Economic Impact Study of the New Bedford/Fairhaven Harbor

Examining the Economic Impact of the Port of New Bedford and the Phase V & Navigational Dredging in the New Bedford/Fairhaven Harbor

September 2016

PREPARED FOR:
The New Bedford Harbor Development Commission
52 Fisherman's Wharf
New Bedford, MA 02740

PREPARED BY:

Martin Associates
941 Wheatland Ave., Ste. 2013
Lancaster, PA 17603
(717) 295-2428

Apex Companies, LLC
1213 Purchase St.
New Bedford, MA 02740
(508) 961-3147

Executive Summary

Conducted by Martin Associates & Apex Companies

For the New Bedford Harbor Development Commission

September 2016

Overview of the Port of New Bedford

The Port of New Bedford is located in the New Bedford/Fairhaven Harbor along the southern coast of Massachusetts. In addition to being the highest value fishing port in the United States, the Port also handles cargo, and several forms of recreational boating are located throughout the Harbor. In 2015, an estimated 140 million pounds of seafood landed at the Port of New Bedford. This seafood was harvested and processed by local fleet operators and processors located in New Bedford. The 40 plus processors not only processed this locally-caught seafood, but also an additional 250 million pounds of seafood from around the world.

The non-seafood cargo handled at the Port totaled 280,000 tons in 2015 and included petroleum, aggregates, and imported fruit.

The Harbor is also home to many recreational boating activities such as water taxis, ferries, and seven recreational marinas that moored approximately 570 recreational boats in the 2015.

Economic Impact Analysis Methodology

Martin Associates, an internationally recognized economic maritime consulting firm, was retained by the New Bedford Harbor Development Commission **to measure the local and regional economic impacts generated by maritime and seafood activity in the New Bedford Harbor**.

The study employs methodology definitions that have been used by Martin Associates over the past 30 years to measure the economic impacts of seaport activity at the majority of the ports in the United States and Canada and at leading airports in the United States. Over 500 impact studies have been completed for these ports and airports.

In order to ensure defensibility**, the Martin Associates' approach to economic impact analysis is based on data developed through an extensive interview and telephone survey program** of the 147 firms participating in the various lines of businesses involved with the New Bedford Harbor. This includes fish processors, fleet operators, maritime services, cargo operations, and marinas.

Specific re-spending models have been developed for the New Bedford Area to reflect the unique economic and consumer profiles of the regional economy. The resulting impacts reflect the uniqueness of the operations in the Harbor, as well as the surrounding regional economy.

The impacts are measured for the year 2015 and separate economic impact models have been developed to measure the impacts generated by the fish processing and fishing fleet operators and the impacts generated by the maritime services, marinas, and cargo activity within the Harbor.

These economic models can be used to estimate annual updates, as well as to test the sensitivity of the impacts to changes in such factors as new fishing fleets and associated seafood processing activity, changes in marine cargo tonnage levels, new marine facilities development and expansion, and the impacts of harbor and channel deepening and navigational projects.

2015 Economic Impact of the Port of New Bedford – Summary of Results

36,578 jobs generated by Port activity	•Direct Jobs: 6,225 •Induced Jobs: 4,101 •Indirect Jobs: 2,512 •Related: 23,739
$9.8 billion of total economic value	•$6.1 billion of related output •$3.3 billion of direct business revenue •$429.4 million of re-spending of direct income and local consumption purchases
$1.2 billion of federal, state and local taxes	•$150.5 million direct, induced and indirect •$358.1 million direct, induced, and indirect federal •$200.7 million related taxes/local taxes •$534.7 million related federal taxes

Totals may not add due to rounding

2015 Port of New Bedford Economic Impact Results

The seafood processors combined with the other maritime services, cargo activity, and marinas in the New Bedford/Fairhaven Harbor supported **36,578 jobs direct, induced, indirect, and related jobs** within the Commonwealth of Massachusetts in 2015.

Of the 36,578 jobs, **6,225 direct jobs** are generated by the seafood activity, marine cargo and marinas, of which, 95% reside in Bristol County. The fishing and seafood industry at the Port of New Bedford creates 5,635 jobs, while the cargo, maritime services and marina activity creates an additional 590 jobs.

As the result of local and regional purchases by those 6,225 individuals holding the direct jobs, an additional **4,101 induced jobs** are supported in the regional economy. Another **2,512 indirect jobs** were supported by $280.2 million of local purchases by businesses supplying services at the processors, maritime services, cargo operations, and marinas dependent on the Harbor.
Jobs related to activity in the New Bedford Harbor accounted for 23,739 jobs. These jobs include downstream logistics operations that are part of the seafood processing, such as warehousing and distribution as well as ultimate sales to wholesalers and restaurants.

The total economic value to the Commonwealth resulting from the maritime activity at the Port in 2015 is estimated at $9.8 billion. This consists of the direct business revenue of $3.3 billion, the re-spending and local consumption impact of $429.4 million, and the related user output of $6.1 billion. This dollar value represents the sphere of influence of the processors, cargo operators, maritime services, ferries and harbor tours, as well as marinas in 2015, and accounts for **2% of the $481.6 billion gross domestic product for the Commonwealth.**

Direct wages and salaries of $320 million were received by those 6,225 directly employed. As a result of re-spending this income, an additional $429.4 million of income and consumption expenditures were created. The 2,512 indirect job holders received $118.2 million of indirect wages and salaries. In total, about $1.6 billion of total personal wages and salaries and local personal consumption activity were supported by the maritime and seafood activity in the New Bedford Harbor.

State and local taxes supported by activity at the processors, maritime services, marinas, and cargo operations totaled about **$1.2 billion of federal, state and local tax revenue.** This includes $508.6 million of direct, induced, and indirect state and local tax revenue as well as nearly $735.2 million of federal, state and local taxes that were supported by economic activity of related users of the Harbor.

New Bedford and Fairhaven Harbor Seafood Industry Impact

Of the 36,578 jobs held by Massachusetts residents that are related to marine cargo and vessel activity at the Port of New Bedford, **35,350 jobs are supported by seafood processors and fleet operations activity in New Bedford.**

Of these 35,350 total jobs, **5,635 direct jobs are generated by the seafood industry** activity in the Harbor. As a result of local purchases by these 5,635 directly employed individuals, an additional 3,760 induced jobs are generated in the local economy.

About $248.1 million of local purchases by firms providing services to the seafood processing industry supported an additional **2,215 indirect jobs**. The balance, 23,739 jobs are classified as related jobs and include downstream logistics operations in relation to the seafood processing in 2015.

In 2015, processor activity in the Harbor supported a **total of $9.6 billion of total economic activity** in the Commonwealth of Massachusetts. Of the $9.6 billion, $3.2 billion is the direct business revenue received by firms directly dependent upon the seafood processing and fleet operations.

An additional $6.1 billion represents the value of the output to the Commonwealth of Massachusetts that is supported by the seafood processing operations in the New Bedford area. This includes value added at each stage of the processing supply chain. The remainder, $396.7 million, represents the personal re-spending and local personal consumption impact.

Processing activity in New Bedford **supported $1.6 billion of total personal wage and salary income** and local consumption expenditures for Massachusetts residents. This includes $794.0 million of direct, indirect, and re-spending and local consumption expenditures, while the remaining $811.7 million was received by related port users as personal income.

A total of $480.3 million of direct, induced and indirect federal, state and local tax revenue was generated by processing activity at the Port of New Bedford. In addition, $200.7 million of state and local taxes were supported due to economic activity of the related users using the Port of New Bedford.

Port of New Bedford maritime services/cargo operations/marinas

Of the 36,578 jobs held by Massachusetts residents that are supported by seaport activity in the New Bedford Harbor in 2105, **1,228 jobs are generated** by maritime services, ferry operations, ship repair, cargo operations, and marina activity in the Harbor. Of these 1,228 jobs, 590 direct jobs are generated by this activity and as a result of local purchases made by these 590 direct jobs, an additional 341 induced jobs are generated in the local economy. $32.1 million of local purchases by firms providing services to these Harbor activities supported an additional 297 indirect jobs. Cargo and marina activity supported a total of **$140.7 million of total economic activity** in Massachusetts. Of the $140.7 million, $108 million is the direct business revenue received by firms directly dependent on this activity. An additional $32.7 million represents the personal re-spending and local consumption impact.

The Potential Economic Impact of Phase V & Navigational Dredging

Dredging is the removal of sediment and other materials from the harbor floor. It is needed on a routine basis to maintain navigational channels and ensure large vessels can safely travel within the harbor. It can also be used to remove contaminants from polluted waterways. Dredging is critical to maintaining the current industries in the harbor, and future economic development in the port.

In New Bedford, the federal navigational channel has not been dredged to its authorized depth in more than 50 years.

As with all infrastructure, **continued investment in dredging is greatly needed for the working waterfront to not only work at full capacity, but to create incentive for businesses to continue growing and investing in the city's economy.**

An Engineer's estimate of the cost savings associated with combining the CAD Cells for Phase V and Navigational Dredging indicates that the State/HDC could save approximately $1.5 million through efficiencies if the two projects are combined and under the management of the HDC for planning and design purposes alone. Another $6.5- $8.2 million could be saved for the construction and construction oversight of the project, **leading to total project savings of approximately $9.7 million.**

Annual Economic Benefits of the Phase V CAD Cell Construction and the Federal Channel Dredging Project

	TOTAL
JOBS	
Direct	391
Induced	269
Indirect	238
Total Jobs	**898**
PERSONAL INCOME (1,000)	
Direct	$21,627
Re-spending/Local Consumption	$29,115
Indirect	$14,348
TOTAL	**$65,090**
BUSINESS REVENUE (1,000)	**$259,201**
LOCAL PURCHASES (1,000)	**$25,919**
STATE AND LOCAL TAXES (1,000)	**$11,541**
FEDERAL TAXES (1,000)	**$27,690**

Based on the analysis conducted by Martin Associates, the Phase V CAD Cell Construction and the U.S. Army Corps of Engineers Channel Dredging Project would support nearly 900 new permanent jobs, of which about 400 jobs are directly generated in the New Bedford/Fairhaven waterfronts.

Contents

Introduction

This report has been prepared by Martin Associates and Apex Companies, LLC for the New Bedford Harbor Development Commission (HDC) to demonstrate the significant economic impact of the Port of New Bedford *(Part I)* and greater opportunity for further growth offered by the completion of Phase V & Navigational dredging *(Part II).*

The HDC is the governing body for the Port of New Bedford and manages the city-owned waterfront properties. The HDC is made-up of seven members, including the Mayor of New Bedford who acts as Chair. The HDC's role is to support the Port of New Bedford by continually upgrading port resources, preserving the Port's spot as the #1 fishing port in the country, and expanding the New Bedford economy.

The Town of Fairhaven occupies the eastern shore of the Acushnet River across from New Bedford. Fairhaven has a strong working waterfront with significant shipbuilding, marine construction, commercial fishing and recreational boating businesses.

Beginning in the fall of 2014, the HDC, along with the New Bedford Economic Development Council, began exploring ways to continue the economic growth of the Port through a Master Plan and a Draft Waterfront Redevelopment Plan. As a part of the planning process – that continues today – the New Bedford Waterfront Stakeholders Group began to review the baseline economic conditions and look at a pathway forward for the New Bedford waterfront. The committee also began exploring potential development and planning projects to improve conditions on the waterfront.

In July of 2015, a meeting with state officials, the HDC and MassPort led to the discussion of the economic impact of large dredging investments. The Seaport Economic Council suggested we study the economic impact of the port and the dredging project as a first step.

Hoping to build upon this meeting and include the Town of Fairhaven, the HDC and the Town of Fairhaven, applied for and received funding from the Seaport Economic Council to study the economic impact of maritime activity and the impacts and benefits of continued dredging and specific, major infrastructure projects.

Part I- The Economic Impact of the Port of New Bedford

Overview

The Port of New Bedford is located in the New Bedford/Fairhaven Harbor along the southern coast of Massachusetts. In addition to being the largest fishing port in the United States, the Port handles cargo, recreational boating, and commercial ferry services.

In 2014, the most recent year data for landings are available, an estimated 140 million pounds of seafood were landed at the Port of New Bedford. This seafood was caught and processed by local fleet operators and processors located in New Bedford. These 40 plus processors not only processed this locally caught seafood, but also an additional 250 million pounds of seafood from around the world.

New Bedford is a full service port, providing businesses to support the fishing and cargo industry, including operations such as warehouses, ice houses, boatyards and ship repair yards, construction, engineering, tug assists, pilots and other maritime services. With regards to the fishing industry, once the seafood is processed, it is then distributed for consumption either locally or internationally.

From the processor, the seafood can be trucked locally to wholesalers, go to a cold storage warehouse, trucked to an airport such as Boston's Logan International Airport or New York's John F. Kennedy International Airport where it is flown to various domestic and international destinations, or trucked to the Port of New York New Jersey where it is put on container vessel to be shipped internationally. It can also be trucked from New Bedford to Worcester where it is railed out to the West Coast for export to Asia.

The cargo handled at the Port totaled 280,000 tons in 2015 and included petroleum, aggregates, and fruit. The Harbor is also home to many recreational boating activities including water taxis, ferries, and seven recreational marinas that moored approximately 570 recreational boats in 2015.

A major emphasis of the study is its defensibility and realistic assessment of the impacts generated by activity at the Port of New Bedford and New Bedford/Fairhaven Harbor.

The study is based on interviews with 147 firms participating in the various lines of businesses involved with the New Bedford Harbor. This includes fish processors, fleet operators, maritime services, cargo operations, and marinas - underscoring the defensibility of the study. The impacts can be traced back to the company level of detail.[1] The data collected from the interviews were then used to develop operational models for the New Bedford area to measure the impacts generated by the fish processing and fishing fleet operators, as well as the maritime services, marinas, and cargo activity within the Harbor.

The impacts are measured for the year 2015 and separate economic impact models have been developed to measure the impacts generated by the fish processing and fleet operators; and the impacts generated by the maritime services, marinas, commercial ferry operations and cargo activity at the Port and within the Harbor.

These economic models can be used to estimate annual updates, as well as to test the sensitivity of the impacts to new fish processing facilities, expansion of fishing fleets, new marine cargo tonnage levels, new marine facilities development and expansion, and the impacts of harbor navigational projects.

Flow of Impacts

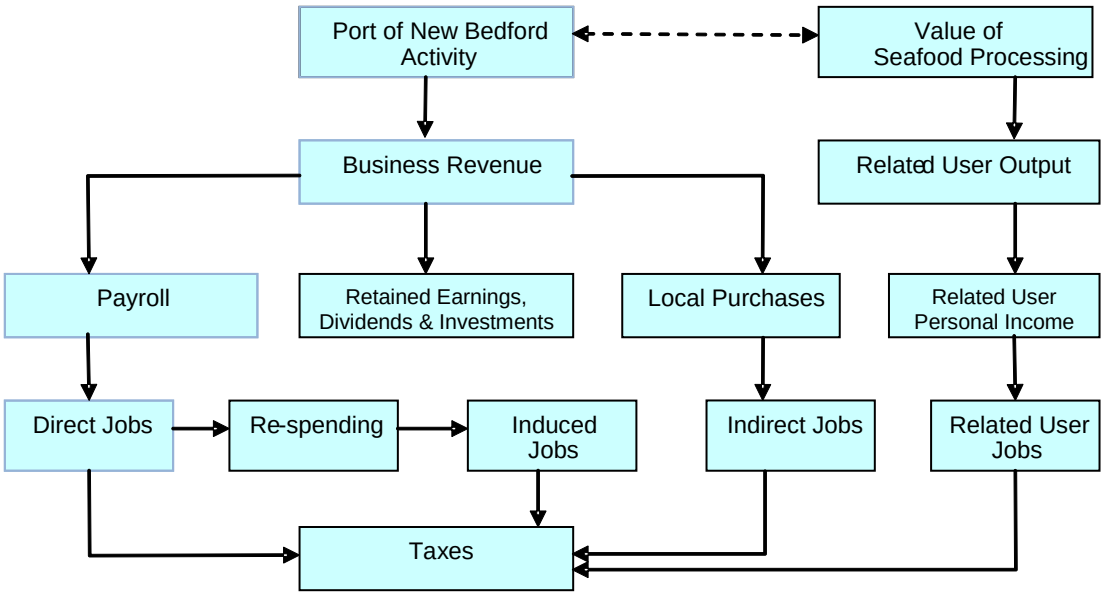
Waterborne activity within the Harbor contributes to the local and regional economy by generating business revenue to local and national firms providing services to the seafood, marine cargo, and marinas and commercial ferry sectors. These firms, in turn, provide employment and income to individuals and pay taxes to state and local governments.

Exhibit A, below, shows how waterborne cargo, marina operations, ferry activity and seafood processing at the Port of New Bedford and within the New Bedford Harbor generate impacts throughout the local, state and national economies. **As this exhibit indicates, the impact of a seaport on a local, state or national economy cannot be reduced to a single number, but instead, they create several impacts.**

These are the revenue impact, employment impact, personal income impact and tax impact. ***These impacts are non-additive***. For example, the income impact is a part of the revenue impact, and adding these impacts together would result in double counting. Exhibit A shows graphically how activity at the Port of New Bedford generates the four impacts.

[1] Individual firm data is collected by Martin Associates to develop the overall economic impact models. Company specific data is held strictly by Martin Associates and not provided to the Port or any other entity under the confidentiality agreement between Martin Associates and the individual companies.

Exhibit A
Flow of Economic Impacts Generated by
The Port of New Bedford Activity



1. Business Revenue Impact

At the outset, activity at the marine cargo and ferry terminals, marinas and seafood processors/fleet operators generates business revenue for firms that provide services. This business revenue impact is dispersed throughout the economy in several ways. It is used to hire people to provide the services, to purchase goods and other services, to pay for the use of port facilities and to make federal, state and local tax payments.

The remainder is used to pay stockholders, retire debt, make investments or is held as retained earnings. It is to be emphasized that the only portions of the revenue impact that can be definitely identified as remaining in the Commonwealth of Massachusetts are those portions paid out in salaries to Massachusetts employees, for local purchases by individuals and businesses directly dependent on the seaport, and in contributions to federal, state and local taxes.

2. Employment Impact

The employment impact consists of the following levels of job impacts.

Direct employment impact

These are jobs that are directly generated by marine cargo, marina and ferry operations, and commercial fishing and processing activity. Direct jobs generated by marine cargo include jobs with trucking companies moving cargo between inland origins and destinations and the Port's cargo marine terminals, longshoremen, stevedores, etc. Direct jobs generated by the fishing fleet and processors using the New Bedford Harbor include fishing fleet crew, shipyard and repair employees, local fishing gear and marine suppliers, packaging, ice, water, fuel, insurance brokers and marine attorneys, etc. Direct jobs supported by the marina activity include jobs directly involved with operating the seven marinas in the Harbor, and jobs supported by the direct purchases by the boat owners including boat repair, equipment, nautical supplies, etc.

Photo Source: southcoasttoday.com

It is to be emphasized that these jobs are classified as directly generated in the sense that the jobs would experience near term dislocation if the New Bedford Harbor commercial and recreational marine terminals and fish processing facilities were to be closed. These jobs are, for the most part, local jobs and are held by residents of Bristol County.

The direct jobs are estimated directly from the survey results of the 147 firms, as well as economic models developed from these surveys.

Induced employment impact

Induced jobs are created throughout the local economy because individuals directly employed due to port activity spend their wages locally on goods and services such as food, housing and clothing. These jobs are held by residents located throughout the region and state, since they are estimated based on local and regional statewide purchases.

Indirect employment impact

Indirect jobs are created in the Commonwealth of Massachusetts due to purchases of goods and services by firms, not individuals. These jobs are estimated directly from local purchases data supplied to Martin Associates by the 147 companies interviewed as part of this study, and include

jobs with local office supply firms, maintenance and repair firms, parts and equipment suppliers, etc. It is to be emphasized that special care was taken to avoid double counting since the current study counts certain jobs as direct, which are often classified as indirect by other approaches.

3. Personal Earnings Impact

The personal earnings impact is the measure of employee wages and salaries (excluding benefits) received by individuals directly employed due to seaport and seafood industry activity.

Direct Personal Earnings Impact

The direct personal earnings impact is a measure of the wages and salaries received by the direct job holders, and obtained directly from interviews with the maritime service providers.

Induced Impacts

Induced impacts are those generated by the purchases of the individuals employed as a result of maritime and seafood activity. For example, a portion of the personal earnings received by those directly employed due to activity at the seaport is used for purchases of goods and services, both in-state, as well as out-of-state. These purchases, in turn, create additional jobs in the Commonwealth of Massachusetts, which are classified as induced.

Photo Source: baltimoresun.com

To estimate these induced jobs, a personal earnings multiplier for the Commonwealth was developed from data provided by the Bureau of Economic Analysis, Regional Input-Output Modeling System. This income multiplier is used to estimate the total personal earnings generated in Massachusetts. A portion of this total personal earnings impact is next allocated to specific local purchases (as determined from consumption data for the Boston/New Bedford MSA, as developed from the U.S. Bureau of Labor Statistics, Consumer Expenditure Survey, 2013-2014). These purchases are next converted into retail and wholesale induced jobs in the regional economy

The re-spending effect varies by state: a larger re-spending effect occurs in states that produce a relatively large proportion of the goods and services consumed by residents, while lower re-spending effects are associated with states that import a relatively large share of consumer goods and services (since personal earnings "leak out" of the state for these out-of-state purchases). The direct earnings are a measure of the local impact since those directly employed by seaport activity and the seafood industry receives the wages and salaries. The re-spending effect is regional.

4. Indirect Impacts

Indirect impacts include indirect jobs, personal income and federal, state and local taxes. These indirect jobs are generated in the local economy as the result of purchases by firms that are directly dependent upon activity in the New Bedford/Fairhaven Harbor, including the seafood processors, maritime services, cargo activity and marinas. These purchases are for goods such as office supplies and equipment, maintenance and repair services, raw materials, communications and utilities, transportation services and other professional services.

To estimate the indirect economic impact, local purchases, by type of purchase, were collected from each of the 147 firms interviewed and the Port of New Bedford Harbor Development Commission. These local purchases were then combined with employment to sales ratios in local supplying industries, developed from U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System for the Commonwealth of Massachusetts. These jobs to sales ratios capture the numerous spending rounds associated with the supply of goods and services. Special care has been exercised to avoid double counting the indirect impacts, and to specifically include only the expenditures by the directly dependent firms that are, in fact, local.

5. Tax Impact

Federal, state and local tax impacts are tax payments to the state and local governments by firms and by individuals whose jobs are directly dependent upon and supported (induced and indirect jobs) by seaport activity and seafood processing at the Port of New Bedford. The tax impacts include state and local taxes collected from all sources, both personal and business taxes. Federal, state and local taxes are based on income indices developed by the Tax Foundation, as well as tax metrics developed from State and Local Government Finance, published by the U.S. Bureau of Census. These metrics are applied to the direct, induced and indirect personal income impacts, as well as average corporate profits.[2]

6. Related User Impacts

Related user impacts occur with firms in the downstream logistics operations involved in the seafood processing industry, such as warehousing and distribution and the ultimate sales to wholesalers and restaurants. These jobs are not entirely dependent upon the Harbor, but reflect the importance of the Harbor to local and national firms. While the facilities and services provided in the Harbor are a crucial part of the infrastructure allowing these related jobs to exist, they would not necessarily be immediately displaced if marine cargo or seafood operations were to cease.

The direct, induced, and indirect port sector job, income, revenue and tax impacts were subtracted from the total related impacts to avoid double counting, as the related impacts include impacts at each stage of the supply chain.

[2] The Tax Foundation publishes similar tax indices for state and local tax burdens for each state in the United States. State and Local Government Finance published by the US Bureau of Census, provides detailed tax revenues by type of tax.

Data Collection

The purpose of this section is to provide a summary of the methodological approach used to estimate the economic impacts of the Port of New Bedford Harbor. The methodological approach to this study is designed to provide highly defensible, as well as accurate results and has been used by Martin Associates over the last 30 years to assess the economic impacts of activity at more than 500 seaports throughout the United States and Canada.

The cornerstone of the Martin Associates approach is the collection of detailed baseline impact data from firms providing services at the Port and within the Harbor. To ensure accuracy and defensibility, the data was collected from personal and telephone interviews with 147 firms in the Port of New Bedford's *Port Services Directory*. These firms represent the universe of firms providing services in the New Bedford Harbor (including marine terminals and cargo activity, seafood processors and fleet operators, maritime services, commercial ferry operations and marinas).

Economic Impact of the Port of New Bedford

Table 1
Summary of the Economic Impacts Generated by the Port of New Bedford, 2015

	TOTAL HARBOR-WIDE
JOBS	
Direct	6,225
Induced	4,101
Indirect	2,512
TOTAL	**12,839**
PERSONAL INCOME	
Direct	$320,285
Re-spending/Local Consumption	$429,375
Indirect	$118,185
TOTAL	**$867,845**
BUSINESS REVENUE (1,000)	**$3,289,076**
LOCAL PURCHASES (1,000)	**$280,192**
STATE AND LOCAL TAXES (1,000)	**$150,544**
FEDERAL TAXES (1,000)	**$358,057**
RELATED IMPACTS	
Jobs	23,739
Income (1,000)	$811,723
Output (1,000)	$6,069,271
State/Local Taxes (1,000)	$200,666
FEDERAL TAXES (1,000)	$534,678

* Totals may not add due to rounding

**The re-spending/local consumption impact cannot be divided by induced jobs to estimate induced income, since the re-spending impact also includes local purchases. This would overstate the induced income impact.

As Table 1 indicates, the seafood processors combined with the other maritime services, cargo activity, and marinas in the New Bedford/Fairhaven Harbor generated the following economic impacts for the local and regional economy:

- **36,578 jobs in Massachusetts** are in some way related to the cargo and seafood moving through the Harbor in 2015.

- Of those 36,578 jobs in Massachusetts, **6,225 direct jobs** are generated by the seafood activity, marine cargo, and marinas. Approximately 95% of these direct jobs are held by residents in cities located within Bristol County, which is depicted in Table 2.

Table 2
Summary of Residency for New Bedford Harbor Employees

City/County	Residency Percent
Bristol County	**95%**
New Bedford	45.03%
Fairhaven	6.47%
Dartmouth	0.40%
Acushnet	0.51%
Fall River	13.32%
Westport	0.46%
Other Bristol County	28.81%
Plymouth County	**2.70%**
Mattapoisett	0.43%
Marion	0.00%
Other Plymouth County	2.27%
Barnstable County	**0.98%**
Falmouth	0.98%
Other MA	**0.46%**
Other RI	**0.67%**
Other US	**0.20%**
TOTAL	**100%**

- As the result of local and regional purchases by those 6,225 individuals holding the direct jobs, an additional **4,101 induced jobs** are supported in the region.

- **2,512 indirect jobs** are supported by $280.2 million of local purchases made by businesses supplying services to the processors, maritime services, cargo operations, and marinas dependent on the Harbor.

- The balance, **23,739 jobs, are classified as related jobs** and are with downstream logistics operations involved with the seafood processing, such as warehousing and distribution after the seafood leaves the port processing operations and cold storage facilities, as well as ultimate sales to wholesalers and restaurants.

In 2015, the maritime and seafood activity in the New Bedford/Fairhaven Harbor supported $9.8 billion of total economic activity in the Commonwealth of Massachusetts.

- Of the $9.8 billion, **$3.3 billion is the direct business revenue** received by the firms directly dependent upon the Port and Harbor and additionally, those firms providing maritime and inland transportation services to the cargo and seafood handled in the Harbor and the vessels and fishing fleets calling the Port, as well as ship and rig repair and maintenance services. An additional $429.4 million is used for local purchases by the direct job holders, and this is captured by the re-spending and local consumption impact portion of the total personal income impact.

  The remaining $6.1 billion represents the value of the output to the Commonwealth of Massachusetts that is created from the downstream logistics involved with the seafood processing industry. This includes the value added at each stage of the processing, as well as the value added at each stage of the logistics supply chain. This dollar value represents the sphere of influence of the processors, cargo operators, maritime services and marinas in 2015, and **accounts for 2% of the $481.6 billion GDP for the Commonwealth**. It is to be emphasized that the $6.1 billion value of output associated with the related users would not necessarily be lost to the Commonwealth's economy since a portion of this related value of output is supported by the consumption of the seafood that is processed in New Bedford. Should the processing operations be relocated out of the Commonwealth, consumption of seafood will still occur in Massachusetts, and hence the logistics supply chain to supply seafood consumption would still be in place. In contrast, if the processing and fishing fleet operations were to be discontinued in New Bedford, a portion of the related value of output supported by the seafood processing, the direct business revenue, and the re-spending of the direct income for local consumption by the directly employed workers would be lost from New Bedford and the Commonwealth, should these operations be moved out of state.

- Marine activity supported nearly $1.6 billion of total personal wage and salary income and local consumption expenditures for Massachusetts residents. This includes $867.8 million of direct, indirect, induced and local consumption expenditures, while the remaining $811.7 million was received by the related port users. The 6,225 direct job holders received $320.3 million of direct wage and salary income.

A total of $508.6 million of federal state and local tax revenue was generated by marine and seafood activity in the Harbor. In addition, $735.4 million of federal, state and local taxes were created due to the economic activity of related users of the seafood moving via the Harbor. The total federal, state and local tax impact, including the impact of related port users, is $1.2 billion.

The Economic Impacts of the Port of New Bedford and the New Bedford/Fairhaven Harbor

The impacts were estimated for two sectors of the New Bedford harbor:

1.) The seafood processing and vessel operations, and
2.) The non-seafood sector including marine cargo terminals, marinas, commercial ferries and marine construction/non-fishing ship repair and boat building operations.

The Economic Impacts of the Seafood Processing and Fleet Operations at the Port of New Bedford

The commercial seafood sector operating in the New Bedford/Fairhaven Harbor consists of processing operations and the fishing fleet operations. Interviews with the processors and vessel owners/operators located in New Bedford Harbor and surrounding area were used to estimate the direct impacts of the home-porting activity as well as the shore-side activity that occurs to support these operations. For those directly employed as crew members on these vessels, efforts were made to identify what percent of the crew are full-time residents of the region versus those who travel to the New Bedford-area for a specific fishery's season.

1. Processors

Interviews with more than 40 processors located in the New Bedford Harbor area were used to estimate the direct impacts associated with processing operations. Through these interviews, full-time and part-time employees were identified as well as residency, pounds of seafood processed from landings in New Bedford and from other domestic and international origins, as well as local expenditures. These expenditures include materials such as ice, packaging, rent and utilities, cost of goods, and contract services with trucking companies, etc.

The expenditures were then combined with jobs to value-of-sales ratios in corresponding supplying industries to estimate the number of local direct jobs supported by processors in the New Bedford Area. **In total, approximately 140 million pounds of seafood was landed in New Bedford Harbor and an additional 250 million pounds of domestic and international seafood**

Photo Source: Eastern Fisheries

was processed. The largest seafood type processed and landed in New Bedford is sea scallops, which accounted for more than three quarters of the landed catch in 2015.

Other seafood that is landed and processed in New Bedford includes Atlantic herring and mackerel, surf clams, lobster, Jonah crabs, flounder, angler, haddock, cod, hake, redfish, and squid as well as several other species.

Processing operations include weighing, fileting, cleaning, and repackaging the seafood. Once the seafood is processed, it is then distributed for consumption either locally or internationally. From the processor, the seafood can be trucked locally to wholesalers, go to a cold storage warehouse, trucked to an airport such as Boston's Logan International Airport or New York's John F. Kennedy International Airport where it is flown to various domestic and international destinations, or trucked to the Port of New York New Jersey where it is put on container vessel to be shipped internationally. It can also be trucked from New Bedford to Worcester where it is railed out to the West Coast for export to Asia.

Economic models were developed to measure the economic impacts at each stage. Interviews were used to develop estimates of the total share and volume of seafood processed that was locally landed; the share and volume of seafood that was trucked or railed into New Bedford for processing (more than 70%), the volume of processed seafood that was frozen and distributed locally, nationally or internationally; the volume and share that was trucked to cold storage facilities in the Harbor or nearby locations of cold storage operations; the share and volume of processed seafood that was moved by rail to the West Coast for export; the volume and share of fresh seafood that was distributed directly from New Bedford processors; and the volume and share of seafood that was trucked to regional distribution centers and also loaded onto flights at JFK International Airport of Logan International Airport.

Using these models, the direct jobs, income, revenue, local purchases and tax metrics were developed for all stages of the fish processing operations and used to estimate the direct impacts for the seafood processing operations. Induced and indirect models, as previously described, were then used to estimate the induced and indirect impacts.

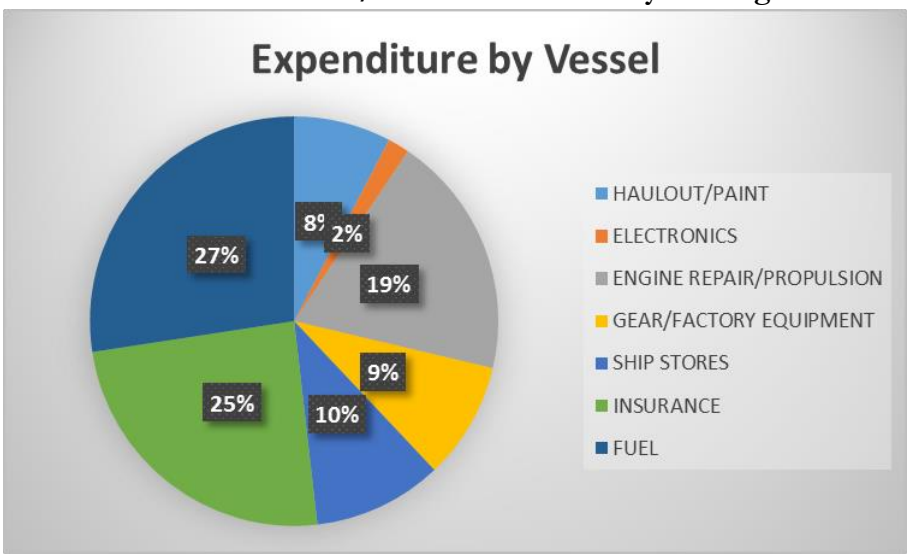
2. Fleet Operations

To estimate the economic impacts generated by the commercial fishing fleet activity in the Harbor, the types of fishing vessels moored at the marinas were profiled as to the average expenditures per type of vessel. To estimate the expenditures for the fishing vessel, Martin Associates conducted interviews with the various fishing vessel and fleet operators operating in the Harbor. Furthermore, interviews were conducted with shipyards specializing in providing services to

the New Bedford based fishing fleet, as well as with chandlers, brokers, hardware and electronics retailers, and engine and propulsion shops.

Exhibit B presents the expenditures in New Bedford per vessel for the fleet based in New Bedford in 2015. These expenditures were then combined with the jobs to value-of-sales ratios in corresponding supplying industries to estimate the number of local direct jobs supported by the vessels based in the Harbor. Added to these direct jobs is the number of crew employed by the fleet, ship brokers and insurance brokers, as well as employees at the Whaling City Seafood Display Auction. Care was taken to not double count jobs in the maritime services sector also providing services to the marine cargo operations, commercial ferries, marine construction, and marinas.

Exhibit B
Annual Expenditures in New Bedford/Fairhaven Harbor by Fishing Vessels in the Harbor



These expenditures were then multiplied by the number of fishing boats moored in the Harbor to estimate the total direct impacts. Induced impacts were also estimated using the previously described induced and indirect impact models developed by Martin Associates for the Commonwealth of Massachusetts.

The impacts of the fish processing operations and the fleet operations were then combined to estimate the impacts of the seafood industry located in the New Bedford/Fairhaven Harbor in the Commonwealth of Massachusetts.

Table 3 presents the economic impacts generated by the fishing activity in the Harbor.

Table 3
Economic Impacts of Port of New Bedford Seafood Industry

	Seafood Industry
JOBS	
Direct	5,635
Induced	3,760
Indirect	2,215
TOTAL	**11,611**
PERSONAL INCOME (1,000)	
Direct	$296,302
Re-spending/Local Consumption	$396,705
Indirect	$101,021
TOTAL	**$794,028**
BUSINESS REVENUE (1,000)	**$3,181,083**
LOCAL PURCHASES (1,000)	**$248,078**
STATE AND LOCAL TAXES (1,000)	**$141,174**
FEDERAL TAXES (1,000)	**$339,067**
RELATED IMPACTS	
Jobs	23,739
Income (1,000)	$811,723
Output (1,000)	$6,069,271
State & Local Taxes (1,000)	$200,666
FEDERAL TAXES (1,000)	$534,678

Note: Totals may not add due to rounding
*Revenue excludes value of the catch

In 2015, commercial fishing/seafood processing activity in the New Bedford/Fairhaven Harbor generated the following impacts:

36,578 jobs were supported by the seafood and commercial fishing industry

- 5,635 direct jobs, including full-time equivalent jobs with the fishing crew based at the Harbor, jobs with local shipyards, chandlers, engine/propulsion repair shops, retail stores, suppliers of fishing gear, insurance brokers, public restaurants, retail stores, and fish processing and cold storage operations.
- As the result of purchases by these 5,635 directly generated jobs, an additional 3,760 induced jobs are created in the local economy.
- The $248.1 million of local purchases by the firms located in the New Bedford Harbor and surrounding area created an additional 2,215 indirect jobs in the local economy.
- Another 23,739 jobs are classified as related jobs and include downstream logistics operations involved in the seafood processing industry in 2015.

Commercial fishing and seafood processing activities supported $1.6 billion of total personal wage and salary income and local consumption expenditures for Massachusetts residents. This includes $794.0 million of direct, indirect, and re-spending and local consumption expenditures, while the remaining $811.7 million was received by related port users as personal income.

Commercial fishing and seafood processing activities supported $9.6 billion of total economic activity in the Commonwealth of Massachusetts.

- Of the $9.6 billion, $3.2 billion is the direct business revenue received by firms directly dependent on the seafood processing and fleet operations.
- An additional $6.1 billion represents the value of the output to the Commonwealth that is supported by the seafood processing operations in the New Bedford area. This includes value added at each stage of the seafood processing supply chain.
- The remainder, $396.7 million, represents the personal re-spending and local personal consumption impact generated by the direct earnings received by the direct job holders.

A total of $480.3 million of direct, induced and indirect federal, state and local tax revenue was generated by processing activity at the Port of New Bedford. In addition, $735.2 million of federal, state and local taxes were supported due to economic activity of the related users using the Port of New Bedford.

The Economic Impacts of Marine Cargo, Marina, and Ferry Activity at the Port of New Bedford

In 2015, a total of 280,000 tons of cargo moved through the marine facilities owned by the Port of New Bedford and was also home to many recreational boating activities such as water taxis, ferries, and recreational marinas. These 280,000 tons included petroleum, aggregates, and imported fruits. The ferries take passengers back and forth to locations such as Martha's Vineyard, Cuttyhunk Island, and Nantucket. Additionally, the seven marinas moored 570 recreational boats in 2015.

1. Overview of the Seaport Impact Structure

The movement of these 280,000 tons of cargo through the Port of New Bedford cargo terminals generates economic activity in various business sectors of the state and local economy. Specifically, three distinct economic sectors are involved in providing services to move the cargo through the Port of New Bedford marine terminals and provide maritime services to the marinas and ferry operations. These are the:

- Surface Transportation Sector
- Maritime Service Sector
- New Bedford Harbor Development Commission

Jobs, income, revenue and tax impacts are estimated for each sector, as well as for specific job categories within each sector.

Economic Impact Sectors

Within each sector, various participants are involved. Separate impacts are estimated for each of the participants. A discussion of each of the three economic impact sectors is provided below, including a description of the major participants in each sector.

(1) The Surface Transportation Sector

The surface transportation sector consists primarily of trucking activity moving cargo to and from the marine terminals.

(2) The Maritime Service Sector

This sector consists of numerous firms and participants performing functions related to the following maritime services:

- Cargo Marine Transportation;
- Vessel Operations;
- Cargo Handling; and
- Federal, State, and Local Government Agencies

A brief description of the major participants in each category is provided below:

- **Cargo Marine Transportation** - Participants in this category are involved in arranging for overland and water transportation for export or import freight through the seaport. The freight forwarder/customhouse broker is the major participant in this category and arranges for the freight to be delivered between the Port of New Bedford and inland destinations, as well as the ocean transportation. This function performed by freight forwarders is most prevalent for general cargo commodities. For bulk cargo, arrangements are often made by the shipper/receiver.

- **Vessel Operations** - This category consists of several participants. The steamship agents provide a number of services for the vessel as soon as it enters the New Bedford/Fairhaven Harbor, including arranging for pilot services and towing and for ship supplies. The agents are also responsible for vessel documentation. In addition to the steamship agents arranging for vessel services, those providing the services include:

- **Pilots** - assist vessels navigating to and from the Port of New Bedford terminals;

- **Chandlers** - supply the vessels with ship supplies (food, clothing, nautical equipment, etc.);

- **Towing firms** - provide tug assist service to vessels docking and undocking at a terminal;

- **Bunkering firms** - provide fuel to the vessels;

- **Marine surveyors** - inspect the vessels and the cargo; and

- **Shipyards/marine construction firms** - provide repairs, either emergency or scheduled, and marine pier construction and dredging.

- **Cargo Handling** - this category involves the physical handling of cargo at the Port of New Bedford between land and the vessel. Included in this category are:

    - **Longshoremen** - are members of the International Longshoremen's Association, involved in the loading and unloading of cargo from the vessels, as well as handling the cargo prior to loading and after unloading;

    - **Stevedoring firms** –manage longshoremen and cargo-handling activities;

    - **Terminal operators** - are often stevedoring firms who operate the maritime terminals where cargo is loaded and off-loaded;

- **Government Agencies** - this maritime service sector category involves federal, state and local government agencies that perform services related to cargo handling and vessel operations at the Port of New Bedford. These include U.S. Customs and Border Protection, U.S. Environmental Protection Agency, U.S. National Oceanic and Atmospheric Administration, and U.S. Coast Guard.

- **Marinas and Ferry Boat Operations** - this includes those employed by the seven recreational marinas located in the Harbor which moored approximately 570 recreational boats in 2015. This also includes employees involved with the ferries located in the Harbor that travel to Cuttyhunk Island, Martha's Vineyard, and Nantucket as well as a water taxi that also sails to Cuttyhunk.

- **Port of New Bedford** - this sector includes those individuals employed by the New Bedford Harbor Development Commission to oversee port activity.

Commodities Included in the Study

The Port of New Bedford handled 280,000 tons of cargo in 2015 including aggregates, fruit, and petroleum. Aggregates handled at the Port of New Bedford are often shipped to Cape Cod for construction projects. Clementines from Morocco are the largest imported fruit at the Port. Petroleum is handled at terminals such as Sprague Energy and Global and is used by bunkers who fuel fishing vessels in the Harbor as well as distributors that provide fuel to residential customers.

2. Methodology

The direct jobs, income and revenue impacts were estimated directly for the surveys of terminal operators, maritime services providers, ship and boat yards, and marine construction companies. For the cargo operations, models were developed to measure the number of dockworker hours generated by the cargo throughput, the number of tug assists and pilotage assignments required by the vessel operations and the number of truck trips and associated trucker jobs. Jobs with freight forwarders and agents were also estimated for the fruit, aggregates and petroleum products handled at the marine cargo terminals.

The results of the interviews with the ferry and marina operations were used to develop the direct impacts for these categories. In addition, a recreational boating model was developed to translate annual expenditures by power and sailboats into jobs with support operations including haulout and storage, painting, electronics and gear, fuel, etc. These expenditures by type of recreational boat were developed from internal Martin Associates databases for marina operations. The recreational boat expenditures by type of boat were multiplied by the number of sail boats and power boats moored at the marinas located in the Harbor to estimate the direct jobs with the local service providers.

Induced and indirect impacts for the cargo, maritime services, ferry, and marina operations were estimated using the induced and indirect models described previously.

3. Summary of the Economic Impacts Generated by Non-Seafood Marine Cargo, Recreational Boating and Ferry Operations Activity at Port of New Bedford Marine Terminals

The economic impacts generated by marine cargo, maritime services, and marina activity handled at Port of New Bedford marine terminals and within the Harbor are summarized in Table 4.

Table 4
Economic Impacts of Cargo activity at Port of New Bedford Marine Terminals and Maritime and Marina Activity

	Maritime Services/Cargo/Marinas
JOBS	
Direct	590
Induced	341
Indirect	297
TOTAL	**1,228**
PERSONAL INCOME (1,000)	
Direct	$23,983
Re-spending/Local Consumption (1,000)	$32,670
Indirect	$17,164
TOTAL	**$73,817**
BUSINESS REVENUE (1,000)	**$107,992**
LOCAL PURCHASES (1,000)	**$32,114**
STATE AND LOCAL TAXES (1,000)	**$9,370**
FEDERAL TAXES (1,000)	**$18,990**

Note: Totals may not add due to rounding

As this table indicates, maritime (cargo and vessel) and ferry and marina activity at the Port of New Bedford and within the New Bedford/Fairhaven Harbor facilities created the following economic impacts:

1,228 jobs were generated by the marine cargo, ferry and marina activity in the Harbor

- 590 direct jobs;
- 341 induced jobs supported by the purchases of 590 directly employed individuals;
- 297 indirect jobs were generated as a result of $32.1 million of local purchases by firms directly dependent upon non-seafood activity at Port of New Bedford marine cargo and marina facilities;

$73.8 million of personal earnings, re-spending and local consumption and indirect income were created on the local economy

- The 590 direct employees earned $24.0 million of wages and salaries;
- As the result of the re-spending of the direct wages and salaries, an additional $32.7 million of re-spending and local personal consumption activity was created;
- The 297 indirect jobs holders received $17.2 million of indirect income;

Businesses providing services to the Port of New Bedford and the Harbor received $108 million of business revenue, and the directly dependent companies providing the services to the Harbor activity made $32.1 million of local purchases that supported the indirect jobs.

A total of $28.4 million of state and local taxes were generated by the marine cargo, ferry and marina activity in the Harbor.

No related impacts were estimated for the cargo, ferry and marina operations, since the related impacts are actually part of the direct, induced and indirect impacts for these sectors.

Photo Source: baltimoresun.com

The economic impact of the harbor is directly related to the continuous maintenance of its infrastructure, including continuous dredging of the harbor – the process of removing silt and materials build up from the bottom of the harbor to ensure the safe and efficient movement of a wide variety of vessels.

Part II-The Case for Phase V & Navigational Dredging in New Bedford and Fairhaven

The Importance of Dredging

Dredging is the removal of sediment and other materials from the harbor floor. It is needed on a routine basis to maintain navigational channels and ensure vessels can safely travel within the harbor. It can also be used to remove contaminants from polluted waterways.

In New Bedford, the -30 foot federal navigational channel has not been fully dredged in more than 50 years. In 2015, the Commonwealth of Massachusetts conducted an interim dredge project that brought the channel down to -28.5 feet. In the 1980s, the U.S. Environmental Protection Agency (EPA) determined the harbor to be contaminated and a threat to public health from years of discharge from local manufacturers directly into the harbor.

From the 1940s until the mid-1970s, PCBs were discharged into the New Bedford harbor directly from two capacitor manufacturers and indirectly into the harbor via the City of New Bedford's sewer system. These discharges contaminated the sediments at levels ranging from a few part per million (ppm or mg/kg) to more than 200,000 mg/kg PCBs. Other contaminants (such as heavy metals and PAHs, Polycyclic aromatic hydrocarbons) have also been discharged from a number of sources into the harbor at various times since the 1800s.

When the EPA determined that the current human health risks from the harbor were from direct contact with PCBs in the sediments, and the ingestion of fish and shellfish, they began (and continue) to address these risks by dredging and disposing of contaminated materials.

Continued investment in dredging is greatly needed for the working waterfront to not only work at full capacity, but to create incentive for businesses to continue growing and investing in the city's economy.

Commercial cargo operations and the commercial fishing industry have suffered due to the inability to build new piers or upgrade existing infrastructure from the contamination and cleanup requirements and costs. As these operations have suffered, it has become more difficult to conduct maintenance dredging for navigational purposes because of the high costs of the environmental cleanup activities.

- Lack of maintenance dredging has resulted in limiting the size of commercial ships that can enter the harbor, thus limiting its use as a regional port facility.
- Additionally, new regulations that restrict total fishing effort across multiple species have increased pressure on the infrastructure due to the increased frequency of boats in port and the number of hours that are spent in port.

Maintaining the New Bedford/Fairhaven Harbor through dredging and infrastructure projects that support vessel activity and access to businesses along the waterfront is extremely important because it preserves jobs and increases development.

Because of the contamination in the Harbor combined with the complex permitting and expensive disposal requirements of conventional dredging projects, it is economically unfeasible for individual property owners to privately fund dredging along their properties to maintain access.

In 2003, recognizing the need for cost-effective and timely maintenance dredging, as well as the proper management of the contaminated dredged sediments, the Massachusetts Office of Coastal Zone Management (CZM) completed the New Bedford Harbor Dredge Material Management Plan (DMMP) which allowed for the proper disposal and management of contaminated navigational and infrastructure improvement related dredged sediment.

The DMMP was later combined with the State Enhanced Remedy (SER) process, a plan created between the Environmental Protection Agency and the Massachusetts Department of Environmental Protection (DEP) that enhances the EPA's cleanup of the Harbor. The SER process provides a streamlined permitting methodology that allows property owners to take advantage of economies of scale associated with group permitting, design, and implementation of a group-phased approach to dredging projects.

The SER provision was created specifically to clarify the process to address contamination with which all future maintenance or improvement dredging projects in New Bedford harbor would have to deal. The SER provision was designed to allow the Port to emulate the Superfund process and was formulated and authorized through inclusion in the 1998 USEPA Record of Decision for the New Bedford Superfund Site. Among other things, the SER process benefits the EPA's cleanup remedy because navigational dredging removes sediment in the harbor contaminated with PCB concentrations up to 50 ppm and heavy metals that are below EPA's cleanup levels and that would not be otherwise addressed.

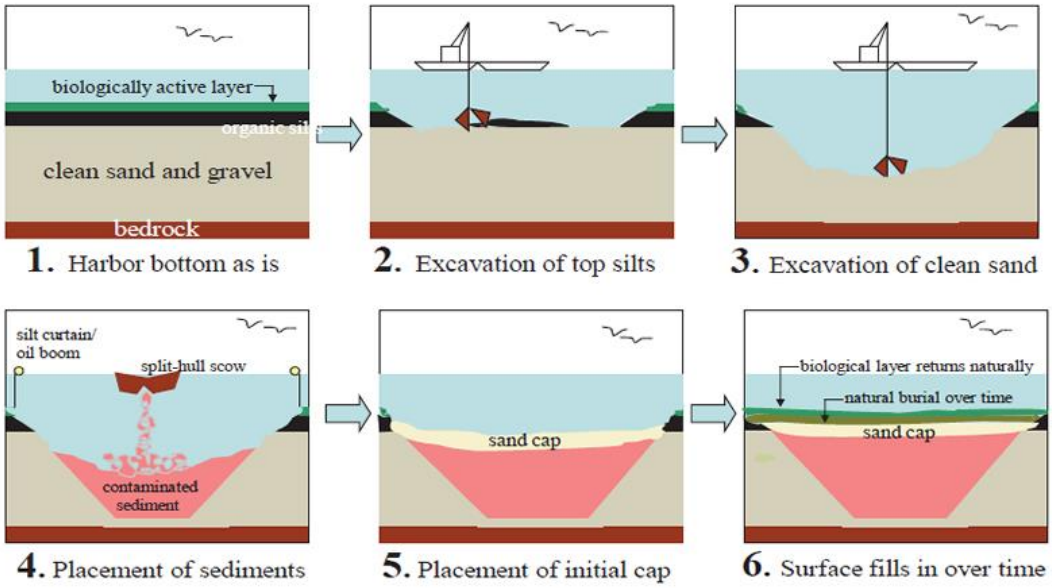
The SER process has allowed navigational dredging to fall under the Superfund regulations which allows for on-site disposal and regulatory over-site without on-site permits. Through the streamlined SER process, regulatory agencies work cooperatively with the EPA and DEP to ensure that projects are adequately regulated and meet the requirements of local and federal laws while also ensuring that the remediation of the harbor is not unduly delayed by the normal permit application and approval process.

The SER Process in Use

Four phases of the SER process have been completed. The next phase of this project, **Phase V, could benefit expansion of up to 22 waterfront properties and businesses and remove up to 620,000 cubic yards (cy) of contaminated dredge material from the harbor bottom that is impacted and unsuitable for offshore disposal,** enhancing the cleanup efforts and maintaining harbor depth that users depend upon.

Building upon and working with the SER process, the 2004 Final Environment Impact Report (FEIR) laid out the methods with which the City of New Bedford could site a series of Confined Aquatic Disposal (CAD) cells in the harbor. The ability to use CAD cells for sediment disposal solved a significant and costly dredged material disposal problem by allowing for nearby, in-water disposal in a manageable consolidated area.

Under the SER process and through the creation of a series of CAD Cells, 545,000 cy of dredged material has been placed in the four CAD Cells to date. This has provided an enormous enhancement to the cleanup that EPA is conducting, and does not include the two CAD Cells or contaminated sediment removed under their cleanup.



For illustrative purposes only – NOT TO SCALE

The use of the SER process and the ability to dispose of the contaminated materials within the CAD cells has provided harbor users with an option to maintain water depths in a timely and cost effective manner in a situation that otherwise would not be economically viable.

The first benefit realized is the permitting time and cost benefits. Traditional permitting requires the application processes of, and coordination with, multiple agencies. Under the normal process, to get a property dredged, a proponent would need the following:

1. A 401 Water Quality Certification from MassDEP
2. A Section 10/404 or 103 Permit from the United States Army Corps of Engineers
3. A Chapter 91 license from the MassDEP
4. Massachusetts Environmental Policy Act Review (for dredging of 10,000 cy or more)
5. Permitting review by the local Conservation Commission (Notice of Intent under the Wetlands Protection Act), particularly if contaminated materials are to be brought upland for offsite disposal.

This permitting process can take anywhere from 6 months for a simple, straightforward project to more than a year to 18 months for a more typical project. The permitting process comes with significant costs for engineering and permitting support, and can cost anywhere from tens of thousands of dollars to several hundred thousand dollars.

While the engineering design process costs or timing are not significantly affected through the SER process and the use of the CAD Cells, the permitting timeline and costs are significantly reduced.

One of the major benefits of the SER process is that all of the permitting agencies are present for the meetings, so the permitting is streamlined, all of the agencies review input from their regulatory peers, and the performance standards for SER projects are already established.

Permitting a project under SER can typically be done in two to three meetings, which are held once per month on average. In addition, the HDC's approach of phased dredging projects allows the property owners to take advantage of the economies of scale of permitting the several properties together as one project.

Through the streamlined SER process, regulatory agencies work cooperatively with the EPA and DEP to ensure that projects are adequately regulated and meet the requirements of local and federal laws while also ensuring that the remediation of the harbor is not unduly delayed by the normal permit application and approval process.

Work completed to date under the SER, as shown on Figures 1 and 2, is summarized in the following table.

Table 5: Dredge Activities Completed Under SER

Phase	Activity	Date of Completion
Phase I	**State Pier berth** Approximately 75,000 CY of contaminated sediment was removed and placed at the New Bedford Railroad Yard This work was not performed under the SER and obtained the required permits.	**2001-2002**
Phase II	**Construction of CAD Cell #1** Dredging of : • Bridge Terminal Fish Island • DW White Terminal • Maritime Terminal • Rt. 6 Bridge Approach • Pease Park Boat Ramp • Linberg Marine • Niemiec Marine • DN Kelly & Sons • Atlantic Shellfish Sediment from the Top of CAD Cell #1 was placed in the Borrow Pit – Approximately 20,000 CY The uncontaminated, native sediment from the bottom of CAD Cell #1 was used for a pilot cap OU#3 outside the hurricane barrier. Navigational Materials dredged in Phase II were placed in the Borrow Pit CAD Cell and CAD Cell #1. A total of 52,000 cy of navigational material was dredged in Phase II.	**2005-2006**
Phase III	**Construction of CAD Cell #2** Dredging of : • Packer Marine • Niemiec Marine • South Terminal • Gifford Street Boat Ramp • NB Rowing Facility • Tonnesson Park • Olde N. Wharf Fisheries • Fairhaven Shipyard • Union Wharf • Linberg Marine • Warren Alexander South • Steamship Authority The construction of CAD Cell #2 proceeded as two separate projects, with 34,210 CY of material contaminated with PCBs excavated from the top of the CAD cell and placed within CAD Cell #1. The 22,381 CY of Steamship Authority material was disposed in CAD Cell #1, because CAD Cell #2 was not completed. Subsequent to the removal of the top of CAD cell material, 120,060 CY of material was excavated and transported to the Cape Cod Bay Disposal Site to finish the creation of CAD Cell #2.	**2008-2009**

	After the completion of Phase III, two additional small dredging projects (AGM Marine and the U.S. Army Corps Hurricane Barrier) disposed of about 5,500 CY and 1,000 CY into CAD Cell #2. CAD Cell #2 received sediment from the Phase III dredge sites in New Bedford and Fairhaven. Approximately 63,176 CY of material was placed within the CAD Cell.	
Phase IV	**Construction of CAD Cell #3** Dredging of: • Mooring Mitigation Areas North and South • Gifford Street Channel Relocation • The Top of Dredge from the new channel for the Marine Commerce Terminal • Federal Turning Basin • South Terminal CAD Cell #3 construction began in spring 2013, with the Top of CAD Cell #3 (contaminated material totaling approx. 31,100 CY) placed into CAD Cell #2. Clean material from the lower portion of CAD Cell #3 was disposed offshore at permitted disposal sites. CAD Cell #3 received material from dredging activities associated with the Construction of the 28.45 acre Marine Commerce Terminal (MCT), consisting of a confined disposal facility ("CDF") and upland area in the South Terminal location of the New Bedford Harbor, as well as the dredging and filling associated with that construction. The navigational sediments dredged and placed within CAD Cell #3 is approximately 231,616 CY from Phase IV. Additionally, EPA as placed material into CAD Cell #3 from the construction of the Superfund Lower Harbor CAD Cell (LHCC) Phase 1. CAD Cells #2 and #3 also received sediment from the Interim Federal Channel Dredge Project (IFCD) totaling approximately 117,000 CY.	**2013-2015**

Prior to the completion of the IFCD Project in 2015, The Federal Navigation Channel had not been dredged since the early 1950s (except for the construction of the Hurricane Barrier in the mid-1960s) when the channel was excavated to elevation -30 MLLW. Prior surveys of the Federal Navigation Channel showed that portions of the channel were inadequate to safely accommodate larger vessels (typically 24' of draft or greater) including some cargo ships.

While maintenance dredging of the Federal Navigation Channel is under the purview of the United States Army Corps of Engineers (USACE), it was apparent that the funding for the USACE to perform the maintenance dredging was not likely to be approved in the near future.

Previous Studies on the Impact of Dredging

As New Bedford is the #1 Fishing Port in America for more than 14 years running, there have been plenty of studies and assessments on the economic activities occurring in the Harbor.

These studies and reports clearly establish the economic viability of the New Bedford Harbor and provide a great baseline for understanding the character and makeup of activities in the Harbor.

These studies highlight and clearly demonstrate the need for dredging and infrastructure improvements.

Studies included in the review:

1. A 2004 study by FXM Associates titled *"Potential Economic Effects of Dredging New Bedford Harbor"*
2. The US Army Corps of Engineers Draft Maintenance Dredging Economic Evaluation, New Bedford Harbor, New Bedford, Massachusetts, 2010
3. The 2010 New Bedford Fairhaven Harbor Plan
4. 2014 MassDOT Ports Compact Study
5. A Technical Memorandum prepared by FXM Associates "*New Bedford Waterfront Plan: Demographic and Economic Characteristics; Summary Interview Findings; Economic Issues and Opportunities"* October 2015
6. Two 2015 Studies led by Sasaki Associates including a Draft Waterfront Report and a Draft Waterfront Redevelopment Plan

The 2004 FXM Assessment highlights the impacts of shallow water depths for Maritime Terminal and Bridge Terminal. It states: *Because of water depth limitations, most refrigerated break bulk vessels cannot be fully loaded and Maritime International cannot fully utilize its maximum freezing capacity, thus limiting production. Inadequate water depths at the Maritime and Bridge Terminals cost shippers $60-100,000 per trip ($1.2 to $2 million annually for a projected 20-vessel export market) and cost producers $400-700,000 in lost sales per trip ($8 million to $14 million in lost sales annually).*

It further discusses the general economic impacts to the Harbor, estimating *that the total direct, indirect and induced economic effects of navigational, fairways and berthing dredging in New Bedford/Fairhaven Harbor could result in an additional $100 million in business sales and 600 jobs in Bristol County; $170 million in additional business sales, 1,200 jobs, $44 million additional household income, and $3.6 million in additional state tax receipts annually within Massachusetts overall…*

(Recognizing that navigational dredging has occurred since this report has been issued, this is only stated to show the benefits that were listed in 2004 when compared against the current economic state of the Harbor and its continued growth clearly supports the benefits of dredging.)

In the **USACE's draft economic evaluation**, only two facilities, State Pier and Maritime Terminal, were evaluated and showed an annual benefit of $1.94 million by solely restoring the federal channel to the previously authorized depth.

The Harbor Plan states *for this Harbor, maintenance and certain improvement dredging projects are strongly supported by federal, state, municipal, and private sector proponents. In its 2002 "Dredge Materials Management Plan" (DMMP) for New Bedford/Fairhaven Harbor, CZM has estimated that a total of up to 2,000,000 cubic yards of material will need to be dredged from the Harbor to return federal channels to authorized depths and to complete several other important state, municipal and private dredging projects outside the federal areas.*

It further discusses the benefits already achieved through 2010: *since 2004, over 150,000 cubic yards of contaminated sediment have been removed from the Harbor during navigational dredging projects and entombed within CAD cells in the DMMP area. The use of CAD cell technology has brought the composite (total) cost of the navigational dredging (including the cost to build the CAD Cell disposal facility) in the Harbor to under $100 per cubic yard. This is significantly less than disposal at available upland sites (all of which are out of state) which would cost over $400 per cubic yard. The use of CAD Cells for disposal of navigational dredge material has energized the dredging efforts within the Harbor, allowing projects that had here-to-fore been unfeasible to be completed in record time at a reasonable cost.*

The 2015 FXM memorandum states that *"Interviewees report that seafood processors have encountered difficulties gaining the permits necessary for them to expand in New Bedford and that this factor largely accounts for the job migrations outside the city limits, as both labor force in the city and infrastructure in the waterfront area remain positive assets. Policy and other economic development initiatives are needed to retain and help expand this industry in New Bedford. This would include supporting and strengthening steps that would enable seafood and related businesses to expand, whether on the waterfront or elsewhere in the city, such as the expedited permitting, zoning changes, bulkhead extensions and other specific initiatives noted in the interviews."*

Logistics of Dredging Projects and Impacts

There are many properties that are eligible for Phase V dredging or have dredging needs (assuming a 3 foot dredge depth, which would need to be verified during the design process) of between 500 cy and 98,000 cy. Four of those properties would need more than 10,000 cy dredged, thus requiring permitting through the MEPA process, and seven properties that if they require more than a 3 ft cut, would be over the 10,000 cy threshold.

As such, permitting projects for these three different scenarios will be reviewed:

- 4 large projects over 10,000 cy,
- 7 medium projects that could be around that threshold
- 11 smaller projects under that threshold

Case Study 1: Small Projects not involved in the SER Process

For these smaller projects, the permitting for a maintenance dredging project would be more straightforward. To set the parameters of this case study, it is assumed that the project requires dredging of approximately 1,000 cy of sediment which has accumulated within a previously clear

footprint. The sediment has been characterized to contain approximately 10 ppm PCBs and is unsuitable for offshore disposal.

The only acceptable disposal facility is an out-of-state landfill, therefore the dredged sediment will not be brought upland, allowed to dewater, and then transported and disposed of as manifested hazardous waste. It is assumed that all engineering, sediment characterization, and designs have been completed in a similar manner as would be completed with or without the SER Process.

Notice of Intent

- File a Notice of Intent with the Conservation Commission, detailing the location of stockpiling the dredged sediment for dewatering, the engineered controls for sediment and runoff management, and methodology and controls for loading on a truck for transport and disposal.
- NOI preparation would take 3-5 weeks, and likely require two hearings for approval.
- The order of conditions would be issued 10 days after the closing of the hearing and would need to be recorded at the registry of deeds.
- The total timing for permitting the NOI would take approximately 4 months. The engineering effort to support these activities would cost approximately $8,000.

Chapter 91 License

The Chapter 91 license application would be prepared concurrently with the NOI.

- The first action would be a pre-application meeting to confirm that a submittal of an Environmental Notification Form under the MEPA process would not be necessary due to the amount of material to be dredged.
- That application review would take 30 days and come back as not requiring further review under the MEPA process.
- While that is occurring, the engineer would begin the Chapter 91 application process. Completing the forms and required supporting information would likely take 4-6 weeks.
- Once the application is filed, if it is determined complete, the project will be assigned and a public notice will be issued to allow for public comments on the project.
- The public comment period will be open for 30 days, and once it is closed, the applicant will need to respond to all comments received, usually done within a month.
- If the comments and any outstanding issues are adequately addressed the file can be considered complete and DEP can make its decision and issue a license.
- The timing for a Chapter 91 license for this size project would like take at least 9 months, and more likely 12 months. The costs for the engineering effort to support and push through the process would be approximately $10,000.

Water Quality Certification

- Using the available sediment and project information, the engineer would be preparing the

Water Quality Certification form.

- This application would be submitted to the DEP to ensure that the dredging project would minimize any impacts to wetlands and waterways of the Commonwealth. For this size project, it would be a minor project certification (BRP WW 08).
- The application preparation would take approximately 1 month to complete and the review process would be another 30 days before the certification, but with revisions and questions, the entire process will likely take 3 months. The costs for the engineering effort for this process would be approximately $6,000.

Section 10/404 Permit

- The water quality certification would be completed concurrently with the necessary USACE permitting, as both permitting agencies would be looking to ensure the project would not cause any degradation to waters of the US.
- Similarly, the application preparation would take approximately 1 month to complete and the review process would be another 30 days before the certification but with revisions and questions, the entire process will likely take 3 months.
- The costs for the engineering effort for this process would be approximately $6,000.

In summary, for each individual project the costs and timelines would be as follows:

Table 6- Costs/Time of Case Study 1

Permit Type	Timeline	Cost
Notice of Intent	4 months	$8,000
Chapter 91 License	12 months	$10,000
401 Water Quality Cert	3 months	$6,000
Section 10/404 Permit	3 months	$6,000
Total	**12 months**	**$30,000**

Case Study 2: Mid-sized Projects not involved in the SER Process

While similar to the small project process outlined above, for a mid-sized dredge project, the permitting for a maintenance dredging project becomes more involved and requires more information and engineering controls, often more time consuming and costly.

To set the parameters of this case study, it is assumed that the project requires dredging of approximately 7,000 cy of sediment that has accumulated within a previously clear footprint, has been characterized to contain approximately 10 ppm PCBs and is unsuitable for offshore disposal.

The only acceptable disposal facility is an out-of-state landfill, therefore the dredged sediment will not be brought upland, allowed to dewater, and then transported and disposed of as

manifested hazardous waste. It is assumed all engineering, sediment characterization, and designs have been completed in a similar manner as would be completed with or without the SER Process.

Notice of Intent

- Similar process as above, however NOI preparation would take *4-6 weeks*, and likely require two hearings for approval.
- The total timing for permitting the NOI would take approximately 4 months. The engineering effort to support these activities would cost *approximately $12,000*.

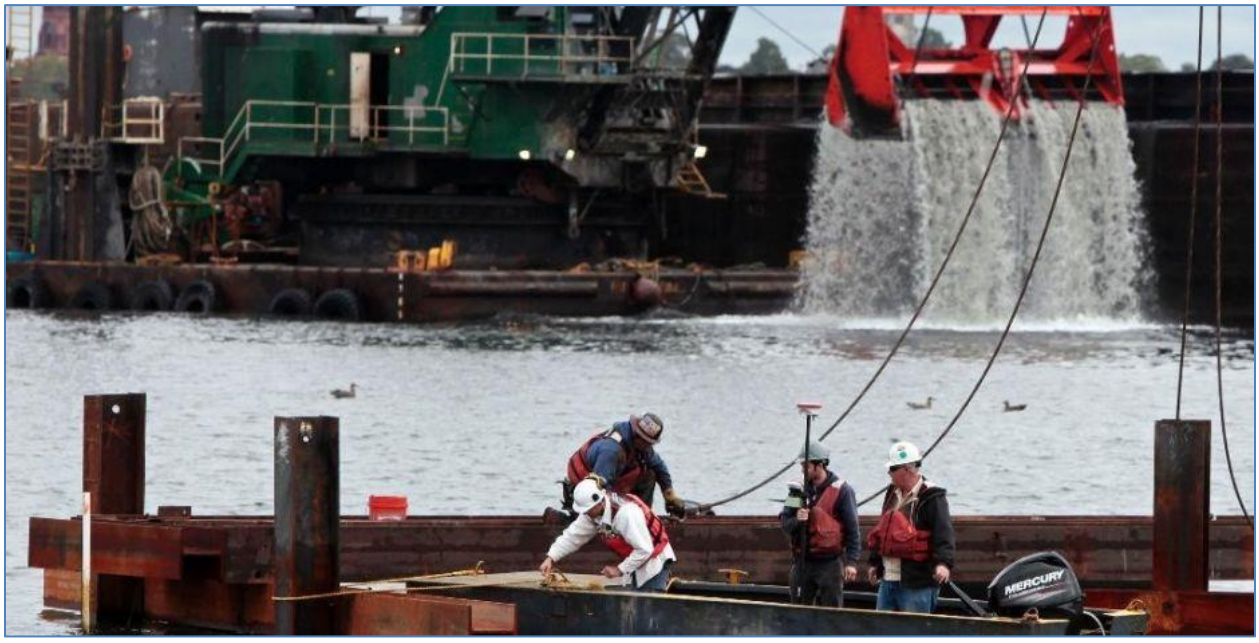


Photo Source: foxbusiness.com

Chapter 91 License

- Similar to a small-sized project, the Chapter 91 license application would be prepared concurrently with the NOI.
- However, the first action would be a submittal of an Environmental Notification Form under the MEPA process. That application review would take 30 days and come back as not requiring further review under the MEPA process.
- While that is occurring, the engineer would begin the Chapter 91 application process. Completing the forms and required supporting information would likely *take 4-6 weeks*.
- Again, once the application is filed, if it is determined complete, the project will be assigned and a public notice will be issued to allow for public comments, open for 30 days.
- Once closed, the applicant will need to respond to all comments received, usually done within a month. If the comments and any outstanding issues are adequately addressed the

file can be consider complete and DEP can make its decision and issue a license.

- The timing for a Chapter 91 license for this size project would likely take at least 12 months, and more likely 16 months. The costs for the engineering effort to support and push through the process would be *approximately $16,000*.

Water Quality Certification

- Similar to a small-sized project, application would be submitted to the DEP; however, for this size project, it would be a major project certification (BRP WW 07).
- The application preparation would take approximately 1.5 months to complete and the review process would take another 30 days before the certification, but with revisions and questions, the entire process will *likely take 4 months*. The costs for the engineering effort for this process would be *approximately $10,000*.

Section 10/404 Permit

- This process is identical to the process for a small-sized project; however, the costs for the engineering effort for this process would be *approximately $10,000*.

In summary, for each individual project the costs and timelines would be as follows:

Table 7- Costs/Time of Case Study 2

Permit Type	Timeline	Cost
Notice of Intent	4 months	$12,000
Chapter 91 License	16 months	$16,000
401 Water Quality Cert	4 months	$10,000
Section 10/404 Permit	3 months	$10,000
Total	**16 months**	**$48,000**

Case Study 3: Large Projects not involved in the SER Process

For a large dredge project, the permitting for a maintenance dredging project becomes more involved and requires more information and engineering controls.

To set the parameters of this case study, it is assumed that the project requires dredging of approximately 15,000 cy of sediment that has accumulated within a previously clear footprint. The sediment has been characterized to contain approximately 10 ppm PCBs and is unsuitable for offshore disposal.

The only acceptable disposal facility is an out-of-state landfill, therefore the dredged sediment will not be brought upland, allowed to dewater, and then transported and disposed of as manifested hazardous waste. It is assumed that all engineering, sediment characterization, and

designs have been completed in a similar manner as would be completed with or without the SER Process.

Notice of Intent

- Again, NOI is filed with the Conservation Commission, however, NOI preparation would take 4-6 weeks, and likely require *three* hearings for approval. The order of conditions would be issued 10 days after the closing of the hearing and would need to be recorded at the registry of deeds.
- The total timing for permitting the NOI would take approximately *6 months*. The engineering effort to support these activities would *cost approximately $15,000*.

MEPA Process

- Similar to the mid-sized project process, the first action would be a submittal of an Environmental Notification Form under the MEPA process. That application review would take 30 days and come back as requiring further review under the MEPA process due to the amount of material to be dredged.
- This would require preparation of an Environmental Impact Report that would discuss and review the project alternatives, proposed environmental controls and effects on the surrounding environment the project will have.
- The process will likely require submittal of a draft environmental impact report and a final environmental impact report. The process will likely *take 9-12 months* for submittals, review, public comments, and finalization of report.
- The cost for engineering effort to support this permitting process is likely to be *at least $40,000*.

Chapter 91 License

- The application process is similar to above; however, completing the forms and required supporting information would likely *take 4-6 weeks*.
- Once the application is filed, if it is determined complete, the project will be assigned and a public notice will be issued – identical to the processes for small and mid-sized projects.
- The timing for a Chapter 91 license for this size project would likely take at least *12 months, and more likely 16 months*. The costs for the engineering effort to support and push through the process would be *approximately $16,000*.

Water Quality Certification

- Similar to the mid-sized project, the engineer would submit a major project certification (BRP WW 07).
- The application preparation would take *approximately 1.5 months* to complete and the review

process would be another 30 days before the certification, but with revisions and questions, the entire process will *likely take 4 months*.

- The costs for the engineering effort for this process would be approximately *$15,000*.

Section 10/404 Permit

- This process is identical to the process for a small- and mid-sized project; however, the costs for the engineering effort for this process would be *approximately $15,000*.

In summary, for each individual project the costs and timelines would be as follows:

Table 8- Costs/Time of Case Study 3

Permit Type	Timeline	Cost
Notice of Intent	6 months	$15,000
MEPA Review	12 months	$40,000
Chapter 91 License	16 months	$16,000
401 Water Quality Cert	4 months	$15,000
Section 10/404 Permit	3 months	$15,000
Total	**16 months**	**$101,000**

Dredging Projects Permitted under the SER Process

The exercises above explored the permitting costs and timelines associated with different types of projects. As was previously indicated, **there are currently 22 properties with an interest in participating within the Phase V Dredging Program under the SER process** (see Figure 3)**.** Using the information presented above, the costs and timing of getting all those properties permitted individually would breakdown as follows:

Table 9

Type of Project	No. of Facilities	Cost per Facility	Extended Costs	Timeline
Small <5,000 CY	11	$30,000	$330,000	12 months
Medium >5,000 CY <10,000 CY	7	$48,000	$336,000	16 months
Large > 10,000 CY	4	$101,000	$404,000	16 months
TOTAL	**22**	**-**	**$1,070,000**	**16 months**

Those costs are for permitting services only. **For comparison, if these properties were to be permitted under the SER process (as is currently) intended, the costs and timescale is dramatically reduced.**

If all of the projects are permitted together, there are built-in savings on the economies of scale of completing one larger application versus 22 individual applications.

And if the SER committee is comprised of regulators from all of the different applicable regulatory departments, so the process is streamlined, it removes the need for redundancies in filing information as well as coordination with multiple agencies over a longer time span.

Projects permitted under the SER process are still required to meet all applicable regulations and performance standards, however with the unique, streamlined approach, the applications are comprehensive and condensed to approach all of the pertinent regulatory standards and the review process is conducted concurrently with all of the different agencies.

Under the SER process, the permitting costs and timeline are greatly improved over the individual permits. It is estimated that the permit preparation, presentation, review and finalization services under the SER process for all 22 properties would require an effort of approximately $220,000 and take approximately 4 months to complete.

This represents a 79.4% savings in the costs, as well as 75% reduction in the permitting timeline.

For quick comparison, the table below shows the difference between the two processes:

Table 10- Cost/Time Savings of SER

Process	Total Cost – 22 facilities	Timeline
Conventional	$1,070,000.00	16 months
State Enhanced Remedy	$220,000.00	4 months
Savings	**$850,000.00**	**12 months**

Design Impacts

The costs savings shown in the previous section are only with respect to permitting the project. While it is much more difficult to estimate the design costs for the individual projects, conducting the design as a larger group allows participants to capture savings associated with the economies of scale on the design aspect, most notably, the field work associated with developing the designs.

Each property/facility would require a hydrographic survey of the existing conditions, survey of the disposal area, as well other field work including sample collection and documentation of existing conditions.

When the facilities are designed together and as they are all located in the same harbor, there is only the need to mobilize the survey vessel once to conduct all of the surveys concurrently, and similar for the mobilization of a vibracore vessel. A typical hydrographic survey can cost between $3,000 and $10,000 per facility, and the vibracore sampling collection would cost between $3,000 and $5,000 per facility.

Using an average rate under similar methodology used for permitting, the costs would be:

Table 11- Design Cost without SER

Type of Project	No. of Facilities	Cost per Facility	Extended Costs
Hydrographic Survey	22	$6,500	$143,000
Vibracore Sampling Collection	22	$4,000	$88,000
TOTAL	**22**	**$10,500**	**$231,000**

Contrasting those figures against the same services if they were provided together for all facilities shows a significant amount of savings. Assuming multiple facilities can be serviced in a single day (which is reasonable) the costs would look like this:

Table 12- Design Cost with SER

Type of Project	Days	Cost per Day – multiple facilities	Extended Costs
Hydrographic Survey	7	$10,000	$70,000
Vibracore Sampling Collection	7	$5,000	$35,000
TOTAL	**7**	**$15,000**	**$105,000**

Those costs savings, which represent a 54% reduced level of effort, are demonstrated in the table below:

Table 13- Cost Savings with SER

Process	Total Cost – 22 facilities
Conventional	$231,000.00
State Enhanced Remedy	$105,000.00
Savings	**$126,000.00**

These are the best representations of the savings associated with the economies of scale on the design side. Beyond the field work collection, the design activities would be relatively consistent whether it is an individual facility design or as part of a larger group design.

Dredging Cost Savings Comparison – Conventional versus SER

While the savings associated with the design and permitting aspects of these projects have been explored, there are also significant savings associated with the dredging aspects of the project under the SER process using CAD Cells for the disposal facility.

There are economies of scales that the phased navigational dredging approach conducted by the HDC takes advantage of over individual projects. The phased projects are let under a single contract rather than each individual property owner letting a contract for their facility. This approach allows for a single mobilization of a single contractor, streamlines contractor dredging management and simplifies logistics of carrying out the project.

Mobilization charges typically range from $40,000-$1,000,000 depending on the size of the project and the type of equipment needed for the project. Looking at the 22 individual projects associated with Phase V, using a weighted mobilization charge of $100,000, the total mobilization costs for all of the projects would be roughly $2,200,000. However the mobilization for a single phased dredging project would likely cost $1,000,000, representing a $1,200,000 savings.

While the dredging costs remain consistent if performed individually or under the SER process, the disposal cost savings are significant. CAD Cell disposal allows for the aggregate collection and disposal of dredge sediments. Individual projects under conventional conditions would not have CAD Cell disposal options available, and the sediments within the Harbor would not meet the offshore disposal standards, thus would require upland disposal at an appropriately licensed disposal facility.

Upland disposal is a significantly more costly disposal option. In a typical process, contaminated material is dredged and placed in a scow or barge to allow for passive dewatering or brought upland for stockpiling and dewatering onsite. Depending on the characteristics of the sediment, additional steps may need to be taken so the sediment can be transported. Those steps may be in the form of chemical admixtures, lime, cement or others. Once the sediment is dry enough to be transported and properly characterized, the sediment can then be loaded onto trucks for transport to the appropriate disposal facility.

The sediment can then be transported under a hazardous waste manifest or a bill of lading and the receiving facility can then use the material as appropriate based on its characteristics. The upland disposal option requires handling the sediment multiple times and it may need to go to different receiving facilities depending on the characterization.

When CAD Cell disposal is being evaluated, the cost for the CAD Cell creation needs to be reflected in the cost savings. Due to the complicated geometry of creating a CAD cell, it will be assumed that 1.3 CY of dredging is required to create 1 CY of CAD Cell capacity. When comparing the dredging costs of conventional versus SER dredging with CAD cell disposal the cost breakdowns, based on recent project data are as follows:

Table 14- SER Savings during Dredge Construction

Activity	Cost per CY	Phase V Extended Cost (243,068 CY)	Estimated Timeline
Conventional Dredging	$30	$7,292,040	300 days
Conventional Upland Disposal	$350	$85,073,800	300 days
Conventional Total	**$380**	**$92,365,840**	**600 days**

Activity	Cost per CY	Phase V Extended Cost (243,068 CY)	Estimated Timeline
CAD Cell Creation	$30	$9,450,000	300 days
SER Dredging and CAD Cell Disposal	$45	$10,938,060	300 days
SER Dredging Total	**$-**	**$20,388,060**	**600 days**

Activity	Cost per CY	Phase V Extended Cost (243,068 CY)	Estimated Timeline
Conventional Total	$380	$92,365,840	600 days
SER Dredging Total	$-	$20,388,060	600 days
Savings	**$-**	**$71,977,780**	**0 days**

To summarize the cost and time savings from concept to execution of SER and CAD Cell disposal versus the conventional process is substantial.

Table 15- Total SER Savings

Activity	Costs Savings- SER Process	Timeline Savings- SER Process
Permitting	$850,000	12 months
Design	$126,000	-
Implementation	$71,977,780	-
Totals	**$72,953,780**	**12 months**

Infrastructure Projects and Impacts

Federal Channel Dredging

As stated earlier, the Federal Navigation Channel, prior to an interim dredging project conducted by the Commonwealth of MA in 2015, had not been dredged since the early 1950s (except for the construction of the Hurricane Barrier in the mid-1960s) when the channel was excavated to elevation -30 MLLW.

Prior to the 2015 dredging project, surveys of the Federal Navigation Channel showed that portions of the channel were inadequate to safely accommodate larger vessels (typically 24' of draft or greater) including some cargo ships.

While maintenance dredging of the Federal Navigation Channel is under the purview of the USACE, it was apparent that the funding for the USACE to perform the maintenance dredging was not likely to be approved in the near future, thus the Commonwealth, through the Executive Office of Energy and Environmental Affairs, took on the interim dredging project to bring the channel down to elevation -28.5 MLLW.

The Project included the planning, design, and execution of required maintenance and improvement dredging to the Federal Navigation Channel to facilitate the safe passage for ships delivering cargo and equipment to multiple port facilities including the Marine Commerce Terminal, and the New Bedford State Pier.

The Project involved the dredging of approximately 117,000 cubic yards (CY) of material which was placed into existing Confined Aquatic Disposal (CAD) cells; CAD Cell #2 and CAD Cell #3, located north of the Route 6 Bridge within New Bedford/Fairhaven Harbor. The project successfully increased the water depths in the channel to allow for larger vessels to more safely navigate the channel. The primary benefit of this project is the increased economic potential of increased operating water depths within the Federal Navigation Channel and along the eastern side berth of the State Pier.

This increased water depth will facilitate the anticipated cargo operations and the increase of shipping activities within the Harbor as well as cut back the limiting restrictions on the size of commercial ships that can enter the harbor.

The project has also been a great benefit to the State Pier, and has increased the depth of the Berth to a minimum depth of -30' MLLW, an increase of approximately two feet of depth. This additional draft will allow larger vessels to call on the State Pier and to remain berthed there without concern for tides.

Despite this successful project, the channel still needs to be returned to the original depth of -30 MLLW, see Figures 4-9. In order to determine the needs for, and to justify maintenance dredging of federal channels, the USACE conducts an economic assessment to evaluate the benefit of continued maintenance of the authorized Federal Navigation project in New Bedford Harbor over the next 20 years. The analysis of cost and benefit follows standard USACE procedures.

One of the study guidelines the USACE uses states "The Federal interest in continued O&M of an existing project for its navigation purpose is defined by that project of maximum scale and extent, within project authorization, for which continued maintenance is warranted in terms of vessel traffic and related factors."3 A project is considered economically feasible if annualized benefit divided by annualized cost is greater than or equal to one. Net benefit, or project benefit minus project cost, must be greater than or equal to zero.

According to a draft economic study conducted by the USACE, the transportation costs for various controlling depths were used to determine annual transportation costs for both the with and without project conditions.

3 USACE Manual EC 1165-2-200

With project conditions evaluated transportation costs with restored project depths from one foot below the existing controlling depth to the authorized project depth. Project benefit is defined as the difference in transportation costs between the *with* and *without* project conditions. (It was assumed in the analysis that there would be no additional maintenance needed over the twenty-year period of analysis.)

The reduction in transportation costs between the *with* and *without* project conditions is the project benefit. Transportation cost is determined by multiplying cost per ton by tonnage. Thus, transportation cost will increase at the same rate as tonnage growth. Project cost savings are evaluated for project depths of -28 feet to -30 feet for the main channel in the harbor.

The USACE Study only looked at the benefits of vessels calling on two facilities, State Pier and Maritime Terminal. Dredging the channel to the authorized depth of -30 Ft. MLLW yields total annual benefits of $1.94M for those two facilities alone, as shown in the table below.

Table 16- USACE Transportation Cost Savings if Dredged

Channel Depth	Transportation Cost Savings (Thousands of Dollars)		
	At Sea	In Port	Total
29	$1,234.50	$39.80	$1,274.30
30	$1,880.70	$60.80	$1,941.50

The USACE Study was performed prior to the construction of the Marine Commerce Terminal, which stands to significantly benefit from allowing deeper draft vessels to call on the terminal. Thus the net benefits shown above would be increased and compounded when factoring in vessels calling on the Marine Commerce Terminal.

While the USACE studied the benefits of the projects in 2010, the engineers estimated the updated costs of the Federal Dredging project to put those benefits into perspective. Using the post-dredge survey conditions from the 2015 project, the remaining sediment was analyzed that would need to be dredged to return the project to the authorized depth of -30 MLLW. A 2 ft over dredge allowance was assumed, which is typical of a USACE Contract.

That breakdown is shown below:

Table 17- Dredge Volume Scenarios

Scenario	Volume (cy)	Unit Costs ($)	Project Cost ($)
-30 with 2 ft Overdredge	750,000	$55	$41,250,000

Phase V Dredging

There are many properties that are eligible for Phase V dredging, and the HDC has received interest from at least 22 different properties/areas (see Figure 3). Those 22 properties/areas have dredging needs (assuming a 3 foot dredge depth, which would need to be verified during the design process) of between 500 cy and 98,000 cy.

To support the dredging program, the creation of a new CAD Cell will be required. There is some existing CAD Cell space that can be used for transitional purposes to allow for dredging to remove the contaminated material from the footprint of the new CAD Cells.

To determine the size of the CAD Cell, the volume of material scheduled to be removed must first be examined. Without analytical data, assumptions must be made regarding the depth of contamination and thus, have looked at the Phase V program four different ways, each property/facility with an average cut of 2 ft, 3 ft, 4 ft, or 5 ft respectively. The volumes of this combined with all 22 properties results in the following volumes:

Table 18

SUM OF 2' CUTS*	SUM OF 3' CUTS*	SUM OF 4' CUTS*	SUM OF 5' CUTS*
158,372	243,068	331,438	423,481

The bathymetry and depth of contamination at each site is different - some sites will have it closer to the surface than others. For the estimate, it is assumed that each site needs a 3 foot cut. Using the volume of the 3 ft cut and applying a cost for dredging and disposal within the CAD Cell yields the project cost shown in the table below.

Table 19- Phase V CAD Cell Construction costs

Scenario	Volume (cy)	Unit Costs ($)	Project Cost ($)
3 ft Cut	243,068	$45	$10,938,060

Knowing the volumes that need to be dredged, it is possible to assume the required CAD Cell capacity that needs to be created to retain all of the Phase V material. When it comes to creating CAD Cell capacity, removing 1 CY of material does not necessarily create 1 CY of capacity due to a combination of geometry and fill limits, however, for this analysis, the engineers have used the ratio of 1.25 CY of sediment removed creates 1 CY of capacity.

A blended rate for the CAD Cell costs was used, as the contaminated material removal costs are significantly higher than native improvement on a unit basis; however, the volume of contaminated material is significantly less than the volume of improvement material.

Table 20- Phase V Dredge Costs

Scenario	Volume (cy)	Unit Costs ($)	Project Cost ($)
3 ft cut	304,000	$30	$9,120,000

Looking at the total program cost (CAD Cell creation, dredging, and disposal) yields the following:

Table 21- Total Cost, Phase V

Scenario	Total Costs
3 ft Cut	$20,058,060

It is important to note that the Phase V Navigational Dredging program is designed as 80% State Cost Share and 20% Private Cost Share. Cost share dollar numbers for the private facility owners are determined based upon the volume of material to be dredged at each of the private facilities.

Costs to the Private facility owners are calculated by taking 20% of the total cost of the project and dividing that by the total cubic yards to be dredged at the Private facilities to determine a Private facility dredging cost-per-cubic-yard**. If the total project construction cost is roughly $20 Million dollars (dredging and CAD Cell included), the private cost share is $4 million.**

So the total fee per cubic yard is the $20 million program cost multiplied by the 20% cost share divided by the 243,000 cy dredged for navigational purposes, which equates to $16.46 per cubic yard. Each facility owner will then be assessed a fee equal to the calculated cubic-yard-cost times the volume to be dredged for that particular facility owner.

Phase V and Federal Channel Dredging Together

One of the project options that has been evaluated would be to conduct the Phase V program in coordination with the USACE's Federal Channel Dredging. This would allow for operational efficiencies and economies of scale that would benefit all parties involved.

The USACE needs to conduct a Dredge Material Management Plan study to determine how to handle and dispose of the material dredged from the navigational channel, which will be conducted in a very similar manner to the DMMP study already performed for New Bedford Harbor as well as the feasibility evaluation for the Phase V program.

The USACE is almost certain to determine that CAD Cell disposal is the most effective disposal option for the navigational material, so benefitting from the efficiencies and economies of scale of **performing the work together will provide a significant savings of time and money to both projects.**

Both projects would require similar elements of studies, designs, and implementation, so combining those allows for costs savings that would benefit both projects. The elements of the combined Project would include:

1) a feasibility evaluation
2) design and permitting support for a CAD cell (or most likely a series of CAD cells) to contain dredge material unsuitable for offshore disposal taken from the Federal Navigation Channel and Phase-V Navigational Dredging
3) Construction of the CAD Cell(s)
4) Dredging of the Federal Channel and Phase-V Navigational Dredge areas.

The total cost of building a CAD cell for both the Navigational material and Phase V, as well as dredging for Phase V is $39.8 million. Of that, the Commonwealth can expect tipping fee revenue from the USACE of $18.2 million. **The total cost of the project to the Commonwealth would be $21.6 million, and would leverage approximately $75 million in Federal funds and $4 million in private funds.**

An Engineer's estimate of the cost savings associated with combining the two projects' CAD Cells indicates that the State/HDC could save approximately $1.5 million through efficiencies if the two projects are combined and under the management of the HDC for planning and design purposes alone. Another $6.5-$8.2 M could be saved for the construction and construction oversight of the project, leading to total project savings of approximately $9.7M.

A breakdown of the cost savings estimations are shown in the table below.

Table 22- Total Cost Savings

		Army Corps	HDC / State	Sum of Costs	Combined Project	Net Total Savings
		Dredge (Alone)	Nav Dredge (Alone)	For individual projects	('HDC/State Build Both CADs	by Combining CAD Cells
DMMP	Location Review	$100,000	$10,000	$110,000	$50,000	$60,000
	Archaeological	$150,000	$0	$150,000	$60,000	$90,000
	DMMP Expansion Submittals	$100,000	$0	$100,000	$100,000	$0
	EFH	$100,000	$0	$100,000	$100,000	$0
	DMMP Sum:	**$450,000**	**$10,000**	**$460,000**	**$310,000**	**$150,000**
Pre-design	Bathymetry	$15,000	$40,000	$55,000	$100,000	-$45,000

Studies	Geophysical	$250,000	$0	$250,000	$200,000	$50,000
	Borings	$500,000	$200,000	$700,000	$300,000	$400,000
	Vibracore	$400,000	$100,000	$500,000	$200,000	$300,000
	Pre-dredge Studies Sum:	**$1,165,000**	**$340,000**	**$1,505,000**	**$800,000**	**$705,000**
Design	Concept Design	$100,000	$20,000	$120,000	$40,000	$80,000
	60% Design	$80,000	$20,000	$100,000	$20,000	$80,000
	Regulatory Incorp.	$100,000	$20,000	$120,000	$40,000	$80,000
	Final Design	$100,000	$40,000	$140,000	$60,000	$80,000
	Plans + Specs	$400,000	$100,000	$500,000	$200,000	$300,000
	Design Sum:	**$780,000**	**$200,000**	**$980,000**	**$360,000**	**$620,000**
CAD Cell Oversight	**Construction Oversight Sum:**	**$3,206,612**	**$1,368,000**	**$4,574,612**	**$2,875,851**	**$1,698,761**
Dredge CAD	**Construction Sum:**	**$21,377,412**	**$9,120,000**	**$30,497,412**	**$23,965,425**	**$6,531,987**
Dredge Oversight - City/Town Berths		**-**	**$472,500**	**$472,500**	**$459,000**	**$13,500**
Dredge City/Town Berths		**-**	**$3,150,000**	**$3,150,000**	**$3,060,000**	**$90,000**
Sub-Total All Costs Minus Army Corps Channel Dredging		**$26,979,024**	**$11,038,000**	**$38,017,024**	**$28,311,276**	**$9,705,748**

Economic Impact of SER Process

As part of this Economic Impact Analysis of the New Bedford/Fairhaven Harbor conducted by Martin Associates, a survey was conducted with 147 maritime service providers, including fish processors, fleet operators, shipyards, and cargo marine terminal operators, to identify the potential economic benefits that could be realized from the Phase V CAD Cell Construction in coordination with the USACE's Federal Channel Dredging project.

Photo Source: Foley Fish

The results of the survey indicated that the combined projects would provide waterfront access for 60 additional commercial fishing vessels now offloading at out of state ports; the ability to compete for about 100,000 tons of bulk cargo now handled at marine terminals in Providence, RI that are destined for the New Bedford area and currently trucked to New Bedford; and the addition of new or expanded processing operations and ship repair and maintenance support to accommodate the 60 additional fishing vessels that would supply about 7 million pounds of additional landings.

The potential cargo tonnage and expanded fleet operations, associated processing activity, and fishing vessel support activity were used in the Martin Associates New Bedford/Fairhaven Harbor Economic Impact Model to estimate the annual benefits of the Phase V CAD Cell Construction and the Federal Channel Dredging Project. These annual impacts are summarized in the following table.

Table 23
Annual Economic Benefits of the Phase V CAD Cell Construction and the Federal Channel Dredging Project

	TOTAL
JOBS	
Direct	391
Induced	269
Indirect	238
TOTAL	**898**
PERSONAL INCOME (1,000)	
Direct	$21,627
Re-spending/Local Consumption	$29,115
Indirect	$14,348
TOTAL	**$65,090**
BUSINESS REVENUE (1,000)	**$259,201**
LOCAL PURCHASES (1,000)	**$25,919**
STATE AND LOCAL TAXES (1,000)	**$11,541**
FEDERAL TAXES (1,000)	**$27,690**

Based on the analysis conducted by Martin Associates, the Phase V CAD Cell Construction and the U.S. Army Corps of Engineers Channel Dredging Project would support nearly an additional 900 jobs annually, of which about 400 jobs are directly generated in the New Bedford region.

$258.2 million of new business revenue is projected to be generated, and $11.5 million annually in state and local tax revenue would be generated. Given a net cost of $20.7 million to the Commonwealth, and given the state and local tax pay back of $11.5 million annually, **the state would recoup its $20.7 million net investment in less than two years,** while supporting nearly 900 new jobs in the New Bedford economy and generating an additional $65.1 million in annual wages and re-spending/local consumption impacts to the Commonwealth's economy.

Summary

In conclusion, the Port of New Bedford is a major catalyst of economic activity in the New Bedford region, as well as in the Commonwealth of Massachusetts. The activity in the New Bedford/Fairhaven Harbor supports nearly $10 billion of annual economic activity, or about 2% of the Commonwealth's Gross Domestic Product.

The seafood industry and marine cargo, ferry and marina operations directly and indirectly generate nearly 13,000 jobs in the Commonwealth of Massachusetts and impact another nearly 24,000 related jobs in the seafood supply chain.

Due to the contamination in the Harbor and the complicated permitting and expensive disposal requirements of conventional dredging projects, it is economically infeasible and unrealistic to expect individual property owners to consistently take on the responsibility of dredging to maintain depths and water access to their waterfront properties.

The SER process provides a streamlined permitting methodology and allows for property owners to take advantage of economies of scale of group permitting, design and implementation of a group phased approach to dredging projects.

Furthermore, dredge material disposal costs are dramatically reduced by adding the use of CAD cells, which allow for nearby, in-water disposal in a manageable, consolidated area. The historical evidence from the first four phases of navigational dredge and CAD Cell disposal show that for **the 22 parties interested in participating in the next round of navigational dredging could save more than $72 million and 12 months** of time when operating under the SER process versus a conventional dredge process with upland disposal.

The Phase V dredging program could serve up to 22 properties and remove up to 500,000 cy of impacted and unsuitable for offshore disposal material from the Harbor bottom, enhancing the cleanup efforts and maintaining harbor depth users depend so heavily upon.

The Federal Navigational channel requires between 200,000 and over 700,000 cy of material to be removed from the federal channel to restore it to its authorized depth. Both of these projects would greatly benefit from the use of a CAD Cell as a disposal option, however **if the projects are performed together, the benefits are further magnified, resulting in close to $10M in costs savings between the two projects.**

If the USACE CAD Cell was done in conjunction with the Phase V CAD, the costs would be $28,311,276, rather than over $38 million if done individually.

The Phase V dredge program and accompanying CAD Cell creation would have a total program cost as follows (based on the assumed depth of dredge cut, final numbers will be worked out during preliminary engineering:

Phase V Dredging Program Costs	
Scenario	**Total Costs**
2 ft Cut	$13,066,740
3 ft Cut	$20,058,060
4 ft Cut	$27,334,710
5 ft Cut	$34,926,645

Beyond dredging, there are several significant infrastructure projects in various stages of planning that would have a significant economic impact on the Harbor, region, and Commonwealth.

The **North Terminal expansion project**, currently planned as three phases, will provide up to 1,600 feet of additional bulkhead berthing space with deep water access, multi-modal connections to road and rail.

State Pier, the Harbor's main commercial hub, will benefit greatly from structural improvements to allow loading and unloading operations to continue and expand, and the redevelopment envisioned will make State Pier a keystone of the working waterfront and downtown, adding an economic boost to the area.

The Route 6 Bridge is nearing the end of its useful life, of the two options being further explored, the new bridge will allow better commercial access and support development north of the Harbor, directly benefiting the North Terminal Project.

Union Wharf in Fairhaven is another project that will provide infrastructure upgrades to allow economic growth, revitalizing an underutilized facility and providing badly needed additional berthing space to the Harbor's fleet of vessels.

South Terminal Rail Extension would bring rail to the New Bedford Marine Commerce Terminal, opening up new cargo development opportunities. Having rail access for the fish processors along South Terminal will also enhance the products they're able to process.

New Bedford Commercial Fish Pier Repairs are needed along the City's five commercial fishing piers that were constructed in the early 20th century. Pier 3, Steamship Pier, Coal Pocket Pier, Homer's Wharf and Leonard's Wharf sustain the bulk of the harbor's fleet and will need substantial repairs in the coming years.

Pope's Island Marina Renovations are needed to handle today's larger and more energy-intense recreational vessels. Built in the 1980s, Pope's Island Marina is still the premier marina in New Bedford Harbor. Thoughtful improvements and renovations will allow the facility to continue to be a productive revenue generator for years to come.

These dredging and infrastructure projects are necessary to continue the Port's growth and position in the northeast. While the national fishing fleet is consolidating, New Bedford continues to grow, which is a direct benefit of previous investments made in the Harbor and these projects here will facilitate further growth and expansion of new activities and industries, as well as provide current users with significant benefits and efficiencies to improve their operations.

As demonstrated by the major economic benefits of the New Bedford/Fairhaven Harbor, to continue to generate and grow the economic benefits to the Commonwealth, it is critical that the infrastructure within the Harbor is continually maintained and expanded to accommodate the demands of the seafood and maritime activity.

These projects provide economic impact for the unique characteristics of New Bedford harbor, and delays in implementing them could lessen the positive impacts of these projects. Navigational dredging and upgrades of facilities are the lifeline of any Harbor, and the Port of New Bedford is well-positioned to benefit and lead the economic resurgence of the south coast of Massachusetts through them.