverse) progress that has been made over the years in the development of this sector of the State's economy. Chief among the Industry's concerns is the maintenance and modernization of the infrastructure of the waterways, including the marine channels and pier facilities. As a whole, the Maritime Industry believes that dredging and infrastructure improvement is required in order to maintain and preserve their businesses and economic viability, and also (and very importantly), that dredging and infrastructure improvement is *critical* to future growth of the existing Industry, as well as in attracting new maritime related industries to Connecticut in order to strengthen the State's economy.

Specifically, dredging is considered a paramount infrastructure issue by the Industry. The absence of dredging, a common situation that has existed for several decades in the State, has led to the shoaling of channels and berthing areas, limiting (or in some cases precluding), dockage of vessels. Existing maritime businesses have seen, and expect to continue to see, decreases in business activity as a result of insufficient water depths and poorly maintained channels.

The lack of dredging also severely limits Connecticut's competitive position in attracting new maritime industries to the State. Without dredging, new maritime initiatives, such as the promising new transportation business elements of the Short Sea Shipping strategy known as "*Americas Deep Blue Highway*", are likely to bypass the State entirely.

Conversely, investment in infrastructure and dredging resulting in the modernization and improvement of the State's marine "roadways" is likely to attract new businesses, as newly maintained waterways will once again accentuate the natural advantages of geography and water access that made the State a national leader in Maritime commerce originally. Studies have indicated that an increase in shipping alternatives for the transport of goods through and around Connecticut (such as the inclusion of the Short Sea Shipping concept) will result in a

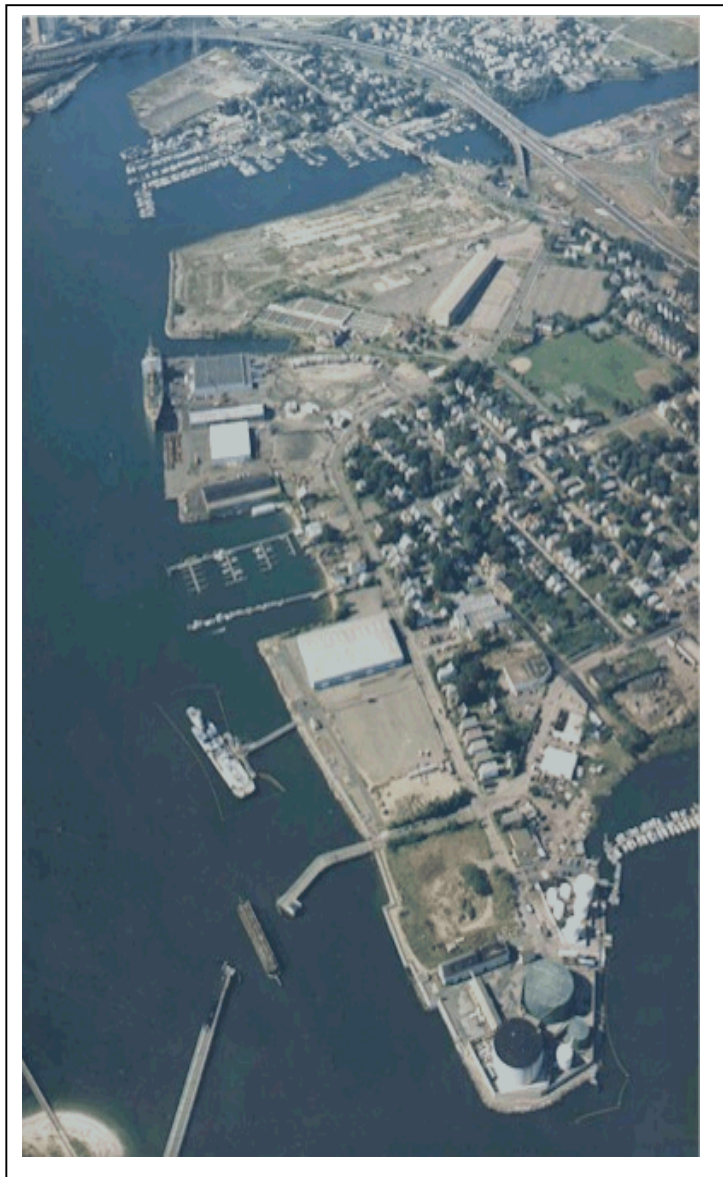
⁴ State Department of Economic and Community Development (DECD) - *Connecticut Economic Strategic Plan*, 2009

reduction in traffic and congestion on the State's major highways, asserting that the Ports will play a key role in the State's strategy for sustainability and environmentally sound growth.

1.0 INTRODUCTION AND BACKGROUND

The Connecticut Maritime Coalition (CMC) has commissioned this Study, *The Economic Impact Study of Maritime Industries in Connecticut*, as an element of its mission to provide information and direction to the maritime community of Connecticut and as a tool for use in its efforts to provide advice and impart direction in the legislative process concerning Connecticut's maritime future. The CMC has contracted the Consultant Team of Apex Companies, LLC and FXM Associates, Inc. (Consultant Team) to prepare this economic assessment of Connecticut's maritime industries and its significant effects on the overall State's economy.

Connecticut's maritime heritage has been an important economic engine for Connecticut throughout most of its history. Today, the world's economic system is developing toward an increasingly integrated global economy marked especially by free trade and free flow of capital foreign labor markets. Globalization means a worldwide movement toward economic, financial, trade, and communications integration. Globalization implies opening out beyond local perspectives to a broader outlook of an interconnected and inter-dependent economic opportunity enhancing and benefiting from transfer of capital, goods, and services. As a result, states and regions are positioning themselves to take advantage of opportunities that enable environmentally sound long-term growth and wealth enhancement. The more regional, national and



international nature of this economic transformation dictates that gateways of commerce and centers of finance will greatly benefit in the 21st century.

Understanding the short- and long-term importance of positioning the State of Connecticut to play an important role in this new economy, on September 16, 2009, Governor M. Jodi Rell announced the release of the State's first-ever *Connecticut Economic Strategic Plan*⁵, a detailed, statewide blueprint for keeping and growing jobs, making the State more business-friendly and investing in the infrastructure and technology that will keep Connecticut competitive in the 21st Century. The *Connecticut Economic Strategic Plan* prepared by the State Department of Economic and Community Development (DECD), articulates a vision for Connecticut in which the economic growth opportunities are tied to Connecticut's unique heritage, distinctive physical setting and geographic location. One of the key elements for Connecticut's success is the maritime industries.

Given the importance of the maritime industry presently and in the future, this economic Study of maritime industries in Connecticut is intended to provide a picture of the present state of the maritime commerce in Connecticut, information which can then be used by the CMC to focus its efforts on the activities and actions in support of the maritime community (such as dredging and infrastructure redevelopment) that will have the greatest overall impact. Through a review of existing reports and documents, interviews with key stakeholders of the maritime industry of Connecticut, and the use of economic modeling tools, the Consultant Team has gathered information and distilled from that information a snap-shot of the maritime industry of the State. The information includes an assessment of the impact to the future economic health of the industry if dredging and infrastructure improvement projects are pushed forward, and also the impact if they are not.

The Consultant Team has assessed the direct, indirect and induced economic effects of the maritime-related industries and clusters in Connecticut using a combination of telephone and in-person interviews, compilation of available and pertinent secondary source data, and application of economic modeling techniques. The evaluation results provides business output (revenues), jobs, household income, value added, and local / state / federal taxes associated with the maritime industries identified by the CMC as critical elements of the State's maritime economy. Total effects of demand within the maritime industries on output, jobs, and income within all

⁵Connecticut Economic Strategic Plan 2009, Department of Economic and Community Development, September 2009

other industries in Connecticut (approximately 90 sectors ranging from the two-digit to four-digit SIC/NAICS level) were included in the economic modeling effort.

1.1 Study Purpose and Objectives

The purpose of the Study is to determine business output (revenues), jobs, household income, value added, and local / state / federal taxes that attributable directly and indirectly to the maritime industries. By using an inclusive state of the art economic model, the Study was able to determine the total effects of demand within the maritime industries on output, jobs, and income in Connecticut. Further, a key objective of the analysis is to provide a preliminary estimate of the possible effects of dredging and other infrastructure developments on business output, jobs, income, and taxes. The CMC will utilize this information for planning purposes and to support activities and actions it will take to promote and preserve the maritime sector in Connecticut, with an aim toward improving the Connecticut economy through expansion and leveraging of the important potential growth opportunities that the Connecticut maritime industries impart.

Of particular interest to the CMC is the extent that deferred maintenance (in particular dredging and waterfront infrastructure improvements such as pier and bulkhead maintenance and expansion) has affected growth in the maritime sector to date, and what potential effect future investment in maintenance may have on the maritime industry and the overall economy of the State. The goal of the CMC's infrastructure initiative is to leverage the potential of the State's maritime activities to increase the economic output of the Connecticut Ports, leading to economic growth of the overall State economy benefiting all its citizens.

1.2 Scope of Work, Focus, and Methodology

The Study focus assessed the direct, indirect and induced economic effects of the maritime-related industries and clusters in Connecticut using a combination of telephone and in person interviews, compilation of available and pertinent secondary source data, and application of state-of-the-art economic modeling techniques.

The results of the evaluation show business output (revenues), jobs, household income, value added, and local / state / federal taxes attributable directly and indirectly to the maritime industries including transportation, maritime manufacturing & services, recreation, commercial fishing and educational / environmental institutions. Total effects of demand within the maritime

industries on output, jobs, and income within all other industries in Connecticut (approximately 90 sectors ranging from the two-digit to four-digit SIC/NAICS level) have been included in the economic modeling effort.

1.2.1 Primary and Secondary Sources

The Consultant Team relied on primary and secondary source data collected from interviews with the Connecticut Maritime businesses and from a comprehensive review of current industry literature and statistics. This approach was the best way to obtain accurate and defensible information related to current business profiles and impacts from dredging and future potential impacts.

This basic approach included one-on-one interviews conducted across a cross section of businesses, trade groups, public sector officials, and others with knowledge and expertise within the maritime industries of Connecticut. These interviews were used to obtain information on sales, expenditures, employment, payrolls, suppliers, customers, and other data relevant to this assessment of economic effects on the broader State economy and to obtain from the interviewees their assessment of how public policy and infrastructure – and dredging specifically – could affect business and employment opportunities and the performance of existing industries. The Consultant Team also interviewed City and State officials engaged in community and economic development planning.

The Consultant Team completed over 36 interviews, a list of which is included at the end of this report. To protect the confidentiality of information provided by the private businesses interviewed, results of the interviews are provided in written summary fashion, and the data in this report on revenues, wages, suppliers, customers, and other financially sensitive topics are aggregated by the type of industry participating in this Study. The Consultant Team also reviewed relevant prior reports provided by the Connecticut Maritime Coalition and some from interested industry experts, city officials and other sources uncovered in the course of our research.

Critical to the success of the economic analysis, comprehensive research and review of pertinent secondary data was conducted by the Consultant Team. Significant sources included but are not limited to the following:

- United States Army Corp of Engineers Dredging Needs Study Survey of Navigation Dependent Facilities For Long Island Sound Regional Dredged Material Management Plan dated June 2008;
- Major Port and Economic Studies such as Port of New Haven Strategic Land Use Plan - Parson Brinkerhoff (2007);
- Connecticut Maritime Coalition Report- Connecticut Ports: Transportation Centers for People and Goods - Parson Brinkerhoff (2002);
- The Economic Impact of Connecticut's Deepwater Ports University of Connecticut Center for Economic Analysis (2001);
- Connecticut Maritime Coalition- Strategic Cluster Initiative Reports (2000 and 2001);
- Revenue Source and industry statistics information from State of Connecticut Agencies;
- Trade and Maritime Industry Organizations;
- Recreational boat industry statistics and information from industry groups such as Connecticut Maritime Trade Association;
- Connecticut Port Authority and Harbor Master groups; and
- Connecticut Department of Transportation (ConnDOT) - Maritime Commission.
- Department of Economic and Community Development, Connecticut Economic Strategic Plan 2009, September 2009

1.2.2 Direct, Indirect and Induced Economic Effects

The method employed by this Study estimates the impact of maritime-dependent industries on the region's economy by simulating their absence, which is the standard approach used to assess the impact of an on-going economic activity. The economic contribution of any industry to an area is more than just the employment and output directly associated with that industry. The total impact must be measured as the direct impact as well as the indirect and induced impacts, also referred to cumulatively as the multiplier impact.

Direct impacts are the initial, immediate economic activities (jobs and income) generated by a project, activity, or business. Indirect impacts are the production, employment and income changes occurring in other businesses/industries in the community that supply inputs to the project industry. Lastly, induced impacts are the effects of spending by the households in the local economy as the result of direct and indirect effects from an economic activity. The induced effects arise when employees who are working for the project spend their new income in the community. The sum of the direct, indirect and induced effects is known as the total effect.

The indirect impact is frequently referred to as the supplier impact, for that is precisely what it is. Every industry requires inputs from other industries to varying degrees. Typically, manufacturing industries, such as shipbuilding, have relatively high indirect impacts. These industries accept large quantities of raw and/or unfinished materials, such as steel or instruments and electronic components, in the production of their finished product. Service industries such as a marina, on the other hand, tend to be labor intensive and, therefore, have smaller supplier impacts.



The induced impact can be thought of as multiple rounds of supplier impacts, that is, the impact on each supplier through the entire supply chain. As a simple example, if boat building did not exist, then some amount of diesel engines would no longer be needed for boats. The manufacturer of such engines would then require less fabricated metal parts from his supplier of such products. That supplier would in turn require less primary metal from his supplier. As one would expect, the induced impact gets smaller as it works its way through the supply chain until it eventually dissipates altogether.

The standard method of estimating these impacts is to use an input-output model. This model estimates the amount of output that each industry demands from every other industry in its production process. The indirect impact on any industry can be estimated by examining the demand flows by that industry from every other industry in the matrix results.

1.3 Background and History

Maritime industries have been important economic industries for Connecticut throughout most of its history. From clipper ships built for the California trade in the nineteenth century to Navy submarines in the twentieth and twenty-first, vessels of many types and functions have been constructed, rebuilt, and repaired in Connecticut "yards." Skilled craftspeople and talented professionals supported the shipbuilding industries and the on-going maintenance and operation of vessels throughout their working lives. Trades and services included sail making, rope making, ship's plumbing and provisioning of vessels. Blacksmiths -- "shipsmiths" -- provided metal fittings, and woodcarvers produced figureheads and other decorative vessel features. As the age of sail waned, Connecticut maritime industries adapted to focus on the manufacture and installation of steam, diesel and gas engines. Besides ship building, fishing and whaling were mainstays of Connecticut's economy in past centuries.

Today, the world's economic system is developing toward an increasingly integrated global economy marked especially by free trade and free flow of capital foreign labor markets. Globalization means a worldwide movement toward economic, financial, trade, and communications integration. Globalization implies opening out beyond local and nationalistic perspectives to a broader outlook of an interconnected and inter-dependent world with free transfer of capital, goods, and services across national frontiers. As a result, nations and regions are positioning themselves to take advantage of opportunities that enable long-term growth and wealth enhancement. The international nature of this economic transformation dictates that gateways of commerce and centers of finance will be at the hub of such national strategic posturing.



According to the Organization of Economic Cooperation and Development (OECD), total world trade reached almost \$3 trillion (in 2000 U.S. dollars) in 2007. Together with the flows of finance, information and people, the flows of goods integrates the world's economies. Trade in turn is underpinned by a global transportation and communication network. Reviewing the data on global trade generally leads us to recognize that trade is growing not only in absolute terms but also as a portion of both the global and U.S. economy⁶. It was estimated that 90 percent of 2008 Modal Shares of World Trade by Volume was attributed to imports and exports by volume are at some point transported by water.

Thus, the maritime related industries and ports, in particular, are incredibly important to trade and, as globalization continues, water-borne trade will become extremely important. Connecticut was once a leader in maritime industries and has an opportunity to regain that

⁶ An Evaluation of Maritime Policy in Meeting the Commercial and Security Needs of the United States IHS Global Insight, Inc. January 7, 2009.

prominence by taking environmentally sound short- and long-term actions to position its unique setting and geographic location to survive and thrive in the future economy.

States near New York City recognize that part of their role in the future economy of the United States is as a gateway to the world. Hence, investment in facilities, infrastructure and services proactively, are important to receive the benefits from opportunities that arise in this climate of global economic change. By providing more efficient port commerce facilities and intraregional transportation systems, Connecticut has the capacity for greater port throughput and for attracting businesses seeking to take advantage of the net lower transportation costs associated with the delivery of their supplies as well as of their products.

As maritime services grow globally and become more integrated with other modes of transportation and distribution, Connecticut has the potential to utilize its special capabilities (logistics) and utilize its physical assets (ports, locations, inter-modal links) to gain sustainable economic vitality for the future.

1.4 Report Organization

The Economic Impact Study of Maritime Industries in Connecticut report has been organized for presentation consistent with the approved outline developed in consultation with the Connecticut Maritime Coalition and the State of Connecticut DECD. **Section 2.0** provides a detailed summary of primary and secondary sources including but not limited to interviews and key documents reviewed in developing key model inputs and developing a significant understanding of the state of the maritime industry in Connecticut and its position more regionally. In particular, critical dredging needs, both maintenance and improvement, in the short and long term are presented. Dredging needs and its potential economic affect on the maritime industry are more fully discussed in **Section 5.0**.

Section 3.0 provides a summary of key attributes of Connecticut's major ports and their setting and contribution to the maritime industry. Profiles are provided for the ports of Bridgeport, New Haven, New London, Norwalk and Stamford.

Section 4.0 provides a detailed discussion and analysis of the baseline economic impacts of the existing maritime industries on the State of Connecticut. This section summarizes key aspects of the economic modeling functions and technique, data acquisition and data usage.

Further, this section presents details related to specific key maritime industry clusters and based on modeling analysis, provides the baseline economic effects associated with each specified maritime cluster and the maritime related industry as a whole.

Section 5.0 provides the results of the detailed economic assessment based on the affects of infrastructure improvements – i.e. the lack or deferment of dredging in the State of Connecticut. Based on comprehensive modeling activities and using the baseline economic conditions, as previously described in **Section 4.0** for comparison, a detailed discussion is provided documenting the affects and importance of dredging to the maritime industry and to the economy of the State of Connecticut.

Section 6.0 the Executive Summary of the Economic Analyses, provides a brief synopsis of the objectives, the methods and sources used in the analysis and a summary of the full report's **Section 4.0** (Economic Impacts of Existing Maritime Industries) and **5.0** (Impacts of No Dredging on Connecticut's Maritime Economy).

Section 7.0 presents the potential positive economic impact of conducting the dredging that is needed along Connecticut's shoreline. **Section 7.0** provides a broad assessment of the potential future benefits to the State's economy and job market based upon existing reports and data and the information collected and presented in this report.

Section 8.0 presents the overall conclusion resulting from the economic impact study of maritime industries in Connecticut. The study identifies that dredging and infrastructure improvement is required in order to maintain and preserve the maritime-related businesses and its economic viability, and also (and very importantly), that dredging and infrastructure improvement is *critical* to future growth of the existing Industry, as well as in attracting new maritime related industries to Connecticut in order to strengthen the Connecticut economy.

2.0 PLANNING CONTEXT

The Consultant Team assessed the direct, indirect, and induced economic effects of the Maritime-related Industries and clusters in Connecticut using a combination of telephone and in-person interviews, compilation of available and pertinent secondary source data, and application of state-of-the-art economic modeling techniques.

As part of the implementation of the planning context of this Study, the Consultant Team implemented an interview program with key maritime related stakeholders and conducted a review of available historical documentation and information available concerning the maritime industries of Connecticut. A summary of the information obtained from the interviews is presented below in **Section 2.1**. A summary of the information concerning the maritime industry of Connecticut as reflected



in reports, documentation and legislation and reviewed as part of the planning context of this Study are provided below in **Section 2.2** through **Section 2.4**. Also summarized below is a detailed compendium of information concerning the issue of maintenance and improvement of navigational channels and berthing infrastructure, including extensive information concerning dredging needs resulting from a significant survey performed by the USACE. The results of the USACE survey have been used extensively in the Consultant Team's economic assessment. This critical information is summarized in **Section 2.5**. A comprehensive list of the documents reviewed is included in **Appendix B**.

2.1 Connecticut Maritime Industry Stakeholder Interviews

Study planning context included interviews with a cross section of businesses, trade groups, public sector officials, and others with knowledge and expertise within the maritime industries of Connecticut. **Appendix A** describes the organization, contact name and topic summary of the interviews performed. The interviews were used to gather and confirm objective data on business sales and jobs and to obtain from the interviewees their assessment of how infrastructure – and dredging specifically – and, to a lesser extent, public policy could affect business and employment opportunities and the performance of existing industries.

Thirty-six interviews were conducted during the Study. Based on the information requested, several interviewees were contacted more than once. Five distinct groups were interviewed: water-borne cargo industries, water-dependant non-cargo industries, recreational / tourism, educational institutions and governance (i.e. State, municipal, USACE, etc.).

Seven interviewees were from the water-borne cargo (20.6 percent) and five interviewees were from water-dependant non-cargo industries (14.8 percent). Water-borne cargo industries include large shipping companies, port authorities and terminal operators. This group also contains the important "transactional" business sector that facilitates regional, national and international commerce. The water-borne cargo industries are generally located in the Bridgeport, New Haven, and New London, Connecticut ports. For example, almost two-thirds of the 17 million tons of cargo flowing through Connecticut's three main ports in 2007 was attributed to the port in New Haven,⁷ according to the Army Corps of Engineers (USACE), Navigation Data Center.

Cargoes handled by these industries include petroleum products, chemicals, scrap metal, lumber, metallic products, cement, sand, stone, salt, and general break-bulk cargo. Interviews with this sector focused on obtaining details on the set of expenditures of the organizations. Water-dependant non-cargo industries included island ferry services, towboat services, cruise ships and larger boat repair facilities and represent a significant component of the maritime industry on its own while, to a greater or lesser degree, also support other maritime clusters including but not limited to water-borne cargo.

These groups, as a whole, believed that dredging and infrastructure improvement are required to maintain and preserve their businesses and the maritime industry as a whole. Further, and very importantly, dredging and infrastructure improvement was considered critical to the growth of their specific businesses and also for attracting new maritime related industries to Connecticut resulting in a stronger Connecticut economy.

Federally authorized navigational channels require a minimum depth of 35 feet and without maintenance dredging, larger draft ships cannot be docked and cargoes off-loaded. Some of these industry personnel have estimated that 25 percent of their business may be lost over the next 5 years should dredging in deep water ports not be performed. Conversely, timely and cost-effective available dredging would result in significant economic growth. **Table 2.1** provides a summary of short-term growth potential, based on timely implementation of dredging as

⁷ U.S. Army Corp of Engineers, Navigation Data Center. *2007 Commodity Movements State to State by Commodity* and files by port on domestic shipment, as well as foreign imports and exports for 2007 at <http://www.iwr.usace.army.mil/ndc/db/ports/data/>

provided by maritime sector stakeholders during the interview program. As provided in **Table 2.1**, cargo and non-cargo related stakeholders cited increases in their businesses from 5 to 30 percent with the majority of respondents indicating growth between 25 and 30 percent. Very importantly, interviewees believed that a concerted effort and commitment from local and State governments to maintain and expand the "working " ports was critical and in the longer term, would provide for the significant opportunities resulting from the more regional, national and international maritime marketplace.

Table 2.1
Summary of Short-term Growth Potential

Maritime Groups	Percent Economic Increase
Cargo	5-30%
Non-Cargo	25-30%
Recreational / Tourism	10-50%

The emphasis, by these stakeholders, on strategic implementation of key infrastructure / dredging projects to facilitate economic growth is consistent with the plethora of reports and literature reviewed as part of this Study. For example, an economic study of the significance of navigation-dependent industries on the State economy was conducted by ENSR International for the USACE in 2001⁸. This study found that the sectors most impacted by navigation-dependent economic activity are manufacturing, transportation, and public utilities, and that the specific industries most dependent on navigational access are waterborne freight transportation, commercial fishing, ship building, boat building, marinas, and waterborne passenger transportation.

The educational sector of the maritime economy includes such institutions as UCONN Avery Point, Coast Guard Academy and The Sound School. This sector provides a significant role by providing a skilled and educated workforce to meet the needs of the industry and its growth in the future. Four interviews were conducted in this sector (11.7 percent).

The Sound School Regional Vocational Aquaculture Center is an accredited inter-district, college preparatory, high school, one of the 19 vocational agriculture centers in Connecticut, and a part of the New Haven Public School System. The Sound School is the first (full-time center) to concentrate in the Study of aquaculture and marine trades. Sound Marine Skills, Inc. (SMS) is



a non-profit adult education partnership between the Sound School and the Bridgeport Regional Vocational Aquaculture Centers, Workforce Alliance, the Connecticut Marine Trades Association and several area full-service marinas and boatyards. SMS brings career opportunities in marine technologies to recent high school graduates, under-employed and qualified unemployed adults at no cost to the trainee while addressing the maritime industry's critical skilled labor shortages. Employment opportunities include cargo and non-cargo related industries, marinas serving recreational boating and noncommercial fishing, retail boat and marine equipment dealers and manufacturers.

The University of Connecticut at Avery Point is a branch campus of the University of Connecticut. It formally came into being in 1967 as the Southeastern Campus of the University of Connecticut. It was then later renamed as the University of Connecticut at Avery Point. The students at the university can take up any of the University of Connecticut's traditional majors as well as the course of the bachelor's degree level in subjects such as coastal studies, American studies and maritime studies. The students can also opt for a wide range of minors like oceanography, environmental economics and policy and marine biology.

The educational sector also believes that investment in dredging and infrastructure (such as docks and piers) is a cornerstone to sustainable job growth in the maritime community and that their mission is to prepare (educate) a workforce to fill new job openings in the Maritime environment.

The recreational / tourism sector consisted of tourist destinations such as Mystic Seaport, maritime museums, boat dealers and private boat marinas and yacht clubs. In particular, the Connecticut Maritime Trades Association has admirably represented the vital needs of recreational boating industry and the industries significant role in the economy of the State of Connecticut. Six interviews were conducted in this sector (17.6 percent). Significant concerns

were raised over the lack of dredging and resultant loss of access. In particular, dredging in areas where stream and river sediment loading and deposition was significant was at a critical point impacting their economic viability. Further, major concerns were raised related to the timeliness of dredge permit acquisition and associated significant permitting and dredge costs, as well as the affect of neighboring state's public policy (i.e. tax policy, etc.) that places Connecticut's recreational industry at a distinct disadvantage. As provided in **Table 2.1**, recreational / tourism related stakeholders cited potential increases in their businesses from 10 to 50 percent with the most significant impact associated with the recreational/marina component.

Twelve interviews were conducted related to the governance sector and included the State of Connecticut Department of Transportation (ConnDOT) Dredge Coordinator, Marine Trades Association Directors and members, Port Authority Directors, Town First Selectmen, Town Directors of Planning, USACE Project Managers, City Economic Development Directors, Presidents of the Chambers of Commerce, Non-Profit Enterprise group members and various City and Town Transportation and Commerce department personnel (35.3 percent). Eight out of twelve interviewees were personnel from City and Town governments. These individuals were queried about financial planning and State support needs. The general consensus from this group was that to maintain or increase economic competitiveness and grow jobs, infrastructure modifications (including dredging) needed to be addressed.

Specific business accounts included the move of the Turbana Corporation's banana importation operation from Bridgeport to Philadelphia, Pennsylvania. The company was founded in 1970 and is based in Coral Gables, Florida. Approximately 180 truckloads of product that previously arrived every week at Bridgeport via Turbana Corporation vessels are now delivered to the New England market via trucks using the congested southwest 1-95 corridor. The State of Pennsylvania provided bond money to the Port Authority of Philadelphia for infrastructure improvements as an enticement for Turbana Corporation to relocate.

In general, the municipal portion of the sector stressed interest in job growth and economic development along the shoreline. This sector believes that investment in dredging and infrastructure (such as docks and piers) would provide sustainable job growth in their districts. The municipal sector was also concerned that pressures from regulatory agencies (i.e. State and Federal regulatory requirements, etc.) may impede the timeliness and effectiveness of dredging in their respective regions. This focus, by these stakeholders, on economic growth

through better planning and utilization of the maritime industry is reiterated in numerous studies and documents reviewed during the implementation of the Study. For example, the CMC, in partnership with Michael Gallis & Associates, prepared a 2000 report outlining a broad strategy for growing the State's maritime industries.⁸ This strategy included a call for public investment into maritime facilities as well as a framework for evaluating and prioritizing investments.

As a follow up to the 2000 report, the *Connecticut Maritime Cluster Strategic Plan* was prepared in 2001.⁹ The strategic plan identified dredging as a primary and time-sensitive concern, noting that all of the State's deepwater ports must be dredged within two to three years and that the Bridgeport Harbor channel was the top priority. It also reports that if these dredging needs are not met, fuel and other products may need to be transported to Connecticut by truck, which may result in 500,000 and 950,000 more truck trips on I-95 per year.

Other members from the governance sector include various departments of the State of Connecticut (i.e. ConnDOT, CTDEP, etc.), and Federal (i.e. USACE, etc.) which are involved with projections of future dredging needs surveys, the management of dredging planning and/or operations, dredging permits and the variety of disposal options of dredge spoils in the State of Connecticut and more regionally. Both the USACE and the ConnDOT have taken significant steps in addressing the needs and issues of short- and long-term dredging and its importance to the overall economic health of the State and region.

Further, most recently the State announced the release of the State's first-ever Economic Strategic Plan¹⁰ a detailed, statewide blueprint for keeping and growing jobs, making the State more business-friendly and investing in the infrastructure and technology that will keep Connecticut competitive in the 21st Century. This plan articulates a vision for Connecticut in which the economic growth opportunities are tied to Connecticut's unique setting and associated transportation system. The Economic Strategic Plan emphasizes the importance of Connecticut's maritime industries, citing data from previously completed economic impact studies, and notes that Connecticut's ports have limited land for cargo storage space and consequently continue to miss opportunities for sea transportation business. As such, it stipulates that seaports need capital investment to expand storage capacity and to increase intermodal connections between water, highway and rails. In addition, the report states that the

⁸ *Connecticut Maritime Coalition, Michael Gallis & Associates and the Connecticut Economic Research Center. 2000. Strategic Cluster Initiative. Prepared for the Connecticut Maritime Coalition.*

⁹ Doyle, P. December 2001. *Connecticut Maritime Cluster Strategic Plan.* Prepared for the Connecticut Maritime Coalition.

¹⁰ Connecticut Economic Strategic Plan 2009, Department of Economic and Community Development, September 2009

State's maritime advantage is literally eroding as silt collects in deepwater ports. Without dredging, port channels grow shallower and larger ships cannot safely enter ports to offload goods; as a result, cargo will need to be transported by alternative methods, most likely over highways, thus increasing congestion, maintenance, and pollution.

Details related to this and other studies referred to in this section and programs spearheaded by the USACE and ConnDOT are provided in **Section 2.0** Planning Context.

2.2 National Marine Transportation System

Vision for the 21st Century National Strategy for the Marine Transportation System

On a national scale, maritime industry leaders in government, academia, and the private sector have noted the recent and projected future growth in maritime commerce. Recent reports from the U.S. Maritime Administration (MARAD) and the interagency Committee on the Marine Transportation System (CMTS) have indicated that the nation's marine transportation system, comprising shippers as well as port intermodal facilities and waterways, is an economic engine providing jobs and facilitating foreign and domestic trade. MARAD indicates that the nation's marine transportation system supports 13 million jobs nationwide and handles 95 percent of America's foreign trade.¹¹ The CMTS reports federal Department of Transportation (ConnDOT) statistics indicating that by 2020 total freight volumes will increase by more than 50 percent from 1998 levels, and that between 2010 and 2020 the value of waterborne freight will increase by 43 percent domestically and 67 percent internationally.¹² These reports also note that America's maritime infrastructure is quickly approaching capacity, and that maintenance dredging and channel deepening will be necessary to maintain existing and grow new port capacity. The CMTS report references a USACE study indicating that in 2000, more than one quarter of the vessel calls in the U.S. were depth-constrained by current channel and port depths. This report calls for the efficient use of existing port capacity so as to accommodate as much as possible of the expected growth in waterborne commerce.¹³

America's Deep Blue Highway: How Coastal Shipping Could Reduce Traffic Congestion, Lower Pollution, and Bolster National Security

¹¹ U.S. Maritime Administration. 2007. *A Vision for the 21st Century*. Available online at http://www.marad.dot.gov/documents/Vision_of_the_21st_Century_10-29.pdf.

¹² Committee on the Marine Transportation System. July 2008. *National Strategy for the Marine Transportation System*. Available online at <http://www.cmts.gov/nationalstrategy.pdf>.

¹³ Committee on the Marine Transportation System. July 2008. *National Strategy for the Marine Transportation System*. Available online at <http://www.cmts.gov/nationalstrategy.pdf>.



Other national reports have called for the development of Short Sea Shipping Ports and routes to address some of the recent and projected future growth in maritime commerce referenced in government reports. Short Sea Shipping (also known as "*America's Maritime Highway*") refers broadly to the movement of goods by inland or coastal routes, and is widely advocated as a way to reduce road and fuel consumption while allowing for efficient, environmentally sound commerce. The 2008 study makes a strong case for short sea shipping and notes that it would present significant economic benefits to small port operators. It also recommends the investment of \$150 million of

federal funds in prospective short sea shipping ports for infrastructure improvements. Bridgeport, New Haven, and New London are all identified in this report as prospective short sea shipping ports.¹⁴

The Business of Marine Transportation¹⁵

The global shipping industry, in all of its operating functions, is estimated to be a \$10 trillion per year business. In the United States, container and passenger ships represent only 16-18 percent of all the ship calls at U.S. ports each year. The global freight bill just for bulk (liquids and dry bulk) movements in 2008 totaled about \$2 trillion. Ocean freight rates for bulk are very volatile. To hedge that volatility, a futures market has grown. In 2005, when freight rates started to zoom upward, the value of trades in that market was about \$57 billion. In 2008, that figure had grown to about \$500 billion.

- ***Shipping in the United States***

United States taxation policies and labor issues have caused the United States flag Liner international operations to be sold to foreign entities. The few United States flag operations that remain are engaged in trades that are protected from competition by United States law.

¹⁴ Institute for Global Maritime Studies. September 2008. *America's Deep Blue Highway: How Coastal Shipping Could Reduce Traffic Congestion, Lower Pollution, and Bolster National Security*. Available online at <http://www.igms.org>.

¹⁵ Donald B. Frost, President, D.B. Frost & Associates. *Marine Transportation Planners and Consultants* November 2009.

Ocean shipping companies started to move from Lower Manhattan in the mid 1960s. The scheduled part of the industry, also known as the Liner Sector, or more commonly known today as the container carriers, moved to northern New Jersey where most of the container lines maintained terminals. These carriers were joined in New Jersey by the specialized cargo carriers operating RO/RO (roll-on/roll-off) ships and some so-called "Break Bulk" operations.

- ***Connecticut – the center of the bulk shipping business in the United States***

Starting about 1968, the unscheduled part of shipping (known as the "Tramp Sector"), the owners and operators of tankers and dry cargo bulk carriers, moved their commercial operations to Connecticut. They were a bit slower to move than the Liners because they were more closely tied to international banking services. As electronic banking evolved, more of the shipping industry left New York City. Many shippers followed.

The Federal tax policies that killed United States flag shipping also impact American ship owners operating foreign flag ships in international trade. Therefore, most of the non-treasury and operating functions are located outside the United States. Nonetheless, while those functions require fewer employees in the United States, many foreign based ship owners and operators have established agency offices in Connecticut to provide commercial operations and sales functions for United States shippers.

- ***Shipping Jobs in Connecticut***

While the shipping and shipping-related firms in Connecticut have fairly small staffs, there are many of these companies, and the industry here employs as many, if not more, people than the United States flagged carriers once did in New York. The purely paper processing jobs are gone and have been replaced with jobs requiring more education and training. Many of the carrier-shipper liaison services and port coordination functions once found in carrier's offices have been assumed and expanded by the shippers, yet these are still shipping jobs. Many of the shippers in Connecticut operate their own time chartered fleets, and these too are shipping jobs, but not performed by a traditional ship owning company. In sum, the international shipping industry headquartered in Connecticut, directly or indirectly, employs about 4,500 people internationally.

The following changes in shipping in the last ten years include, but are not limited to, the following:

- Trade – It has grown exponentially, driven by China
- Shifting geography – Asia vs. Euro-centric
- The ship owners – Younger, better educated, more risk tolerant
- The financing of ships – Shipping went public and Wall Street noticed
- Disintermediation – Jobs defined as shipping are more complicated
- Freight markets – More volatile and briefly higher than at any time in history
- Risk Management – New tools
- New Players – Hedge and Private Equity Funds, Investment banks

Graphical representation of the changes is shown in **Table 2.2 and 2.3** below.

Table 2.2
Changes in Shipping over the Last Ten Years

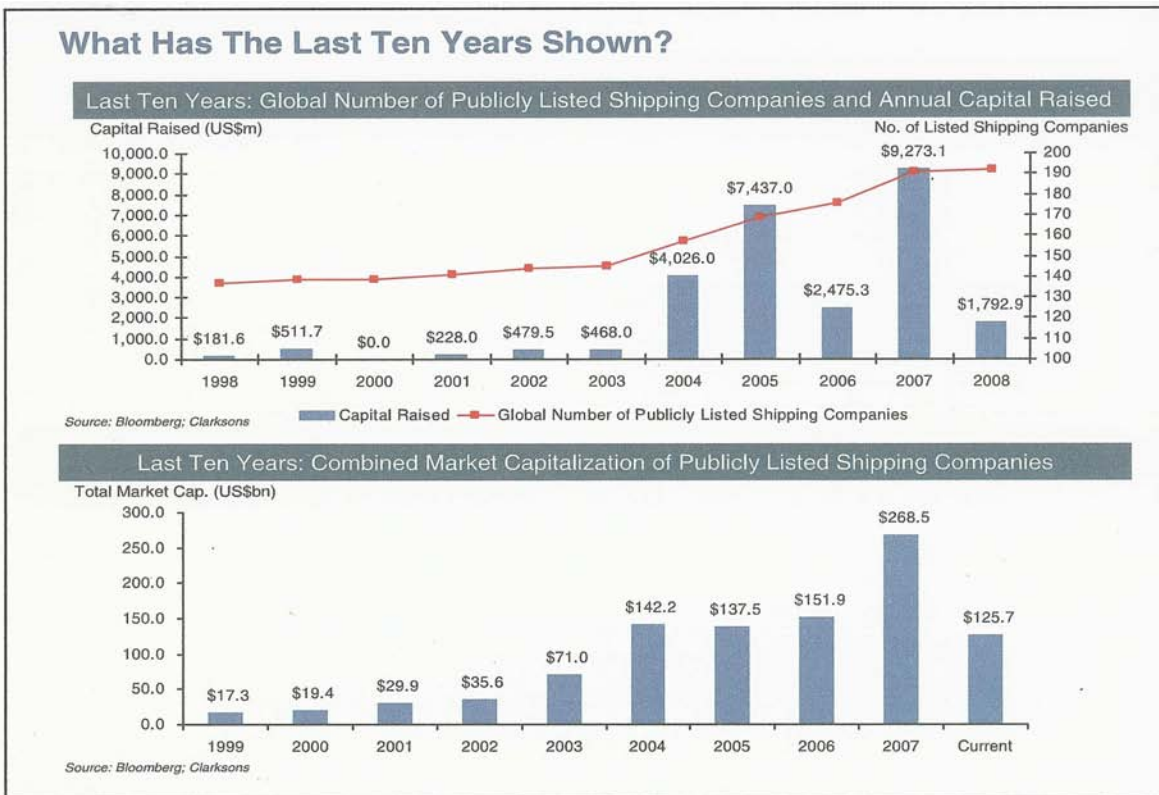
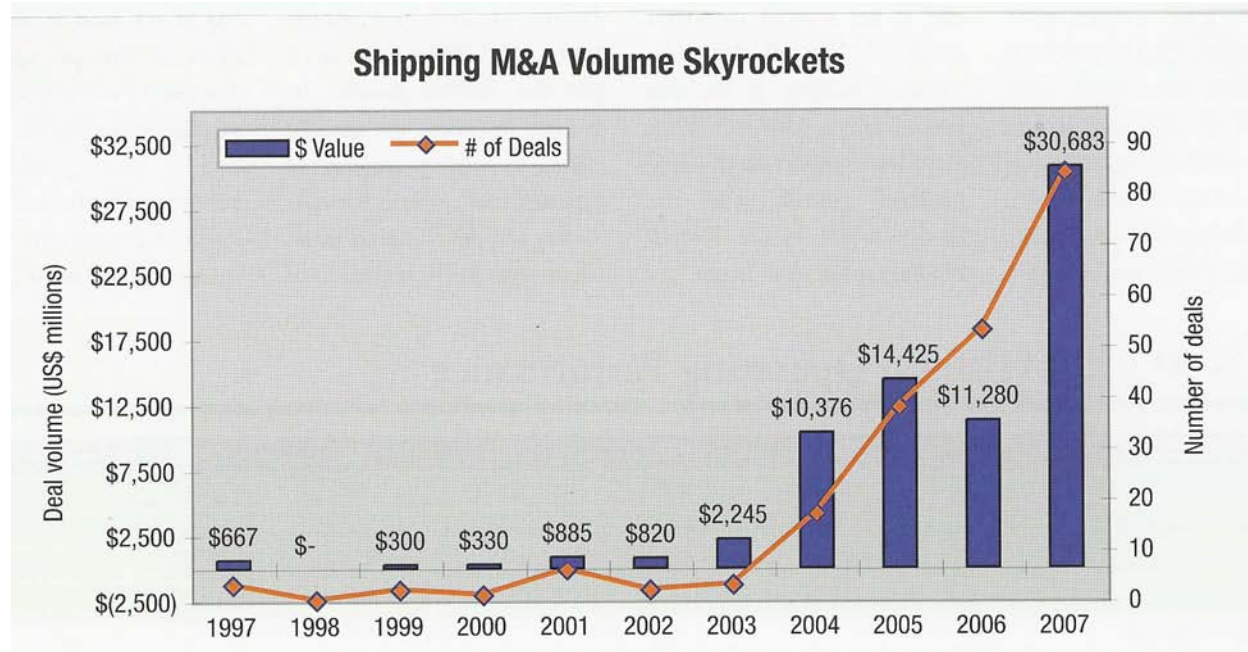


Table 2.3



Source: Marine Money

2.3 Regional Waterborne Commerce

Long Island Sound Waterborne Transportation Plan

The plan was prepared by Cambridge Systematics for the New York Metropolitan Transportation Council and released in 2005. The purpose of the Long Island Sound Waterborne Transportation Plan (LISWTP) was to explore possibilities for expanding Long Island Sound's waterborne passenger and freight transportation network and to develop a Sound-wide transportation plan accordingly. While this study did not include an assessment of the economic impact of current or future uses of Connecticut's ports, it did incorporate a review of several sites for potential future ferry services. This review involved consideration of marine structures and vessel navigation, including dredging needs; any site-specific and relevant data is included in the Port Profiles (**Section 3.0**) This report's recommendations are site and route-specific and do not address the overall economic impact of maritime industries, nor the issue of dredging. Further, the report recommendations for potential ferry routes and services are based on site characteristics, transportation demand, community input, and other factors, but not on the potential economic benefits of such services.¹⁶

¹⁶ Cambridge Systematics, Inc. 2005. Long Island Sound Waterborne Transportation Plan. Prepared for the New York Metropolitan Transportation Council. Online at www.nymtc.org.

Estimates of Water Quality-Related Values and Other Relevant Data for Long Island Sound

Some recent planning and economic impact studies have examined transportation and other maritime uses for the entire Long Island Sound conducted by research staff of the National Ocean Economics Project (NOEP). The study was prepared for Long Island Sound Study, a program of the United States Environmental Protection Agency (USEPA), and assessed the economic value of water quality-dependent and other recreational and commercial uses of Long Island Sound. These uses included commercial fishing, recreational fishing and boating, and maritime transportation. The economic impact of Connecticut's commercial fisheries was reported as the value of fish landings based on 2000 National Marine Fisheries Service data. The economic impact of recreational fishing and boating was assessed using an IMPLAN analysis and presented for the entire Sound, not by state. The economic significance of marine transportation was reported as results from prior University of Connecticut and USACE studies. This study considered non-market values of some uses. In the case of recreational fishing and boating, the NOEP team conducted their analysis of these activities to calculate *non-market* recreational use values, summarized below in **Table 2.4**:¹⁷

Table 2.4 - Connecticut Non-Market Recreational Use of Long Island Sound

Recreational Activity	Estimated Activity Days	Value per day (2001 dollars)	Total user value (2001 dollars)
Recreational Fishing	1,722,806	\$46.78	\$80,592,865
Boating related Activities	8,409,711	\$22.35	\$187,957,041
Total			\$268,549,906

Source: Estimates of Water Quality Related Values and Other Relevant Data for Long Island Sound (2004)

2.4 Connecticut Maritime Industry Strategies

Strategic Cluster Initiative

Over the past decade, a series of studies have been conducted to assess the nature and economic impact of Connecticut's maritime industries. The earliest of these was in 2000, when the newly-formed CMC partnered with Michael Gallis & Associates to prepare a strategic report of the Connecticut maritime industry cluster. The resulting report was intended to provide an

¹⁷ Kildow, Judith T., et al. 2004. *Estimates of Water Quality-Related Values and Other Relevant Data for Long Island Sound*. Prepared by the research staff of the National Ocean Economics Project for the Long Island Sound Study/U.S. Environmental Protection Agency.

overarching framework for understanding, analyzing, and promoting Connecticut's maritime cluster. The report identified four maritime industry sectors (transportation, manufacturing and services, recreation, and commercial fishing), and outlined a broad strategy for growing the State's maritime industries. This strategy includes a call for public investment into maritime facilities as well as a framework for evaluating and prioritizing investments. This document also reported on the economic impact of each of the four sectors; these results are summarized in **Table 2.5**. The report does not include a description of the methodology and data sources used to calculate this economic impact, nor does it specify the year dollar value reflected by these figures. The report also does not include any specific discussion of the role of dredging with regard to the State's maritime cluster.¹⁸

Table 2.5 - Economic Impact of Connecticut Maritime Sectors from 2000

Maritime Sector	Businesses	Jobs	Payroll	Sales
Transportation	63	1,399	\$69.7 million	\$771.7 million
Manufacturing & Services	17	8,927	\$418.9 million	\$1.6 billion
Recreation	203	1,292	\$37.4 million	\$204.3 million
Commercial Fishing	66	607	\$27.4 million	\$32.5 million
TOTAL	349	12,225	\$553.4 million	\$2.61 billion

Source: Strategic Cluster Initiative Report¹⁹

Connecticut Maritime Cluster Strategic Plan

The *Strategic Cluster Initiative* study led to this report in 2001. The strategic plan identifies dredging as a primary and time-sensitive concern, noting that all of the State's deepwater ports must be dredged within two to three years and that the Bridgeport Harbor channel was the top priority, "Bridgeport's harbor channel is currently 29 feet deep in some areas. It should be 35 feet deep." It also reports that if these dredging needs are not met, fuel and other products may need to be transported to Connecticut by truck, which may result in 500,000 and 950,000 more truck trips on I-95 per year as well as an increase in fuel prices. The document does not provide further details about dredging needs or related economic issues, whether in Bridgeport

¹⁸ Connecticut Maritime Coalition, Michael Gallis & Associates and the Connecticut Economic Research Center. 2000. *Strategic Cluster Initiative*. Prepared for the Connecticut Maritime Coalition.

¹⁹ Connecticut Maritime Coalition, Michael Gallis & Associates, and the Connecticut Economic Research Center. 2000. *Strategic Cluster Initiative*. Prepared for the Connecticut Maritime Coalition.

or in other ports. While the strategic plan references the establishment of a statewide dredging task force, it does not offer any further details on how the above-mentioned dredging goals will be attained.²⁰

The Economic Impact of Connecticut's Deepwater Ports: An IMPLAN and REMI Analysis

In 2001, the former Connecticut Coastline Port Authority commissioned a detailed economic impact study of Connecticut's deepwater ports. The Connecticut Center for Economic Analysis at the University of Connecticut completed this study and issued this final report. This study focused primarily on the State's three major ports, Bridgeport, New Haven, and New London, and on only two of the maritime industry sectors, transportation and manufacturing and services. It employed both dynamic and static economic models (REMI and IMPLAN) and estimated the total (direct, indirect, and induced) economic impact of the three ports on the State's economy over a 35-year period into the future. Overall, the study found that in 1997 Connecticut's ports accounted for almost 2 percent of the State's total employment, 2.6 percent of the State's total output (GSP), and 2.5 percent of the State's total taxes, including municipal taxes. The results of the REMI analysis are presented as average changes in selected economic variables over the 35-year study period, as presented in **Table 2.6**.

In particular, the report indicated that according to the Bureau of Labor Statistics, Connecticut had 120,000 jobs in steel consuming industries in 1998. Were it not for Connecticut's seaports, many of these jobs would be lost because of higher costs for firms that employ them. Construction materials for highways such as asphalt and concrete and construction materials such as lumber and steel also arrive through our seaports. The employment in these sectors is, therefore, dependent on Connecticut's seaports. Similarly, in the manufacturing sector, steel industries are among the leading port users in Connecticut²¹.

This report does not disaggregate study results to show the economic impact of the individual ports or the individual industry sectors. In its concluding remarks, this report argues that Connecticut's deepwater ports have significant economic impact such that they merit strong State support for dredging. This study did not assess the loss of port economic activity due to

²⁰ Doyle, P. December 2001. Connecticut Maritime Cluster Strategic Plan. Prepared for the Connecticut Maritime Coalition.

²¹ *Economic Impact of Connecticut's Deepwater Ports, Connecticut Center for Economic Analysis, University of Connecticut, May 2001.*

the lack of dredging, nor the potential increase of port economic activity that may occur due to future dredging.²²

Table 2.6 - Changes in Economic Variables as a Consequence of Employment

	Average Incremental Change over Baseline
Employment (thousands)	27.051
GRP (billions 1992 \$)	\$1.941
Personal income (billions nominal \$)	\$2.698
Population (thousands)	46.221

Source: Connecticut Port Service Providers and Port Users²³

The REMI analysis indicated the secondary employment impacts of the ports over the 35-year study period as presented **Table 2.7**.

Table 2.7- Changes in Secondary Employment and Output of Connecticut Ports

Sectors	Average Change in Employment over Baseline	Avg. Change in Output over Baseline (billions 1992 \$)
Durable manufacturing	4260	0.433
Non-durable manufacturing	1230	0.226
Mining	20	0.001
Construction	2240	0.111
Transportation/Public Utility	5160	0.438
Finance/Ins./Real Estate	800	0.147
Retail Trade	2940	0.105
Wholesale Trade	1160	0.156
Services	6510	0.242

Source: The Economic Impact of Connecticut's Deepwater Ports: An IMPLAN and REMI Analysis (2001).

The REMI analysis also indicated the average annual fiscal impacts of Connecticut's ports as shown in **Table 2.8**.

Table 2.8 - Average Changes in Tax Revenue in Nominal Dollars

	Average Tax Revenue Change
State Tax Revenue	\$161.48 million
Local Property Taxes	\$135.41 million
Induced Government Spending	\$300.77 million
Total Taxes	\$297.09 million

Source: The Economic Impact of Connecticut's Deepwater Ports: An IMPLAN and REMI Analysis (2001)

²² Carstensen, Fred V. et al. 2001. *The Economic Impact of Connecticut's Deepwater Ports: An IMPLAN and REMI Analysis*. Prepared for the Connecticut Coastline Port Authority by the Connecticut Center for Economic Analysis.

²³ Carstensen, Fred V. et al. 2001. *The Economic Impact of Connecticut's Deepwater Ports: An IMPLAN and REMI Analysis*. Prepared for the Connecticut Coastline Port Authority by the Connecticut Center for Economic Analysis.

The IMPLAN analysis drew upon 1997 employment data. Results of the IMPLAN analysis are presented in **Table 2.9** and are best understood as what the authors describe as a "once-and-for-all" static state of the economy:

Table 2.9 - Economic Impact of Connecticut's Ports

Description (1885 \$ million)	Direct Impacts	Indirect Impacts	Induced Impacts	Total Impacts
Employment (Jobs)	10,452	5,130	7,182	22,765
Output	\$1522.689	\$531.523	\$567.667	\$2,621.867
Personal Income	\$531.409	\$210.460	\$223.515	\$965.385
Total Value Added	\$792.857	\$307.456	\$371.125	\$1,471.639
Other Property Income	\$209.050	\$72.420	\$107.655	\$389.126
Indirect Business Taxes	\$52.397	\$24.575	\$40.154	\$117.127

Source: The Economic Impact of Connecticut's Deepwater Ports: An IMPLAN and REMI Analysis (2001)

Connecticut's Ports: Transportation Centers for People and Goods

The CMC commissioned a review of existing reports on Connecticut's three major deepwater ports and made recommendations to improve public understanding of these facilities and the overall benefits of the maritime industry cluster to the State.²⁴ The report builds directly on the above-mentioned 2000 CMC study and provides discussion and statistics to illustrate the activities characterizing each of the four industry sectors in each of the three major ports. This report does not contain a new economic impact analysis of the ports but simply cites the economic impact analysis results from the 2000 CMC study. It does include other quantitative data, including ridership numbers from several of Connecticut's passenger ferries and data describing the facilities and cargo capacity of Connecticut's three major ports. Port-specific data are included in the Port Profiles (**Section 3.0**). **Table 2.10** includes passenger ferry data only from those ferries which are still in operation and, therefore, relevant to this Study.

Table 2.10 - Annual Boardings on Passenger and Auto Ferries (2000)

Operator	Passenger Boardings (2000)	Vehicle Boardings (2000)
Bridgeport-Port Jefferson Steamboat Company	800,000	425,000
Fishers Island Ferry	164,000	47,000
Cross Sound Ferry (NL-Orient Point) (conventional)	919,183	379,885
Cross Sound Ferry (NL-Orient Point) (fast ferry)	215,000	n/a
Block Island Express (NL-BI) (formerly Nelseco Nav)	Not provided	n/a

Parsons Brinckerhoff. 2002. *Connecticut's Ports: Transportation Centers for People and Goods*. Prepared for the Connecticut Maritime Coalition.

²⁴ Connecticut's Ports Transportation Centers for People and Goods, Parsons Brinckerhoff (2001)

The report identifies two key challenges for the ports – dredging and port security – and includes sections exploring each challenge in depth. The dredging section includes discussion of dredged material disposal alternatives, the regulatory environment, and strategies employed in other ports with regard to these issues but no detailed analysis of dredging needs in the State or the economic impacts of dredging. The report concluded that the State's ports have many of the characteristics of successful niche, or cargo-specific, ports, and outlines a series of broad recommendations to address the aforementioned challenges. Report recommendations include the development of a dredging task force, to be led by a State agency, to identify key issues and develop an action plan and strategy for addressing them.²⁵

Connecticut River Maintenance Dredging – Economic Evaluation²⁶

The purpose of the economic assessment was to evaluate the benefit of the authorized project (dredging) in the Connecticut River. An existing river channel that is approximately 15 feet deep and 300 feet wide from the mouth of the Connecticut River to the Lyme Railroad Bridge, and then generally 150 feet wide from Lyme Railroad Bridge to Hartford for a total length of about 52 miles was constructed in September 1937. Dredging of this channel has not been performed since 1965. Presently, shoaling of the sand bars in the channel has forced shippers to light-load barges serving the terminals along the Connecticut River. As a result, a decline in tanker trips and tonnage carried by barges has been realized allowing a significant modal shift to the Buckeye Pipeline. However, the report also indicates that barge traffic would increase if authorized dredging occurred in the river.

The overall conclusion of this EIS was that maintenance dredging of the Connecticut River would reduce the transportation cost of delivering goods to ports along the river²⁷. The additional benefit of restoring the Connecticut River to its authorized depth would assist in restoring the commercial use of an important waterway thus, once again, be a significant benefit to the citizens of the State.

²⁵ Parsons Brinckerhoff. 2002. *Connecticut's Ports: Transportation Centers for People and Goods*. Prepared for the Connecticut Maritime Coalition.

²⁶ Connecticut River Maintenance Dredging Economic Evaluation draft prepared by the Department of the Army dated April 2007.

²⁷ Connecticut River Maintenance Dredging Economic Evaluation prepared by the Department of the Army dated April 2007.

Transportation in Connecticut: Trends and Planning Data (2006) and Transportation in Connecticut: The Existing System (2007)

The ConnDOT has addressed the importance of passenger and freight maritime transportation to the State in several of its transportation planning studies. In *Transportation in Connecticut: Trends and Planning Data* (2006), it is predicted that by 2010, 19 million tons of freight worth \$4 billion will be transported, to, from, or within Connecticut by water, and by 2020, that number will increase to 20 million tons of freight worth \$5 billion.²⁸ In *Transportation in Connecticut: The Existing System* (2007), ConnDOT describes the port facilities and services at the three major deepwater ports (Bridgeport, New Haven, New London), and identifies opportunities and challenges related to their future use and growth potential. This document provides much greater detail about New London than the other ports because ConnDOT manages the State Port Complex, comprising New London's two main commercial piers, the Admiral Harold E. Shear State Pier and the Central Vermont Railroad Pier. This report notes that maintenance dredging will be required to maintain current commercial uses of the Shear State Pier in New London; the Port of New Haven (last dredged in January 2004); and, in particular, the Port of Bridgeport, where there is a "critical" need as the main channel has not been dredged since at least 1966. This report also highlighted opportunities for growth at the State Port Complex: it notes that recent improvements at the State Pier that have enhanced its intermodal capabilities (ship to rail) may allow for new commerce at the pier. Further, it noted that new dredging "to the maximum depth available" at the State Pier, particularly on the west side, may be desirable to accommodate larger vessels in response to global shipping trends. It suggests that such dredging be deferred "until such time as forecasts or capacity identifies the need for such dredging."²⁹

Economic Impact of Tourism

The economic impact of marinas in Connecticut was assessed as part of a 2006 study by the Connecticut Center for Economic Analysis. This study assessed the travel expenditure patterns of visitors to marinas as part of a statewide tourism assessment and determined that marina visitors spent a total of \$554.3 million in 2004. Marina sales constituted the overwhelming bulk

²⁸ Connecticut Department of Transportation. June 2006. *Transportation in Connecticut: Trends and Planning Data*. Available online at <http://www.ct.gov/dot/cwp/view.asp?a=3531&q=317920>.

²⁹ Connecticut Department of Transportation. June 2007. *Transportation in Connecticut: The Existing System*. Available online at <http://www.ct.gov/dot/cwp/view.asp?a=3531&q=317920>.

of that spending and included membership fees, boat rentals, slip and mooring fees, boat repair, sail repair, notary services, and chandlery services.³⁰ **Table 2.11** provides a breakdown.

Table 2.11 - Travel Expenditure Patterns of Marina Visitors

Expenditure Category	Expenditure (2004 \$ millions)
Recreation	\$0.0
Meals	\$17.2
Shopping	\$22.3
Fuel	\$11.3
Other Auto	N/A
Local Transportation	\$7.3
Lodging	\$0.5
Wagers	\$0.0
Marina Sales	\$495.2
State Total	\$554.3

Source: Economic Impacts of the Arts, Film, History, and Tourism Industries in Connecticut (2006)

Comprehensive Economic Development Strategy for Southeastern Connecticut

The Southeastern Connecticut Council of Governments (SECOG) comprehensive economic development strategy (CEDS) highlights the importance of the "maritime cluster" to southeastern Connecticut. This strategy report was prepared in 2004.

The industries involved in water transportation, the manufacturing and servicing of maritime components and vessels, particular recreational facilities, and commercial fishing are all major components of the maritime cluster. The ship and boat building industry comprises establishments primarily engaged in operating shipyards or boatyards. Activities of shipyards include the construction of ships, their repair, conversion and alterations, the production of prefabricated ship and barge sections, and specialized services, such as ship scaling. Industries in the water transportation subsector provide water transportation of passengers and cargo using water craft, such as ships, barges, and boats. The freight transportation arrangement industry is comprised of establishments primarily engaged in arranging transportation of freight between shippers and carriers.³¹

The maritime cluster is one of six clusters critical to the regional economy and includes employment in a range of maritime activities including shipbuilding, defense, maritime

³⁰ McMillen, Stanley. 2006. *The Economic Impact of the Arts, Film, History and Tourism Industries in Connecticut*. Prepared for the CT Commission on Culture and Tourism by the Connecticut Center for Economic Analysis.

³¹ Labor Market Information, July 2006. *Connecticut's Industry Clusters* prepared for the Connecticut Department of Labor

transportation, marine-related heritage and tourism, recreational boating, cruise ships, marine-related festivals, marine manufacturing and distribution, commercial fishing, aquaculture, and marine-related research and development. This report identifies the region's maritime cluster as among its most critical economic assets upon which to build and describes Long Island Sound and its waterways as the region's most critical economic resource. It includes an analysis of the cluster's sales, employment, and compensation, which are summarized in **Table 2.12**.

Of the five ports germane to this Study, this document deals only with the Port of New London (which includes the cities of New London and Groton). Included in the report's strategies for economic development is "Support the Growth of the Maritime Cluster." Recommendations to implement this strategy include the "develop a regional maritime infrastructure initiative"; this recommendation is marked as a high priority for immediate action in the CEDS implementation plan. While discussion of this recommendation does not explicitly address dredging, it does implicitly highlight the importance of infrastructure to maintaining and growing the viability of southeastern Connecticut's maritime industries. It also promotes the development of New London as an intermodal passenger transportation hub.³²

Table 2.12 - Southeastern Connecticut Regional Industry Maritime Cluster Profile

NAICS Code	Description	Sales (\$ mil)	Employment	Employment Compensation (\$ million)
357	Ship building and repairing	\$985.0	6,888	\$453.83
393	Water transportation	\$93.6	151	\$9.98
390	Wholesale trade	\$16.3	120	\$5.99
401	Motor vehicle and parts dealers	\$9.5	114	\$4.60
16	Fishing	\$2.5	122	\$0.31
434	Machinery and equipment rental/leasing	\$1.1	3	\$0.12
358	Other industries including boat building	\$0.7	5	\$0.27
TOTAL		\$1,108.6	7,404	\$475.11

Source: Comprehensive Economic Development Strategy for Southeastern Connecticut (2004)

³² Southeastern Connecticut Enterprise Region and Southeastern Connecticut Council of Governments. 2004. *Comprehensive Economic Development Strategy for Southeastern Connecticut*. Available online at <http://www.secter.org/Home/Resources/ComprehensiveEconomicDevelopmentStrategyCEDS/tabid/89/Default.aspx>

Regional Plan of Conservation and Development

The Southeastern Connecticut Council of Governments' 2007 *Regional Plan of Conservation and Development* highlights the significance of the State's maritime cluster to not only New London but all of southeastern Connecticut. This document draws extensively on the Southeastern Connecticut CEDS document and further emphasizes the importance of current and future commercial shipping, passenger ferries, and cruise ships to New London; see the Port Profiles section, **Section 3.0**, for further discussion. It notes that the Shear State Pier is underutilized and that it has the potential to become "a key freight handling resource" and may have a future as "a passenger depot." It also highlights the importance of maintenance dredging of the main shipping channel, which provides for all of these uses.³³

Economic Significance of Navigation-Dependent Facilities

An economic study of the significance of navigation-dependent industries on the State economy was conducted by ENSR International for the USACE in ³⁴ 2001³⁵, and included an economic impact analysis and an assessment of economic sector impact. This study found that the sectors most impacted by navigation-dependent economic activity are manufacturing, transportation, and public utilities, and that the specific industries most dependent on navigational access are waterborne freight transportation, commercial fishing, ship building, boat building, marinas, and waterborne passenger transportation. At the time, the Consultant Team conducted a survey and used publicly-available employment data sources to analyze the economic activity associated with the above sectors. The DRI-WEFA input-output model, which is described as similar to the more commonly used RIMS model, was used to analyze these data. This study found that in Connecticut, navigation-dependent industries constituted 17,481 jobs, \$1,812.8 million toward the GSP, \$1,553.4 million in personal income, and \$185.4 million in taxes (in 2001 dollars). This constituted just over 1 percent of the State's \$164.5 billion GSP. In addition, this study used data from a 1996 analysis to estimate the economic impacts of recreational boating in Connecticut. Numbers are presented as a range because of the difference in spending habits between day and overnight boaters as shown in **Table 2.13**.

³³ Southeastern Connecticut Council of Governments. 2007. *Regional Plan of Conservation and Development*. Available online at http://www.seccog.org/pdfs/RPCOD_Draft_1107.pdf.

³⁴ ENSR International. 2001. *Economic Significance of Navigation-Dependent Facilities*. Prepared for the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers in support of the Long Island Sound Dredged Material Disposal EIS.

Table 2.13 - Economic Impact of Recreational Boating in Connecticut

Sales (\$ thousands) (2001)	Income (\$ thousands) (2001)	Employment (2001)
7,971.6 – 19,009.9	4,177.9 – 9,962.9	214-513

Source: Economic Significance of Navigation Dependent Facilities (2001)

The study noted that in Connecticut, navigation-dependent industry has a disproportionate impact on the State manufacturing sector because of the production of submarines for the military by Electric Boat in Groton. This report does not break down these results for Connecticut by maritime industry sector or by Port.³⁵

State of Connecticut Public Act Number 08-101

As part of the State's commitment to the preservation and expansion of the maritime industry, House Bill 5746, An Act Concerning the Department of Transportation, was recently passed as Public Act 08-101. PA 08-101 amended Section 13b-57 of the General Statutes³⁶. This Public Act is based on a draft Harbor Improvement Fund (HIF) Bill submitted by Connecticut Maritime Commission (CTMC) in 2008.

The legislation was introduced by the Committee on Environment as SB 302 and established an account to be known as the "harbor improvement account". This account is a separate, non-lapsing account within the General Fund. The "account" receives deposits from multiple sources:

1. The proceeds of notes, bonds or other obligations issued by the State;
2. Funds appropriated by the General Assembly; and
3. Any other funds required or permitted by law to be deposited in the account.

The funds are available to the Commissioner of Transportation for the purpose of initiating harbor improvement projects. These improvements include the preparation of plans, studies and construction for the alteration and improvement of various State, municipal and other properties in or adjacent to the waters of the state, for the purpose of improving the economy and infrastructure of the State.

³⁵ ENSR International. 2001. *Economic Significance of Navigation-Dependent Facilities*. Prepared for the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers in support of the Long Island Sound Dredged Material Disposal EIS.

³⁶ State of Connecticut Substitute House Bill No. 5746, Public Act No. 08-101 An Act Concerning the Department of Transportation

At this time, this bill is not funded. However, the harbor improvement account may be used for federal dredging projects:

1. to support, in full or in part, local and State matching requirements for such projects;
2. to cover the incremental costs associated with applicable environmental regulatory requirements or management practices, including beneficial use; and
3. to cover part or all of the costs of such projects in the absence of adequate federal funds. If any account funds are used for the purpose described in subdivision (3) of this subsection, the commissioner shall pursue reimbursement to the account from the federal government.

Connecticut Economic Strategic Plan 2009

On September 16, 2009, Governor M. Jodi Rell announced the release of the State's first-ever Economic Strategic Plan³⁷ a detailed, statewide blueprint for keeping and growing jobs, making the State more business-friendly and investing in the infrastructure and technology that will keep Connecticut competitive in the 21st Century.

The Connecticut Economic Strategic Plan (Plan), prepared by the State Department of Economic and Community Development (DECD), articulates a vision for Connecticut in which the economic growth opportunities are tied to Connecticut's unique setting and associated transportation system. One of the key transportation systems is the maritime industries. The Plan emphasizes the economic impacts of Connecticut's maritime industries, citing data from previously completed (and referenced) economic impact studies, and notes that:

- Connecticut's ports have limited land for cargo storage space and consequently continue to miss opportunities for sea transportation business. Seaports need capital investment to expand storage capacity and to increase intermodal connections between water, highway and rails.
- The State's maritime advantage is literally eroding as silt collects in deepwater ports. Without dredging, port channels grow shallower and larger ships cannot safely enter ports to

³⁷Connecticut Economic Strategic Plan 2009, Department of Economic and Community Development, September 2009

offload goods. Cargo will need to be transported by alternative methods, most likely over highways, thus increasing congestion, maintenance, and pollution.

The Plan quantifies the number of business establishments and jobs associated with the maritime industry cluster defined to include five 4-digit NAICS codes as shown in **Table 2.14**:

Table 2.14 - Maritime Industry Cluster Employment and Establishments, 2005

NAICS Code	Description	Employment (2005)	No. of Businesses (2005)
3366	Ship and Boat Building	7,500	17
4831	Deep Sea, Coastal, and Great Lakes Water Transportation	566	22
4832	Inland Water Transportation	83	5
4883	Support Activities for Water Transportation	341	31
4885	Freight Transportation Arrangement	1,373	151
TOTAL		9,863	226

Source: U.S. Census, CPB 2006

The Plan³⁸ further discusses that Connecticut's maritime businesses and activities benefit the State by:

- Strengthening linkages to global trade;
- Attracting a skilled workforce;
- Increasing productivity and personal income;
- Reducing costs of goods and services for inland industries;
- Revitalizing waterfront cities;
- Relieving congestion on interstate highways, in particular, Interstate 95; and
- Strengthening a superior quality of life and environment by reducing congestion, pollution, and highway accidents.

Two areas that are described in the plan as increasing the effectiveness and improving the economic viability of maritime industries are cargo storage and dredging.

Connecticut's ports have limited land for cargo storage (laydown area) space and consequently continue to miss opportunities for sea transportation business. Instead, goods are transported by truck. The Connecticut Maritime Coalition estimates 80,000 truck trips per year on I-95 could be eliminated if this cargo was transported through Connecticut's ports.³⁹ The seaports need

³⁸ Source: U.S. Census, CPB 2006 <http://www.census.gov/epcd/cbp/index.html>. Industries: DECD, DOL, Others

³⁹ Connecticut Maritime Coalition, "Ports: Dependence on waterborne transportation is increasing," July 10, 2008, <http://www.ctmaritime.com/ports.html>.

capital investment to expand storage capacity and to increase intermodal connections between water and land transport (highway and rails).

The Plan states that Connecticut's maritime advantage is slowly eroding as its deepwater ports are on an extremely critical timeline to be dredged. As port channels grow shallower, depth dictates the size of ships that are able to safely enter ports to offload goods. Larger ships will be unable to use ports, and cargo will need to be transported by alternative methods, most likely over highways, thus increasing highway congestion, maintenance, and pollution.

A study by the Texas Transportation Institute (TTI) found that 70 trucks are needed to carry the equivalent dry cargo load (1,750 short tons) as one barge, and 144 trucks are needed to carry the equivalent liquid cargo load (27,500 BBL) as one barge.⁴⁰ TTI also found safety, hazardous material, and infrastructure advantages to maritime transport compared to rail or highway transport.

Furthermore, the Plan reiterates that Connecticut's deepwater ports need maintenance dredging to assure safe navigation for vessels calling upon the ports of Bridgeport, New Haven and New London. In addition, maintenance dredging is needed along the Thames River to meet the needs of the U.S. Department of Defense.

Finally, the strategic plan presents recommendations for growing the State's maritime industries. The Plan outlines 25 "growth initiatives" that are needed to capitalize on the past and provide a path to the future. Of these 25 recommendations, 3 are directly related to the maritime community. These are:

1. Create a statewide Connecticut Port Authority consisting of the Ports of Bridgeport, New Haven and New London, and Bradley, Tweed and Oxford / Sikorsky Memorial Airports (Item No. 2).
2. Invest in our ports by creating a Maritime Investment Fund for port infrastructure pursuing federal funding under the Maritime Highway program and creating a new CDA program to provide low-cost financing for qualified seaport investments targeted to companies that expand maritime industrial jobs in Connecticut. Pursue federal funding under the Maritime Highway Program, ferryboat discretionary funding and Port Homeland Security funding (Item No. 6).

⁴⁰Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public", November 2007.

3. Implement a freight feeder barge service between Connecticut and the Port of New York / New Jersey (Item No. 7).

2.5 Maintenance and Improvement Dredging

The documents, reports and legislation summarized above clearly connote the importance of Connecticut's maritime industry to the overall health of the State economy and underscore the significant relationship and dynamic that the maritime industry brings to the State. A comprehensive updated assessment of the economic benefits to the State of Connecticut relative to the maritime industry is presented in **Section 4.0** and **Section 5.0**. As part of this detailed assessment and consistent with a key objective of the analysis (to provide an estimate of the possible effects of dredging and other infrastructure developments on business output, jobs, income, and taxes), the Consultant Team conducted an examination of the current and projected status of dredging needs in the State of Connecticut.

The Consultant Team, on behalf of the CMC, has undertaken a series of efforts to gather data that quantifies and elucidates these dredge needs (maintenance and improvement) so that an economic impact assessment of dredging (or the lack thereof) on the maritime industry and resultant State economy can be developed. In order to frame the discussion of dredge needs (as currently anticipated), the subsections presented below summarize the currently planned and/or anticipated dredge projects slated for State waters and includes anticipated volumes of dredging to be conducted and an assessment of the potential estimated costs of these projects. Further, for the purpose of context, a discussion of the federal regulatory framework under which dredging programs are implemented is provided.



Periodic dredging and, therefore, dredged material disposal, are essential for ensuring safe navigation and facilitating marine commerce. Periodic dredging of certain parts of the nation's waterways provides many benefits. The dredging of shipping channels not only benefits those employed in shipping and related industries, but also benefits society at large through the contributions of shipping to the movement of goods and services through the economy of the Long Island Sound

region and the Nation⁴¹. Over 95 percent of all of the nation's international cargo is shipped through our ports. Without adequately accessible harbors, goods and materials would need to be shipped using other methods, including air freight, rail, and trucking. These other methods are generally more costly. Further, a shift to heavier reliance on non-maritime shipping would increase the cost of consumer goods shipped into the country and decrease the nation's competitiveness concerning export commodities. Although land-based shipping does not require dredging, it has other adverse environmental ramifications, such as increased highway congestion and air pollution from truck and rail freight emissions, increased threat of accidents and related pollutant spills, and increased roadway maintenance costs including more frequent road repair and construction to accommodate greater vehicle traffic.

In 2006, Connecticut adopted a "State of Connecticut Maritime Policy," which is a statement of policy codifying the State's intent to make maximum use of its maritime resources in an environmentally responsible manner. The principles presented in this statement of policy were adopted by the Connecticut Maritime Commission (CTMC) as cornerstone elements of its work to promote the development and protect the health of the State's Ports.⁴² The policy statement focuses on dredging and general economic development. With regard to dredging, this document states that maintenance dredging of Connecticut's channels to federally authorized project depths is the top maritime priority, and that the highest priority maintenance dredging projects are those in the State's three major commercial ports. It further states that the State will provide capital and regulatory assistance as necessary to help facilitate Federal maintenance dredging projects and will establish a long-term plan and schedule of priority maintenance dredging projects throughout the State. The policy draws a clear distinction between maintenance dredging and channel deepening (improvement) projects, noting that channel deepening will be considered as a priority in connection with port expansion and economic development plans and the demonstrated need to accommodate larger vessels. It also notes that dredging of privately-maintained channels that are of particular importance to recreational uses will be prioritized as resources allow. The policy references the complexity of the dredging regulatory environment and notes that the State will work to support the development and implementation of the Long Island Sound Dredged Material Management Plan (LIS DMMP).⁴³

⁴¹Response to Comments on the Final EIS for the Designation of Dredged Material Disposal Sites, May 2005. Central and Western Long Island Sound, Connecticut and New York

⁴² Connecticut Maritime Commission. 2007. Annual Report. Online at <http://www.ct.gov/dot/lib/dot/documents/dcmctc/a2007.pdf>.

⁴³ *State of Connecticut Maritime Policy*. Online at <http://www.ct.gov/dot/cwp/view.asp?a=2314&Q=309828>.

In 2003, the USACE assessed the dredging needs and economic significance of navigation-dependent maritime industries on Long Island Sound in support of an Environmental Impact Statement for dredged material disposal. Through this survey-based assessment, the USACE identified key “dredging centers” or geographical areas of dredging needs. Dredging centers included Bridgeport, New Haven, New London, Stamford, and Norwalk, which each have numerous navigation-dependent facilities (**Table 2.15**). The dredging needs analysis quantified the estimated volume of dredged sediments that would need to be removed from these ports and harbors in 5-year intervals from 2001-2020. It determined that a major factor associated with maintenance dredging in the Sound will be the need for the dredging of federal navigation channels including Bridgeport, New Haven, and Norwalk Harbor. The report represented a survey of the status of federal navigable waterways under USACE authorization but did not quantify the costs associated with these projects or the economic impact of not conducting this dredging, though a data survey of waterway users conducted as part of the work did include questions relating to these topics as part of a dredging needs survey distributed to navigation-dependent businesses.⁴⁴

Table 2.15 – Connecticut Navigation-Dependent Facilities

Dredging Center	Number of Navigation-Dependent Facilities
Stamford	28
Norwalk	67
Bridgeport	33
New Haven	33
New London	59

Source: Dredged Needs Navigation Dependent Facilities (2003)

The USACE, New England District prepared and executed a “Dredging Needs Study Survey of Navigation Dependent Facilities for Long Island Sound Regional Dredged Material Management Plan on June 2008”⁴⁵ to augment the 2003 study. This study updates dredging needs and potential impacts due to the lack of dredging on the maritime related businesses. To facilitate the preparation of this study, the USACE provided two data tables (Financial Impacts Summed

⁴⁴ U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. 2003. Environmental Impact Statement for the Designation of Dredged Material Disposal Sites in Central and Western Long Island Sound, Connecticut and New York. Available online at <http://www.epa.gov/region1/eco/lisdreg/assets/pdfs/eis2003/lisemain.pdf>.

⁴⁵ Dredging Needs Study Survey of Navigation Dependent Facilities For Long Island Sound Regional Dredged Material Management Plan. US Army Corps of Engineers. June 2008. OMB Control No. 0710-0001

Across all Connecticut Responses and Summary of Response to Question 14 Only) to the consultant team. A more detailed discussion of this important survey is provided in **Section 2.5.1** and **Section 5.0** of this report.

In addition to the on-going Dredge Needs Study, the USACE has been in the process of developing a DMMP for Federal Navigation Projects as well as facilitate the needs of non-federal (municipal and private dredge projects, etc.) for which there is an indication of insufficient placement or disposal capacity to accommodate maintenance dredging for the next 30 years. The DMMP intends to designate two open water disposal sites in central and western LIS.

The DMMP will have a significant impact on the maritime related industry here in the State of Connecticut. The DMMP addresses a wide range of environmentally acceptable, cost-effective, and practicable alternatives for the management of dredged material, culminating with the selection of a base plan and a recommended plan that ensures that sufficient capacity for dredged material placement exists for a project or group of projects for the required 30-year planning period. The range of alternatives includes those that may provide environmental or commercial benefits through the beneficial use of dredged material. The scope of a DMMP may also include private dredging projects that are geographically congruent to the federal project(s) and represent opportunities to maximize a return on investment by combining dredge efforts. In these cases, the sponsors of those projects may need to provide non-federal funds to fully support these complementary dredging components.

The DMMP is a comprehensive planning process and decision making tool to address the management of dredged material for a specific harbor or navigation project, group of related projects, or geographic area. The DMMP process involves a phased approach. The first phase, a Preliminary Assessment (PA), draws on existing information to:

1. determine the economic and engineering need for dredging according to existing and reasonably prospective navigation traffic;
2. identify the anticipated locations and volumes of dredged material to be generated within the study area;
3. examine existing dredged material disposal sites and management practices to determine if shortfalls in capacity or opportunities for better management exist; and

4. provide an estimate of the cost of completing the DMMP. The Preliminary Assessment determines whether a federal interest exists in participating in a feasibility level DMMP study and also identifies potential non-federal sponsor(s) of the DMMP.

After the PA phase is completed, the DMMP is initiated. The first step is development of a Project Management Plan (PMP) that describes:

1. the scope of the DMMP;
2. the sequence of the studies;
3. a plan for acquisition management covering the various study tasks (labor, contracts, other agency contributions);
4. a plan for public involvement and participation; and
5. an estimated budget, organized by federal fiscal year budget cycle.

Following review and acceptance of the PMP by the cooperating federal and state agencies, feasibility level study efforts would commence, subject to the availability of staff and funding. These studies generally focus on the following topics:

1. dredging needs;
2. management options;
3. capacities of placement sites;
4. environmental compliance requirements;
5. potential for beneficial use of dredged material; and
6. indicators of continued economic justification.

The PMP is considered a "living document," subject to change based on new information and input from the public and other agencies. The LIS DMMP is required to be in place by June 2013, at which time, both the existing Western LIS and Central LIS disposal sites will be closed.

2.5.1 Currently Anticipated Dredging Projects

The USACE, New England District prepared and executed a "Dredging Needs Study Survey of Navigation Dependent Facilities for Long Island Sound Regional Dredged Material Management

Plan on June 2008."⁴⁶ The USACE will use the survey to aid in the preparation of a Dredged Materials Management Plan for the Long Island Sound region.

For the purposes of identifying navigation-dependent facilities and assessing their effect on the region's economy, the study area was defined as follows. The study area extends from Montauk Point, New York west along northern Long Island to the East River, and then east through Connecticut to the southern coast of Rhode Island to Point Judith, then south to include Block Island, Rhode Island. The survey area includes all harbors on Long Island Sound proper in Connecticut and New York. In New York, the study area includes the East River and Long Island shorelines of the Bronx and Queens counties, and the Long Island shoreline of Westchester, Nassau,



and Suffolk Counties. In Connecticut, the study area includes the entire coastline. In addition, the study area includes the Great and Little Peconic Bay in New York, the Fishers Island Sound shores of Connecticut and Rhode Island, and the Block Island Sound shores of New York and Block Island. The survey area does not include New York Harbor itself but does include the USACE, New York District projects for the eastern East River, Flushing Bay, Bronx River, and so forth. The Connecticut River below Hartford navigation project is included, as is the Thames River to Norwich and Housatonic River to Derby. All harbors and port or navigation-dependent facilities in this area, whether Federal or not, are included in the survey area.

The USACE prepared a total of 743 surveys; 445 were returned which is a return percentage rate of 59.9 percent. Of these, 413 Connecticut facilities were surveyed and 284 surveys were returned for evaluation for a return percentage rate of 68.8 percent, somewhat better than the total survey project. Based on the results of the survey, the USACE *Dredge Center* recently published a list of anticipated dredge needs for Connecticut and surrounding waters. The information was compiled and tabulated into a summary of backlogged federal and anticipated non-federal maintenance dredge and improvement dredge projects. A copy of the summary table from the Dredge Center report is included in **Appendix C** and is summarized below. It

⁴⁶ Dredging Needs Study Survey of Navigation Dependent Facilities For Long Island Sound Regional Dredged Material Management Plan. US Army Corps of Engineers. June 2008. OMB Control No. 0710-0001

should be noted that the information concerning federal navigation needs presented in the *Dredge Center* report is relatively comprehensive and detailed (as it is relatively straightforward to determine the needs of well documented and specific federally authorized channels for which the USACE maintains a complete database of information), whereas the information concerning non-federal dredge projects is based on a mail survey and represents more of a subset of examples of the dredging of municipal or private channels, anchorages, fairways, driveways, and slips that is required to maintain navigational access.

The *Dredge Center* report identifies twelve (12) Connecticut dredge centers with over a total of ninety-two (92) dredge needs projects. A total of 37 facilities (40 percent) are listed as federal projects, and 52 (60 percent) are designated as non-federal projects. Three (3) projects are described as "other" federal projects and are not included in this Study. The anticipated volume of maintenance dredging estimated over the next 30-year period for federal and non-federal sites. Of the 9.7 million cubic yards of total dredge material needs, 4.1 million cubic yards (42 percent) is federal and 5.4 million (58 percent) is non-federal. Non-federal facilities are further detailed to include dredge needs across the 30-year period based on the following intervals: 0-5 year period: 1,555,842 cubic yards; 6-10 years: 1,414,155 cubic yards; 11-20 years: 1,368,390 cubic yards; and 21 -30 years: 1,019,750 cubic yards. These results show a backlog of dredging needs and the importance of a consistent, predictable maintenance dredge schedule.

Other important information that was presented in the *Dredge Center* report includes "improvement" dredging needs for Connecticut facilities. Federal facility improvement dredging is estimated at 1.4 million cubic yards and non-federal facilities are estimated at 1.5 million cubic yards over the 30-year survey period.

The information presented in the *Dredge Center* report represents a cross-section of the dredging needs of the State in terms of the number of projects anticipated over the next 30 years and the volume of dredged materials associated with those projects. The statistics summarized in the preceding paragraphs present a fairly clear indication of the scale of the dredging needs; however, to obtain a complete picture of the critical nature of the situation confronting the State's Ports, descriptions of the urgency of key projects is required. The sections below present examples of several of the dredge projects listed in the *Dredge Center* report. **Section 2.5.2** presents relevant information concerning example projects on the federal list, and **Section 2.5.3** presents information concerning non-federal projects.

2.5.2 Details of Example Federal Dredge Project Needs

Navigational maintenance of federal channels can only be maintained if entire channel lengths are maintained to the congressionally authorized depths noted on maritime charts. Shoaling of portions of channels, either through the collapsing of side slopes or the deposition of new sediment, affects the navigability of the entire channel. As such, an analysis of the total volume of material that needs to be dredged from federal channels and anchorages tells only a portion of the overall story. The following projects represent examples of the types of federal dredge projects that the USACE has determined require critical maintenance dredging and describe the importance of these projects in maintaining navigational channels.

North Cove Federal Navigation Project Old Saybrook, Connecticut (Completed 2009)

Since the last maintenance dredging in 1992, natural shoaling processes in the harbor have decreased project depths. The 6-foot and 11-foot anchorages were both as shallow as 3.5 feet. The 11-foot channel depths had been reduced to as little as 4.5 feet. Shoaling in the channel and anchorages were making navigation in the cove more and more difficult. The project removed the shoaled material and now provides safe access to the cove at all tide stages. Water dependant facilities in the cove include a private yacht club and town water access facilities including a dock, boat ramp and landing. About 150 vessels are currently moored in the Federal anchorages. The work was performed by a private contractor under contract to the Federal Government. A mechanical dredge removed the material from the bottom of the cove and placed it in scows, which were then towed by tug to the Cornfield Shoals Disposal Site (and/or the Central Long Island Sound Disposal Site) where the materials were released.

As of January 31, 2009, approximately 82,000 cubic yards of material were removed and transported to the Cornfield Shoal Disposal Site (CSDS). Dredging of the remaining 75,000 cubic yards was used as capping material for the Norwalk Harbor Phase 2 project (see below) and 19 private and 2 municipal projects at Central Long Island Sound Disposal (CLIS) area.

**North Cove Phase 2
Old Saybrook, Connecticut**

The North Cove (Phase 2) project in Old Saybrook is a continuation of a project that was completed winter of 2008-2009 at a cost of \$4.1 million. Cost estimates to complete are \$4.3 million. A \$1.0 million State Bond issued from CTDEP was provided as a "local share" to transport some of the material to CLIS disposal site as capping material for the Norwalk dredging project. It is anticipated that the same process would be followed.

This dredged material is classified as acceptable open water disposal cap for other less than suitable projects. The material was slated for Cornfield Shoals disposal and, due to the capping needs at Central Long Island site, the material will be transported to this disposal site. The capping of dredged material at this site is a Non-Federal responsibility, and the cost for transport will have to be shared.

**Norwalk Harbor Dredging Project (Phase 2)
Norwalk, Connecticut (Completed 2009)**

The Norwalk Connecticut dredge project was completed during the 2008-2009 dredging season. There were two options for this project; Option 1 was to complete 400,000 cubic yards of dredged materials with bid amount \$7.1 million, and Option 2 was prepared to revise dredging based on a Congressional Appropriation provided \$4.5 million. Option 2 was executed removing approximately 200,000 cubic yards of material leaving another 200,000 cubic yards to be removed as funding is made available. This project may have a cap requirement. A quantity of 75,000 cubic yards from the North Cove project above would be needed to be transported to the Central Long Island Disposal site as outlined above.

**Rocky Hill-Glastonbury Ferry Dredging and Slip Improvement Project
Rock Hill, Connecticut (Completed Spring 2009)**

Work began December 2008 and completed in the Spring of 2009. The contractor dredged approximately 3,500 cubic yards, dewatered on barges, off-loaded into dump trucks and stockpiled for characterization at a cost of \$1.493 million. Once the test results came back, the material was found to be suitable for upland disposal at the Hartford Landfill (CRRRA facility) for a mid-level cap.

Patchogue River
Westbrook, Connecticut

The Patchogue River project located in Westbrook, Connecticut cost an estimated \$1.4 million needed and an additional \$689,000 was provided in Fiscal year 2009. Approximately 45,000 cubic yards of dredged material was designated for Cornfield Shoals disposal or could be used for capping at Central Long Island Sound site.

Clinton Harbor
Clinton, Connecticut

Approximately 47,000 cubic yards of material will be dredged from the Clinton Harbor using a hydraulic machine using a pipeline for placement on the public beach at Hammonasset State Park. Costs are estimated at \$2.0 million.

Bridgeport Harbor CAD Cell Construction
Bridgeport, Connecticut

Approximately 1.5 million cubic yards of material are to be dredged to construct a CAD (confined aquatic disposal) for the disposal of unsuitable dredged materials from other Long Island dredge projects. Costs are estimated at \$7.0 million and include borings, engineering, development of plans and specifications, mobilization / demobilize, cad construction and cad cap design.

Bridgeport Harbor Main Channel Tributaries, Turning Basins, Anchorages
Bridgeport, Connecticut

Approximately 1.85 million cubic yards of materials are to be dredged to maintain harbor channel tributaries, turning basins and anchorages. Approximately 1.1 million cubic yards of material determined to be unsuitable for open disposal requiring disposal in the Bridgeport Harbor CAD Cell described above. The remaining 750,000 cubic yards are determined to be suitable for disposal in the Central Long Island Sound Disposal (CLIS) area. Costs are estimated at \$40.0 million.

Housatonic River / Hammonasset State Park
Stratford / Madison, Connecticut

An estimated 600,000 cubic yards of suitable material is slated to be dredged in the Housatonic River area. The dredging project would provide multiple commercial and environmental benefits to the State by enabling commercial navigation to return to the Housatonic River area, providing

an additional means of transportation to businesses with the ability to transport goods via the river. The project would also improve flood control and reverse beach erosion at the Hammonasset State Park Beach. Maintenance of this navigable waterway provides the corresponding incentive for businesses to maintain the valuable associated infrastructures such as docks, wharfs, and other marine facilities. It also improves safe passage as large vessels must navigate under bridges and through tight channels.

Dredged material will be used to re-nourish the beach at Hammonasset Beach State Park. The cost share responsibility is that of the State of Connecticut. Dredging costs are estimated at \$20.5 million with the federal contribution estimated at \$13.5 million and approximately \$7.0 million from State funding.

Connecticut River Maintenance Dredging

The Connecticut River is one of the State's most vital waterways. With its entrance near the eastern end of Long Island, it serves (upstream order) recreational harbors and commercial waterfronts in the communities of Old Saybrook, Old Lyme, Essex, Lyme, Deep River, Chester, East Haddam, Haddam, East Hampton, Middletown, Portland, Cromwell, Rocky Hill, Glastonbury, Wethersfield, East Hartford and Hartford.

There are approximately 8 sediment sand bars (approximately 200,000 cubic yards) that require dredging, and it is believed that most of the material may be suitable for Beach Nourishment or disposal at the Cornfield Shoals Disposal Site. The initial funding, estimated at \$1.0 million, will start the testing and planning stages.

New Haven Harbor Maintenance Dredging New Haven, Connecticut

An initial sample and analysis study into the concentration of potential contaminants within sediments in the New Haven Harbor is being funded by federal source with costs estimated at \$400,000.

Stony Creek Dredged Project
Branford, Connecticut

An initial sample and analysis study into the concentration of potential contaminants within sediments at the Stony Creek Dredge Project is being funded by federal source with costs estimated at \$150,000.

Greenwich Harbor Dredged Project
Greenwich, Connecticut

An initial sample and analysis study into the concentration of potential contaminants within sediments in the Greenwich Harbor is being funded by federal source with costs estimated at \$178,000.

A complete list of federal dredge projects from the USACE Dredge Center report is included in **Appendix C**.

2.5.3 Details of Example Non-Federal Dredge Project Needs

Non-federal dredge project needs fall into several categories: municipal and state projects that require dredging in order to match depths with the federal projects noted; municipal and state projects that are independent of federal channels and require dredging to maintain existing navigational channels; municipal and state projects that require deepening for strategic development (such as the deepening of driveways and berths to accommodate new ferry access or to increase the number and type of vessels that may be serviced at existing or planned piers and terminals); private dredging that is required in order for private terminals and marinas to match depths that will be created as a result of the federal, state, and / or municipal projects noted; and private dredging for strategic development (such as the creation of a new or expansion of an existing terminal or marina. This also includes state and municipal project that have yet to be federally funded. The following projects represent examples of these types of dredge projects that require dredging (source USACE Dredge Center Report).

New Haven Harbor Deep Draft Improvement
New Haven, Connecticut

The New Haven harbor was last dredged in 1992 to a depth of 35 feet. The federal authorized channel depth is stated at 40 feet. A resolution was drafted in 2007 requesting additional improvement dredging to 42 to 45 feet. It is estimated that 5 million cubic yards of material to

be dredged within the harbor channel and 100,000 cubic yards of material dredged from the entrance to the New Haven harbor at Ledge Rock.

A reconnaissance study is planned with federal funding at \$100,000 and a feasibility study is planned with funding from federal and State sources estimated at \$1.0 million.

Mystic Harbor
Mystic, Connecticut

Approximately 100,000 cubic yards of sediment materials are required to be dredged from the Mystic Harbor. The dredging project would provide multiple commercial and environmental benefits to the State by enabling commercial navigation to return to the Mystic River area, providing an additional means of transportation to businesses with the ability to transport goods via the river. The project would also improve flood control and provide shore erosion protection with some beneficial use of dredged material at the Mystic Seaport.

A reconnaissance study is planned with federal funding at \$100,000, and a feasibility study is planned with funding from federal and State sources estimated at \$500,000.

New London Harbor - Greens Harbor Inner Breakwater Study
New London, Connecticut

An initial appraisal report for the New London Harbor was performed in the fall of 2001. The initial report looked at several different lengths and alignments of non-traditional breakwaters (a-frame, concrete pile, etc.). It is estimated that 350,000 cubic yards of dredged material will be disposed of. The benefits of this project would minimize / mitigate wave damages on public, private and military shore property and moored vessels along the New London Harbor shoreline. The New London Harbor is a major port servicing the Groton Nuclear Submarine Center of the United States Navy and the United States Coast Guard Academy, as well as the United States Navy Underwater Systems Laboratory and the Groton General Dynamics Ship Yard. In addition, the Connecticut State Pier and Pfizer Corporation are also located in the New London Harbor. The 2001 report would require updating for the initial appraisal and then review by the City, State and USACE division in New York City.

A reconnaissance study is planned with federal funding at \$100,000, and a feasibility study is planned with funding from federal and State sources estimated at \$500,000.

A partial list of non-federal dredge needs projects is outlined in **Table 2.16** below.

Table 2.16
Non-Federal Facilities – Maintenance Dredge Needs (30-years)

Facility	Total Maintenance (yd ³)
Clinton Harbor	201,000
Patchogue River	395,000
Connecticut River	279,270
Old Saybrook Harbor	344,000
Watch Hill Cove	300,000
New Haven Harbor	835,000
New London Harbor	267,385
Thames River	210,000
Wethersfield Cove	230,000
Niantic Bay	226,500

Source: Dredging Needs Study Survey of Navigation Dependent Facilities For Long Island Sound Regional Dredged Material Management Plan. US Army Corps of Engineers. June 2008. OMB Control No. 0710-0001

The Importance of Non-Federal Dredge Projects

The non-federal projects noted above represent examples of the dredging needs of the industry and local governments in Connecticut. The full extent of the need for private and municipal and State channel, fairway, driveway, and slip dredging in the State is difficult to assess based upon the survey information because not all respondents to the survey are aware of the implications of dredging (or not dredging) their facilities, and the surveyed population represents a subset of the overall maritime industry sector that is affected by dredging (or not dredging as the case may be).

In general, navigational uses of a Port or waterway depend upon the condition of both the main federally maintained channels and anchorages, the State and local waterways, and the private berths, driveways, and fairways. Maintenance of a marine traffic corridor is roughly analogous to a highway system on land: the transport of goods can only be accomplished efficiently if the federal ways are properly maintained, and the State and local passageways are in good repair, and the private driveways to the sending and receiving distribution system are passable. So it is with maritime commerce. Federal channel dredging is critical to maintaining vessel activity within the State's Ports, but just as critical to actual vessel traffic are the local channels and

anchorages and the side channels, driveways and slips. While it is difficult to assess the exact number of ancillary passageways that may require dredging to keep the maritime system operating efficiently, there are generally between several and several dozen non-federal projects related to each federal channel. By extension then, one can estimate that the total number of non-federal dredge projects can be represented by some number multiplier of the number of federal projects, and that while the volume of the individual local projects are generally less than the related federal projects, the sum total of the volume of the local projects is likely to be similar to or even exceed the volume estimated by the USACE for the federal projects.

A complete list of non-Federal dredge projects from the USACE Dredge Center report is included in **Appendix C**.

3.0 PORT PROFILES

This section provides a summary of key attributes of Connecticut's major ports and their setting and contribution to the maritime industry. In terms of economic potential, Connecticut is one of just 12 states with 3 or more of the 105 largest deepwater ports in the country, each with \$100 million or more in annual foreign trade. This resource represents a potential competitive advantage for Connecticut to connect with the global economy. Ninety five percent of the volume of all overseas trade enters or leaves the United States through a deepwater port by ship. Nationwide, this represents nearly \$1 trillion in commerce and creates employment for more than 13 million people⁴⁷.

Information developed and presented herein was acquired through detailed literature research, site visits and interviews with key stakeholders. While extensive information related to the significant presence and contributions of the ports and harbors of Connecticut have been previously described in **Section 2.0** within the overall maritime framework, a focused discussion is provided below. Profiles are provided for the ports/harbors of Bridgeport, New Haven, New London, Norwalk and Stamford.

3.1 Port of Bridgeport

The Port of Bridgeport is located on Bridgeport Harbor and is approximately a 40-acre deep water port located one-quarter mile south on I-95 at exit 27. The port has access not only to I-95, but to Connecticut Routes 8 and 25. Amtrak trains run daily between New Haven and Stamford.

Bridgeport has year round ferry service to Port Jefferson, New York. Service is provided daily with sixteen one-way crossings daily on a three-boat schedule. Winter schedules may decrease to a two-boat, eleven crossing schedule depending on weather. The Sikorsky Airport is also available (90,000 landings & takeoffs in 2005) within easy commute of the port.

The modes of transportation served at the port are vessels, barges, and trucks. The two main commercial terminals at Bridgeport are owned by Coastline and Motiva, an operation that brings in petroleum products on about 250 ships and barges a year. Coastline's terminal is run by

⁴⁷ Yim, Joan and Parsons Brinkerhoff, "Connecticut's Ports: Transportation Centers for People and Goods – Executive Summary", Connecticut Maritime Coalition, May 2002.

Logistec, and it hires Coastline's (owned by the International Longshoremen's Association Local 1398 in New Haven) union members to conduct work activities.



There are two berthing facilities, one of which can accommodate vessels drawing 33 feet at mean low water (MLW), and more than 40 pieces of stevedoring equipment, such as electric forklift equipment for handling cargo in refrigerated warehouses and/or ships. Also, there are an additional 20 pieces of electric forklift equipment that can handle up to a 20-ton capacity, a shore crane with a 110-ton capacity, four payloaders, and five yard hustlers. It has approximately 20 acres of outside storage and/or staging area, a 113,000-square-foot dry storage space, bonded storage, and 85,000 square feet of refrigerated warehouse space.

In the 19th and early 20th centuries, Bridgeport was recognized as a major maritime commercial center in New England. Over time, the waterfront has experienced major change from its traditional role as a maritime commercial center, and currently contains a mix of industrial, commercial, and recreational uses. Bridgeport's developed waterfront areas include Bridgeport Harbor, Johnson's Creek, Yellow Mill Creek, the Pequonnock River, Black Rock Harbor and Cedar Creek.

From the western shore of Black Rock Harbor, south of Ocean Terrace, to the eastern shore of Ash Creek, land use is generally residential with some recreational and commercial uses. Utility, transportation, recreational, and industrial uses are commonplace north of Ocean Terrace in Black Rock Harbor and along both shores of Cedar Creek.

Shoreline land uses located along Bridgeport Harbor consist primarily of industrial, utility-transportation, and recreational activities. The land use along the western side of Bridgeport Harbor is characterized mainly by an electrical power generating facility and some former light and heavy industrial properties. The land use on the eastern side of Bridgeport Harbor is characterized by a shipping terminal, a shipyard, some recreational boating sites, and industrial uses. Much of the land in the Steel Point area, formerly industrial, commercial, and recreational,

has been claimed through eminent domain by the City of Bridgeport for a planned re-development of the area. The remaining properties, a shellfishing operation and two yacht clubs, are fighting the eminent domain process.

Railroads, fuel storage, and industrial uses are located along the shores of the Pequonnock River. Land use along Yellow Mill Creek channel's shoreline is primarily industrial and recreational. Oil handling facilities, light industry marinas and small craft anchorages can all be found on the banks of Johnson's Creek.

There are numerous vacant and underutilized waterfront properties along the shoreline of Cedar Creek, the Pequonnock River, and Yellow Mill Creek.

The Port of Bridgeport is just barely able to adequately meet current demands of the shipping community for commodities that were traditionally handled through the facility. According to the ConnDOT, the port is in critical need of dredging to restore its main channel to 35 feet; it has not been dredged since at least 1966⁴⁸.

Description/Harbor Characteristics: The Port of Bridgeport includes Johnson's Creek, Yellow Mill Creek, the Pequonnock River, Black Rock Harbor and Cedar Creek.

Governance: Bridgeport Port Authority (incorporated under State law)

Infrastructure/Marine Structures: The Bridgeport Harbor Federal Navigation Project comprises a series of federally authorized channels. The main channel within the Harbor is authorized at a depth of 35 feet. It is 400 feet wide closer to the Sound and widens to 600 feet at the bend in the Harbor. Federally authorized channels also provide access up the Pequonnock River, into the adjacent Black Rock Harbor, and into a couple of creeks off the main harbor.⁴⁹

Cargo Handled: petroleum products; bulk cargo (sand / gravel aggregate and coal)

⁴⁸ Connecticut Department of Transportation. June 2006. Transportation in Connecticut: Trends and Planning Data. Available online at <http://www.ct.gov/dot/cwp/view.asp?a=3531&q=317920>

⁴⁹ Apex Environmental Inc., et al. 2006. City of Bridgeport, Connecticut Harbor Management Plan. Prepared for the City of Bridgeport Harbor Management Commission.

Terminals and Facilities:

- The Port of Bridgeport, which comprises the port's main shipping facilities had historically handled bananas and clementines and had employed approximately 70 workers.⁵⁰ The main terminal is Cilco Terminal/Logistic USA, Inc.
- Numerous oil terminals (including Hi-Ho Petroleum; Santa Fuel; Hoffman Fuel; and Motiva Enterprises)⁵¹
- PSEG (Bridgeport generating Station) is located in the Bridgeport Harbor which has fuel and coal docks.
- The Bridgeport Regional Maritime Complex includes the Derecktor Shipyard facility and a site which has been earmarked for a new barge feeder service to be developed in collaboration with the Port of New York and New Jersey.⁵²
- The Bridgeport-Port Jefferson Steamboat Company which serves approximately a million passengers and half a million vehicles each year.⁵³
- The Arena at Harbor Yard, built in 2001, serves as the city's sports and hospitality center. Seating 10,000, the Arena serves as the home rink of the Bridgeport Sound Tigers American Hockey League hockey team, as well as the home court of the Fairfield University's basketball team.
- The Ballpark at Harbor Yard, built in 1998, serves as a minor-league baseball stadium and was built in 1998 to serve as the homefield of the Bridgeport Bluefish. It is located downtown on a former Brownfield site. It is visually prominent to commuters on I-95 or on passing trains.
- Coast Guard Station.
- Marinas and Public Boat Ramps.

Intermodal Connections: Cargo: rail (1 mile from terminal); truck. Passenger: auto; train; ferry.

⁵⁰ City of Bridgeport. June 2007. Comprehensive Economic Development Strategy 2007-2012. Available online at <http://bridgeportmasterplan.com/ceds.htm>.

⁵¹ Apex Environmental Inc., et al. 2006. City of Bridgeport, Connecticut Harbor Management Plan. Prepared for the City of Bridgeport Harbor Management Commission.

⁵² City of Bridgeport. June 2007. Comprehensive Economic Development Strategy 2007-2012. Available online at <http://bridgeportmasterplan.com/ceds.htm>.

⁵³ City of Bridgeport. June 2007. Comprehensive Economic Development Strategy 2007-2012. Available online at <http://bridgeportmasterplan.com/ceds.htm>.

Shipyards/Boat Repair: Derecktor Shipyards is a 23-acre facility with 180 employees and has been cited as an example of one of Bridgeport's remaining successful manufacturing businesses.⁵⁴

Dredging Issues: Federal and non-federal maintenance and improvement dredging needs in New London harbor as provided in the USACE report. See **Section 2.5** and **Appendix C** for details.

Relevant Planning Documents

- *Bridgeport 2020*, the Bridgeport Master Plan of Conservation and Development, released in 2008, includes some discussion of Bridgeport's maritime industrial facilities and the economic benefits they present to the city of Bridgeport. It places significant emphasis on the need to grow the city's employment base, setting a goal of attracting 15,000 new jobs to the city by 2020. It includes some discussion of the Port of Bridgeport and explicitly supports the Bridgeport Harbor Federal Navigation Project, through which the USACE maintains the shipping channels and anchorage basins that sustain the Port's operations. The Plan includes a goal to "Maintain and enhance the Port of Bridgeport, including dredging of the harbor as needed, to provide vital economic, transportation and environmental benefits of local, state-wide, and national significance." It notes that Bridgeport should continue to support port-related industries and should also seek new opportunities to enhance port activities. The Strategic Action Plan notes that Bridgeport's natural deepwater port is one of its chief assets, and includes a goal to "make better use of our assets: Value our waterfront, industrial heritage and location." To accomplish this goal, the plan outlines a series of strategies including "support deepwater port uses that are environmentally sound." In discussing this goal, it is noted that port uses are vital largely because they provide jobs.⁵⁵
- The Bridgeport *Comprehensive Economic Development Strategy* (CEDS), released in 2007, articulates economic development goals for the city of Bridgeport. It recounts Bridgeport's recent history of job loss, due largely to the dramatic decline of its manufacturing base between 1990 and 2006. The CEDS projects employment growth in the near future, largely

⁵⁴ City of Bridgeport. June 2007. Comprehensive Economic Development Strategy 2007-2012. Available online at <http://bridgeportmasterplan.com/ceds.htm>.

⁵⁵ BFJ Planning. 2008. Bridgeport 2020: The Bridgeport Master Plan of Conservation and Development.

in service and government sectors, though it does project modest gains in transportation and other sectors. Bridgeport's maritime activities are primarily included in the transportation and warehousing sector of the city's economy. According to the CEDS, this sector of Bridgeport's economy has 38 establishments with 776 jobs, and employment in this sector remained relatively unchanged between 2000 and 2006. The CEDS provides further details about some of these businesses which are included above.

The CEDS notes that Bridgeport's transportation infrastructure and natural deepwater port is one of its greatest natural assets. It articulates a vision for Bridgeport's future which will grow the city's employment base and which relies heavily on private housing investment and commercial development. However, it also notes the importance of the city's maritime assets and includes in its Strategic Action Plan a goal to "Make better use of our assets: value our waterfront, industrial heritage and location." Strategies to achieve this goal include supporting the expansion of Bridgeport Shipyards and the feeder barge service. The



Strategic Action Plan also includes a goal to strengthen economic competitiveness by attracting, creating, and retaining jobs; strategies to achieve this goal include investing in infrastructure (including transportation). No mention is made in this document neither of dredging, nor of the importance of other maritime industries to Bridgeport's employment base.⁵⁶

- The *Bridgeport Harbor Management Plan* (HMP), released in 2006 and approved in 2009, provides detailed descriptions of Bridgeport Harbor's maritime facilities and outlines strategies to better manage and grow those uses. The HMP notes that Bridgeport Harbor's strengths include that it is one of Connecticut's three deepwater ports; that it is a center for

⁵⁶ City of Bridgeport. June 2007. Comprehensive Economic Development Strategy 2007-2012. Available online at <http://bridgeportmasterplan.com/ceds.htm>.

shipping with potential to support "a robust increase in the industry"; and that it contains multiple successful water-dependent industries. It lists among the problems facing Bridgeport Harbor that its existing infrastructure, including shipping channels and marine structures, must be maintained to support existing and encourage new water-dependent uses of the harbor.

The HMP also notes that Bridgeport Harbor has not been dredged in 40 years due to concerns related to disposal of the harbor's contaminated sediments. It identifies a series of planned harbor improvement projects, which include maintenance dredging of each of the aforementioned federal channels. Bridgeport Harbor's main shipping channel, including its entry channel and turning basin, is at the top of this list. The HMP does not specify why these channels need to be dredged (i.e. what volume of sediments must be removed, what businesses are being impacted by the lack of dredging, and how maintaining these channels might be economically beneficial to the harbor). It also recommends maintenance dredging for several marine structures/businesses, but in all cases simply indicates that those structures "could require maintenance dredging". In no cases is improvement dredging identified as part of the harbor improvement plan.

The HMP also identifies potential future businesses in the Harbor, including a proposed high-speed ferry serving New York City and a barge feeder service being developed in collaboration with the Port of New York and New Jersey. With regard to the implementation of these improvements, the HMP indicates that the Harbor Management Commission will work with relevant agencies to obtain the necessary funding and regulatory approvals to move forward with these projects.⁵⁷

3.2 Port of New Haven

New Haven is the second-largest municipality in Connecticut, after Bridgeport and just ahead of Hartford, with a core population of about 124,000 people. The Port of New Haven is located on New Haven Harbor less than 500 yards off exit 49 from I-95, and has immediate access to I-91 and State Route 1. The port primarily handles petroleum products, chemicals, scrap metal, metallic products, cement, sand and stone, salt and general break-bulk cargo. The Port of New Haven's fuel facilities are part of the United States Government's strategic petroleum reserve.

⁵⁷ Apex Environmental Inc., et al. January 2006. *City of Bridgeport, Connecticut Harbor Management Plan*. Prepared for the City of Bridgeport Harbor Management Commission.

Pipeline connections (Buckeye Pipeline) from the port handle jet fuel for Bradley International Airport and for the Massachusetts Air National Guard Base in Westover, Massachusetts.

The modes of transportation served are vessels, barges, train, and trucks. With more than a half-dozen owners, the ownership and management of New Haven's port is more complex than the Port of Bridgeport. Magellan Midstream Partners, a Tulsa-based company, has 3 docks and 54 storage tanks that hold 3.9 million barrels of petroleum products in New Haven. Motiva has 1.7 million barrels of storage, its second-largest operation in the United States. The locally-based company, New Haven Terminal, which at one time owned most of the ports of New Haven and Bridgeport and operated the State Pier in New London for the State, operates a terminal with 2.5 million barrels of storage. It leases out its non-petroleum terminal to Coastline, which, in turn, leases the operation to Logistec. Coastline also owns a terminal in New Haven. Gateway Terminal, also locally based, is another owner in the Port of New Haven. There are also several other smaller owner/operators at the port.

There are three berthing facilities; two can accommodate vessels drawing 36 feet at mean low water (MLW) and one can accommodate vessels drawing from 39 feet MLW. New Haven Port facilities are very capable of handling any type of break-bulk cargo. The stevedoring equipment that is used to move the cargo has 5 shore cranes that move up to a 250-ton capacity with 61 forklifts that have a 26-ton capacity. The truck facility has the capability for loading up to 200 trucks per day from the ground or via loading docks.

Rail freight service at the port is provided by the Providence & Worcester Railroad which connects to nine other rail lines: Canadian National, Canadian Pacific, CSX, Pan Am Railways, New England Central Railroad, New York and Atlantic, Housatonic Railroad, Connecticut Southern, and Norfolk Southern. The storage facility at the Port of New Haven has approximately 400,000 square feet of inside storage and approximately 50 acres of outside storage space available. Bonded storage is available and warehousing is available for zinc, aluminum, lead, tin, and nickel.

Although the ConnDOT study believes that the Port of New Haven is currently able to adequately meet the demands of the shipping community for commodities that were traditionally handled through the facility, one of the challenges facing the port's ability to meet future demand

is that of dredging⁵⁸. The port was dredged in January 2004, but it requires maintenance dredging. As stated previously, the USACE is responsible for maintaining federally designated navigation channels (maintenance dredging) to their respective project depths; however, there has never been enough federal funding to address dredging needs throughout the country.

Description/Harbor Characteristics: The Port of New Haven is the highest volume port on Long Island Sound and is considered the busiest port between Boston and New York City. Recent statistics show that of the 134 ships entering Long Island Sound between January-May 2009, 90 called at the Port of New Haven. Within a regional context, the Port of New Haven ranks third among the New England ports in total tonnage, behind Portland, Maine and Boston, Massachusetts⁵⁹ and handles approximately 9.6 million tons of cargo a year.

Governance: The New Haven Port Authority (formed in 2006)

Infrastructure/Marine Structures: The primary shipping channel has an authorized depth of 35 feet and a width of 400 to 800 feet. North of the Tomlinson Bridge and to the north, the channel becomes narrower and shallower.⁶⁰

Cargo Handled: Petroleum products, chemicals, scrap metal, lumber, metallic products, cement, sand, stone, salt, and general break-bulk cargo.⁶¹

Terminals/Facilities:

- Gateway Terminal;
- Getty Terminal;
- Gulf Terminal;
- Magellan Terminal;
- New Haven Terminal (including Coastline Terminal Facility, operated by Logistic, Inc.);
- Motiva Enterprises; R&H Terminal; PSEG Harbor Station.⁶²

⁵⁸ Connecticut Department of Transportation. June 2006. Transportation in Connecticut: Trends and Planning Data. Available online at <http://www.ct.gov/dot/cwp/view.asp?a=3531&q=317920>

⁵⁹ New Haven Port Authority. 2007. Port of New Haven Strategic Land Use Plan [Public Hearing Draft]. Prepared by Parsons Brinckerhoff. Online at <http://cityofnewhaven.com/PortAuthority/pdfs/Port%20Land%20Use%20Plan.%20Draft.%2002-01-07.pdf>.

⁶⁰ New Haven Port Authority. 2007. Port of New Haven Strategic Land Use Plan [Public Hearing Draft]. Prepared by Parsons Brinckerhoff. Online at <http://cityofnewhaven.com/PortAuthority/pdfs/Port%20Land%20Use%20Plan.%20Draft.%2002-01-07.pdf>.

⁶¹ New Haven Port Authority. 2007. Port of New Haven Strategic Land Use Plan [Public Hearing Draft]. Prepared by Parsons Brinckerhoff. Online at <http://cityofnewhaven.com/PortAuthority/pdfs/Port%20Land%20Use%20Plan.%20Draft.%2002-01-07.pdf>.

- Coast Guard Station

Intermodal Connections: Rail; truck

Shipyards/Boat Repair: None identified

Dredging Issues: Federal and non-federal maintenance and improvement dredging needs in New London harbor as provided in the USACE report. See **Section 2.5** and **Appendix C** for details.

Relevant Planning Documents

The *Port of New Haven Strategic Land Use Plan* (2007) describes the Port's current conditions as well as the Port's economic development opportunities. The plan draws upon interviews with terminal operators and transportation service providers and emphasized the importance of deepwater shipping channels to the Port's viability as a center of transportation and commerce. It identified user concerns that the main shipping channel be deepened from 35 feet to 42 or even 45 feet to accommodate larger ships. It also included discussion on the economic development opportunities associated with the Port, which included the general economic activity associated with the Port as well as specific growth opportunities such as a proposed feeder barge service in connection with the Port of New York and New Jersey. The Plan identified several strategies for future development. Those that are relevant to this Study include "Improve the Transportation Network within the Port" and "Formulate a Plan for Dredging of the Harbor Channel." Specifically, the Plan recommends undertaking a study of the scope, costs, and impacts of dredging the shipping channel to 42 feet. With regard to economic development, the Plan recommends pursuing the establishment of a feeder barge service as well as expanding and diversifying its market in order to generate new jobs and related income. It also recommends, as a performance measure of economic development, an increase in Port-related jobs from 400 to 450 over a 5-year period.⁶³

⁶² New Haven Port Authority. 2007. Port of New Haven Strategic Land Use Plan [Public Hearing Draft]. Prepared by Parsons Brinckerhoff. Online at <http://cityofnewhaven.com/PortAuthority/pdfs/Port%20Land%20Use%20Plan.%20Draft.%2002-01-07.pdf>.

⁶³ New Haven Port Authority. 2007. Port of New Haven Strategic Land Use Plan [Public Hearing Draft]. Prepared by Parsons Brinckerhoff. Online at <http://cityofnewhaven.com/PortAuthority/pdfs/Port%20Land%20Use%20Plan.%20Draft.%2002-01-07.pdf>.

The City of New Haven Port Authority is presently seeking a total of \$41,271,952 in TIGER Grant funding for transportation and infrastructure improvements⁶⁴ from the federal government under the American Recovery and Reinvestment Act of 2009 (Public Law 111-5). This program is an economic stimulus package enacted by the 111th United States Congress in February 2009. The Port Infrastructure Project will help to reinforce the port's role in the local and regional economy. The proposed components of the Port Infrastructure Project would translate to a total of 287 direct and indirect job years, based on a Council of Economic Advisors formula of \$92,000 of construction creating one job year, with 64 percent of those jobs being considered direct or indirect employment.

These proposed actions represent a coordinated effort by the Port Authority and its terminal partners to improve and develop facilities in a manner which reflects the overall goals and strategies of the Port of New Haven's 2007 Strategic Land Use Plan. However, it should be recognized that each of these proposed actions has independent utility, and that the funding of only one (or more) individual components by United States Department of Transportation (USDOT) is entirely acceptable to the Port Authority. Specific Port Infrastructure Projects are described below.

Waterfront Street Reconstruction

The ConnDOT, due to financial constraints, is not able to undertake this reconstruction project at this time. Waterfront Street is the main roadway and rail line connection for various terminals located within the port district. In its present condition, the roadway is in poor condition and lacks necessary curbing, drainage, parking, sidewalk and traffic control facilities. The railroad tracks embedded in the street are similarly deteriorated and require reconstruction as part of the roadway. Design and construction contract documents have been completed for this project: The Reconstruction of Waterfront Street, State Project No. 92-541.

Waterfront Street Reconstruction

ConnDOT supports this project but is unable to contribute funding in FY 2010 and 2011.

Designated Sponsor - City of New Haven (funds spent to date on design = \$671,200)

TIGER Grant Construction Funding Requested \$6,179,800

⁶⁴ New Haven Port Authority, September 15, 2009. American Recovery and Reinvestment Act TIGER Grant Application.
<http://www.cityofnewhaven.com/economicdevelopment/ARRA/TIGER/NHPATIGERAPPLICATION.pdf>

New Haven Terminal □ Fuel and Railroad Facilities

This facility, situated off of Waterfront Street, handles general cargoes as well liquid petroleum products. It is currently undergoing a series of improvements intended to allow for the handling of biodiesel and bio-heat fuel and general cargoes. The facility presently handles bulk liquid petroleum cargo consisting primarily of "clean" petroleum distillate fuel products such as kerosene, commercial aviation jet fuel, ultra-low sulfur diesel fuel, and home heating oil. The annual, combined volume for all products handled during the period June 1, 2008 to June 1, 2009 was 2,500,000 barrels, equivalent to 105,000,000 gallons or 393,750 tons.

The proposed action consists of the modification and upgrading of tanks, pipelines and pumping facilities to enable the handling of these new bulk petroleum products. The storage and handling of biodiesel and bio-heat fuel products, as proposed by potential customers, would increase annual volumes by 360,000 barrels, equivalent to 15,120,000 gallons or 56,700 tons, an increase of approximately 14 percent.

New Haven Terminal - Fuel and Railroad Facilities

Designated Sponsor - New Haven Terminal (funds spent to date = \$0)

TIGER Grant Construction Funding Requested \$1,558,097

Magellan – 286 Waterfront Street – Fuel and Railroad Facilities

Magellan is evaluating the feasibility of installing a 10-car spot rail offloading facility for more efficient receipt of renewable fuels, namely ethanol, into its New Haven terminal. These railcars would be discharged via pipeline into existing Tank 201 on the southeast side of its terminal at 280 Waterfront Street. Additionally, an ethanol pipeline would be constructed to establish connectivity between the Waterfront Street facility and Magellan's other ethanol storage at 134 Forbes Avenue. Each facility has roughly 65,000 bbl of ethanol storage capacity, which means that tank capacity constraints at any one location may offset the economic benefit of bringing the product in by rail. This line may be reconstructed in conjunction with the relocation of four existing docklines connecting these locations due to the on-going relocation of the I-95 highway bridge (expected to commence by early 2010).

It is foreseeable that up to 80 percent of the current volume of ethanol demand at the Terminal, approximately 5,000 barrels per day, could be supplied by this new rail facility, justifying processing eight to ten rail cars per day on a 5-day weekly cycle.

Magellan – 286 Waterfront Street – Fuel and Railroad Facilities

Designated Sponsor - Magellan Midstream Partners (funds spent to date = \$9,600)

TIGER Grant Construction Funding Requested \$14,300,005

North Yard – Bulkhead, Crane and Fuel Barge Facilities

As noted previously, this site has a history of industrial use and has been identified in the Port's Strategic Land Use plan as a key site for further development in conjunction with maritime related uses. The site provides approximately 1,100 feet of frontage along the eastern side of the Quinnipiac River defined by a deteriorated bulkhead. At present, approximately 300 feet of this bulkhead remains in use as a support facility for a marine contractor who stages construction barges at the site. Material and equipment is stored at the site and is loaded onto barges which then proceed to various pier and marina construction locations along the southern New England and Long Island Sound coastlines. The current condition of the bulkhead restricts the ability of the contractor to store and load materials in terms of weight.

By reconstructing the bulkhead along its entire 1,100-foot length, there is an opportunity to provide additional space for the marine contractor and to provide a facility for processing, storing and distributing biodiesel fuels transported to the site by barges. The contemplated bio-fuels facility will utilize domestically-generated waste vegetable oil to displace 30 million gallons of imported oil, equivalent to 5 percent of the heating oil consumed in Connecticut each year.

The North Yard Area bulkhead reconstruction component of the Port Infrastructure project will also require the dredging of the Quinnipiac River channel north of the Tomlinson Bridge and the adjacent barge mooring areas.

North Yard – Bulkhead, Crane and Fuel Barge Facilities

Designated Sponsor - New Haven Waterways (funds spent to date = \$50,000)

TIGER Grant Construction Funding Requested \$14,059,650

East Shore Parkway-Warehouse and Material Handling Equipment

The Port Authority is proposing to construct a warehousing facility on its Eastern Shore Parkway property. This facility will be a 40,000-square foot, pre-engineered building and will be made available to terminal operators on a lease basis. This will allow for the storage of cargoes in an

environment protected from the elements and in compliance with CTDEP regulations. The estimated cost for this warehouse to be constructed on Port Authority property is \$2,728,000 based on a marked-up cost of \$62 per square foot and an allowance of 10 percent for site preparation. The warehousing operation is expected to create 12 full-time employment positions.

The Authority is also proposing to obtain and install electrical connections for refrigerated containers and trailers at a cost of \$200,000 and a mobile marine container handling crane at an estimated cost of \$2,000,000. The total construction and procurement cost for these items is \$4,928,000. A 5 percent allocation, applied to the total cost, for preparing bid documents and construction management by the Port Authority is \$246,400.

East Shore Parkway Warehouse and Material Handling Equipment

Designated Sponsor - New Haven Port Authority (funds spent to date = \$0)

TIGER Grant Construction Funding Requested \$5,174,400

3.3 Port of New London

The Port of New London includes two 1,000-foot-long cargo piers, the Admiral Harold E. Shear State Pier (State Pier) and the Central Vermont Railroad (CVRR) Pier which are located approximately 3.8 miles up river from the deep waters of Long Island Sound via the main navigational channel. The Admiral Harold E. Shear State Pier at the Connecticut State Pier facilities is owned and managed by the ConnDOT Bureau of Aviation and Ports. In addition to easy access to I-95, the piers have the advantage of a railroad connection and track that extends as far as Canada.⁶⁵



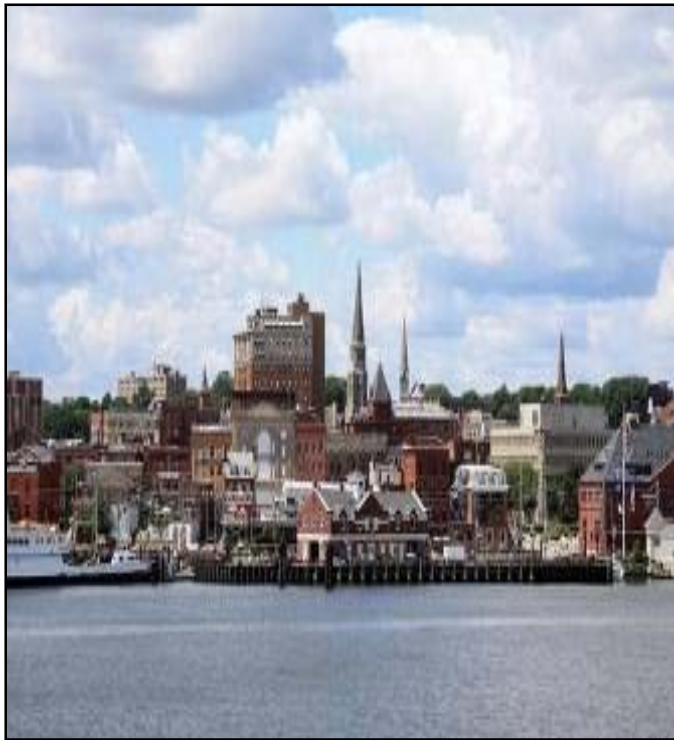
ConnDOT's Bureau of Aviation and Ports has a contract with a private stevedore company, Logistec, USA, to operate a marine terminal at the State Pier. Logistec, USA is under contract to

⁶⁵ Connecticut Department of Transportation. June 2006. *Transportation in Connecticut: Trends and Planning Data*. Available online at <http://www.ct.gov/dot/cwp/view.asp?a=3531&q=317920>

manage the cargo operations at the State Pier facility as well as to provide security for the entire complex in accordance with the Maritime Transportation Security Act (MTSA).

Additionally, the Bureau of Aviation and Ports has a leasing agreement with the Thames River Seafood Cooperative for use of the western most part of the CVRR Pier as a support facility for scallopers and other fishing vessels.

The City of New London owns and leases facilities to passenger ferry service operators on the New London side of the port. Amerada Hess owns and operates a liquid bulk terminal in Groton. The United States Coast Guard Academy, General Dynamics Electric Boat shipyard and the U.S. Navy's submarine base in Groton have facilities along the Thames River at New London and utilize the same navigation channels as commercial vessels and ferries.



The New London Development Corporation, with State funds from the Department of Economic and Community Development, acquired additional acreage located in the center of the complex. Logistec has also entered into leases for two adjacent properties totaling 8.4 acres, bringing the entire State Pier complex to approximately 35 acres. At this time, only the State Pier's 12 acres and Logistec's leased parcels are available for marine terminal operations. The City of New London has leased its waterfront lands and facilities to others while maintaining public open space

along its waterfront and marina areas. The City invested a significant amount of funds to improve these facilities for *OpSail 2000*, involving the visit of "tall ships" from around the world.

The State Pier has been primarily used as a lumber port and storage facility, with some copper and other commerce being minimal. Cargo such as chemicals, wood pulp, core stock, aluminum, copper, lumber, and general cargos are all principal waterborne commodities

targeted to be handled at the pier. According to the ConnDOT June 2006 study report, inbound cargo to the pier increased from approximately 75,000 metric tons in 1998 to more than 250,000 in 2004, and outbound cargo from the pier fell from about 4,000 metric tons to little or none during the same period⁶⁶.

Although the ConnDOT study believes that the State Pier facility is currently able to adequately meet the demands of the shipping community for commodities that were traditionally handled through the Port of New London, in order to meet the future needs for the shipping community, recommendations that were made in the *Transportation and Land Use Compatibility Study* will need to be evaluated and implemented. These recommendations include provision of some refrigerated warehouse space, security issues, use of the Central Vermont Railroad and dredge to the maximum depth (40 feet) alongside the State Pier (especially the west side) to respond to trends in ocean shipping.

Description/Harbor Characteristics: The Port of New London includes the municipalities of New London and Groton. It has been described as the best natural harbor and best harbor of refuge in Connecticut.⁶⁷

Governance: There is no New London Port Authority. New London's main port facilities are owned and managed by the State of Connecticut and managed by the ConnDOT.

Infrastructure/Marine Structures: The Thames River has a 40-foot deep, 500-foot wide federally authorized channel that provides access from Long Island Sound up to the Admiral Harold E. Shear State Pier.⁶⁸

Cargo Handled: Lumber, metals

Terminals/Facilities:

- State Port Complex, comprising the Admiral Shear State Pier and the Central Vermont Railroad Pier (CVRR). Both facilities are state-owned and managed. Logistic USA has a

⁶⁶ Connecticut Department of Transportation. June 2006. *Transportation in Connecticut: Trends and Planning Data*. Available online at <http://www.ct.gov/dot/cwp/view.asp?a=3531&q=317920>

⁶⁷ Think Global Incorporated. 2004. *Port Connecticut Transportation & International Trade Magazine*.

⁶⁸ Think Global Incorporated. 2004. *Port Connecticut Transportation & International Trade Magazine*.

contract to manage the State Pier. Sections of the CVRR are leased to the Thames River Seafood Cooperative.⁶⁹

- United States Coast Guard Academy.
- General Dynamics Electric Boat shipyard.
- Thames River Shipyard.
- United States Naval Submarine Base.
- Cross Sound Ferry Terminal.
- Fishers Island Ferry Terminal.
- Coast Guard Station.
- Marinas and Public Boat Ramps

Intermodal Connections: Cargo: on-dock rail, truck. Passenger: auto, train, ferry.

Shipyards/Boat Repair: Electric Boat Corporation, United States Naval Submarine Base.

Dredging Issues: Federal and non-federal maintenance and improvement dredging needs in New London harbor as provided in the USACE report. See **Section 2.5** and **Appendix C** for details.

Relevant Planning Document

- The *Comprehensive Economic Development Strategy for Southeastern Connecticut* (CEDS) places great emphasis on the Port of New London. It notes that, despite a significant decline in the role of defense-related maritime employment since 1990, the Port's U.S. Naval Submarine Base and Electric Boat Corporation still play a significant role in the region's economy. As of 2004,



these two institutions were two of the top five employers in southeastern Connecticut and

⁶⁹ Connecticut Department of Transportation. June 2007. *Transportation in Connecticut: The Existing System*. Available online at <http://www.ct.gov/dot/cwp/view.asp?a=3531&q=317920>.

employed 10,500 and 8,800 employees, respectively. The CEDS study employed a scenario analysis to consider the theoretical economic impact of the sub base and Electric Boat closing and predicts severe impacts to New London including the direct loss of \$1.75 billion in industry sales; the loss of 15,000 direct jobs and another 8,000 due to indirect effects; and losses in personal income of \$900 million as a direct result and more than \$200 million as an indirect result.⁷⁰

- The *Regional Plan of Conservation and Development*, prepared by Southeastern Connecticut Council of Governments in 2007, highlights the significance of the State's maritime cluster to not only New London but all of southeastern Connecticut. This document draws extensively on the Southeastern Connecticut CEDS document and further emphasizes the importance of current and future commercial shipping, passenger ferries, and cruise ships to New London. It notes that the State Pier is underutilized and that it has the potential to become "a key freight handling resource" and may have a future as "a passenger depot." It also highlights the importance of maintenance dredging of the main shipping channel, which provides for all of these uses.⁷¹

3.4 Norwalk Harbor

The Norwalk Harbor is a notable recreational and commercial harbor at the estuary of the Norwalk River where it flows into Long Island Sound. The farming of oysters has long been important to Norwalk, which was once nicknamed "Oyster Town." Norwalk is Connecticut's largest oyster producer and home to the nation's largest oyster company, Hillard Bloom Shellfish. The last portion of the Norwalk River from the head of navigation near Wall Street in Central Norwalk to the Long Island Sound forms Norwalk Harbor. It is a



⁷⁰ Southeastern Connecticut Enterprise Region and Southeastern Connecticut Council of Governments. 2004. Comprehensive Economic Development Strategy for Southeastern Connecticut. Available online at <http://www.secter.org/Home/Resources/ComprehensiveEconomicDevelopmentStrategyCEDS/tabid/89/Default.aspx>

⁷¹ Southeastern Connecticut Council of Governments. 2007. Regional Plan of Conservation and Development. Available online at http://www.seccog.org/pdfs/RPCOD_Draft_1107.pdf.

federal navigation channel of the "recreational and small commercial harbor" variety.

As of 2007, in and around the harbor there are fifteen marinas, thirteen private clubs with boating facilities, and five commercial port facilities. The commercial port facilities include: two that receive barge shipments of sand and gravel (one of these facilities also receives waterborne shipments of fuel oil); a marine construction and towing business; the largest commercial shellfishing operation in Connecticut; and the Norwalk Harbor Power Station which receives barge shipments of fuel oil to power its generators.

The Norwalk Harbor has more than 1,800 berthing spaces and more than 500 harbor mooring locations. About 800 boats may be launched from storage racks at marinas and clubs as well as via the city-maintained launching ramp in Veterans Park. More than 2,700 commercial vessel trips to and from the harbor occur each year.⁷² The main harbor channel is small enough to restrict the size of vessels that could attempt to use it. In 2001, waterborne commerce in the harbor totaled 512,000 tons. Typical freight included fuel oil, sand, gravel, stone, and shellfish.

Governance: The Norwalk Harbor Commission was established in 1984 by the Norwalk City Council. The commission is responsible for maintaining a Harbor Management plan that includes maintaining the safe navigation in the harbor, policies for the harbor master, the promotion of the harbor, and the maintenance of the visitors dock at Veterans Park.⁷³

Infrastructure/Marine Structures: Five commercial port facilities

Cargo Handled: Typical freight included fuel oil, sand, gravel, stone, and shellfish (particularly oysters and lobsters)

Terminals/Facilities:

- O&G Industries.
- Norwalk Harbor Power Station.
- Norwalk Marine Contractors Inc.
- Marinas and Public Boat Ramps.

⁷² "The History of Norwalk Harbor "The Jewel of Long Island Sound", Harbor Commission, Norwalk CT"
<http://www.norwalkct.org/NorwalkHarborHistory.htm>. 2008.

⁷³ "[About the Harbor Commission 2007](http://www.norwalkct.org/HarborComm/2007AbouttheCommission.html)". <http://www.norwalkct.org/HarborComm/2007AbouttheCommission.html>. 2007

Intermodal Connections: Cargo: on-dock rail, truck. Passenger: auto, train, ferry.

Shipyards/Boat Repair: None Identified

Dredging Issues: Federal and Non-federal maintenance and improvement dredging needs in New London harbor as provided in the USACE report. See **Section 2.5** and **Appendix C** for details.

Relevant Planning Document:

Norwalk Harbor Management Plan Addendum, November 1997

Draft Norwalk Mid-Harbor Planning Study Chan Krieger & Associates, Cambridge, Massachusetts, June 2004

3.5 Port of Stamford

Stamford's harbors, including the main Stamford Harbor and the several small harbor management units including Stamford Inner Harbor West Branch; Stamford Inner Harbor East Branch; Stamford Outer Harbor; Dolphin Cove; Westcott Cove; Cove Island Harbor and Holy Pond. However, virtually all of Stamford's waterfront commercial and industrial development is found along the inner harbor which also supports residential and recreational uses and municipal facilities, including the city's wastewater treatment



plant. Commercial office buildings have been constructed on several waterfront sites. Outside of the inner harbor, residential neighborhoods along with the city's two largest waterfront parks, Cummings and Cove Island parks, dominate the shoreline.

In terms of the amount of materials shipped to and from its port facilities, the City of Stamford is the fourth largest commercial harbor in Connecticut, behind the three deep-water ports of Bridgeport, New Haven, and New London. The port facilities depend on the movement of tugs, scows, and barges through the Stamford Harbor Management Area to deliver construction

materials and petroleum products and ship out scrap metal. There are currently six port facilities on the Stamford waterfront, all in the inner harbor.

Stamford is also one of the most important centers of recreational boating in western Long Island Sound with a number of facilities serving the boating public located on the waterfront and in the Stamford Harbor Management Area⁷⁴. These facilities include docks, boat slips, moorings, and launching ramps as well as boat sales, repair, service, and storage facilities. Boating facilities include those owned and operated by the City of Stamford for public use, including the marinas at Czescik, Cummings, and Cove Island parks. Privately owned facilities include the city's one remaining commercial boatyard, Brewer Yacht Haven West, which is one of the largest boatyard / marina facilities serving pleasure craft in the northeast United States. Other marina facilities have been developed in recent years as ancillary components of waterfront residential and commercial developments that otherwise are not water-dependent. There are currently nine such ancillary marinas in the Stamford Harbor Management Area . In addition, three private clubs provide recreational boating services, facilities, and activities for members and guests.

Port facilities in the inner harbor provide the bulk of the concrete and asphalt products used in southwest Connecticut and include a major fuel oil distribution terminal.

Community Profile **Stamford, Connecticut**

Stamford plans to reclaim the harbor area as an economic and recreational resource and revitalize the city's two poorest neighborhoods. Redevelopment of three Brownfields will leverage \$370 million in private investment and create 600 construction and 1,300 permanent jobs.

Background

The Brownfields National Partnership has selected the City of Stamford as a Brownfields Showcase Community. The Stamford Harbor Redevelopment Project⁷⁵ seeks to restore the 250-acre harbor area to a major economic and recreational resource. Restoration of the harbor will also provide a much-needed economic boost to Stamford's two lowest-income

⁷⁴ Draft Stamford Harbor Management Plan 2008

⁷⁵ USEPA EPA 500-F-98-266 Brownfield Showcase Community: Stamford, Connecticut November 1998

neighborhoods, Waterside and South End, which are located within a state Enterprise Zone. Waterside's population is 71 percent minority, with 25 percent of families living below the poverty level, while South End's residents are 80 percent minority with a 16 percent poverty rate.

Current Activities and Achievements

The Stamford Harbor area has a strong track record for Brownfields restoration, having recently completed cleanup of a 12-acre site with extensive petrochemical contamination. The ensuing \$250 million construction project created a new facility for 2,300 traders and other financial services professionals. In 2008, major redevelopment projects were being planned for several prominent waterfront properties on and near the inner harbor. These include, but are not limited to, the following:

- Cleaning up and removing of contamination at the HELCO property, which was financed by the current owner at a cost of \$700,000. The city has agreed to purchase one acre of this site for construction of a \$1.7 million fire station and is negotiating with the owner to acquire an additional three acres for a \$3 million, high-speed ferry terminal;
- Completing environmental studies on the fuel oil depot site, and the outlining of a cleanup program with costs estimated between \$1.5 and \$2.0 million. The property was recently sold to an investment management firm. Cleanup costs will be absorbed by the seller, an energy company, as part of the sales agreement;
- Receiving Planning Board approval for a mixed-use development at the Yale & Towne site, which consist of approximately 500 units of market-rate housing, 100,000 square feet of retail space, and 200,000 square feet of state-of-the-art industrial space. Total investment is estimated at approximately \$150 million; and
- Receiving a U.S. Department of Housing and Urban Development (HUD) HOPE VI grant of \$26.4 million, in addition to a \$6.5 million HUD demolition grant, which will leverage \$35 million in private and municipal funds to convert a low-income housing project to a mixed-income community. This project will stabilize the harbor's western edge and vastly improve the entire area's image.

Governance: The Stamford Harbor Management Commission will regulate and monitor water front development, encourage the retention of water front industries recreational uses in all parts of Stamford harbor.

Infrastructure/Marine Structures: Four commercial port facilities

Cargo Handled: Typical freight included fuel oil, sand, gravel, stone, and shellfish

Terminals/Facilities:

- O&G Industries.
- Stamford Iron & Metal.
- Rubino Brothers.
- Sprague Energy Terminal.
- Coast Guard Station.
- Marinas and Public Boat Ramps

Intermodal Connections: Cargo: on-dock rail, truck. Passenger: auto, train, ferry.

Shipyards/Boat Repair: None Identified

Dredging Issues: Federal and non-federal maintenance and improvement dredging needs in New London harbor as provided in the USACE report. See **Section 2.5** and **Appendix C** for details.

Relevant Planning Document:

Draft Stamford Harbor Management Plan 2008
2008 Stamford Harbor Management Plan Summary

4.0 ECONOMIC IMPACTS OF EXISTING MARITIME INDUSTRIES

The economic impact study of maritime industries in Connecticut provides a picture of the present state of the maritime industry and its significance to the economy of the State of Connecticut. **Section 4.0** provides a detailed description of the data acquisition effort, modeling methodologies, and analyses of the present status of the State's maritime industry.

The Consultant Team has assessed the direct, indirect and induced economic effects of the maritime-related industries and clusters in Connecticut using a combination of telephone and in-person interviews, compilation and refinement of available and pertinent secondary source data, and the application of economic modeling techniques. The evaluation results provides business output (revenues), jobs, household income, value added, and local/state/federal taxes associated with the maritime industries identified by the CMC as critical elements of the State's maritime economy. Total effects of demand within the maritime industries on output, jobs, and income within all other industries in Connecticut were included in the economic modeling effort.

The regional input-output model used by this study to derive the total economic impacts is the R/ECON™ I-O model. R/ECON™ I-O provides estimates of the total regional impacts of an economic activity and employs detail for about 500 industries in calculating the effects. This model and its predecessors have been shown to be the best of the non-survey-based regional input-output models at measuring a region's economic self-sufficiency. The models also have a wide array of measures that can be used to analyze impacts. In particular, R/ECON™ I-O enables an analysis of government revenue (i.e., tax) impacts and an analysis of gains in total regional wealth.

4.1 Overview of Connecticut's Maritime-dependent Industries

This section provides an overview of the contribution of Connecticut's maritime-dependent industries to the State's economy. Maritime-dependent industries include: cargo and passenger water transportation and supporting industries; scenic and sightseeing water transportation; ports and marinas; ship and boat building, repair and sales; fishing and seafood preparation; and maritime museums.

The section starts by summarizing annual average employment and wages from the latest full year (2007) reported in the Quarterly Census of Employment and Wages (QCEW) by the United States Bureau of Labor Statistics (BLS). The data for 2007 are compared to those from 2001,

which enables an examination of the sectors' growth over the period. The sectors' shares of Connecticut total employment are also compared to employment shares of the same sectors within the national economy. A final subsection summarizes findings from the QCEW.

Because the QCEW is a true census of firms, it produces the highest quality state and county data available on employment and payrolls by detailed industries. But this does not mean the data are without problems. For reasons of confidentiality, the BLS does not permit the QCEW to report employment and payroll numbers when three firms or fewer exist in a sector within the specified geography. Moreover, the QCEW is made possible through a system that reports an establishment's employees who covered by unemployment insurance. However, all self-employed, employees of railroad companies, and government workers are not covered by such insurance and, therefore, are not included in the QCEW data.

QCEW reports are typically sufficient for economic analysis purposes even if they are missing certain establishments. But in the course of our analysis of the QCEW data, it became quite clear that certain rather large establishments were not reported, namely General Dynamics's Electric Boat Division in Groton and the Coast Guard Academy in New London. Hence, we adjusted the QCEW report with some estimates to fill in the data disclosure issues, like the above, which often inherent to federal data.

In addition, some of the usual caveats of the QCEW census apply to the present analysis as well. It is well known that the QCEW under-reports the total employment and payroll for sectors that have large shares of establishments that that are owner-operated (where a firm's proprietor is also an employee)—namely construction, real estate, retail trade, and the various personal services sectors. As a result, we also adjusted the QCEW data for selected sectors—namely, Scenic and sightseeing transportation (water) and Boat dealers. We enhanced these data using ratios built from the Regional Economic Information System (REIS) produced by the U.S. Bureau of Economic Analysis (BEA).

After enhancing the QCEW data via specialized investigations and the REIS data, the basic set of maritime industries are summarized in a set of tables. These are the data that are entered into the R/ECON™ I-O model for Connecticut, the results of which are reported in the next section of the report.

4.2 Analyses of the QCEW Data from the US Bureau of Labor Statistics

4.2.1 Water Transportation

The largest maritime-dependent industry in Connecticut is the water transportation sector, which consists of firms providing both passenger and cargo transportation. Thus within the State, it is the sector that represents steamship and passenger ferry lines. Cargo operations are largely included in a different sector—Support Activities for Water Transportation, which is discussed in the next section. In 2007, the Water Transportation industry accounted for 925 jobs, a decline of 5.3 percent from its 2001 level but almost 15 percent higher than its low of 806 jobs in 2005 (**Table 4.1**). The industry accounts for approximately 0.5 percent of total employment in Connecticut – slightly higher than the comparable national figure. In contrast to the decline in employment, total wages in the sector grew dramatically over the 2001-2007 period from \$77.6 million to \$199.2 million – an increase of 156 percent.

Because some inland water transportation may not necessarily be considered maritime-dependent, it is also worth examining the Sea, coastal and Great Lakes water transportation subsector of the industry. This subsector represents the majority of Connecticut's water transportation sector, accounting for 832 of the industry's 925 jobs (90 percent) in 2007. Employment in the subsector declined by 9.3 percent from 2001 to 2007, a slightly faster rate than the total Water transportation industry. However, total wages in the subsector grew at a faster rate (161 percent) than the larger industry over the period from \$74.6 million in 2001 to \$195.4 million in 2007.

Table 4.1 - Water Transportation Jobs and Wages

Jobs		Change: 2001-2007			
NAICS	Sector	2001	2007	Absolute	Percent
483	Water transportation	977	925	-52	-5.3
4831	Sea, coastal, and Great Lakes transportation	917	832	-85	-9.3

Wages (in thousands)		Change: 2001-2007			
NAICS	Sector	2001	2007	Absolute	Percent
483	Water transportation	\$77,565	\$199,222	\$121,657	156.8
4831	Sea, coastal, and Great Lakes transportation	\$74,641	\$195,367	\$120,726	161.7

Source: QCEW, U.S. Bureau of Labor Statistics.

4.2.2 Support Activities for Water Transportation

The water transportation sector generates significant additional employment through activities that support the industry – namely, marine cargo handling, navigational services, and other support activities. Together, these industries accounted for 358 jobs in Connecticut in 2007, a decline of 179 jobs (33 percent) from 2001 (**Table 4.2**). The majority of this decline occurred in the Marine cargo handling subsector, which lost 108 jobs (33 percent) from 2001 to 2007, and in Navigational services to shipping, which lost 65 jobs (59 percent) over the same period. Compared to the nation, these industries are all underrepresented in Connecticut, accounting for less than half the share of total state employment (0.02 percent) as they do at the national level (0.07 percent).

Total wages in the Support activities for water transportation sector in Connecticut declined at a rate similar to that of employment, falling by \$6.6 million (29 percent) between 2001 and 2007. The majority of this decline occurred in Navigational services where wages fell by \$5.4 million or 75 percent. Wages in the Marine cargo handling subsector fell by \$1.5 million (13 percent), while they grew slightly in the other support activities sector (\$319,000 or 7.5 percent).

Table 4.2 - Support Activities for Water Transportation: Jobs and Wages

Jobs				Change: 2001-2007	
NAICS	Sector	2001	2007	Absolute	Percent
4883	Support Activities for Water Transportation	537	358	-179	-33.3
48832	Marine Cargo Handling	327	219	-108	-33.0
48833	Navigational Services to Shipping	111	46	-65	-58.6
48839	Other Support Activities for Water Transport.	98	93	-5	-5.1

Wages (in thousands)				Change: 2001-2007	
NAICS	Sector	2001	2007	Absolute	Percent
4883	Support Activities for Water Transportation	\$23,099	\$16,502	-\$6,597	-28.6
48832	Marine Cargo Handling	\$11,605	\$10,114	-\$1,491	-12.8
48833	Navigational Services to Shipping	\$7,250	\$1,826	-\$5,424	-74.8
48839	Other Support Activities for Water Transport.	\$4,243	\$4,562	\$319	7.5

Source: QCEW, U.S. Bureau of Labor Statistics.

4.2.3 Scenic and Sightseeing Water Transportation

The Scenic and sightseeing water transportation sector is considered separate from the other water transportation sectors. This sector accounted for 69 jobs in Connecticut in 2007, a decline of almost 50 percent (67 jobs) from its 2001 level (**Table 4.3**). In 2007, this represented only 0.004 percent of employment in the State compared to a 0.01 percent share at the national level. Total wages in the sector declined at a rate similar to that of employment, falling 58 percent, or \$1.8 million, from \$3.1 million in 2001 to only \$1.3 million 2007.

Table 4.3 - Scenic and Sightseeing Water Transportation: Jobs and Wages

	NAICS	Sector	2001	2007	Change: 2001-2007	
					Absolute	Percent
Jobs	48721	Scenic and sightseeing transportation, water	136	69	-67	-49.3
Wages*	48721	Scenic and sightseeing transportation, water	\$3,096	\$1,314	-\$1,782	-57.6

*Wages in thousands

Source: QCEW, U.S. Bureau of Labor Statistics.

4.2.4 Ship and Boat Building

The ship and boat-building industry in Connecticut is divided into two parts. The boat-building sector is part of private industry, while data available on the State's Ship-building sector is limited to ship building and repair by the federal government. Both industries are described here, at least to the extent reported through the QCEW.

According to BLS, boat building (private) in Connecticut accounted for just 237 jobs in 2007, an increase of 216 percent over its 2001 level of 75 jobs (**Table 4.4**). The sector had a 0.01 percent share of total employment in the state, compared to a national share of 0.04 percent. Total wages in the sector were \$14.1 million in 2007, an increase of \$10.3 million or 277 percent, over their 2001 level of \$3.7 million.

Ship building and repair (federal government) in Connecticut accounted for 185 jobs in 2007, a slight decline from 189 jobs in 2004, the earliest year for which data was available. The industry accounted for 0.01 percent of total employment in the state, compared to a 0.02 percent share at the national level. In addition, the 189 jobs accounted for 0.7 percent of total federal government employment in the sector. The sector generated total wages of \$17 million in 2007, an increase of 17 percent over the 2004 level of \$14.6 million.

In combination, the private boat-building and federal government ship-building industries in Connecticut accounted for 426 jobs in 2007, or 0.025 percent of total employment in the State, and \$31.1 million in total wages, or 0.03 percent of total wages in the State.

Table 4.4 - Ship and Boat Building: Jobs and Wages

Jobs		2001	2004	2007	Change: 2001(4)-2007	
NAICS	Sector				Absolute	Percent
336612	Boat building (private)	75	-	237	162	216.0
336611	Ship building (federal govt.)	-	189	185	-4	-2.1
Total Ship and boat building		-	-	422	-	-

Wages (in thousands)		2001	2004	2007	Change: 2001(4)-2007	
NAICS	Sector				Absolute	Percent
336612	Boat building (private)	\$3,735	-	\$14,105	\$10,370	277.6
336611	Ship building (federal govt.)		\$14,580	\$17,025	\$2,445	16.8
Total Ship and boat building		-	-	\$31,130	-	-

Source: QCEW, U.S. Bureau of Labor Statistics.

4.2.5 Boat Dealers

In addition to ship and boat-building and repair, some portion of the state's Boat dealing industry can be considered maritime dependent. In order to capture that portion of the industry that is maritime dependent, and exclude that portion of the industry that is likely associated more with inland waterways and smaller craft, the analysis is limited to the industry's presence in the four coastal counties of Fairfield, Middlesex, New Haven, and New London.

Boat dealers in the four coastal counties employed 611 workers in 2007 (**Table 4.5**). This represented 91.1 percent of all boat dealer employment in Connecticut (671 jobs). Industry employment in the four counties grew by 14 jobs (2.3 percent) from 597 in 2001 to 611 in 2007 but declined by 5 percent from its peak of 644 jobs in 2005. The statewide industry (671 jobs) is slightly over-represented with a 0.04 percent share of total employment, compared to 0.03 percent for the nation.

Total wages in the Boat dealing industry in the four coastal counties totaled \$32.6 million (95 percent of the state total) in 2007, an increase of \$7.7 million, or 31 percent, from 2001. The

bulk of that increase, \$5.9 million, or 75 percent, occurred in Fairfield County, where wages in the industry grew by 45 percent from \$13.1 million in 2001 to \$19 million in 2007.

Table 4.5 - Boat Dealers: Jobs and Wages

Jobs		Change: 2001-2007			
NAICS	County	2001	2007	Absolute	Percent
441222	Total - Coastal Counties	597	611	14	2.3
441222	Fairfield County	251	254	3	1.2
441222	Middlesex County	135	149	14	10.4
441222	New Haven County	78	77	-1	-1.3
441222	New London County	133	131	-2	-1.5

Wages (in thousands)		Change: 2001-2007			
NAICS	County	2001	2007	Absolute	Percent
441222	Total - Coastal Counties	\$24,898	\$32,575	\$7,677	30.8
441222	Fairfield County	\$13,144	\$19,001	\$5,857	44.6
441222	Middlesex County	\$5,163	\$5,738	\$575	11.1
441222	New Haven County	\$1,757	\$2,315	\$558	31.8
441222	New London County	\$4,834	\$5,521	\$687	14.2

Source: QCEW, U.S. Bureau of Labor Statistics.

4.2.6 Marinas

Parallel to the case of boat dealers is that of Marinas. In fact, the two industries essentially cater to the same clientele. Moreover, since some marinas are located on Connecticut's freshwater lakes, that portion of the industry clearly associated with freshwater marinas, was omitted from the ensuing analysis by limiting the geographic scope of the industry to the state's four coastal counties: Fairfield, Middlesex, New Haven and New London.

Marinas in the four coastal counties employed 1,235 workers in 2007, the largest number of jobs reported by the QCEW for a maritime-related industry in Connecticut. This amounted to 98.6 percent of all Marina employees (1,253) in the State that year. Moreover, economic activity at marinas grew rapidly from 2001 to 2007 as marked by both its employment and aggregate payroll, which grew by 42.1 and 52.2 percent, respectively, over the 6-year span. This somewhat surprising pace is undoubtedly due to Connecticut's relative wealth and the general success of the economy during the period since use of marinas is somewhat of a luxury good/service. This is supported by the industry's greatest growth in Fairfield County, where it more than doubled in size during the period.

Table 4.6 - Marinas: Jobs and Wages

Jobs				Change: 2001-2007	
NAICS	County	2001	2007	Absolute	Percent
71393	Total - Coastal Counties	869	1,235	366	42.1
71393	Fairfield County	263	544	281	106.8
71393	Middlesex County	285	324	39	13.7
71393	New Haven County	87	93	6	6.9
71393	New London County	234	274	40	17.1

Wages (in thousands)				Change: 2001-2007	
NAICS	County	2001	2007	Absolute	Percent
71393	Total - Coastal Counties	\$33,155	\$50,466	\$17,312	52.2
71393	Fairfield County	\$9,337	\$19,702	\$10,365	111.0
71393	Middlesex County	\$12,884	\$15,771	\$2,887	22.4
71393	New Haven County	\$3,502	\$4,635	\$1,133	32.4
71393	New London County	\$7,431	\$10,358	\$,927	39.4

Source: QCEW, U.S. Bureau of Labor Statistics.

4.2.7 Seafood Product Preparation and Packaging

In addition to water transportation and related services and manufacturing, Connecticut's maritime-dependent industries also include the preparation and packaging of seafood. In 2007, this sector accounted for 68 jobs, a decline of 37 percent from 108 jobs in 2003, the earliest year for which data are available (**Table 4.7**). The sector accounts for 0.004 percent of total employment in the State compared to a share of 0.03 percent for the nation.

Total wages in the seafood product preparation and packaging sector in Connecticut totaled \$2.5 million in 2007. This represented a decline of \$821,000, or 25 percent, from \$3.3 million in 2003.

Table 4.7 - Seafood Product Preparation and Packaging: Jobs and Wages

NAICS Sector		2003	2007	Change: 2003-2007	
				Absolute	Percent
Jobs	3117 Seafood Product Preparation	108	68	-40	-37.0
Wages*	3117 Seafood Product Preparation	\$3,325	\$2,504	-\$821	-24.7

*Wages in thousands.

Source: QCEW, U.S. Bureau of Labor Statistics.

4.2.8 Commercial Fishing

An additional maritime-dependent industry is the commercial fishing industry. QCEW data in 2007 for Connecticut do not enable the fishing industry to be disentangled from the State's hunting and trapping industries, which are clearly not maritime dependent. Nonetheless, according to State data from 2006, fully 45 of 53 jobs (85 percent) of the aggregate industry were in commercial fishing. Nonetheless, since comprehensive data are not available for the fishing industry alone, the broader industry is described here.

Employment in the fishing, hunting and trapping industry totaled 50 jobs in 2007, a decline of 20 jobs (29 percent) from 2001 (**Table 4.8**). In 2007, the industry accounted for approximately 0.003 percent of total employment in the State, about half the comparable national share for the sector. Although employment declined, total wages in the sector grew by \$209,000 (9 percent) from \$2.2 to \$2.5 million.

Table 4.8 - Fishing, Hunting and Trapping: Jobs and Wages

	NAICS	Sector	2001	2007	Change: 2001-2007	
					Absolute	Percent
Jobs	114	Fishing, Hunting and Trapping	70	50	-20	-28.6
Wages						
*	114	Fishing, Hunting and Trapping	\$2,288	\$2,497	\$209	9.1

*Wages in thousands

Source: Quarterly Census of Employment and Wages, U.S. Bureau of Labor Statistics

4.2.9 Aggregate Maritime-Dependent Sectors

In total, the maritime dependent industries described in **Table 4.9a and b** accounted for 3,738 jobs in 2007, about 0.15 percent of total employment in Connecticut, compared to a national employment share of 0.26 percent for the same set of industries. These industries accounted for a total of \$336.2 million in wages in the State, approximately 0.3 percent of the state total, or twice their share of total employment.

Table 4.9a - Maritime Dependent Industries: Jobs

NAICS	Sector	2007
114	Fishing, Hunting and Trapping	50
3117	Seafood Product Preparation	68
336612	Boat building (private)	237
336611	Ship building (federal govt.)	185
441222	Boat Dealers - Coastal Counties	611
483	Water transportation	925
48721	Scenic and sightseeing transportation, water	69
4883	Support activities for water transportation	358
71393	Marinas (coastal counties only)	1,235
Total: Maritime Dependent Industries		3,738

Table 4.9b - Maritime Dependent Industries: Wages

NAICS	Sector	2007
114	Fishing, Hunting and Trapping	\$2,497
3117	Seafood Product Preparation	\$2,504
336612	Boat building (private)	\$14,105
336611	Ship building (federal govt.)	\$17,025
441222	Boat Dealers - Coastal Counties	\$32,575
483	Water transportation	\$199,222
48721	Scenic and sightseeing transportation, water	\$1,314
4883	Support activities for water transportation	\$16,502
71393	Marinas (coastal counties only)	\$50,466
Total: Maritime Dependent Industries		\$336,210

*Wages in thousands

Source: QCEW, U.S. Bureau of Labor Statistics.

4.3 Ameliorating Disclosure Issues in the QCEW Findings

The QCEW is the best source of data for state and county employment and payroll by detailed industry. But not all data collected by the government are released to the public because the government promises to protect the confidentiality of company-specific information. This results in data suppression or nondisclosure that can lead to an inaccurate analysis if the analyst is not vigilant about his/her data. Primary suppression (dubbed the 80/3 rule) occurs when either: (1) there are fewer than three establishments in the given industry for a geographic area or (2) a firm constitutes more than 80 percent of an area's employment in a given industry. Also, a state can request that data be withheld if there is reason to believe that the "fewer than three" rule would not prevent disclosure of information pertaining to an individual firm or would otherwise violate the state's disclosure provisions. For example, if information is not disclosed for one

detailed sector, data for a related second detailed sector must also not be disclosed so that one cannot simply "back out" the missing information of the targeted sector that suffers from official disclosure issues. Regardless, information concerning federal workers, however, is always fully disclosable.

Typically, data are not disclosed where the few establishments also have relatively few employees. The omission of such data then ought not to negatively impact the overall economic analysis. But when a major employer's data are suppressed, additional steps must be taken to ensure a thorough, complete economic evaluation.

In the current study, a problem in the boat-building sector became apparent because at least one major employer is not included—General Dynamic's Electric Boat Corporation in Groton, Connecticut. Since it is certainly a maritime-dependent establishment and also among Connecticut's ten largest private employers, its omission from the QCEW data summarized in **Table 4.9a and 4.9b** above is noticeable and significant.

The Department of Defense (DOD) reports that their contracts with Electric Boat supported 6,721 full-time equivalent jobs in Groton in 2006, which had a \$361.3 million payroll⁷⁶. Direct communications Electric Boat's public affairs office revealed that Electric Boat presently has 8,073 jobs. Since the gap between the DOD and Electric Boat figures is more than the total employment reported for the ship- and boat-building industry, it was concluded that Electric Boat's Groton facility was not included in the QCEW report. Unfortunately, Electric Boat's public affairs office was unable to release current payroll figures. Its payroll, therefore, was estimated to be \$434.5 million, which is the average DOD estimated payroll per worker (\$53,800) multiplied by Electric Boat's own employment figure of 8,703 jobs, both numbers of which were included in the modeling of impacts in this study.

The United States Navy base in Groton was not included in the QCEW because it is a government-run operation. Moreover, due to a lack of reliable data on the facility, the civilian and military employment associated with the base was not incorporated in the model runs. However, the Navy base is important to Connecticut's economy as evidenced in a press release from the Office of the Governor M. Jodi Rell (through the DECD website) on September 24, 2009, the United States Navy formally accepted the State of Connecticut offer of \$7.65 million

⁷⁶ [Atlas/Data Abstract](#) for the US and Selected Areas (L03), United States Department of Defense, 2008

for construction upgrades to the naval base and that the upgrades would "greatly enhance the military value of the base, which accounts for about 15,000 jobs and a \$3 billion annual economic impact in Connecticut."⁷⁷ Governor Rell also stated that the "...base is a vital part of our (sic Connecticut's) economy" and "if committing \$7.65 million now helps preserve \$3 billion a year in economic impact, I call that a wise investment." Although not specifically modeled, the Navy base impacts are considered in the discussion of overall impacts to Connecticut's economy.

Another major maritime-dependent employer missing from the QCEW data is the United States Coast Guard Academy in New London. While it is unclear whether Electric Boat is missing because BLS designated it a military facility or because it is a singularly large private industry, the United States Coast Guard Academy was not included in the QCEW because it is a government-run operation. That is, it was not reported in the QCEW because it does not have employees covered by unemployment insurance. However, the United States DOD (2008) reliably reports that the Academy had 828 employees with by a payroll of \$63.2 million in 2006, and this information was included in the Study's simulations.

Table 4.10 presents the adjusted QCEW data analysis based on the investigation into the disclosure issues. In summary, a total of 13,269 jobs (about 0.54 percent of the state's total) are attributed to maritime-dependent industries. These jobs are supported by \$833.9 million in payroll (about 0.64 percent of the state total). Thus, they pay an annual average wage of about \$62,846, which is very nearly the state worker earnings average of \$63,127.

Table 4.10 - Maritime Dependent Industries: Jobs and Wages, 2007

NAICS	Sector	Wages	Jobs
114	Fishing, Hunting, and Trapping	\$2,497	50
3117	Seafood Product Preparation	\$2,504	68
336611	Ship building (federal govt.)	\$17,025	185
336612	Boat building (private)	\$448,605	8,940
441222	Boat Dealers - Coastal Counties	\$32,575	611
483	Water transportation	\$199,222	925
48721	Scenic and sightseeing transportation, water	\$1,314	69
4883	Support activities for water transportation	\$16,502	358
61131	Colleges, universities, and professional schools	\$63,200	828
71393	Marinas (coastal counties only)	\$50,466	1,235
Total: Maritime Dependent Industries		\$833,910	13,269

Source: QCEW, U.S. Bureau of Labor Statistics.

⁷⁷ Governor Rell: Navy to Accept Improvements to Sub Base, Press release by Department of economic & Community Development on September 24, 2009

4.4 Enhancing QCEW Findings to Include Information on Proprietors

Another issue with the QCEW data is that it does not include information on the self-employed. There is no readily available data by detailed industry and geography on such proprietors. The prime source of proprietors' data is the Internal Revenue Service, which has approximate county-level estimates for proprietors' income and employment for broad industry categories, largely from Schedule C of individuals' income tax returns. Such data are reported by BEA in the REIS database. **Table 4.11** shows the share of aggregate payroll by industry that was attributed to proprietors in Connecticut in 2007. Note that for most of the maritime-related industries, which are highlighted, the percentage is rather low. Exceptions among other maritime-related industries are fishing, hunting, and trapping for which proprietors' income amounts to 58.0 percent of total earnings and Scenic and sightseeing services for which proprietors' income amounts to 36.3 percent of total earnings.

Table 4.11 - Proprietors' Share of State Aggregate Worker Earnings by Industry in Connecticut, 2007

INDUSTRY	SHARE
Farms	14.5 percent
Forestry, fishing, related activities, and other	51.0 percent
Forestry and logging	96.4 percent
Fishing, hunting, and trapping	58.0 percent
Agriculture and forestry support activities	28.1 percent
Mining	77.3 percent
Mining (except oil and gas)	58.7 percent
Utilities	28.0 percent
Construction	32.2 percent
Construction of buildings	46.4 percent
Heavy and civil engineering construction	11.8 percent
Specialty trade contractors	28.3 percent
Manufacturing	11.0 percent
Durable goods manufacturing	7.8 percent
Wood product manufacturing	9.1 percent
Nonmetallic mineral product manufacturing	13.8 percent
Primary metal manufacturing	2.8 percent
Fabricated metal product manufacturing	2.7 percent
Machinery manufacturing	1.0 percent
Computer and electronic product manufacturing	0.4 percent
Electrical equipment and appliance manufacturing	0.8 percent
Furniture and related product manufacturing	3.2 percent

Table 4.11 - Proprietors' Share of State Aggregate Worker Earnings by Industry in Connecticut, 2007 (cont.)

Miscellaneous manufacturing	48.3 percent
Nondurable goods manufacturing	18.8 percent
Food manufacturing	5.0 percent
Beverage and tobacco product manufacturing	41.3 percent
Textile mills	11.6 percent
Textile product mills	10.1 percent
Apparel manufacturing	55.4 percent
Leather and allied product manufacturing	0.5 percent
Paper manufacturing	28.6 percent
Printing and related support activities	43.4 percent
Petroleum and coal products manufacturing	13.2 percent
Chemical manufacturing	12.6 percent
Plastics and rubber products manufacturing	1.1 percent
Wholesale trade	5.7 percent
Retail trade	12.7 percent
Motor vehicle and parts dealers	11.5 percent
Furniture and home furnishings stores	12.2 percent
Electronics and appliance stores	5.7 percent
Building material and garden supply stores	5.6 percent
Food and beverage stores	13.7 percent
Health and personal care stores	4.0 percent
Gasoline stations	49.5 percent
Clothing and clothing accessories stores	6.3 percent
Sporting goods, hobby, book and music stores	14.0 percent
General merchandise stores	2.0 percent
Miscellaneous store retailers	26.8 percent
Non-store retailers	19.0 percent
Transportation and warehousing	11.7 percent
Air transportation	7.1 percent
Water transportation	8.4 percent
Truck transportation	23.1 percent
Transit and ground passenger transportation	3.0 percent
Pipeline transportation	14.7 percent
Scenic and sightseeing transportation	36.3 percent
Support activities for transportation	26.4 percent
Warehousing and storage	3.3 percent
Information	21.5 percent
Publishing industries, except Internet	9.1 percent
Motion picture and sound recording industries	2.3 percent

Table 4.11 - Proprietors' Share of State Aggregate Worker Earnings by Industry in Connecticut, 2007 (cont.)

Broadcasting, except Internet	57.1 percent
Telecommunications	1.7 percent
ISPs, search portals, and data processing	13.8 percent
Other information services	5.9 percent
Finance and insurance	8.0 percent
Credit intermediation and related activities	9.1 percent
Securities, commodity contracts, investments	12.2 percent
Insurance carriers and related activities	2.5 percent
Real estate and rental and leasing	47.7 percent
Real estate	46.8 percent
Rental and leasing services	52.8 percent
Lessors of nonfinancial intangible assets	8.7 percent
Professional, scientific, and technical services	30.8 percent
Management of companies and enterprises	0.7 percent
Administrative and waste services	15.8 percent
Administrative and support services	14.9 percent
Waste management and remediation services	23.4 percent
Educational services	3.5 percent
Health care and social assistance	10.7 percent
Ambulatory health care services	21.7 percent
Hospitals	0.2 percent
Nursing and residential care facilities	1.2 percent
Social assistance	3.2 percent
Arts, entertainment, and recreation	16.0 percent
Performing arts and spectator sports	26.4 percent
Museums, historical sites, zoos, and parks	22.6 percent
Amusement, gambling, and recreation	8.8 percent
Accommodation and food services	6.8 percent
Accommodation	13.9 percent
Food services and drinking places	5.4 percent
Other services, except public administration	14.3 percent
Repair and maintenance	23.4 percent
Personal and laundry services	16.5 percent
Membership associations and organizations	0.6 percent
Private households	27.9 percent

Source: US BEA, Regional Economic Information System

For one maritime-related industry, Fishing, hunting, and trapping, in 2007, BEA's REIS database provides total workers income, the sum of wage and salary payroll *and* proprietors' income, for which aggregate earnings are reported as \$11,798 thousand. This is substantially above the wages reported in the QCEW and also far more than would be expected from the

proprietors' premium of 58 percent identified in **Table 4.11**. The other maritime-related industries examined in this study also do not match up well with those reported in the REIS. Because of this, we must estimate the total workers' earnings.

To estimate total workers' earnings by industry, we divide the aggregate payroll of wage and salary workers reported in **Table 4.10** by their share of industry aggregate earnings. This share is simply 100 percent minus the proprietors' share reported in **Table 4.11**. For example, the Seafood product preparation industry (**Table 4.10**) is part of the Food manufacturing industry in **Table 4.11**. From **Table 4.10**, we know that the total wage and salary payroll for the Seafood product preparation industry (NAICS 3117) in Connecticut is \$2,504 thousand. From **Table 4.11**, we know that, on average, wage and salary payroll comprises 95 percent (100 percent minus the 5 percent reported for Food manufacturing) of total workers earnings in this industry. By dividing \$2,504 thousand by 0.95, we find that total workers earnings are \$2,636 thousand. Thus, proprietors' income for the Seafood products preparation industry in Connecticut in 2007 was \$131.8 thousand (\$2,636 minus \$2,504).

The procedure for estimating proprietors' jobs is somewhat more subjective. For simplicity, we assumed that proprietors received the state's average earnings per job in 2007 of \$63,127. This value is only somewhat higher than the average payroll per job in these industries, which was \$62,846. But most of the proprietors' income is attributable to lower-paying sectors—Fishing, Boat dealers, and Support activities for water transportation. We did not apply this proprietors' premium to the Boat building industry, or to Colleges, universities, and professional schools, since these are government-based operations. **Table 4.12** displays the resulting estimates for total jobs and total worker earnings by maritime-dependent industry. In total, 727 jobs and \$45,907 thousand in income were allocated by the addition of proprietors.

4.5 Economic Impacts of Connecticut's Maritime-Dependent Industries

Previous subsections (**Sections 4.2 and 4.3**) of this report detail a working definition of maritime-dependent industries in Connecticut for 2007. This subsection examines how a somewhat broader swath of Connecticut's economy is affected by these industries and then presents an estimate of this broader impact. In some cases, the method of modeling this expansion is relatively straightforward, since one need only examine a comprehensive supply chain of businesses that supply and service the maritime-dependent organizations and the households of the workers they employ.

Table 4.12 - Maritime-Dependent Industries in Connecticut: Total Jobs and Worker Earnings, 2007

NAICS	Sector	Earnings		
		(thousands)	Jobs	Earnings/Job
114	Fishing, hunting, and trapping	\$11,798	197	\$59,786
3117	Seafood product preparation	\$2,636	70	\$37,607
336611	Ship building	\$19,347	222	\$87,235
336612	Boat building	\$448,605	8,940	\$50,180
441222	Boat dealers (coastal counties only)	\$36,810	678	\$54,285
483	Water transportation	\$217,592	1,216	\$178,940
48721	Scenic and sightseeing transportation, water	\$2,062	81	\$25,504
4883	Support activities for water transportation	\$22,412	452	\$49,626
61131	Colleges, universities, and professional schools	\$63,200	828	\$76,329
71393	Marinas (coastal counties only)	\$55,355	1,312	\$41,176
Total: Maritime Dependent Industries		\$879,817	13,996	\$62,862

Source: FXM calculations of data from both BLS's QCEW and BEA's REIS data.

In other cases, deriving estimates is more complex. For example, as defined in this study, maritime-dependent industries themselves do not purchase services required by importers and exporters to deliver their goods to and from Connecticut's ports, and certainly such inland transportation is essential to the operation of the ports and vice versa. Perhaps the most complex activity is the spending of tourists who frequent the Long Island Sound specifically to visit



maritime destinations like Mystic Seaport. Unfortunately, tourism is not an officially designated industry, so even this more general activity is tough to define. It is even more complicated in that some tourism money is spent on ferries, fishing cruises, and boat rentals, many activities that are already explicitly counted as maritime-dependent industries. Hence, care must be taken in such analysis to assure no double-counting of economic activity.

The following section starts with a general description of economic impact analysis and a rationale for using an economic model. Subsequently, we report the results of the economic impact analyses derived using the R/ECON™ I-O model for Connecticut. This analysis starts

with industries designated as maritime dependent in prior subsections and moves forward from there.

4.5.1. Impact Analysis

Total economic impacts encompass both direct and indirect (multiplier) effects. The latter incorporate indirect and induced impacts. The character of the direct effects in maritime industries is derived from the production functions of the activities that are the focus of the analysis, for example, waterborne cargo movement; shipbuilding, commercial fishing, ferry services,



marina operations, and boat sales. The process for estimating a given project's multiplier effect, which describes the extent to which the direct activities mentioned above affect the rest of the economy, is more roundabout. By definition, a project's first round of indirect impact includes the local purchases of any supplies and/or services that are required to produce the direct effects. For example, fishermen use trawl nets, so any purchases by fishermen from trawl-net producers are considered indirect impacts. Trawl-net producers create another round of indirect impacts through the purchases of floats (to keep the net's headrope open), rockhoppers (heavy rubber or metal rollers attached to the footrope that lays on the sea floor), tickler chains, and otter doors that are needed to make the nets function. Induced impacts are the purchases that arise, in turn, from the increase in the labor income of households as a result of employment by commercial fishing operations, the net producers, and producers of the net hardware. So household spending by fishermen, net makers, and float producers, as well as any spending required to produce items purchased by their households, qualify as induced effects. Both the indirect and induced economic impacts demonstrate how the demand for direct requirements by maritime industries reverberates or ripples through an economy.

A survey-based approach to estimating indirect and induced impacts consumes a great deal of money and time. In addition, response rates by firms and households on surveys regarding financial matters are notoriously low. Hence, in the rare cases where survey work has been conducted to measure economic impacts, the results have tended to be not statistically

representative of the targeted network of organizations and households related to a specific industry. Consequently, less expensive economic models based on Census data are typically used to measure economic impacts.

The economic model that has proven to most accurately estimate the indirect and induced economic effects of events is the input-output model (I-O model). Its advantage stems from its level of industry detail and its depiction of inter-industry relations. Input-output tables are constructed from nationwide Census surveys of businesses and households. A single calculation, known as the Leontief inverse, simulates the many rounds of business and household transactions. The most difficult part of regional impact analysis is modifying a national input-output model so that it can be used to estimate impacts at a sub-national level. "Regionalization" of the model typically is undertaken by the model producer and requires a large volume of data on the economy being modeled. This Study employs an input-output model developed to estimate the extent of the indirect and induced economic contributions of the maritime-dependent industries to the State of Connecticut. (See **Appendix D** for technical details on input-output models.)

The R/ECON™ Input-Output Model

The regional input-output model used by this study to derive the total economic impacts is the R/ECON™ I-O model. R/ECON™ I-O provides estimates of the total regional impacts of an economic activity and employs detail for about 500 industries in calculating the effects. This model and its predecessors have been shown to be the best of the nonsurvey-based regional input-output models at measuring a region's economic self-sufficiency. The models also have a wide array of measures that can be used to analyze impacts. In particular, R/ECON™ I-O enables an analysis of government revenue (i.e., tax) impacts and an analysis of gains in total regional wealth.

The results of R/ECON™ I-O include many categories of data. The categories most relevant to this study are the total impacts with respect to the following:

- *Jobs*: Employment, both part- and full-time, by place of work, estimated using the typical job characteristics of each detailed industry. (Manufacturing jobs, for example, tend to be full-time; in retail trade and real estate, part-time jobs predominate.) All jobs generated at businesses in the region are included, even though the associated labor income of commuters may be spent outside of the region. In this study, all results are for activities

occurring within the time frame of one year. Thus, the job figures should be read as job-years, i.e.; several individuals might fill one job-year on any given project.

- *Income*: "Earned" or "labor" income—specifically wages, salaries, and proprietors' income. Income in this case does not include nonwage compensation (i.e., benefits, pensions, or insurance), transfer payments, dividends, interest, or rents.
- *Wealth*: Value added—the equivalent at the sub-national level of gross domestic product (GDP). At the state level, this is called gross state product (GSP). Value added is widely accepted by economists as the best measure of economic effects. It is estimated from state-level data by industry. For a firm, value added is the difference between the value of goods and services produced and the value of goods and non-labor services purchased. For an industry, therefore, it is composed of labor income (net of taxes); taxes; non-wage labor compensation; profit (other than proprietors' income); capital consumption allowances; net interest; dividends; and rents received.
- *Taxes*: Tax revenues generated by the activity. The tax revenues are detailed for the federal, state, and local levels of government. Totals are calculated by industry.
 - ✓ Federal tax revenues include corporate and personal income, social security, and excise taxes, estimated from the calculations of value added and income generated.
 - ✓ State tax revenues include personal and corporate income, state property, excise, sales, and other state taxes, estimated from the calculations of value added and income generated (e.g., purchases by visitors).
 - ✓ Local tax revenues include payments to sub-state governments mainly through property taxes on new worker households and businesses. Local tax revenues can also include revenues from local income, sales, and other taxes.

4.5.2. Economic Impact Analysis of Waterborne Cargo

One aspect of the R/ECON I-O™ model is a module that was used to develop the MARAD PortKit. The PortKit is a user-friendly interface to R/ECON I-O™ for port administrations and planners and co-developed by Rutgers University for the U.S. Maritime Administration. It essentially converts tonnage volumes of cargo (twenty-foot equivalent units—TEUs for container traffic or, alternatively, the number of vehicles) into the labor by industry required at a port for moving the freight. The PortKit's definition of "at the port" is somewhat critical to the

investigation in the present study since it not only includes activities associated with loading and unloading ships, piloting the ships into port, and supplying them with bunker and provisions, but also with inland movement of the cargo. Thus, it can explicitly include the economic consequences from the inland shipment of incoming and outgoing waterborne cargo via truck, rail, and pipeline as being maritime-dependent.

The first step of the analysis was identifying the tonnage of cargo by handling type flowing in and out of Connecticut's ports. **Tables 4.13 and 4.14** show the results of the study team's effort to synthesize tonnage data on imports, exports, and domestic shipments through Connecticut's ports. The total shipments in the two tables do not perfectly correspond; we presume this is due to rounding issues at the U.S. Army Corps of Engineers.



The commodity tonnages in **Table 4.13** were totaled by handling type. Petroleum and chemical products were assigned to be handled via low-cost liquid-bulk handling methods, and coal-related products were assigned as dry-bulk shipments. Manufactured equipment and "Unknown or Not Elsewhere Classified" items were assigned as project cargo.⁷⁸ The remaining were assigned handled as break-bulk items. Default values of the PortKit were generally employed, with the exception of bunker fuel and the costs of trucking. Bunker fuel was set to zero since prior work by study team members suggests that most domestic and international ships bunker at the Port of New York and New Jersey before steaming off across the sea. Trucking costs limited to short-haul trucking only, which were increased by 50 percent to reflect the increased costs of fuel since the PortKit defaults were established in 2001. After effecting these changes to the default values, the four tonnage totals were entered into the MARAD PortKit: dry bulk 2,518 thousand tons, liquid bulk 11,049 thousand tons, break bulk 1,076 thousand tons, and project cargo 9,235 thousand tons. The results of this PortKit modeling effort are shown in **Table 4.15**.

⁷⁸ It was decided that "Unknown or Not Elsewhere Classified" items were project cargo because information on waterborne exports from Connecticut as reported on WISERTrade's Port HS Database were dominated by Aircraft, Spacecraft and Parts Thereof, which are not explicitly reported in the U.S. Army Corps of Engineers database.

A total of 6,569 jobs were directly related to cargo-based port activity in Connecticut in 2007. Although not shown in **Table 5.15**, just 17.7 percent or 1,165 of these direct port jobs were conventional ship, dock, and terminal jobs. Fully, 62.0 percent (4,073) of the direct jobs were in trucking and warehousing. The remaining 12.3 percent of the direct jobs were allocated to business services and manufacturing.

Because the bulk of the jobs are in low-paying trucking services, the average pay for the direct jobs is about \$44,071, which is somewhat lower than the state average. However, the annual wealth accumulated (state GDP contribution) of these direct jobs is nearly twice that at \$80,305 annually. The difference between GDP and labor income is largely profits of the cargo and trucking industries, although indirect business taxes also contribute to the difference.

On top of the 6,529 direct jobs, the port activity was supported by another 2,298 jobs which were largely in the form of business service, retail, and personal service jobs. At about \$45,016 per job, these also paid substantially below (about 71.3 percent of) the State average rate of \$63,127 per job. Still, it is important to note the 1,165 actual port-based jobs are essentially supported by 7,702 other jobs in Connecticut's economy.

In addition to jobs, payroll, and GDP, the port-based economy of Connecticut also provides about \$24.7 million annually in the form of state tax revenue and another \$27.4 million in the form of local property taxes for a total annual contribution of \$52.1 million to State and local tax coffers. This activity also adds about \$77.8 million to federal tax coffers through corporate receipts taxes and household income taxes.

In summary, the port-based cargo industry contributed a total of 8,867 jobs with a total payroll of \$393.0 million. It also contributed nearly \$689.6 million in GDP to the state's economy and also added about \$52.1 million to State and local tax revenues.

As noted in **Table 4.12**, we estimate that in 2007 a total of 13,996 jobs could be counted as being maritime related. After subtracting the 1,165 strictly port-based count, 12,831 remain. The following paragraphs discuss the nature of the total economic contribution of this remaining aspect of the maritime industry, the direct effects of which have already been covered in the previous subsection of this report as well as in **Table 4.12**.

Table 4.13 - Cargo Shipments through Connecticut Ports by Commodity, 2007

	Total	Domestic Shipments		Imports	Exports
		In-shipments	Out-shipments		
Coal, Lignite & Coal Coke	2,517,710	-	-	2,517,710	-
Crude Oil and Refined Petroleum Products	10,435,793	7,278,423	459,156	2,607,885	90,329
Chemicals and Related Products	613,023	505,929	-	107,094	-
Forest Products, Lumber, Logs, Woodchips, Pulp, etc.	84,054	-	-	84,054	-
Non-Ferrous Ores and Scrap	42	-	-	42	-
Sulphur (Dry), Clay & Salt	113,598	-	-	113,598	-
Paper & Allied Products	398	-	-	398	-
Building Cement & Concrete; Lime; Glass	12	-	-	12	-
Primary Wood Products	177	-	-	177	-
Primary Metal Products	642,962	-	-	273,149	369,813
Vegetable Products	14,868	-	-	14,868	-
Animal Feed, Grain Mill Products, Flour, Processed Grain	36	-	-	36	-
Food and Kindred Products	219,950	-	-	219,950	-
All Manufactured Equipment, Machinery and Products	19,389	-	-	19,389	-
Unknown or Not Elsewhere Classified	9,215,884	5,417,060	3,787,823	11,001	-
	23,877,896	13,201,412	4,246,979	5,969,363	460,142

Sources: U.S. Army Corp of Engineers, Navigation Data Center. *2007 Commodity Movements State to State by Commodity* and files by state on foreign imports and exports for 2007 at <http://www.iwr.usace.army.mil/ndc/db/foreign/>.

Table 4.14 - 2007 Cargo Shipment Tonnages through Connecticut Ports by Port

Port	Total	Domestic	Imports	Exports
New Haven, CT	9,565,491	6,239,265	2,866,087	460,139
Bridgeport, CT	7,625,773	4,700,280	2,925,493	0
New London, CT	177,686	0	177,686	0
Stamford, CT	1,072,809	1,072,809	0	0
Hartford, CT, and other CT ports	5,436,134	5,436,037	97	0
Total	23,877,893	17,448,391	5,969,363	460,139

Sources: U.S. Army Corp of Engineers, Navigation Data Center. *2007 Commodity Movements State to State by Commodity* and files by port on domestic shipment, as well as foreign imports and exports for 2007 at <http://www.iwr.usace.army.mil/ndc/db/ports/data/>.

Table 4.15 - Economic and Tax Impacts of Connecticut's Waterborne Cargo, 2007

	Economic Component			
	Output (000 \$)	Employment (jobs)	Income (000\$)	Gross Domestic Product (000\$)
I. TOTAL EFFECTS (Direct and Indirect/Induced)				
1. Agriculture	308.3	6	51.2	59.4
2. Agri. Serv., Forestry, & Fish	276.6	4	132.3	247.4
3. Mining	208.4	1	36.2	169.4
4. Construction	9,428.8	22	1,288.0	2,873.0
5. Manufacturing	68,643.8	113	6,779.0	54,032.8
6. Transport. & Public Utilities	752,313.9	5,594	258,745.4	470,159.6
7. Wholesale	25,521.0	144	10,378.2	11,047.6
8. Retail Trade	51,413.9	825	19,104.1	29,861.6
9. Finance, Ins., & Real Estate	67,155.6	217	23,433.5	43,734.3
10. Services	129,596.3	1,861	68,854.0	69,654.8
Private Subtotal	1,104,866.6	8,789	388,801.8	681,839.9
11. Government	12,535.5	78	4,151.8	7,774.3
Total Effects (Private and Public)	1,117,402.1	8,867	392,953.6	689,614.2
II. DISTRIBUTION OF EFFECTS/MULTIPLIER				
1. Direct Effects	817,053.1	6,569	289,505.5	527,526.3
2. Indirect and Induced Effects	300,349.0	2,298	103,448.1	162,087.9
3. Total Effects	1,117,402.1	8,867	392,953.6	689,614.2
4. Multipliers (3/1)	1.368	1.350	1.357	1.307
III. COMPOSITION OF GROSS STATE PRODUCT				
1. Wages--Net of Taxes				346,269.2
2. Taxes				88,815.2
a. Local				16,378.9
b. State				13,097.3
c. Federal				59,339.0
General				17,208.2
Social Security				42,130.8
3. Profits, dividends, rents, and other				254,529.8
4. Total Gross State Product (1+2+3)				689,614.2
IV. TAX ACCOUNTS				
		Business	Household	Total
1. Income --Net of Taxes		346,269.2	353,658.2	-----
2. Taxes		88,815.2	83,200.4	172,015.6
a. Local		16,378.9	11,062.0	27,440.9
b. State		13,097.3	11,572.8	24,670.1
c. Federal		59,339.0	60,565.6	119,904.6
General		17,208.2	60,565.6	77,773.8
Social Security		42,130.8	--	42,130.8
EFFECTS PER MILLION DOLLARS OF INITIAL EXPENDITURE				
Employment (Jobs)				10.8
Income				480,606.1
State Taxes				30,173.0
Local Taxes				33,561.9
Gross State Product				843,440.1
INITIAL EXPENDITURE IN DOLLARS				817,620,865.7

Note: Detail may not sum to totals due to rounding.

As **Table 4.16** shows, the 12,831 non-cargo maritime industry jobs are supported by another 7,732 jobs in Connecticut's economy. These added jobs are largely in sectors that support households, such as retail trade jobs and personal service industries, which include health services, museums, and auto repair shops. But some are in manufacturing as well as both producer and distributive services, where the latter are jobs in finance and insurance, transportation services, and wholesaling. With the exception of construction, mining, and agriculture, the maritime industries impact a broad array of industries within Connecticut.

Industries that support households tend to be paid less due to heavy competition and their general ubiquitous nature. These industries paid \$377.2 million in labor income to the 7,732 workers in indirect jobs. Thus, the average pay of these supporting jobs (about \$48,793) was lower than (78.5 percent of) the State's average of \$63,127. However, as was the case for the port cargo activity, the supporting jobs contributed substantially to the State's wealth, about \$73,205 in GDP per job, in net just over \$566.0 million. Additionally, about \$146.2 million was collected by State and local governments in the form of tax revenues through these maritime activities.

The most difficult aspect of maritime-related industries to quantify accurately is that related to tourism, beyond that already defined via Marinas, Boat dealers, and Scenic and sightseeing transportation (water)—all of which have already been covered in prior analysis within this section of the report. Certainly, the Connecticut's coast on the Long Island Sound is a tourism destination for some. But much of that is not maritime related and is more affiliated with history, nature, and beach visitation. The *Official Museum Directory* (2009) places attendance at the state's four maritime museums around 300,000 for The Museum of America and The Sea, Mystic; 16,000 at the Connecticut River Museum, Essex; 160,000 at the Submarine Force Museum and Historic Ship Nautilus, Groton; and 25,000 at the U.S. Coast Guard Museum, New London. Connecticut's 23 lighthouses qualify as well. Only a few of the lighthouses are accessible, however. Given that museum attendance is likely a conservative indicator of non-marina maritime tourism, we assume that each attendee spends a whole day enjoying maritime tourism events and sites. This yields a total of 501,000 visitor days. We assumed these were all overnight visitors (and hence, visitor nights rather than days), and applied default lodging (and hence spending) distributions from the U.S. National Park Service's PEIM model for Connecticut, which is also a R/ECONTM I-O derivative. To this we estimated, from a 2006

study⁷⁹ of marina tourism spending, that on the order of \$62.5 million (in 2007 dollars) was spent by marina, excluding marinas sales themselves. Since the PEIM estimates that day-visitor spending is on the order of \$62.50 dollars per day per visitor, we estimate that marinas account for 1.0 million visitor days. Thus, we attribute about 1.5 million visitor days to maritime activities and, according to PEIM estimates, about \$97.8 million in visitor spending or \$65.20 per visitor day. **Table 4.17** displays the results from the PEIM model for Connecticut.

As should be clear from **Table 4.17**, retail trade and services dominate the tourism trade. Because of this, the average annual payroll for the industries directly engaged in the activity is rather low, \$25,434, which is less than half the State's average annual pay rate. The \$97.8 million in tourism spending is estimated to generate a total of 1,152 jobs state wide. These jobs are associated with \$33.6 million in labor income and \$52.0 million in GDP to the state. Also, they contribute about \$7.3 million in State and local tax revenues.

Combining all three aspects of the maritime industries (cargo only, other core maritime industries, and tourism) reveals that they comprise over 30,582 jobs that yield \$1.68 billion in labor income and \$2.74 billion in GDP to the State of Connecticut (**Table 4.18**). This amounts to about 1.37 percent of the total job count, 1.19 percent of the total labor income earned, and 1.27 percent of the GDP produced in Connecticut in 2007. The analysis also reveals that maritime-related industries contribute substantially to Connecticut's tax coffers, producing on the order of \$205.8 million in State and local tax revenues annually.

With an annual business activity of more than \$5 billion, the collection of maritime-related industries is, therefore, a bigger job contributor than either the Utilities or Federal Government sectors in Connecticut. Moreover, it is larger than the state's Utilities and Arts, entertainment, and recreation sectors with regard to labor income. Due largely to the water transportation services and ship and boat-building sectors, the sector has a respectable presence in terms of its annual rate of pay, which at \$57,463 is just below (91 percent of) the state's average rate of \$63,127. Tourism-related industries including marinas and sightseeing certainly bring down the maritime-industry average. However, they are mainly seasonal jobs operating during limited periods of the year and often supplementing the household incomes of local workers.

⁷⁹ McMillen, Stanley. 2006. *The Economic Impact of the Arts, Film, History, and Tourism Industries in Connecticut*. Prepared for the CT Commission on Culture and tourism by the Connecticut Center for Economic Analysis.

Table 4.16 - Economic and Tax Impacts of Connecticut's Non-cargo Maritime Industry, 2007

	Economic Component			
	Output (000 \$)	Employment (jobs)	Income (000\$)	Gross Domestic Product (000\$)
I. TOTAL EFFECTS (Direct and Indirect/Induced)				
1. Agriculture	987.7	20	164.1	191.1
2. Agri. Serv., Forestry, & Fish	39,835.7	223	10,786.0	35,637.6
3. Mining	311.5	1	78.4	257.4
4. Construction	33,664.9	81	4,624.4	10,269.2
5. Manufacturing	1,837,919.3	10,221	657,963.6	928,526.0
6. Transport. & Public Utilities	1,031,307.3	2,583	215,584.3	532,703.1
7. Wholesale	88,444.1	498	35,966.0	38,285.8
8. Retail Trade	267,015.1	3,238	91,497.0	160,090.4
9. Finance, Ins., & Real Estate	216,870.9	695	72,854.2	141,765.1
10. Services	293,957.7	2,911	138,102.4	144,329.8
Private Subtotal	3,810,314.1	20,471	1,227,620.3	1,992,055.6
11. Government	17,888.9	93	5,394.1	8,340.0
Total Effects (Private and Public)	3,828,203.0	20,563	1,233,014.4	2,000,395.7
II. DISTRIBUTION OF EFFECTS/MULTIPLIER				
1. Direct Effects	2,715,665.2	12,831	854,418.3	1,471,531.0
2. Indirect and Induced Effects	1,112,537.8	7,732	377,264.9	566,024.7
3. Total Effects	3,828,203.0	20,563	1,257,081.9	2,000,395.7
4. Multipliers (3/1)	1.410	1.603	1.441	1.395
III. COMPOSITION OF GROSS STATE PRODUCT				
1. Wages--Net of Taxes				1,130,053.5
2. Taxes				235,159.4
a. Local				37,520.9
b. State				37,776.6
c. Federal				159,861.9
General				132,198.5
Social Security				27,663.4
3. Profits, dividends, rents, and other				635,182.8
4. Total Gross State Product (1+2+3)				2,000,395.7
IV. TAX ACCOUNTS				
		Business	Household	Total
1. Income --Net of Taxes		1,130,053.5	1,109,712.9	--
2. Taxes		235,159.4	261,067.0	496,226.4
a. Local		37,520.9	34,710.5	72,231.4
b. State		37,776.6	36,313.1	74,089.7
c. Federal		159,861.9	190,043.4	349,905.3
General		27,663.4	190,043.4	217,706.8
Social Security		132,198.5	--	132,198.5

EFFECTS PER MILLION DOLLARS OF INITIAL EXPENDITURE

Employment (Jobs)	7.6
Income	453,547.4
State Taxes	27,282.4
Local Taxes	26,598.0
Gross State Product	750,297.1
INITIAL EXPENDITURE IN DOLLARS	2,715,665,161.5

Note: Detail may not sum to totals due to rounding.

Table 4.17 - Economic and Tax Impacts of Connecticut's Maritime Tourism, 2007

	Economic Component			
	Output (000 \$)	Employment (jobs)	Income (000\$)	Gross Domestic Product (000\$)
I. TOTAL EFFECTS (Direct and Indirect/Induced)				
1. Agriculture	110.2	1	12.6	14.6
2. Agri. Serv., Forestry, & Fish	98.6	2	45.1	88.4
3. Mining	8.5	0	2.1	6.9
4. Construction	1,352.6	3	187.5	411.8
5. Manufacturing	5,176.9	19	1,214.1	2,145.0
6. Transport. & Public Utilities	5,305.9	36	1,460.4	2,621.0
7. Wholesale	6,336.1	33	2,576.6	2,742.8
8. Retail Trade	46,825.1	770	16,517.2	23,167.1
9. Finance, Ins., & Real Estate	9,300.6	37	2,451.1	6,912.7
10. Services	27,807.5	248	8,948.8	13,574.3
Private Subtotal	102,322.1	1,148	33,415.5	51,684.7
11. Government	683.5	4	207.2	324.4
Total Effects (Private and Public)	103,005.6	1,152	33,622.7	52,009.1
II. DISTRIBUTION OF EFFECTS/MULTIPLIER				
1. Direct Effects	71,124.0	926	23,555.0	34,576.0
2. Indirect and Induced Effects	31,881.7	226	10,067.7	17,433.1
3. Total Effects	103,005.6	1,152	33,622.7	52,009.1
4. Multipliers (3/1)	1.448	1.244	1.427	1.504
III. COMPOSITION OF GROSS STATE PRODUCT				
1. Wages--Net of Taxes				32,240.3
2. Taxes				10,602.8
a. Local				2,213.1
b. State				3,193.4
c. Federal				5,196.3
General				1,591.4
Social Security				3,604.9
3. Profits, dividends, rents, and other				9,166.0
4. Total Gross State Product (1+2+3)				52,009.1
IV. TAX ACCOUNTS				
	Business	Household	Total	
1. Income --Net of Taxes	32,240.3	33,622.7		----
2. Taxes	10,602.8	7,119.0		17,721.8
a. Local	2,213.1	946.5		3,159.6
b. State	3,193.4	990.2		4,183.6
c. Federal	5,196.3	5,182.2		10,378.6
General	1,591.4	5,182.2		6,773.7
Social Security	3,604.9	0.0		3,604.9

EFFECTS PER MILLION DOLLARS OF INITIAL EXPENDITURE	
Employment (Jobs)	11.8
Income	343,796.9
State Taxes	42,777.5
Local Taxes	32,307.5
Gross State Product	531,799.5
INITIAL EXPENDITURE IN DOLLARS	97,798,255.4

Note: Detail may not sum to totals due to rounding.

Table 4.18 - Economic and Tax Impacts of Connecticut's Maritime-related Industries, 2007

	Economic Component			
	Output (000 \$)	Employment (jobs)	Income (000\$)	Gross Domestic Product (000\$)
I. TOTAL EFFECTS (Direct and Indirect/Induced)				
1. Agriculture	1,406.3	27.4	227.9	265.1
2. Agri. Serv., Forestry, & Fish	40,210.9	228.8	10,963.3	35,973.4
3. Mining	528.4	1.8	116.7	433.7
4. Construction	44,446.2	106.9	6,100.0	13,554.0
5. Manufacturing	1,911,740.0	10,353.1	665,956.7	984,703.8
6. Transport. & Public Utilities	1,788,927.1	8,212.8	475,790.1	1,005,483.6
7. Wholesale	120,301.2	674.9	48,920.8	52,076.2
8. Retail Trade	365,254.1	4,833.1	127,118.3	213,119.1
9. Finance, Ins., & Real Estate	293,327.1	948.5	98,738.8	192,412.2
10. Services	451,361.5	5,020.1	215,905.2	227,558.9
Private Subtotal	5,017,502.8	30,407.4	1,649,837.6	2,725,580.2
11. Government	31,107.9	174.7	9,753.1	16,438.7
Total Effects (Private and Public)	5,048,610.7	30,582.1	1,659,590.7	2,742,019.0
II. DISTRIBUTION OF EFFECTS/MULTIPLIER				
1. Direct Effects	3,603,842.3	20,326.3	1,167,478.8	2,033,633.2
2. Indirect and Induced Effects	1,444,768.5	10,255.7	490,780.7	745,545.7
3. Total Effects	5,048,610.7	30,582.1	1,683,658.2	2,742,019.0
4. Multipliers (3/1)	1.401	1.505	1.442	1.348
III. COMPOSITION OF GROSS STATE PRODUCT				
1. Wages--Net of Taxes				1,508,563.0
2. Taxes				334,577.4
a. Local				56,112.9
b. State				54,067.3
c. Federal				224,397.2
General				150,998.2
Social Security				73,399.1
3. Profits, dividends, rents, and other				898,878.6
4. Total Gross State Product (1+2+3)				2,742,019.0
IV. TAX ACCOUNTS				
		Business	Household	Total
1. Income --Net of Taxes		1,508,563.0	1,496,993.9	--
2. Taxes		334,577.4	351,386.3	685,963.7
a. Local		56,112.9	46,719.0	102,831.9
b. State		54,067.3	48,876.1	102,943.3
c. Federal		224,397.2	255,791.2	480,188.5
General		46,463.1	255,791.2	302,254.3
Social Security		177,934.2	--	177,934.2

EFFECTS PER MILLION DOLLARS OF INITIAL EXPENDITURE

Employment (Jobs)	8.4
Income	463,679.2
State Taxes	28,350.6
Local Taxes	28,319.9
Gross State Product	755,151.6
INITIAL EXPENDITURE IN DOLLARS	3,631,084,282.6

Note: Detail may not sum to totals due to rounding.

5.0 IMPACTS OF NO DREDGING ON CONNECTICUT'S MARITIME ECONOMY

Section 5.0 provides an assessment of possible economic and fiscal effects of deferred dredging in the State of Connecticut. Using the baseline economic conditions described in **Section 4.0** for comparison, a detailed discussion is provided documenting the effects and importance of dredging to the maritime industry and to the economy of the State of Connecticut.

5.1 Overview of a "No Dredging" Scenario

A key objective of this report is to determine how much maritime-related business in Connecticut would be affected if for some reason regular dredging was halted or new required dredging was not undertaken. Not all of the 30,582 maritime-related jobs that yielded \$1.68 billion in labor income and \$2.74 billion in GDP to the State of Connecticut in 2007 as detailed in **Table 4.18** are at risk if maintenance or new dredging fails to take place. But a significant portion of that sector of



Connecticut's economy would be affected. This section of the Study identifies how much of the maritime business might be lost and further shows the total direct, indirect, and induced economic and tax effects on the overall State economy.

The analysis starts off with an examination of data from a survey undertaken by the USACE⁸⁰ (2008). In that survey, firms were probed for their dredging needs as well as for the business losses they would likely suffer if there was no dredging. Background related to this comprehensive survey is provided in **Section 2.5**.

Predicated on the survey results, the no-dredging option is related to direct economic effects upon subsectors of the maritime industry as detailed in **Tables 4.12 and 4.15**. The findings are detailed for four future periods: 1-5 years (2008-2013), 6-10 years (2014-2018), 11-20 years (2019-2028), and 21-30 years (2029-2038) from the date the survey was originally undertaken.

Finally, based on the direct economic losses based on the USACE survey, estimates of the total economic effects of the no-dredging option are derived. Caveats of the analysis are detailed throughout.

⁸⁰ Dredging Needs Study Survey of Navigation Dependent Facilities For Long Island Sound Regional Dredged Material Management Plan, June 2008, US Army Corps of Engineers.

5.2 Results from the U.S. Army Corps of Engineers Survey⁸¹

In June 2008, the USACE engaged Battelle Memorial Institute to conduct a survey of Connecticut maritime businesses. In total, Battelle received 292 responses to the survey. As shown in **Table 5.1**, 174 were marina operators, 35 were other water transportation firms, 19 were ship and boat builders, 12 were commercial fishing operators, and 9 were boat dealers. A total of 34 other responses were not allocated to an identifiable industry. Potential respondents were informed at the outset that the survey was to be used in the preparation of a dredged material management plan. They were further informed that responding was strictly voluntary and that all responses would only be tabulated in a form that would ensure their individual response's anonymity.

Table 5.1 Survey Sample by Sector of Connecticut's Maritime Industry

NAICS	Sector	# firms	Dredging Would Help	
			Count	%
114	Fishing	12	8	66.7%
33661	Ship & boat building and repairing	28	17	60.7%
441222	Boat dealers (coastal counties only)	9	7	77.8%
483	Water transportation	33	19	57.6%
4883	Towing and Tug boat services	2	0	0.0%
71393	Marinas (coastal counties only)	174	120	69.0%
NA	Other	34	17	50.0%

Source: Us Army Corps of Engineers. 2009

Some issues arise when considering the data shown in **Table 5.1** above. The no-dredging option posed in the survey was relayed as one in which there suddenly became a lack of cost-effective means for disposing dredged materials. Probabilities for that scenario were not determined (or even the intent of the survey), nor were levels of costs that would be incurred if dredging was undertaken. While dredging costs could rise rapidly, perhaps even to a prohibitive level, such costs typically rise more gently to levels that might eventually fully disable dredging. Thus, the scenario proposed to the survey respondents is not one that necessarily evokes a response that is reflective of a broad range of possible outcomes, but rather one that is likely to represent a worst-case scenario. It is noted that in addition to disposal issues, the difficulties of permitting and funding dredge projects represent significant issues in Connecticut, also resulting

⁸¹ We are grateful to the Corps for sharing their survey data. Without them, the present chapter would not be possible. Business-based surveys are always difficult and costly to administer. Moreover, interpreting responses with precision is especially tough without being privy to the usually detailed dialog that goes on between the interviewer and the respondent. In any case, the 2008 Army Corps survey clearly represents the most comprehensive and best available data for the purposes of the present study.

in an inability to dredge, as borne out by the literature reviewed and interviews conducted as part of this Study. Second, dredging was only proposed as something that the respondent would undertake themselves. Because the specific purpose of the survey did not lend itself to a broader application, it did not include separate questions for situations where dredging is already undertaken by a municipality, the State of Connecticut, the Navy, or the USACE. Given that the USACE often undertakes such dredging itself, and uses federal funds to do so, it is possible that survey respondents intuited that the USACE was thinking of undertaking the dredging that the respondents usually do themselves at no, or at the very most, very little added cost. In essence, the scenario presented a worst-case situation for a cost burden on maritime firms—notably that they would incur all costs of future dredging, whether or not they now do so. This being said, the non-federal project driven costs or added costs beyond the benefits of combining federal and non-federal designated projects can be significant and borne by the non-federal entity that has the dredge need. As such, the cost burden is a real concern that the industry repeatedly expressed during the Study's interviews.

Data in **Table 5.2** shows the information received by the Consultant Team from the USACE on the results of their survey Question 19. Results were not included for the 34 firms in unidentified industries, nor for Towing and Tug Boat services because only two such firms responded. From a strictly statistical perspective, of the results in **Table 5.2**, the responses from the Marina industry were the only statistically significant data group. The sample sizes for the remaining subsectors of the Connecticut's maritime industries were small compared to the number of businesses in the subsectors statewide. However, the indications of significant loss of business from a lack of dredging in the USACE survey are similar to the responses from the maritime industries interviewed during this Study.

Table 5.2. Survey Results of Revenue Losses Resulting from a Dredging Stoppage, by Sector

NAICS	Sector	1-5 yrs	6-10 yrs	11-20 yrs	21-30 yrs
114	Fishing	55.0%	62.5%	75.0%	87.5%
33661	Ship & boat building and repairing	34.5%	40.5%	53.9%	73.8%
441222	Boat dealers (coastal counties only)	29.4%	20.8%	12.5%	12.5%
483	Water transportation	23.1%	36.9%	47.3%	55.2%
71393	Marinas (coastal counties only)	25.3%	34.2%	52.6%	65.4%

5.3 Interpreting the Survey Results

The numbers in **Table 5.2** need further clarification in order to assess the effectiveness of their use for the purpose of the present Study. The most valid use for the present Study purpose

would be as percentages for each sector that are weighted by the size of responding firms. In this manner, percentage losses reported by firms that employ more people and produce more revenue would have greater weight in the final results. Since one intention of the Study is to apply the percentages in **Table 5.1** to the entire industry, such size-weighted percentages are preferred. A review of the percentages and the sample sizes, however, suggests the percentages are straight averages. That is, the responses of small firms were given equal weight to those of larger firms. As such, the results may be biased toward the perspectives of smaller firms, which are more likely than large firms to be negatively affected by the costs of dredging. Moreover, they are also more likely to locate in low-rent dockage areas where shallow drafts dominate. Hence, the need for dredging at these facilities, especially publicly subsidized dredging, is higher.

An additional complication in interpreting the results of the USACE-sponsored survey for the specific purpose associated with the present study emanates from a lack of knowledge as to the derivation of the data for a specific instance (i.e., what was the respondent thinking). That is, it is likely that only results for firms that reported needing additional or more frequent dredging (a "Yes" to Question 14 of the survey) replied to Question 19, which yielded the business loss percentages shown in **Table 5.2**. The percentages of firms by industry in the survey sample that responded affirmatively to Question 19 are shown in the left-most column of **Table 5.1**. It is noted that these percentages are high. Given uncertainty as to the correspondence between responses to Questions 14 and 19 in the survey, along with the high percentages reported in **Table 5.1**, a strategy to mollify the effects of these uncertainties on the interpretation was arrived at that involved applying the percentages in **Table 5.1** (by industry) to those in **Table 5.2**, **Table 5.3** results.

Table 5.3 Adjusted Revenue Losses Resulting from a Dredging Stoppage, by Sector

NAICS	Sector	2008-2012	2013-2017	2018-2027	2028-2037
114	Fishing	36.7%	41.7%	50.0%	58.3%
33661	Ship & boat building and repairing	21.0%	24.6%	32.7%	44.8%
441222	Boat dealers (coastal counties only)	22.9%	16.1%	9.7%	9.7%
483	Water transportation	13.3%	21.2%	27.3%	31.8%
71393	Marinas (coastal counties only)	16.5%	22.3%	34.3%	42.7%

Table 5.3 reports numbers that are significantly dampened compared to those upon which they are based (in **Table 5.2**). For any given sector, however, the general pattern fundamentally is the same across the two tables. Moreover, with the exception of a greater percentage of losses reported by Boat dealers compared to Ship and Boat builders, the rank order of industries in

terms of losses remains the same. That is, **Table 5.3** shows that through 2012 the Fishing industry is likely to experience the greatest percentage loss from a lack of ability to dredge with losses on the order of 36.7 percent. Second in rank among maritime industries is Boat dealers with a forecasted 22.9 percent loss in revenues. Next is Ship & Boat building and repairing with a 21.0 percent loss in revenues during the period. Marinas and Water Transportation follow at 16.5 and 13.3 percent, respectively.



Finally, an additional area where the survey architecture, while suitable for the purposes of the USACE-sponsored study, could lead to bias in the interpretation for this Study, is in the actual amount of revenue reduction predicted by an individual facility. Respondents were asked to assess revenue reductions for the no-dredge scenario; information that is useful in determining impacts but difficult to extract deeper significance from. It is difficult to extrapolate the content of percentage revenue reductions (Question 19) based on the responses received. In responding to the question, respondents may have accounted for impacts in a variety of ways. One could have responded assuming that, for example, losses reported for 2013-2017 were on top of those reported for 2008-2012. That is, in the case of the Fishing sector, of the revenues retained after the 36.7 percent in revenues lost from 2008-2012, another 41.7 percent was subsequently lost over the 2013-2017 period. More specifically, the 2017 sectors revenues would be 36.9 percent $(1-0.367) \times (1-0.4170) \times 100\%$ —of what they were in 2008. For the main part, however, the percentages reported in **Table 5.3** tend to increase over time, supporting the assumption that the percentage losses reported generally represent accumulated losses forecast from the date of the survey. Thus, it is assumed that the losses reported for the Fishing sector for 2013-2017 represent a drop of 5 percentage points (41.7 percent minus 36.7 percent) over those experienced by that industry through to 2012.

That notwithstanding, the upward trend generally reported for other sectors are not evident for Boat dealers. Results for this sector show that it alone peaks over the 2008-2012 periods, subsequently declines, and then bottoms out at a loss of 9.7 percent for the last 20 years of the total study period. This anomaly in the data tends to suggest that the responses for this sector may be an aberration, perhaps the result of a misinterpretation by firms of that sector on how to

respond to Question 19. The declining trend for Boat dealers would normally suggest a third possible way to interpret the percentages—that is, a representation of the distribution of revenues lost by period. If it is assumed that this is the case, then summing across the row in the Table 5.3, we find that total revenues lost by Boat dealers could be found to be 58.5 percent through 2037. Using this approach, then, 22.9 percent would be lost during the first five years, another 16.1 percent of year 2008 revenues would be lost during the 2013-2017 timeframe, and an additional 9.7 percent would be lost in each ten-year period thereafter. However, it is not reasonable to apply this rationale to all sectors and, therefore, for this Study, we assumed that Boat dealers lose 22.9 percent of their revenues through 2013, and that their revenue losses due to a lack of dredging hold steady thereafter.

Table 5.4 Maritime-Dependent Industries in Connecticut: Total Jobs and Worker Earnings, 2007

NAICS	Sector	Earnings (thousands)	Jobs	Earnings/Job
114	Fishing, hunting, and trapping	\$11,798	197	\$59,786
3117	Seafood product preparation	\$2,636	71	\$37,607
336611	Ship building	\$19,347	222	\$87,235
336612	Boat building	\$448,605	8,941	\$50,180
441222	Boat dealers (coastal counties only)	\$36,810	671	\$54,285
483	Water transportation	\$217,592	1,211	\$178,940
48721	Scenic and sightseeing transportation, water	\$2,062	8	\$25,504
4883	Support activities for water transportation	\$22,412	452	\$49,626
61131	Colleges, universities, and professional schools	\$63,200	821	\$76,329
71393	Marinas (coastal counties only)	\$55,355	1,311	\$41,176
Total: Maritime Dependent Industries		\$879,817	13,996	\$62,862

Source: FXM calculations of data from both BLS's QCEW and BEA's REIS data.

For convenience, Table 5.4 replicates Table 4.12, which presents the economy of maritime-dependent industries in Connecticut. Note that the table includes several sectors not specifically accounted for in the USACE-sponsored survey data. As a matter of practicality, it should be noted that it is unlikely that the educational facilities—colleges, universities and professional schools—would depart in the wake of a dredging stoppage. Seafood production is also not included in the survey. While this industry segment in Connecticut is presently intertwined with the Fishing sector, it need not be. As a corollary, work on other Port evaluations (including some conducted by members of the Consultant Team) investigated the economic development potential for what is now an on-going endeavor of importing raw fish into east coast Ports (such

as New Bedford, Massachusetts), for processing into food products. That notwithstanding, because of strong ties, the Seafood processing industry was projected to experience losses commensurate with the commercial Fishing industry. Finally, Sightseeing water transportation and Support activities for water transportation also represent sub-segments of the industry that are not covered by the USACE-sponsored survey. Unlike the other two industries noted above, these two sub-segments have been included in the ensuing analysis, albeit under assumptions applied to the rest of the Water transportation sector. In addition to the industries noted above, **Section 4.0** of this report also considered the economic impact of cargo handling at Connecticut's Ports. Cargo handling was also extrapolated using the assumptions of the Water transportation sector, although, as detailed in **Section 4.0**, the impacts measured considered more than just the Water transportation sector.

Table 5.5. Final Adjusted Revenue Losses Resulting from a Dredging Stoppage, by Sector

NAICS	Sector	2008-2012	2013-2017	2018-2027	2028-2037
114	Fishing	36.7%	41.7%	50.0%	58.3%
33661	Ship & boat building and repairing	21.0%	24.6%	32.7%	44.8%
441222	Boat dealers (coastal counties only)	22.9%	22.9%	22.9%	22.9%
48	Water transportation	13.3%	21.2%	27.3%	31.8%
71393	Marinas (coastal counties only)	16.5%	22.3%	34.3%	42.7%

Table 5.3 transforms only modestly into **Table 5.5** after adjusting revenue losses by Boat dealers to conform those forecasted by other sectors. **Tables 5.6 through 5.9** show how these scenarios play out in the statewide economy.

5.4. Total Direct, Indirect and Induced Economic Effects

Tables 4.6 through 5.9 present the analysis of economic losses attributable to lack of dredging on all sectors of the Connecticut economy, including not only the direct effects on maritime industries but also the indirect effects on firms supplying goods and services to the maritime industries as well as the effects of reduced spending due to business sales and employment losses directly and indirectly connected to the maritime industries. **Table 5.6** reports that - counting total direct, indirect and induced economic effects - by the year 2012 just over 4,800 jobs making about \$225.5 million in payroll (about \$46,750 per job in year 2007 dollars) would be lost to the state of Connecticut. Close to \$28.7 million in state and local tax revenues would be lost as well. These totals would edge up modestly over the following five years (through 2017) to just over 6,150 jobs making an aggregate of \$321.6 million in payroll (\$52,242 per job) as manufacturing jobs become a larger source of the losses and the losses attributable to

lower-paying marinas and boat dealers' decline as a share of overall payroll losses (**Table 5.7**). State and local tax revenues are expected to decline accordingly by 2017 to \$38.1 million.

Table 5.8 reports on the effects forecast according to respondents of the USACE survey also but for 2027. The total number of jobs lost is estimated to be nearly 8,100 and the accompanying payroll for them (in year 2007 dollars) \$423.1 million. The pay per job is fairly stable between 2017 and 2027, when it is \$52,278 per job. State and local tax revenues loss are expected to rise to close to \$50 million. By 2037 (**Table 5.9**) in Connecticut, as many as 10,400 jobs are forecast to be lost if effective maintenance and new dredging is not undertaken, which may largely be due to an inability to dispose of dredging wastes according to the USACE. Nearly \$550.0 million in payroll (in 2007 dollars) are expected to be associated with those jobs losses (\$52,885 per job) and nearly \$1.6 billion in industry output. With that over \$62 million in tax revenues would be lost to municipalities and the State of Connecticut. Cargo and Ship building losses dominate at this stage.

Table 5.6. Economic and Tax Loss to Connecticut's Economy of Not Dredging through 2012

	Economic Component			
	Output (000 \$)	Employment (jobs)	Income (000\$)	Gross Domestic Product (000\$)
I. TOTAL EFFECTS (Direct and Indirect/Induced)				
1. Agriculture	219.4	4	36.6	42.5
2. Agri. Serv., Forestry, & Fish	14,400.8	78	3,847.3	12,885.2
3. Mining	77.9	0	18.1	64.1
4. Construction	6,405.9	15	873.5	1,955.9
5. Manufacturing	390,902.2	2,126	136,848.2	200,194.8
6. Transport. & Public Utilities	142,916.9	1,038	47,748.8	87,784.1
7. Wholesale	19,136.8	108	7,782.0	8,284.0
8. Retail Trade	60,576.8	732	20,744.5	36,345.7
9. Finance, Ins., & Real Estate	42,800.5	141	15,165.9	27,523.2
10. Services	44,719.8	555	21,170.0	23,061.7
Private Subtotal	722,157.0	4,798	254,235.0	398,141.2
11. Government	4,091.9	23	1,285.6	2,176.3
Total Effects (Private and Public)	726,249.0	4,821	255,520.6	400,317.5
II. DISTRIBUTION OF EFFECTS/MULTIPLIER				
1. Direct Effects	518,531.7	3,267	184,333.5	294,761.4
2. Indirect and Induced Effects	207,717.2	1,554	71,187.0	105,556.1
3. Total Effects	726,249.0	4,821	255,520.6	400,317.5
4. Multipliers (3/1)	1.401	1.476	1.386	1.358
III. COMPOSITION OF GROSS STATE PRODUCT				
1. Wages--Net of Taxes				234,250.4
2. Taxes				48,666.0
a. Local				7,269.3
b. State				7,778.1
c. Federal				33,618.6
General				24,081.1
Social Security				9,537.5
3. Profits, dividends, rents, and other				117,401.1
4. Total Gross State Product (1+2+3)				400,317.5
IV. TAX ACCOUNTS				
		Business Household		Total
1. Income --Net of Taxes		234,250.4	230,043.8	--
2. Taxes		48,666.0	54,101.6	102,767.5
a. Local		7,269.3	7,193.1	14,462.4
b. State		7,778.1	7,525.3	15,303.3
c. Federal		33,618.6	39,383.2	73,001.8
General		6,222.8	39,383.2	45,606.0
Social Security		27,395.8	0.0	27,395.8

EFFECTS PER MILLION DOLLARS OF INITIAL EXPENDITURE	
Employment (Jobs)	9.3
Income	492,705.3
State Taxes	29,508.5
Local Taxes	27,887.0
Gross State Product	771,908.7
INITIAL EXPENDITURE IN DOLLARS	518,607,257.6

Note: Detail may not sum to totals due to rounding.

Table 5.7. Economic and Tax Loss to Connecticut's Economy of Not Dredging through 2017

	Economic Component			
	Output (000 \$)	Employment (jobs)	Income (000\$)	Gross Domestic Product (000\$)
I. TOTAL EFFECTS (Direct and Indirect/Induced)				
1. Agriculture	274.5	6	45.7	53.1
2. Agri. Serv., Forestry, & Fish	16,387.1	89	4,383.0	14,662.2
3. Mining	103.0	0	23.3	84.7
4. Construction	8,022.5	19	1,093.9	2,449.2
5. Manufacturing	461,639.2	2,497	160,682.1	237,479.9
6. Transport. & Public Utilities	214,036.3	1,569	72,072.2	132,391.8
7. Wholesale	23,858.9	134	9,702.3	10,328.1
8. Retail Trade	69,619.7	877	24,104.5	41,592.5
9. Finance, Ins., & Real Estate	53,839.0	177	19,078.4	34,632.6
10. Services	59,656.3	755	28,672.3	30,924.1
Private Subtotal	907,436.5	6,124	319,857.7	504,598.2
11. Government	5,497.4	31	1,739.2	2,986.2
Total Effects (Private and Public)	912,933.9	6,156	321,596.9	507,584.4
II. DISTRIBUTION OF EFFECTS/MULTIPLIER				
1. Direct Effects	652,699.1	4,206	232,354.9	374,838.0
2. Indirect and Induced Effects	260,234.8	1,950	89,242.0	132,746.4
3. Total Effects	912,933.9	6,156	321,596.9	507,584.4
4. Multipliers (3/1)	1.399	1.464	1.384	1.354
III. COMPOSITION OF GROSS STATE PRODUCT				
1. Wages--Net of Taxes				294,314.7
2. Taxes				61,762.4
a. Local				9,436.9
b. State				9,625.1
c. Federal				42,700.4
General				29,196.6
Social Security				13,503.7
3. Profits, dividends, rents, and other				151,507.3
4. Total Gross State Product (1+2+3)				507,584.4
IV. TAX ACCOUNTS				
		Business	Household	Total
1. Income --Net of Taxes		294,314.7	289,522.7	--
2. Taxes		61,762.4	68,091.9	129,854.3
a. Local		9,436.9	9,053.2	18,490.1
b. State		9,625.1	9,471.3	19,096.4
c. Federal		42,700.4	49,567.4	92,267.8
General		8,220.2	49,567.4	57,787.6
Social Security		34,480.2	0.0	34,480.2
EFFECTS PER MILLION DOLLARS OF INITIAL EXPENDITURE				
Employment (Jobs)				9.4
Income				492,627.6
State Taxes				29,252.1
Local Taxes				28,323.5
Gross State Product				777,526.5
INITIAL EXPENDITURE IN DOLLARS				652,819,470.6

Note: Detail may not sum to totals due to rounding.

Table 5.8. Economic and Tax Loss to Connecticut's Economy of Not Dredging through 2027

	Economic Component			
	Output (000 \$)	Employment (jobs)	Income (000\$)	Gross Domestic Product (000\$)
I. TOTAL EFFECTS (Direct and Indirect/Induced)				
1. Agriculture	361.3	7	60.2	69.9
2. Agri. Serv., Forestry, & Fish	19,689.5	108	5,275.0	17,616.7
3. Mining	134.8	1	30.6	110.8
4. Construction	10,508.3	25	1,432.5	3,208.2
5. Manufacturing	612,213.1	3,315	213,414.7	314,781.4
6. Transport. & Public Utilities	284,568.5	2,097	95,997.9	176,709.7
7. Wholesale	31,429.9	177	12,781.0	13,605.4
8. Retail Trade	83,785.3	1,105	29,367.7	49,808.1
9. Finance, Ins., & Real Estate	70,624.6	232	25,071.1	45,386.3
10. Services	77,953.2	986	37,433.9	40,392.4
Private Subtotal	1,191,268.5	8,053	420,864.6	661,688.9
11. Government	7,181.3	41	2,270.5	3,893.7
Total Effects (Private and Public)	1,198,449.8	8,094	423,135.2	665,582.6
II. DISTRIBUTION OF EFFECTS/MULTIPLIER				
1. Direct Effects	856,071.0	5,528	305,672.4	491,081.9
2. Indirect and Induced Effects	342,378.8	2,566	117,462.7	174,500.7
3. Total Effects	1,198,449.8	8,094	423,135.2	665,582.6
4. Multipliers (3/1)	1.400	1.464	1.384	1.355
III. COMPOSITION OF GROSS STATE PRODUCT				
1. Wages--Net of Taxes				387,947.4
2. Taxes				80,554.5
a. Local				12,329.6
b. State				12,196.6
c. Federal				56,028.3
General				38,562.9
Social Security				17,465.5
3. Profits, dividends, rents, and other				197,080.7
4. Total Gross State Product (1+2+3)				665,582.6
IV. TAX ACCOUNTS				
		Business	Household	Total
1. Income --Net of Taxes		387,947.4	380,924.2	--
2. Taxes		80,554.5	89,590.7	170,145.3
a. Local		12,329.6	11,911.6	24,241.3
b. State		12,196.6	12,461.6	24,658.2
c. Federal		56,028.3	65,217.4	121,245.8
General		10,661.6	65,217.4	75,879.0
Social Security		45,366.7	0.0	45,366.7

EFFECTS PER MILLION DOLLARS OF INITIAL EXPENDITURE

Employment (Jobs)	9.5
Income	494,186.3
State Taxes	28,798.7
Local Taxes	28,311.8
Gross State Product	777,344.6
INITIAL EXPENDITURE IN DOLLARS	856,225,974.7

Note: Detail may not sum to totals due to rounding.

Table 5.9. Economic and Tax Loss to Connecticut's Economy of Not Dredging through 2037

	Economic Component			Gross Domestic Product (000\$)
	Output (000 \$)	Employment (jobs)	Income (000\$)	
I. TOTAL EFFECTS (Direct and Indirect/Induced)				
1. Agriculture	470.2	9	78.4	91.0
2. Agri. Serv., Forestry, & Fish	23,031.6	127	6,186.3	20,606.1
3. Mining	171.3	1	39.4	140.9
4. Construction	13,550.6	32	1,846.4	4,137.6
5. Manufacturing	832,697.5	4,525	291,586.7	427,165.4
6. Transport. & Public Utilities	340,577.2	2,500	114,506.0	210,873.5
7. Wholesale	41,224.4	232	16,764.0	17,845.3
8. Retail Trade	101,503.6	1,391	35,950.7	60,081.7
9. Finance, Ins., & Real Estate	91,293.6	300	32,490.6	58,573.1
10. Services	98,152.0	1,232	46,830.6	50,746.8
Private Subtotal	1,542,671.9	10,350	546,279.1	850,261.4
11. Government	9,028.3	51	2,845.3	4,847.2
Total Effects (Private and Public)	1,551,700.1	10,401	549,124.4	855,108.6
II. DISTRIBUTION OF EFFECTS/MULTIPLIER				
1. Direct Effects	1,106,173.8	7,065	396,234.3	628,691.7
2. Indirect and Induced Effects	445,526.3	3,336	152,890.0	226,416.9
3. Total Effects	1,551,700.1	10,401	549,124.4	855,108.6
4. Multipliers (3/1)	1.403	1.472	1.386	1.360
III. COMPOSITION OF GROSS STATE PRODUCT				
1. Wages--Net of Taxes				505,231.5
2. Taxes				102,767.6
a. Local				15,511.7
b. State				15,133.8
c. Federal				72,122.1
General				50,949.4
Social Security				21,172.7
3. Profits, dividends, rents, and other				247,109.5
4. Total Gross State Product (1+2+3)				855,108.6
IV. TAX ACCOUNTS				
		Business	Household	Total
1. Income --Net of Taxes		505,231.5	494,331.6	--
2. Taxes		102,767.6	116,266.5	219,034.1
a. Local		15,511.7	15,458.4	30,970.1
b. State		15,133.8	16,172.1	31,305.9
c. Federal		72,122.1	84,636.1	156,758.1
General		13,247.3	84,636.1	97,883.4
Social Security		58,874.7	0.0	58,874.7

EFFECTS PER MILLION DOLLARS OF INITIAL EXPENDITURE	
Employment (Jobs)	9.4
Income	496,336.8
State Taxes	28,296.5
Local Taxes	27,992.9
Gross State Product	772,906.6
INITIAL EXPENDITURE IN DOLLARS	1,106,354,366.1

Note: Detail may not sum to totals due to rounding.

6.0 EXECUTIVE SUMMARY OF THE ECONOMIC ANALYSES

This Executive Summary of the Economic Analyses provides a brief synopsis of the objectives, the methods and sources used in the analysis and a summary of the full report's **Section 4.0** (Economic Impacts of Existing Maritime Industries) and **Section 5.0** (Impacts of No Dredging on Connecticut's Maritime Economy). The economic analyses conducted for this Study have two principal objectives:

1. To assess the current contribution of maritime industries to the overall economy of Connecticut; and
2. To estimate the effect that dredging projects might have on the performance of maritime industries and consequently to the overall State economy.

In each case, the measures of economic effects include business output (sales), employment, household income, state contribution to Gross Domestic Product (GDP), and local/state/federal taxes. In order to account for the full effects of maritime industries on the economy of Connecticut, the analysis includes not only the contribution of water-dependent and other maritime industries *directly* in terms of jobs, income, output, GDP, and taxes; but also the *indirect and induced* effects on each measure of economic performance, based on the contribution of all industries and labor in Connecticut that supply goods and services to the maritime sectors. To estimate these total direct, indirect, and induced economic effects, the study team used the R/ECON™ Input Output (I-O) Model. R/ECON™, which is specifically calibrated for each state and county and regularly updated with the latest national and state economic data, has been in continuous use by professionals and academics for over 30 years and is one of the three primary I-O models used for regional economic analyses in the United States.⁸²

6.1 Methods and Sources

For the purposes of this Study, maritime, or maritime-dependent industries, are generally defined to include cargo and passenger water transportation and supporting industries; scenic and sightseeing water transportation; ports and marinas; ship and boat building, repair, and sales; fishing and seafood preparation; and maritime museums. From these general categories, more detailed industry sectors are analyzed by their North American Industrial Classification Code (NAICS).

⁸² The other Input Output models are IMPLAN, by the Minnesota Implan Group, and RIMS II, by the US Department of Commerce. R/Econ is maintained at Rutgers University.

For each detailed NAICS corresponding to a maritime-dependent industry in Connecticut, data on employment and wages were obtained from the Quarterly Census of Employment and Wages (QCEW) maintained by the US Bureau of Labor Statistics. QCEW data are limited, however, by some data irregularities at the level of detailed NAICS codes and by the fact that they do not include the jobs or income of workers who do not contribute to state unemployment insurance (uncovered), including self-employed persons who comprise a substantial proportion of jobs and income in several economic sectors. In Connecticut, QCEW data also do not identify employment in some major companies and institutions, including General Dynamics Electric Boat Division in Groton or the Coast Guard Academy in New London.

Adjustments to the QCEW data were, therefore, made based on interviews with relevant public and private sector officials, and proprietary data obtained from Dun & Bradstreet and Nielsen/Claritas. The QCEW data limitations on self-employed persons were addressed by using ratios for total to covered employment built from the Regional Economic Information System (REIS) produced by the United States Department of Commerce Bureau of Economic Analysis (BEA). With regards to the Navy base, military and civilian employment was not incorporated into the I-O simulations but was included in the Study's overall assessment. A more detailed discussion of data sources, their limitations and use in this analysis is contained in the full report.



It should be noted that this Study uses a somewhat less expansive definition of maritime and maritime-dependent industries than used in some prior reports. Comparisons to prior studies are, therefore, problematic and neither the total economic contribution of so-called maritime industries overall nor that of detailed maritime industry sectors derived in this Study necessarily correspond to the prior reports of others.

For the assessment of potential economic effects of dredging, the Consultant Team used the findings of a recent (2008) survey done by the USACE of nearly 300 water-dependent and related industries in coastal communities within Connecticut. The USACE survey asked businesses how failure to provide adequate maintenance and new dredging would affect their business sales within 1-5 years (2009-2013), 6-10 years (2014-2018), 11-20 years (2019-2028),

and 21-30 years (2029-2038). Business surveys are always difficult to administer and interpret, particularly when the respondents are asked to make judgments that may or may not be substantiated by a rigorous analysis of each individual case. Experience with many similar surveys and related follow-up studies suggest, however, that most respondents will attempt an objective assessment of their existing conditions and future needs. Whatever the limitations of the USACE survey, it clearly represents the most comprehensive and best available data for the purposes of this Study. The Consultant Team is grateful to the USACE for sharing their survey data prior to its official publication. All interpretation of the survey data are solely the responsibility of the Consultant Team.

6.2 Summary Findings

- In 2007, Connecticut's maritime-dependent industries, their suppliers and related economic activity (total direct, indirect, and induced effects) accounted for over \$5 billion in business output within the State of Connecticut; more than 30,000 jobs; approximately \$1.7 billion in household income; and \$2.7 billion in State GDP. A breakdown of these effects by major economic sector is shown in **Table 4.18**.
- As a consequence of these direct, indirect, and induced economic effects within the statewide economy, maritime industries annually account for over \$36 million in taxes paid to local communities; \$54 million in State tax revenues; and over \$224 million in Federal tax revenues.
- Wages within Connecticut's maritime-dependent industries averaged nearly \$63,000 per year per job in 2007 (**Table 5.4**). This average wage is 15 percent higher than the average wage of \$55,000 reported for all jobs in Connecticut in 2007.
- Not all of Connecticut's maritime-related industries will be affected by dredging, but many important ones will. Data in **Table 5.5** below show the study team's estimate of revenue losses based on the USACE survey.⁸³

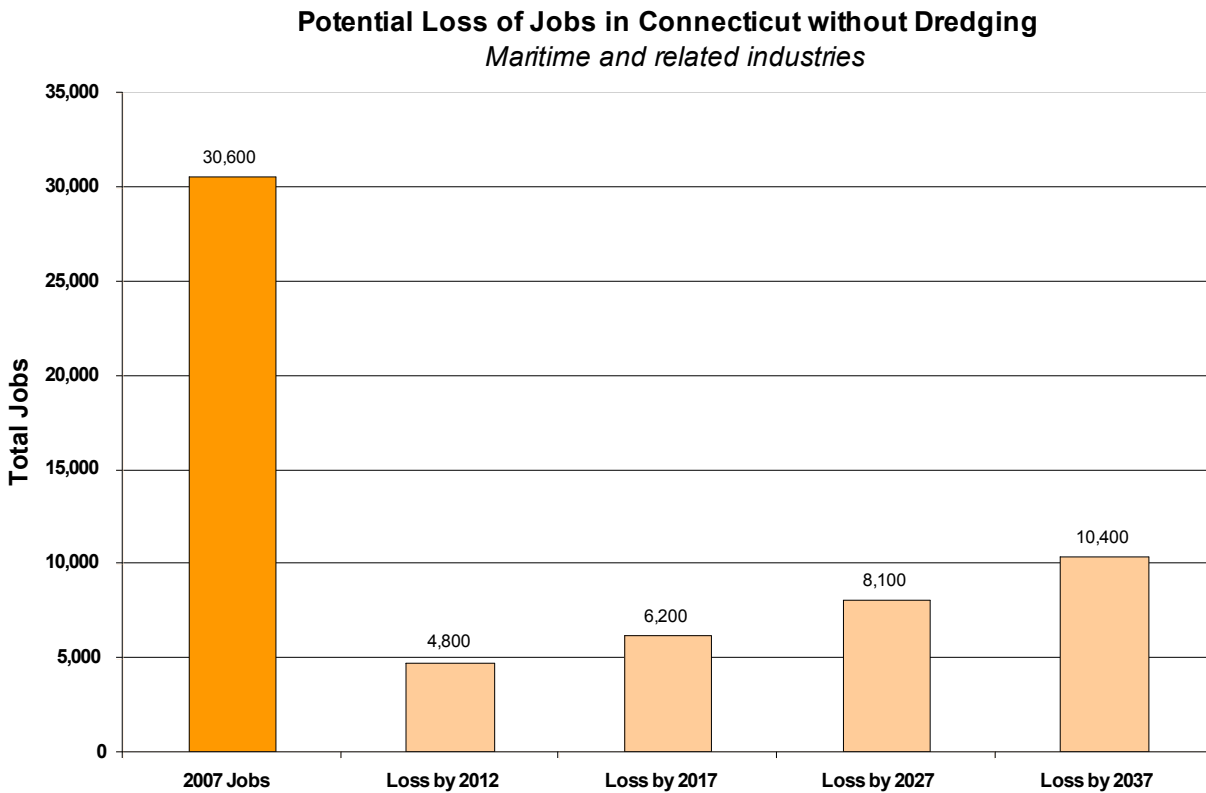
⁸³ In an attempt to properly represent industry-wide effects the consultant team adjusted the raw data on reported sales losses in one USACE survey question to account for businesses in the same NAICS industry who responded in another survey question that dredging would not affect their sales.

Table 5.5. Final Adjusted Revenue Losses Resulting from a Dredging Stoppage, by Sector

NAICS	Sector	2008-2012	2013-2017	2018-2027	2028-2037
114	Fishing	36.7%	41.7%	50.0%	58.3%
33661	Ship & boat building and repairing	21.0%	24.6%	32.7%	44.8%
441222	Boat dealers (coastal counties only)	22.9%	22.9%	22.9%	22.9%
48	Water transportation	13.3%	21.2%	27.3%	31.8%
71393	Marinas (coastal counties only)	16.5%	22.3%	34.3%	42.7%

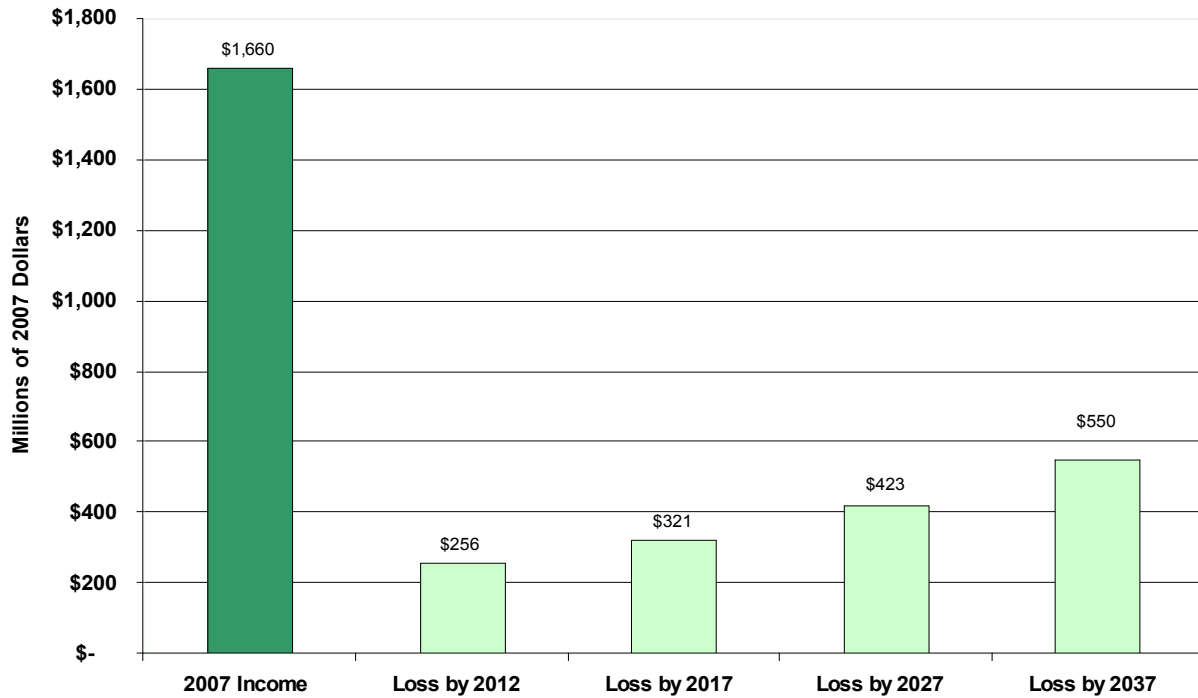
- By 2012, lack of effective maintenance and new dredging could cost the State of Connecticut economy \$726 million in business output, 4,800 jobs, and \$256 million in household income annually. These economic losses would also mean a loss of \$7.3 million in local tax revenues, \$7.8 million in State tax revenues, and \$34 million in Federal tax revenues.
- By 2037, lack of dredging could cost the Connecticut economy over \$1.5 billion in business output, over 10,000 jobs, and \$550 million in household income annually. Corresponding fiscal losses would include over \$15 million in local tax revenues, \$14 million in State tax revenues, and over \$72 million in lost Federal tax revenues.

The following graphs show potential losses in employment, income, and state and local taxes without dredging by period compared to the 2007 baseline amounts attributable to maritime-dependent industries in Connecticut. The baseline 2007 numbers and losses in jobs, income, state and local taxes include total direct, indirect, and induced economic effects.

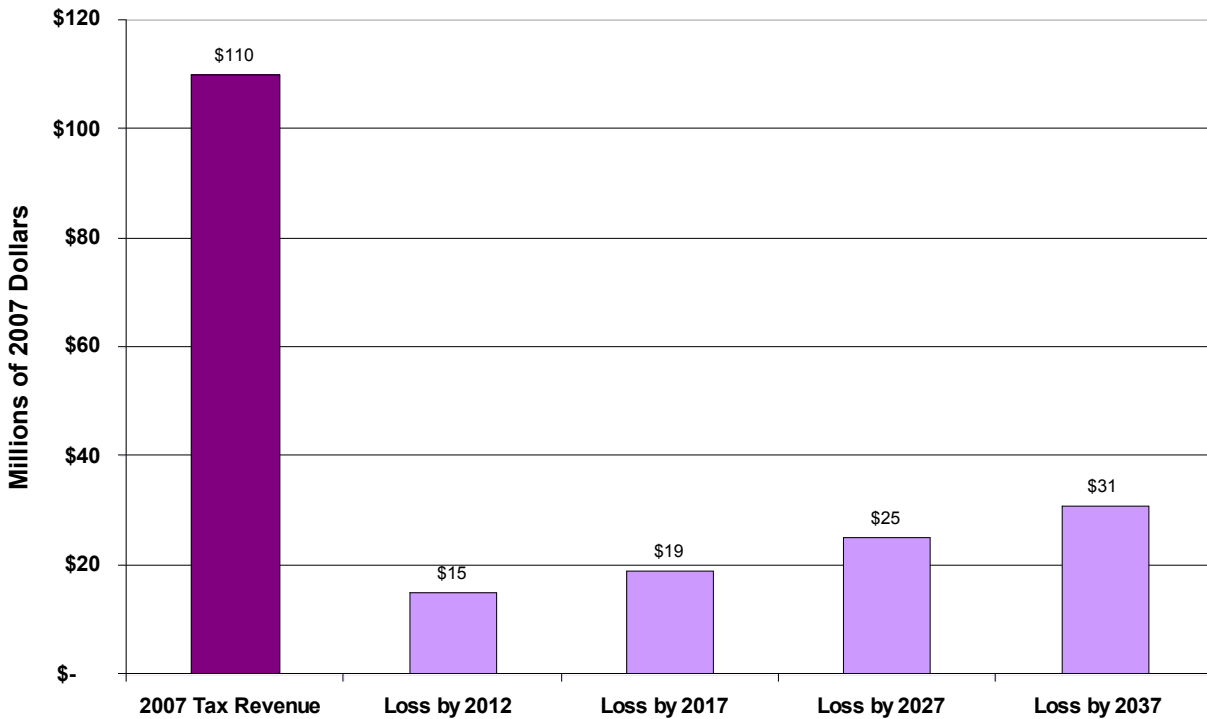


By 2012, the potential loss of 4,800 jobs without dredging would reduce employment within the Connecticut economy attributable to maritime industries by about 15 percent compared to the baseline 2007 number of jobs. By 2037, potential job losses without dredging could reduce maritime industries and related jobs in Connecticut by one-third (34 percent). Similar proportional losses would occur in household income and in state and local tax revenues throughout Connecticut, as shown in the subsequent graphs.

Potential Loss of Income in Connecticut without Dredging *Maritime and related industries*



Potential Local and State Tax Losses without Dredging *Maritime and related industries*



7.0 POTENTIAL FUTURE ECONOMIC BENEFITS OF DREDGING

The analysis performed through the modeling of the QECD 2007 data indicates clearly that lack of dredging across the State will have significant impacts to both the maritime economy and the overall State economy. Assessing the potential positive impact of conducting the dredging that is needed across the State is a somewhat more difficult task, as a comprehensive dataset of need vs. potential *increase* in business is more difficult to extract from the existing databases. That notwithstanding, broad assessments of the potential future benefits to the State's economy and job market can be estimated based upon existing reports and data and the information collected and presented in this report. Interviewees canvassed as part of this study were encouraged to assess the future increases in business they would expect if needed dredging were completed at their facilities. The results of these inquiries indicated that respondents anticipated between a 5 percent and up to a 50 percent increase in annual business activity if needed dredging were to be conducted at their facility and the channels leading up to their facilities. As noted above, the range of increases respondents anticipate by sector is:

- Cargo Sector = 5%-30% economic increase;
- Non-Cargo Sector = 25%-30% economic increase; and
- Recreational/Tourism = 10%-50% economic increase.

While these responses were presented by a relatively statistically small proportion of the industry overall, the information does indicate that businesses in Connecticut clearly expect to receive a benefit in the future in the form of increased business as a result of investments made in dredging. Based upon the respondents responses, the percent increase in business if dredging *is conducted* are likely to be at least 5 percent, and potentially as high as 30 percent. While it is unlikely that a 30 percent increase in



business activity across the entire maritime sector would result from completion of required dredging on a year-after-year basis, a conservative range of between 15 and 20 percent increase in the existing activity across the sector appears to be consistent with the expectations of the cross-section of the industry that responded to this question when interviewed.

Potential Economic and Jobs Benefits to Existing Business Related to Investment

Utilizing the fiscal information summarized in the 2007 QCEW census statement and the information modeled as part of this study via the I-O model, the potential fiscal benefits from dredging are significant. Utilizing rough straight-line projections from the modeled results presented as part of this study, potential increases to the maritime sector economy could have the following impacts:

For an assumed 15% increase in existing business overall:

<u>Fiscal Component</u>	<u>Potential 15% Increase</u>
Total Industry Effects (Direct, Indirect, and Induced):	\$ 752,625,420
Total Industry Jobs Effect:	4,587
Household Income Effects:	\$ 248,938,605
State GDP Effects:	\$ 411,302,850
Local Taxes Effect:	\$ 8,416,935
State Taxes Effect:	\$ 8,110,095
Combined State & Local Taxes Effect (State + Local):	\$ 16,527,030
Federal Taxes Effect:	\$ 33,659,580

The projections above show that if the initial investment is made in completing the dredge projects needed by the industry, as much as \$752.6 million in total economic benefit may be realized, leading to as many as 4,587 jobs and nearly a quarter billion dollars in additional household income if a 15 percent increase in overall business is forecast (the low end of that forecast by the business sectors interviewed).

For an assumed 20% increase in existing business overall:

<u>Fiscal Component</u>	<u>Potential 20% Increase</u>
Total Industry Effects (Direct, Indirect, and Induced):	\$ 1,003,500,560
Total Industry Jobs Effect:	6,116
Household Income Effects:	\$ 331,918,140
State GDP Effects:	\$ 548,403,800
Local Taxes Effect:	\$ 11,222,580
State Taxes Effect:	\$ 10,813,460
Combined State & Local Taxes Effect (State + Local):	\$ 22,036,040
Federal Taxes Effect:	\$ 44,879,440

The projections above show that if the initial investment is made in completing the dredge projects needed by the industry, as much as \$1.03 billion in total economic benefit may be realized, leading to as many as 6,116 jobs and nearly a third of a billion dollars in additional

household income if a 20 percent increase in overall business is forecast (the low-mid-level of that forecast by the business sectors interviewed).

Benefit/Cost of Projected Investment

Based upon the analysis of potential benefits from dredging presented and utilizing the numbers for volume of short-term dredging anticipated need (from the recent USACE-sponsored survey of the industry in Connecticut), a relative benefit related to overall cost of investment can be approximated. Assumptions utilized to arrive at Benefit/Cost approximations include:

- A total of 3,380,092 cubic yards of Non-Federal Maintenance and Improvement Dredging is needed immediately and over the 1-5 year timeframe (this from the USACE 2009 survey of dredge needs) by the Connecticut Maritime Industry;
- The average cost per dredging is approximately \$24 per cubic yard (this average cost was calculated from awards made by the USACE in New England to various dredge contractors for various dredge projects over the last year); and
- The USACE will complete the Federal Navigational Dredge projects needed in the State that are currently anticipated.

Calculations of the potential Benefit/Cost for dredging are shown in **Table 7.1** below. The calculations are based upon assumed yardage for dredging from the USACE-sponsored survey at an assumed approximate dredge cost of \$24 per yard.

Utilizing the factors noted above, an overall investment of approximately \$81.1 million is estimated to complete the short-term (1-5 year timeframe) Non-Federal dredging that is required to keep the industry moving forward. Based on this investment and the potential fiscal benefits noted above, general /Benefit/Cost assumptions can be made:

For an Assumed Annual Economic Activity Increase of 15%:

- Total Industry Effects (Direct, Indirect, and Induced) = Benefit/Cost of 9.3/1
- Household Income Effects = Benefit/Cost of 3/1
- State GDP Effects = Benefit/Cost of 5/1
- Combined State & Local Taxes Effect (State + Local) = Benefit/Cost of 0.2/1

Table 7.1
CMC Summary of Future Benefits from Initial Investment

Projected Costs for Dredging:					
Years 1-5 Period		Volumes:	Cost/Yard	Cost to Dredge	
	Non-Fed. Maintenance:	1,555,842	\$ 24	\$ 37,340,208.00	
	Non-Federal Improvement:	1,824,250	\$ 24	\$ 43,782,000.00	
	Total Non-Federal Maintenance + Improvement:	3,380,092	\$ 24	\$ 81,122,208.00	
Benefits Assuming a 15% Increase in Business:					
Benefits:	Total Industry Effects ³	Increase %	Increase \$ at %	Industry Jobs (in 2007)	# of Increased Jobs
Industry ¹	\$ 5,017,502,800.00	0.15	\$ 752,625,420.00	30,582.10	4,587.32
Household Income:	\$ 1,659,590,700.00	0.15	\$ 248,938,605.00		
State GDP:	\$ 2,742,019,000.00	0.15	\$ 411,302,850.00		
Taxes Local:	\$ 56,112,900.00	0.15	\$ 8,416,935.00		
Taxes State:	\$ 54,067,300.00	0.15	\$ 8,110,095.00		
Taxes State + Local:	\$ 110,180,200.00	0.15	\$ 16,527,030.00		
Taxes Federal:	\$ 224,397,200.00	0.15	\$ 33,659,580.00		
Cost/Benefit	Benefit	Cost	Benefit Ratio:	Cost Ratio:	
Industry ¹	\$ 752,625,420.00	\$ 81,122,208.00	9.28	1.00	
Household Income:	\$ 248,938,605.00	\$ 81,122,208.00	3.07	1.00	
State GDP:	\$ 411,302,850.00	\$ 81,122,208.00	5.07	1.00	
Taxes Local:	\$ 8,416,935.00	\$ 81,122,208.00	0.10	1.00	
Taxes State:	\$ 8,110,095.00	\$ 81,122,208.00	0.10	1.00	
Taxes State + Local:	\$ 16,527,030.00	\$ 81,122,208.00	0.20	1.00	
Taxes Federal:	\$ 33,659,580.00	\$ 81,122,208.00	0.41	1.00	
Years to Payback through State & Local Taxes =		4.90845651			
Benefits Assuming a 20% Increase in Business:					
Benefits:	Total Industry Effects ³	Increase %	Increase \$ at %	Industry Jobs (in 2007)	# of Increased Jobs
Industry ¹	\$ 5,017,502,800.00	0.20	\$ 1,003,500,560.00	30,582.10	6,116.42
Household Income:	\$ 1,659,590,700.00	0.20	\$ 331,918,140.00		
State GDP:	\$ 2,742,019,000.00	0.20	\$ 548,403,800.00		
Taxes Local:	\$ 56,112,900.00	0.20	\$ 11,222,580.00		
Taxes State:	\$ 54,067,300.00	0.20	\$ 10,813,460.00		
Taxes State + Local:	\$ 110,180,200.00	0.20	\$ 22,036,040.00		
Taxes Federal:	\$ 224,397,200.00	0.20	\$ 44,879,440.00		
Cost/Benefit	Benefit	Cost	Benefit Ratio:	Cost Ratio:	
Industry ¹	\$ 1,003,500,560.00	\$ 81,122,208.00	12.37	1.00	
Household Income:	\$ 331,918,140.00	\$ 81,122,208.00	4.09	1.00	
State GDP:	\$ 548,403,800.00	\$ 81,122,208.00	6.76	1.00	
Taxes Local:	\$ 11,222,580.00	\$ 81,122,208.00	0.14	1.00	
Taxes State:	\$ 10,813,460.00	\$ 81,122,208.00	0.13	1.00	
Taxes State + Local:	\$ 22,036,040.00	\$ 81,122,208.00	0.27	1.00	
Taxes Federal:	\$ 44,879,440.00	\$ 81,122,208.00	0.55	1.00	
Years to Payback through State & Local Taxes =		3.681342383			

Source: Us Army Corps of Engineers. 2009

For an Assumed Annual Economic Activity Increase of 20%:

- Total Industry Effects (Direct, Indirect, and Induced) = Benefit/Cost of 12.4/1
- Household Income Effects = Benefit/Cost of 4/1
- State GDP Effects = Benefit/Cost of 6.8/1
- Combined State & Local Taxes Effect (State + Local) = Benefit/Cost of 0.3/1

The above rough analysis of the potential benefits and costs shows that there is the potential for an initial investment of approximately \$81 million made by state and local sponsors to be recouped via state and local tax receipts from increased business activity as a result of dredging in a conservative period of between approximately 3.5 to 5 years, assuming that dredging will increase overall marine industry sector business by the approximately 15-20 percent per year expressed by those interviewed as part of this study. This assessment also suggests that for each \$1 of investment, between approximately \$9.3 and \$12.4 of new (direct, indirect, and induced) maritime economic activity is likely to be generated; as well as \$3-\$4 of new household income generated. The effects on the State GDP are also significant, with approximately \$5-\$6.8 of State GDP improvement suggested for each relevant \$1 of investment in dredging.

8.0 CONCLUSIONS

The results of this study clearly support other authors and sources that suggest that the Maritime Industry Sector of the Connecticut economy is important to the State. This fact has been recognized at the highest levels within the State, where it has been asserted that the Connecticut Maritime Industries, which are so positively tied to the State's unique heritage, distinctive physical setting, and geographic location, represent key elements of the State's economic growth opportunities in the future⁸⁴.

⁸⁴ State Department of Economic and Community Development (DECD) - *Connecticut Economic Strategic Plan*, 2009

The Maritime Industry, canvassed as part of this study (as well as other reviewed surveys), has indicated, however, that it faces significant hurdles that threaten to dampen (or even reverse), progress that has been made over the years in the development of this sector of the State's economy. Chief among the Industry's concerns is the maintenance and modernization of the infrastructure of the waterways, including the marine channels and pier facilities. As a whole, the Maritime Industry believes that dredging and infrastructure improvement is required in order to maintain and preserve their businesses and economic viability, and also (and very importantly), that dredging and infrastructure improvement is *critical* to future growth of the existing Industry, as well as in attracting new maritime-related industries to Connecticut in order to strengthen the Connecticut economy.



Specifically, dredging is considered a paramount infrastructure issue by the Industry. The absence of dredging, a common situation that has existed for several decades in the State, has led to the shoaling of channels and berthing areas, limiting (or in some cases precluding), dockage of vessels. Existing maritime businesses have seen, and expect to continue to see, decreases in business activity as a result of insufficient water depths and poorly maintained channels. The lack of dredging also severely limits Connecticut's competitive position in attracting new maritime industries to the State. Without dredging, new maritime initiatives, such as the promising new transportation business elements of the Short Sea Shipping strategy known as "*Americas Deep Blue Highway*", are likely to bypass the State entirely. Conversely, investment in infrastructure and dredging resulting in the modernization and improvement of the State's marine "roadways" is likely to attract new businesses, as newly maintained waterways will once again accentuate the natural advantages of geography and water access that made

the State a national leader in Maritime commerce originally. Studies have indicated that an increase in shipping alternatives for the transport of goods through and around Connecticut (such as the inclusion of the Short Sea Shipping concept) will result in a reduction in traffic and congestion on the State's major highways, asserting that the Ports will play a key role in the State's strategy for sustainability and environmentally sound growth.

Modeling of economic data conducted as part of this study supports the industry assertion that the economic impact to the State of *not* conducting needed dredging activities will be significant and severe, including:

- A loss of 4,800 Maritime Industry jobs by 2012 and 10,400 jobs by 2037;
- Loss of Household Income of up to \$256 million by 2012 and \$550 million by 2037; and
- Resulting losses of up to \$15 million (by 2012) and \$31 million (by 2037) in State and Local tax receipts.

On the other hand, making the investment in dredging in the near future is expected to have substantial short- and long-term economic benefits. As enumerated in **Section 7.0**, it is estimated that for every \$1 spent on dredging in the State, that as much as \$9-\$12 of economic activity will be generated through projected resultant increases in Maritime business, netting anticipated tax receipts that will cover the initial investment in the dredging in as little as 3.5 to 5 years. The findings presented herein substantiates the findings of others that suggest that the economic, environmental and cultural benefits of investing in the infrastructure that supports the Connecticut Maritime Industry will result in a solid and far-reaching return-on-investment. In fact, the data supports assertions that investment in waterways infrastructure such as dredging is *critical* if the State is to maintain its position as a leader in maritime commerce, and is *essential* if the State desires to play a leadership role in the sustainable global economy of the future.