Groundfish Port Recovery and Revitalization Plan for the Port of New Bedford/Fairhaven

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All errors, omitted or committed, are the responsibility of the authors.

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Groundfish Port Recovery Plan complete with appendices is available at www.portofnewbedford.org/

Peter Pereira Standard-Times

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EXECUTIVE SUMMARY

The Port of New Bedford, which includes Fairhaven, has led the nation in value of seafood landings since 1999. Scallop landings accounted for the majority of increased value landed in the Port due to increased catch and higher prices, due to successful marketing of scallops. The groundfish fishery in the Port contributed a large share of the port's value until recently, when the value of landings from groundfish vessels dropped sharply from 2011 to 2013.

The Port of New Bedford is also the Commonwealth's second most valuable commercial port. In addition to fisheries, which is the main commercial activity, the Port offers commercial opportunities in break bulk cargo, marine service to off-shore wind farms, ship repair and other shoreside marine support services, ferries to Martha's Vineyard and Cuttyhunk islands, cruise vessels, excursion vessels, and a growing recreational fishing and boating industry.

This report documents the recent decline of the groundfish industry in the Port of New Bedford, estimates its effect on shoreside businesses, and makes recommendation for the recovery of this fishery and improvements in the Port. We used data from the Massachusetts Division of Marine Fisheries (MA DMF) on landings in the Port of New Bedford and Fairhaven by vessel from both federal and state waters from 2006-2013 to document the recent decline in revenue landed by New Bedford groundfish vessels. We interviewed 47 business owners and managers to estimate the effect of the decline in landings on businesses that service the fishing industry in the Port.

Major Findings on the Decline of Value Landed from Groundfish Vessels

- Value of groundfish landed in New Bedford by all vessels declined from $31 million in 2011 to $19 million in 2013, a decline of 44 percent in two years.
- Value of landings from all species by groundfish vessels (defined as vessels that land the majority of their value in groundfish) decreased from $33 million in 2011 to $22 million in 2013, with most of this decline from groundfish species.
- Average price per live pound for groundfish increased from 2009 through 2012 but dropped in 2013. The decline in average price per live pound of groundfish in 2013 reflects both declining prices for some species and a change in the composition of groundfish landings, with an increasing share generated by lower-value species. The actual average price per live pound of groundfish was roughly the same in 2012 and 2013 as it was in 2006 and 2007, but the average price adjusted for inflation declined over this period from $2.15 per pound in 2006 (in 2013 dollars) to $1.41 in 2013.
- The number of groundfish vessels actively landing any species in New Bedford declined from 97 vessels in 2006 to 47 vessels in 2013.
- Groundfish sector vessels actively landing groundfish in New Bedford declined from 72 vessels in 2010 to 39 vessels in 2013. Groundfish non-sector vessels declined from 13 to 5 over the same period with their average landings per vessel from all species less than $1,000 in 2013.
- The average value landed per trip and the average annual value landed from vessels 75 feet and longer increased significantly in 2010 through 2012 relative to years before sectors. Following

the drop in landings in 2013, average annual value landed by these vessels in 2013 was not significantly different from the years before sector management. There were no significant differences between before and after sectors for average annual value landed in New Bedford per vessel for vessels between 50 feet and 75 feet.

- Data on trips costs were not available to us. The 2012 Final Performance of the Multispecies (Groundfish) Fishery (Northeast Fisheries Science Center Reference Document 14-01) estimated trips costs from observer data for groundfish trips. That analysis estimated that average costs for groundfish trips on vessels 75 feet and longer increased from $9,833 in FY2009 to $29,714 in FY2012 (Tables 15 and 46). Much of this increase in costs was due to fuel prices. These costs do not include leasing costs for species quotas.
- The loss of 41 groundfish vessels landing in New Bedford from 2010 through 2013 implies a loss of 164 crew positions assuming a average crew size of four. The MA Office of Labor and Workforce Development estimates a loss of 116 employees in fishing from all fisheries from 2010 through 2012 in Bristol County, which includes New Bedford and Fairhaven.

Major Findings on the Effects of Declining Landings on Shoreside Businesses

- Fifty businesses that supplied products or purchased fish from New Bedford fishing vessels have gone out of business between 2004 and 2013. More than half of these businesses were in processing, wholesaling and retailing.
- The loss of 50 businesses, as well as reductions in employment in surviving businesses, translates to job loss. The MA Office of Labor and Workforce Development estimates a loss of 227 jobs between 2010 and 2012 in Seafood Product Preparation & Packaging in Bristol Country, which includes Fairhaven and New Bedford. The MA Office of Labor and Workforce Development does not estimate employment in other shoreside businesses because they are parts of much larger businesses categories.
- The decline in the vessels, trips, and landings in groundfish fishery has created more dependence in the Port on the scallop fishery, which landed 85% of the port's value in 2012.
- Despite these recent declines, the Port of New Bedford remains a full-service port with numerous businesses in every category of shoreside services with a total of 148 shoreside businesses whose main customers are the fishing industry.
- We interviewed 47 shoreside business owners or managers. Every business owner or manager that we interviewed was angry and frustrated by federal groundfish management. These business owners and managers said that they are at the mercy of federal government agencies with little knowledge of the way that the industry works, little consideration for fishing businesses, and almost no information on the fish available to be caught.
- Sector managers of the four sectors that operate from New Bedford told interviewers that estimating, finding and allocating quota for fishing trips are the most difficult parts of their job. They can't find quota to lease when they need quota on choke species at prices that make fishing trips profitable.

- Interviews showed that businesses in the Port of New Bedford that depend on the groundfish fishery now rely more on other fisheries, vessels from other ports, other products (such as frozen fish inputs for processing), and other industries (such as trucking).

RECOMMENDATIONS FOR REVITALIZING THE GROUNDFISH FISHERY

Develop a Video Groundfish Survey Process to Generate Data for Stock Assessment

SMAST is developing a new groundfish survey that combines traditional fishermen's knowledge with advanced video observations designed for nets and state-of-the art benthic imagery and sonar. The objective of the survey is to estimate the abundance, spatial distribution, size structure, and length-weight relationship of the Georges Bank yellowtail flounder stock on the southern flank of Georges Bank and also estimate these parameters for cod, haddock, monkfish, skate and other groundfish. Sampling protocol using video surveys has served to increase the examination of the data supporting the yellowtail flounder stock assessments.

Change Magnuson-Stevens Act

There is widespread agreement that the current fisheries management system needs improvement because it is not producing the maximum benefit to the nation. Much of the problem stems from ambiguities in the language of the law and a focus on one phrase: "preventing overfishing" which does not take into account benefits to the nation including economic stability or growth for ports like New Bedford. To achieve a balance between conservation and economic growth within the Port, the often contradictory ten National Standards for conservation and management measures require revisions to improve balance between biological, economic, and social goals, including safety at sea.

Improve Scientific Support for Annual Catch Limits

Recommendations for stock assessments to meet the needs of management:

- More accurate and frequent stock assessments and catch projections
- Greater consideration of alternative stock assessment approaches, including cooperative research with the fishing industry
- More timely and transparent catch monitoring, including collaborations with fishing vessels for data sharing
- Greater consideration of environmental change in stock assessments and overfishing definitions
- A more open, inclusive and transparent stock assessment process.

Examine the Effects of Individual Species Quotas on Commercial Landings

In 2012, only 32 percent of the Northeast groundfish quota was caught, down from 41 percent in 2011. What has caused this low and declining percentage of total groundfish quotas that are caught? Answering this questions require a concerted effort of scientists using biological and economic models with data from a wide variety of sources, for example, a model that predicts apparent or available abundance as a function of costs, regulation, availability, catchability, and stock size. This type of research is well suited for cooperative research between scientists and fishermen. An experimental fishery using revenue from the catch could be used to underwrite data collection.

Use Conservation Engineering to Develop More Effective Fishing Gear

Both groundfish and scallop fisheries are severely challenged by the low quotas of yellowtail flounder and winter flounder, and more recently, windowpane flounder. Developing fishing gear that avoids capture of these species will allow the groundfish and scallop fisheries to harvest relatively healthy stocks and allow these flounder stocks to recover quickly. SMAST and MA DMF scientists, commercial fishermen and gear suppliers are developing trawl gear for haddock, pollock, hake and redfish that will fish more effectively. This new gear can reduce flounder bycatch, reduce impact to fish escapees, lower intrusiveness on the seabed, and save fuel.

Provide Funds to Fishermen for Licensing in Other Marine Activities

Licenses and training for Master/Mate, Able Body Seaman, Operating Engineer, and other trades are available for other maritime trades, but these are expensive for fishermen. Schools and institutes in this area offer training for licenses that cost from $2700 for the top license to about $1600 for other licenses and take from 6-8 weeks of intense training.

RECOMMENDATIONS FOR IMPROVING THE PORT

Capital Project Recommendations Specific to the Fishing Industry

1. Structural repairs to New Bedford municipal fishing piers.
2. Expansion of New Bedford municipal fishing piers -Steamship, Homer's and Leonard's.
3. Phase V dredging of New Bedford municipal and private berths.
4. Develop and implement plan for fleet use of shoreside power installed at New Bedford municipal fishing piers.

Recommendations to Increase Overall Economic Activity in the Port

1. Repair of the north side of the State Pier.
2. Maintenance dredging of the Federal Channel.
3. Bulk heading of State Pier.
4. State Pier Refrigeration Project.
5. Route 6 Bridge Replacement Study.
6. South Coast Rail.
7. South Terminal Rail Connection.
8. Offshore Wind Business Development.
9. Excursion/public access hub at Fisherman's Wharf/State Pier and land use planning for State Pier and adjacent properties.
10. Recreational Vessel Dockage and Survey Study.
11. Buildout of Harbor Development Commission Offices and Regional Command Center.

Groundfish Port Recovery and Revitalization Plan for the Port of New Bedford/Fairhaven

I. INTRODUCTION AND BACKGROUND

In September 2012, U.S. Secretary of Commerce Rebecca Blank declared the commercial Northeast groundfishery a disaster, stating that, "The future challenges facing the men and women in this industry and the shore-based businesses that support them are daunting.[1]" Despite almost continuous management actions intended to reduce fishing effort and quotas for New England groundfish over the previous 20 years and reductions in vessels, crew positions, and catch, many groundfish stocks have not reached legally determined rebuilding targets according to NOAA stock assessments. Many groundfish stocks are scheduled for further cuts in fishing quotas for Fishing Year (FY)2014, which runs from 5/1/2014 to 4/30/2015 for groundfish [2]. The recent declines in landings, vessels, and crew positions in the groundfish fishery were not confined to fishing but were transmitted to shoreside businesses and port facilities that service this fishery.

The following is a plan for the recovery of the groundfish fishery and the revitalization of the Port of New Bedford in response to these recent reductions in groundfish landings. Throughout this report, Port of New Bedford refers to both New Bedford and Fairhaven, which share the harbor. The Report is funded by a grant from Massachusetts State Legislature and the Department of Fish and Game to the New Bedford Harbor Development Commission (HDC), an autonomous body, chaired by the Mayor of New Bedford that has jurisdiction over all of the coastal waters in New Bedford and manages all city-owned waterfront property.

The federal government recently allocated $75 million in disaster relief, with $32.8 million scheduled for relief to the groundfish fishery. We make recommendations in this report for reviving the groundfish fishery, but we do not make recommendations on how these relief funds should be spent. We leave those decisions to the complex political process consistent with U.S. fishery management.

The report includes the recent history of commercial fishing in the port, recent changes in New England groundfish management, typical preparations for a groundfish trip, an analysis of annual landings by groundfish vessels in the port from 2006 through 2013, an analysis of impacts of declines in groundfish landings on shoreside businesses, and recommendations for groundfish recovery and revitalization in the Port.

II. RECENT HISTORY OF COMMERCIAL FISHING IN THE PORT

The Port of New Bedford is New Bedford's and Fairhaven's greatest natural resource, economically and historically. Maritime industries include the predominant industry, commercial fishing, as well as bulk and break bulk cargo, ship repair, ferries to Martha's Vineyard and Cuttyhunk islands, cruise vessels, excursion vessels, and a growing recreational fishing and boating industry. The Port is the Commonwealth's second largest deep water commercial port, approximately nine nautical miles from the Cape Cod shipping canal, 83 miles south of Boston, and 166 miles north of New York. Port activities employ over 4,000 people.

The commercial fishing industry developed in the New Bedford harbor based on natural advantages: a deep-water harbor with proximity to the fishing grounds, and built advantages: the hurricane barrier across the mouth of the harbor. The barrier's 150-foot opening closes during hurricane conditions and coastal storms making the harbor one of the safest on the eastern seaboard. The dredging of the southwesterly side of the harbor adjacent to the hurricane barrier created the South Terminal where many of the processing plants and other shoreside businesses are located, which was connected by a new highway to the interstate highway system.

The Port with its fishing industry, processing and shoreside businesses, infrastructure and other natural and built physical assets, was well prepared for the extension of the U.S. fishing zone to 200 miles offshore in 1976. The Fishery Conservation and Management Act (FCMA) favored larger offshore vessels both for scalloping, hauling dredges to catch scallops, flounders and monkfish, and for dragging, pulling otter trawls to catch groundfish and other bottom tending species. The Port boomed with large increases in the number of vessels, crews, landings, and shoreside businesses. Prosperity was short-lived; by the mid 1980s, both fisheries were in decline. Both fisheries recovered and followed offsetting cyclical patterns of boom and bust.

During the mid-1990s, scallop landings in the port fell sharply due to federal fishery managers closing three large areas in 1994 that covered about one-third of Georges Bank. The value of scallop landings fell below one half of the Port's total value of landings. The opening of access areas within the closed areas to scalloping in 1999, based on the discovery of highly abundant scallop beds in the closed areas through cooperative research between fishermen and scientists at SMAST and at The Northeast Fisheries Science Center, caused scallop landings to rise (Figure 1).

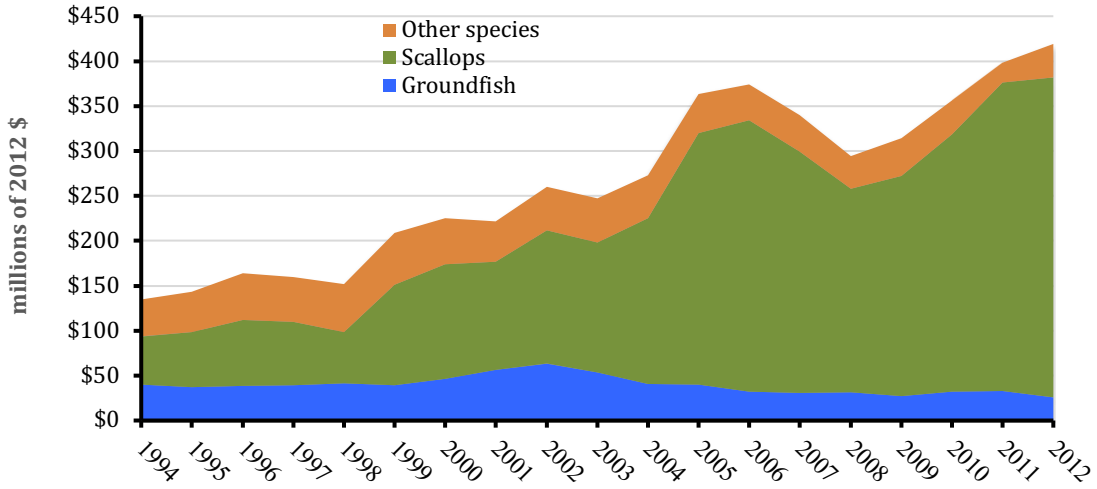

Figure 1.Groundfish, scallops, and other species landed in New Bedford adjusted for inflation.

Maintaining scallop abundance through rotational opening of the limited access areas[3] combined with investment in fishing vessels, fishermen's skill, efficiency of shoreside businesses, and port infrastructure created a long-term boom in scallops landed in the Port. Successful marketing, especially for large

scallops, increased prices even when landings increased. The value of scallop landings in the Port adjusted for inflation more than tripled between 1999 and the peak of 2012. Since 1999, the Port of New Bedford has ranked first in the nation for the value of seafood landed, with scallop landings now totaling 85 percent of the total value landed in the Port.

New Bedford's offshore draggers participate in more complex fisheries than scallopers. These vessels land groundfish as well as a wide variety of other species, including squid, monkfish, skate, fluke, dogfish, lobster, scallops and other species. Many of these species are managed through separate limited access permits, which some vessels have and others have not. Financial success for a dragger generally depends on the permits that it holds.

The financial pattern for draggers that declared New Bedford as their home port during the mid-1990s followed a cycle different than that for scallopers. A study that focused on New Bedford home port vessels[4] found more offshore draggers than offshore scallopers in 1993 and average annual crew income higher for draggers than for scallopers (Georgianna and Shrader, 2005). By 2002, both the number of groundfish vessels and revenue per vessel had declined. A subsequent study showed a continued decline in total revenue landed in the Port by offshore draggers, and the number of offshore groundfish vessels that declared New Bedford as home port had declined to 70 vessels by 2005 (Georgianna and Shrader, 2008).

The Port has long specialized in large, offshore vessels, but inshore vessels have always found a place in the harbor. We have no record of the number of in-shore vessels that docked in New Bedford in the past. In 2006, fewer than 10 vessels less than 50' long landed fish or scallops in the Port.

New Bedford harbor has also become the principal landing port for vessels from other ports, attracted to New Bedford's location near the fishing grounds, full commercial services, and port infrastructure. Pelagic fisheries, such as tuna and swordfish, also have long been located in the harbor. Some new fisheries have recently entered the Port due to the Port's advantages. Largely based on offshore vessels, these new fisheries include red crab (four vessels), herring and mackerel (eight to ten vessels), and surf clams (eight to ten vessels). In terms of total revenue, the Port fluctuates between the second highest and fourth highest port for herring and mackerel landings (NEFMC 2013). Though herring and mackerel are landed in New Bedford year round, most are landed during winter (January-April) when the fisheries are primarily prosecuted in waters from southern New England to New Jersey. Neither draggers nor scallopers target these species. As with vessels landing and docking in the harbor, these new fisheries attracted processing plants to the Port and added revenue to shoreside businesses.

III. RECENT CHANGES IN GROUNDFISH MANAGEMENT

In 1994, following a court ruling brought by environmental groups that the federal management system was not adequately managing groundfish stocks, the New England Fisheries Management Council (Council) instituted a system of maximum days at sea (DAS) for each vessel, based on the average days that the vessel had fished for the defined prior period[5]. Subsequent management plans reduced maximum DAS (Figure 2). Trip limits and other restrictions were also imposed for specific stocks that were classified with low biomass.

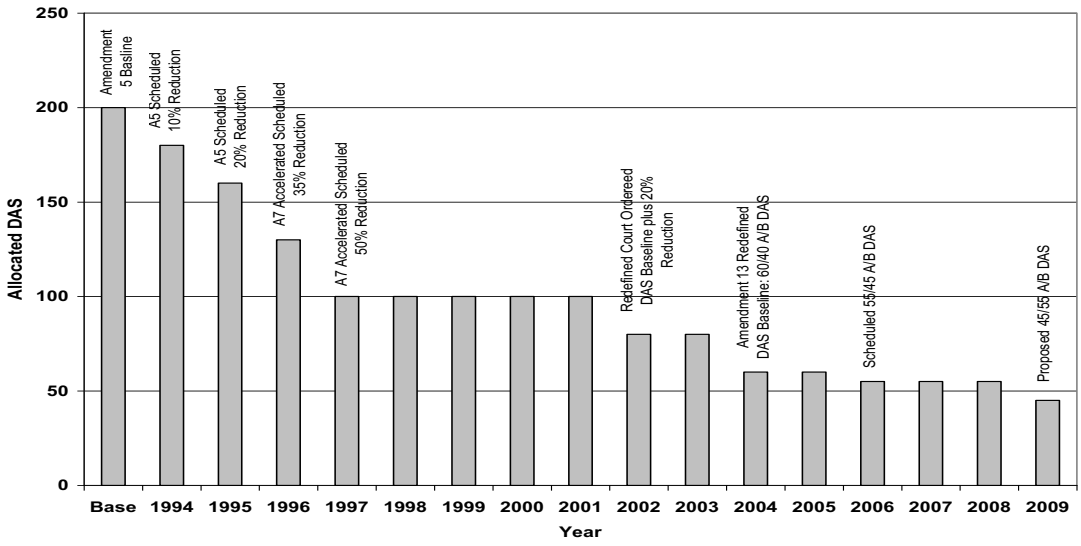

Figure 2. Timeline of management actions and reductions in allocated DAS for a hypothetical groundfish vessel.

In addition to management restrictions for groundfish, regulations were also tightened on other stocks that groundfish vessels caught to offset their reduced fishing effort for groundfish. Trip limits and other quotas reduced landings and permits restricted groundfish vessels' access to scallops, monkfish, dogfish, skates and other species, which were valuable alternatives to groundfish over the 15 years that fishery management reduced groundfish DAS[6].

In 2010, vessel owners were given the choice to take a large cut in their DAS or to join a groundfish sector, which were allocated individual stock quotas called Annual Catch Entitlements (ACE), based on the sector vessels' historical catch. While the ACE for most species was sufficient for the economic health of the fishery in FY2010, the catch of stocks with large ACE was limited by low ACE for species caught in the net together with abundant species in subsequent years. In other words, catch was limited by the stock with the lowest ACE, called choke species. As the quotas were reduced from FY2010 through FY2012, the restrictions caused by the choke species worsened. For example, Georges Bank cod and haddock totaled about half of the total ACE for the New England groundfish fishery from FY2010 to FY2012, but the much lower ACE for Georges Bank yellowtail flounder limited the catch of these species. As a result, the percentage of the ACE caught for cod and haddock was quite low. In FY2012, only four per cent of the Georges Bank haddock ACE, the largest stock in the fishery, was caught. The percentage of total groundfish ACE that was caught fell to 32% in FY2012[7].

IV. PREPARATIONS AND COSTS FOR A GROUNDFISH TRIP

Fishermen fish for dollars. Vessel owners decide the number of trips that their vessels will take, depending on the expected trip costs, costs of leasing quota if necessary, expected landings and expected prices. Depending on their expectations for these variables, vessel owners may decide to fish for groundfish with the vessel, buying or trading for necessary quota, or they may decide to lease their quota rather than fish for groundfish.

For every trip, the vessel's captain maximizes net revenue from the trip (total revenue minus trip costs) subject to the cost of fuel and other inputs, his vessel's efficiency, his and his crew's skill, stock abundances and location, weather, and management regulations. Since 2010, he is also constrained by the annual stock quotas required by the 2007 revisions in the MSA and other regulations. Captains choose the species to target and the place or places to fish. Depending on his quota for choke species, he must find areas with both abundant target species and scarce choke species. Fishing has always been a gamble that depends on fish abundance in time and space, prices, and weather, now made riskier by individual species quotas.

The captain is responsible for making sure his boat is ready to go fishing and gives the owner a list at the end of each trip of items needed for the next trip. He is also responsible for keeping a fishing log, which is sent to NOAA Fisheries at the end of a trip and keeping a personal log, which, the Coast Guard can view upon a boarding. He is also responsible for keeping a log of safety drills with the crew. The captain is also responsible to follow all fishing regulations.

The vessel owner provides most of the paper charts for navigation and the electrical connections for the captains needs. The captain brings his own computer with computerized charts and navigation programs at a cost of several thousand dollars. The captain also hires the crew.

There are two types of costs necessary to keep groundfish vessels fishing: overhead costs and trip costs. Both types of cost depend on the vessel size.

Overhead costs, which are paid by the owner, include insurance, major repairs and maintenance, gear purchases, safety equipment, and finance. Insurance includes Port Risk insurance required for tying to the dock and Hull and Protection and Indemnity Insurance for damage to the hull and fishermen. Major repairs and maintenance includes repairs or purchases of new equipment to hull, engine, winches, hydraulics, electronics, rigging, drive train, and fishing gear. Safety equipment includes a life raft capable of carrying the entire crew, Emergency Position-Indicating Radio Beacons, parachutes, flares, an immersion suit for each person on board, life rings, first aid kits, and CPR equipment.

At least one person on board has to have updated first aid and CPR training. Life rafts and other safety equipment require annual inspection and monthly safety drills recorded in a log. While new financing is usually not available for groundfish vessels, repaying previous loans is also an overhead cost for some vessels.

Trip costs, which are usually paid from the gross revenue from the trip are split between owner and crew, include fuel, lubricants and gear oil, food, water, ice, and costs of unloading, auction fees, safety inspections, gear repairs, costs of leasing quota, and a wide assortment of tools and materials carried on the vessel.

Fuel for a fishing trip in a vessel over 75 feet, the majority of New Bedford groundfish vessels currently fishing, ranges from 300 to 600 gallons per day, at $3.60 per gallon, totaling $12,000 to $15,000 for a seven day fishing trip in 2013. A trip on this size vessel uses 15 to 20 tons of ice, at $60 per ton; food costs $1,500 to $2,000 for an average trip. Lubricating and gear oil for a trip costs from $1,000 to $1,500. Before leaving the dock, the vessel owner has spent between $15,000 and $20,000. Net revenue, after trip costs are deducted from the gross revenue, is split between owner and crew based on percentages for that vessel.

Before leaving port, the captain of a sector vessel needs sufficient quotas for the quantities of species he expects to land and the imputed bycatch for every species that the Northeast Fishery Science Center Bycatch Estimation Method has assigned to that sector in that area. The imputed bycatch depends on the area fished, species landed from that area for that trip, and the sector's observed bycatch history. The captain is charged for this imputed bycatch if he catches it or not. If he has an observer on board, he is not subject to the imputed bycatch but is charged for the bycatch recorded by the observer. Given this choice he may prefer an observer, which currently is paid by NOAA Fisheries, and select an area to fish that reduces the potential bycatch of choke species. If the captain has insufficient quota for his landed species, observed catch, or imputed bycatch, he must lease, trade for, or borrow quota from the sector, which in turn may trade for or buy ACE from other sectors.

V. DECLINE OF GROUNDFISH FISHERY IN THE PORT 2006-2013

Methods and Data

The Massachusetts Division of Marine Fisheries (MA DMF) supplied data on quantities and values of fish and shellfish landed in the Port by vessel for each vessel that landed any fish or shellfish in New Bedford or Fairhaven from 2006 through 2013[8]. Observations were included for each vessel for each year, whether or not the vessel landed any fish or shellfish in New Bedford in the given year. Each observation included vessel identification number, vessel name, vessel length, number of dealer reports of landings by the vessel during the year, quantity in live pounds and total value in current prices of landings for all groundfish species, quantity in meat pounds and value for scallops, and quantity in live pounds and total value for other species, which includes any species other than groundfish, scallops, and ocean quahog, surf clam, and Bluefin tuna landings (which were omitted from MA DMF data). MA DMF listed quantities and values in the data as recorded by licensed dealers.

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A total of 724 vessels landed fish or shellfish in the Port during the eight years from 2006 through 2013 (Table 1).[9] Landing quantities and values were summed for all eight years for each vessel into three categories of groundfish, other species, and scallops. Each vessel was classified for the eight year period on the basis of the majority of its landed value as "groundfish" (a majority of landed value was in the groundfish category), "scallop" (a majority of the landed value were sea scallop category), or "other species" (a majority of the landed value was in the other species category). The vessels also differ by type of fishing gear used and the type of permit under which the vessel lands its catch, but such data were not available to us. Vessels are often classified on the basis of permits but classification by permit would misrepresent groundfish vessels because scallopers in New Bedford with groundfish permits would inflate the value of landings for groundfish vessels from these scallopers that receive little if any of their landed value from groundfish.

A total of 141 groundfish vessels landed their catch in New Bedford at some time during the period from 2006 through 2013 (Table 1).

Table 1. Number of vessels that landed in the Port of New Bedford at any time from 2006-2013.

Category	Total number of vessels
Groundfish vessels	141
Sector	83
Non-Sector	58
Scallop vessels	480
Other species vessels	103
Total vessels	724

Sector management of the groundfishery began in 2010[10]. We determined sector membership from the list of sector membership provided by the Northeast Regional Office of NOAA and data provided by the sector managers of the four sectors that operate from the Port.

Most vessels landed multiple species in the groundfish, scallops, and other species categories but each vessel almost always targeted a particular category. Target species changed during the period 2006-2013 for some vessels in response to the permits they held on the vessel and quotas for these permits if applicable, availability of quota from other vessels, variability of success in locating target species in particular areas, landing prices, and trip costs. Because groundfish species, in particular, are usually caught mixed with other fish species, such as monkfish, skate, dogfish, scallops and other species, a particular haul of a groundfish dragger's nets almost always brings up species other than the targeted groundfish species.

A vessel was considered an "active vessel" for that year if it landed any fish or shellfish in New Bedford in that year. A vessel was considered an "active sector vessel" for that year if it landed any groundfish in New Bedford in that year.

We also classified vessels by length, one component of a vessel's fishing capability, which was the only vessel physical characteristic available to us. Vessels were classified into the categories of less than 30 feet, from 30 feet to less than 50 feet, from 50 feet to less than 75 feet, and 75 feet or greater in order to compare our results with the 2012 Final Performance of the Multispecies (Groundfish) Fishery (2012 Performance Report). Among groundfish vessels, particular attention was devoted to the vessels that were members of sectors from 2010 through 2013. Although no vessels had sector membership until 2010, we identified those in sectors as sector members for the entire period 2006-2013, in order to track their fishing experience over the entire eight -year period.

Results: Groundfish Landings

Landings and values of groundfish landed in the Port declined $12 million (44 percent) in value from 2011 to 2013 (Figure 3). Not all groundfish were landed by vessels whose primary catch species was groundfish. Scallop vessels and other species vessels added a relatively small share to the total groundfish catch. The percentage landed by scallop vessels and other species vessels remained around 10 percent of total groundfish landed in New Bedford over the period.

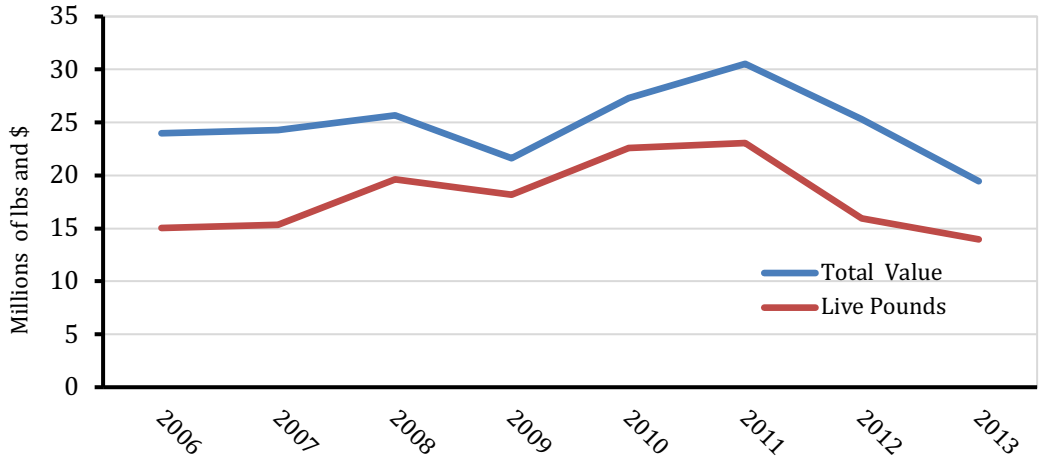

Figure 3. Total groundfish pounds and values landed in New Bedford.

At 90 percent of groundfish landed in the Port, groundfish vessels suffered most of the decline in groundfish value (Figure 4). Landings of other species by groundfish vessels in New Bedford also declined. Scallop landings by groundfish vessels declined almost to zero by 2013, and the value landed of other species by groundfish vessels also declined over this period.

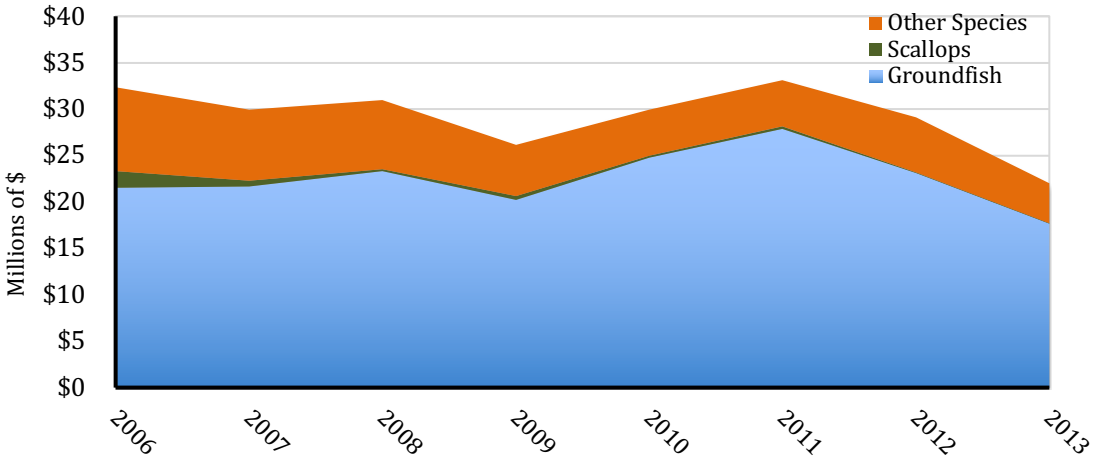

Figure 4. Value of New Bedford landings by groundfish vessels by categories.

The actual average price per live pound of groundfish landed in New Bedford by groundfish vessels was roughly the same in 2012 and 2013 as it was in 2006 and 2007, but the average price adjusted for inflation declined over this period (Figure 5)[11].

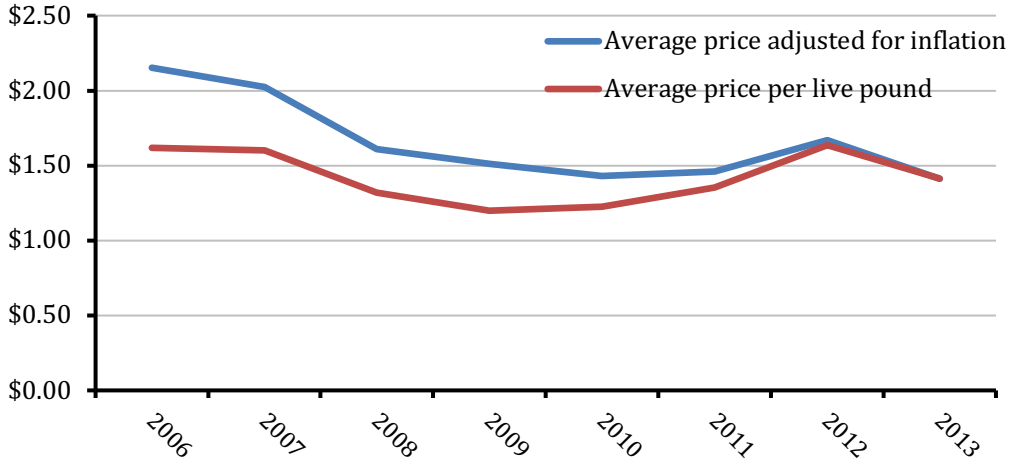

Figure 5. Average price per live pound of groundfish landed in New Bedford by groundfish vessels and average price adjusted for inflation .

Average price per live pound for groundfish increased from 2009 through 2012 but dropped in 2013. The decline in average price per pound of groundfish in 2013 reflects both declining prices for some species and a change in the composition of groundfish landings by groundfish vessels.[12]. This change in the composition of groundfish landings reflects changes in the available quotas of specific species of groundfish, changes in bycatch regulations, and other factors. The trend in average price per pound for groundfish contrasts with the opposite recent pattern for sea scallops where prices per pound have increased significantly, reflecting increasing demand in the world market for scallops.

Results: Activity Status of Vessels

From 2006 through 2013, the number of active vessels fishing primarily for groundfish, as defined above, decreased from 97 vessels to 47 vessels (Figure 6).

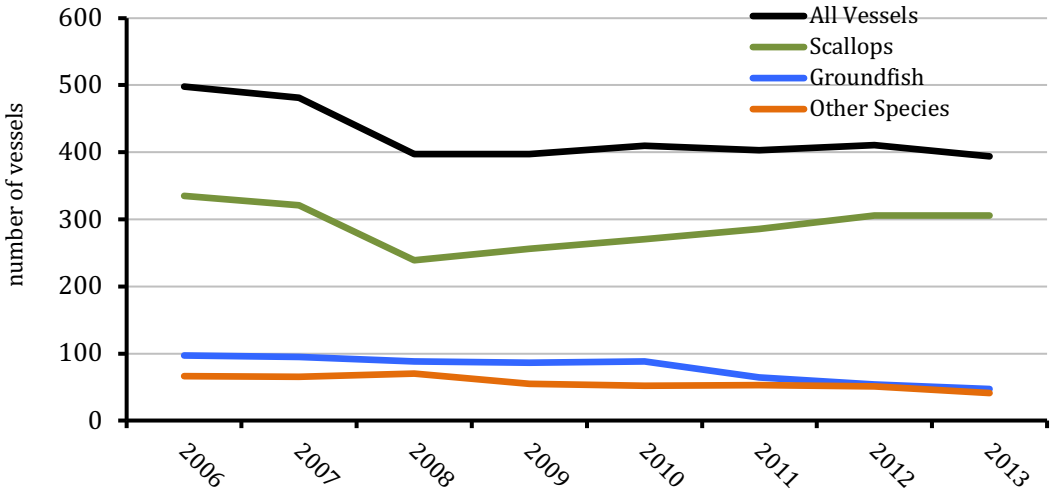

Figure 6. Number of active vessels that landed fish or shellfish in New Bedford by vessel type.

While more than two-thirds of all groundfish vessels that landed in the Port at any time during the period of 2006 though 2013 (141 vessels) were actively fishing in 2006 (97 vessels), only one-third landed fish in New Bedford in 2013 (47 vessels). The number of active groundfish vessels fell more than either other species vessels or scallop vessels. The number of scallop vessels that were active has increased since 2008, the only vessel category that increased over that period.

Using vessel length data from MA DMF, we classified and summed sector and non-sector vessels into length categories. Larger New Bedford groundfish vessels were more likely to join sectors than smaller vessels (Table 2). Almost 90 percent of groundfish vessels 75 feet and longer that had landed groundfish at any time between 2006 and 2013 in New Bedford joined sectors, while only 65 percent of the vessels between 50 feet and 75 feet joined sectors, and about 15 percent of the smaller category vessels joined sectors.

Table 2. New Bedford groundfish vessels from 2006-2013 by vessel size and sector membership.

	Under 30'	30' to under 50'	50' to 75'	75' and over	All lengths
Sector vessels	0	5	38	40	83
Non-sector vessels	4	28	21	5	58
All Groundfish vessels	4	33	59	45	141

While both sector and non-sector groundfish vessels have declined in this fishery, more than half of groundfish vessels that joined sectors remained active sector vessels in New Bedford in 2013 (Figure 7). Of the 58 vessels that had landed groundfish in New Bedford that did not join sectors, only 5 vessels landed fish or shellfish in New Bedford in 2013. The non-sector vessels have almost disappeared from the New Bedford fishery.

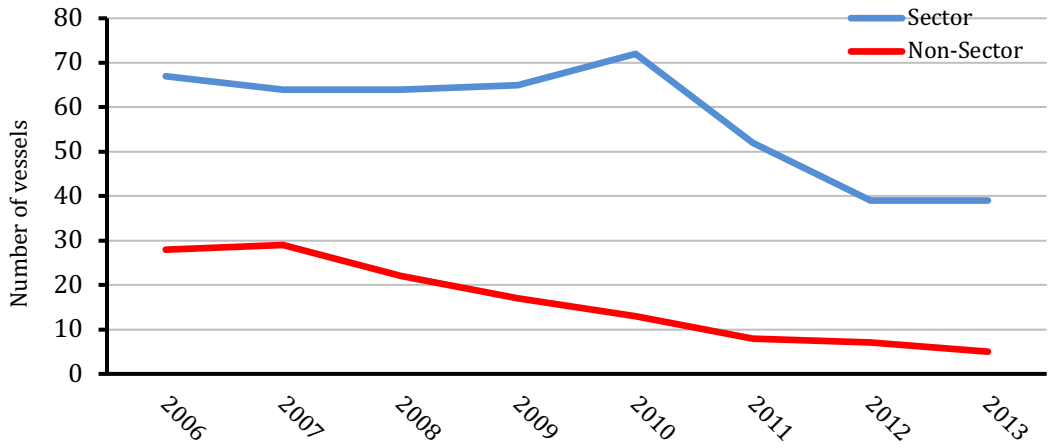

Figure 7. Number of groundfish vessels that landed in New Bedford by sector membership.

Considering those groundfish vessels that joined sectors in 2010 as sector vessels over the entire period from 2006 through 2013, the number of active sector vessels in the Port in both vessel size classes declined starting in 2010 (Figure 8).

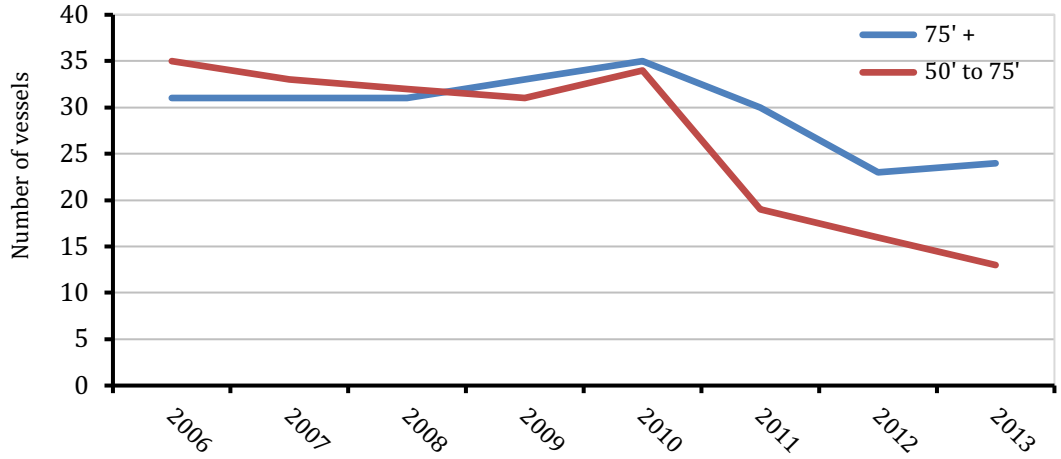

Figure 8. Number of groundfish sector vessels that landed in New Bedford by vessel length

More sector vessels between 50 feet and 75 feet left the Port than larger vessels. In the years before sector management began in 2010, medium sized vessels either outnumbered or were slightly fewer than larger vessels. Since 2010, the proportion of sector vessels exceeding 75 feet has increased from 46 percent to 57 percent of those that continue actively landing groundfish in the Port. This reflects the increasing dominance of larger vessels among those that have remained in the fishery.

Results: Value of Landings Per Vessel

We examined the changes in averages in the following five figures for statistical significance using One-way ANOVAs**.** Years were compared individually and grouped into presector (2006-2009), postsector-increasing (2010-2012), and postsector-decline (2013). The average annual value of landings of all species per active sector vessel increased significantly in 2011 and 2012 compared to 2006-2010 (Figure 9).

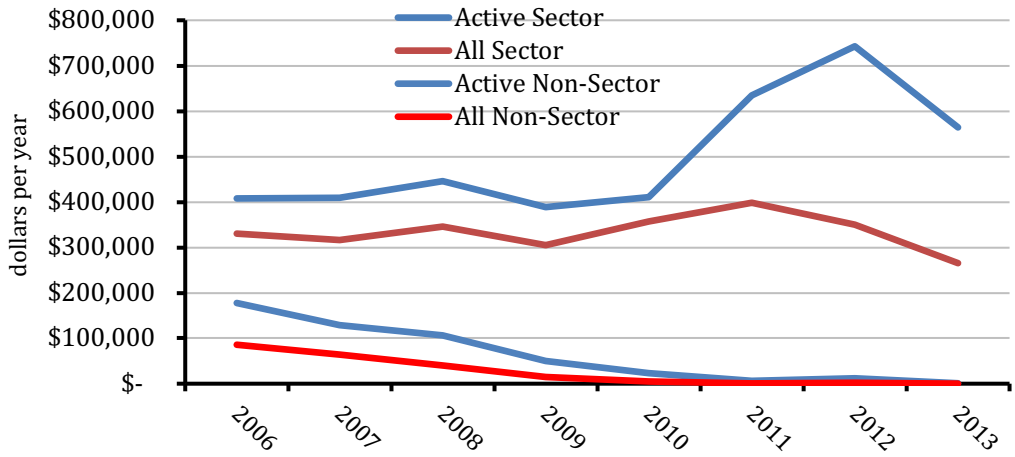

Figure 9. Average annual value landed per vessel in New Bedford for active and all (active and inactive) groundfish vessels.

Following the decline in landings in 2013, average annual value of landings for 2013 was not statistically different from any year, including pre-sector years. The average revenue based on all (active and inactive) vessels did not change significantly between 2006 and 2013. The difference between average annual value of landings per vessel for all (active and inactive) vessels and the average for active vessels reflects the impact of the large number of vessels that have stopped landing in the Port, as compared with the continuing relative success of the vessels that have maintained active landings.

The average revenue from all species landed by non-sector vessels declined to almost zero for either active non-sector vessels and all non-sector vessels.

The MA DMF data file includes a record for each purchase of landings by a registered dealer. In order to estimate the number of trips by a vessel per year, we reviewed individual dealer reports for each vessel for each year. It is clear from the dealer report data that some vessels sold to different dealers from the same trip. Some of the dealer reports were for the same date while others were for the next day or the day after that. In reviewing the dealer report data, we decided that dealer records on any of three consecutive dates signified a single trip[13]. We counted a dealer record for a fourth consecutive date as a separate trip. For example, landings reported by dealers on 3/1, 3/2, and 3/3 were counted as one trip. If there were also landings reported on 3/4, this sequence was counted as two trips. Landings reported on 3/1 and 3/3 were counted as one trip even though there was no dealer report for 3/2. The MA DMF data file also records the vessel length.

There were no significant changes in average trips per vessel for any year for vessels 75 feet and longer (Figure 10). Average trips per vessel decreased significantly in 2010 for the smaller class vessels, relative to all other years. The patterns of fluctuations are similar for both length classes. Since 2007, the larger class vessels have taken more trips per year on average than the intermediate-size class vessels, but the differences are not statistically significant.

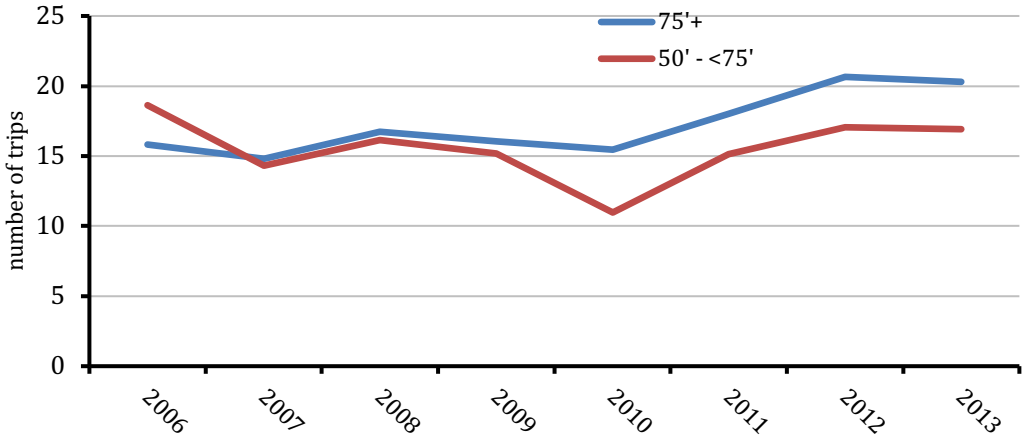

Figure 10. Average trips per year by active New Bedford sector vessels by vessel length.

The average value per trip increased significantly for vessels 75 feet and longer from 2010 to 2012 (Figure 11). Average value per trip for these vessels in 2013 was not significantly different from the years before sector management. There were no significant differences in average value per trip for smaller vessels for any year in the series. Sector management made no significant differences in terms of value landed per trip for vessels between 50 feet and 75 feet long.

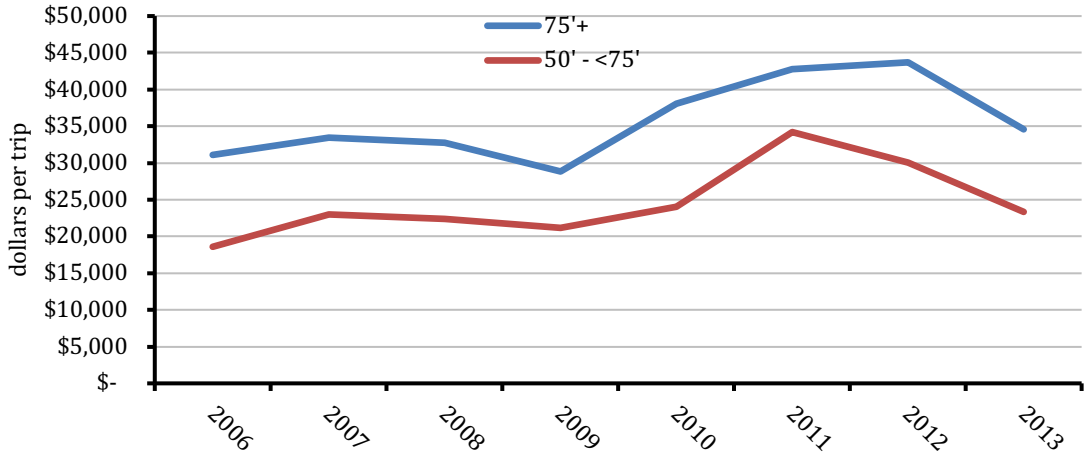

Figure 11. Average value landed in New Bedford per trip by active sector vessels by vessel length.

The values landed per trip shown in Figure 11 represent gross revenue. Trip costs would be subtracted from these revenues to yield net trip revenue per vessel, which would be divided between the vessel crew and owner, who would also have to pay repairs and other overhead costs. While data on trip costs were not available from MA DMF for these vessels, the 2012 Performance Report estimated trip costs from observer data for the entire Northeast fishery. This analysis showed substantial increases in trip costs since 2009. See the Discussion below for more detailed estimation of trip costs.

As with average value landed per trip, average annual value landed for larger vessels increased significantly in 2010 through 2012 relative to years before sectors (Figure 12). Following the decline in landing value in 2013, average annual value landed for 2013 was not significantly different from the years before sector management. There were no significant differences between before and after sectors for average annual value landed for smaller vessels. Revenue landed was consistently higher for vessels over 75' than for vessels between 50 feet and 75 feet. This difference increased after 2009.

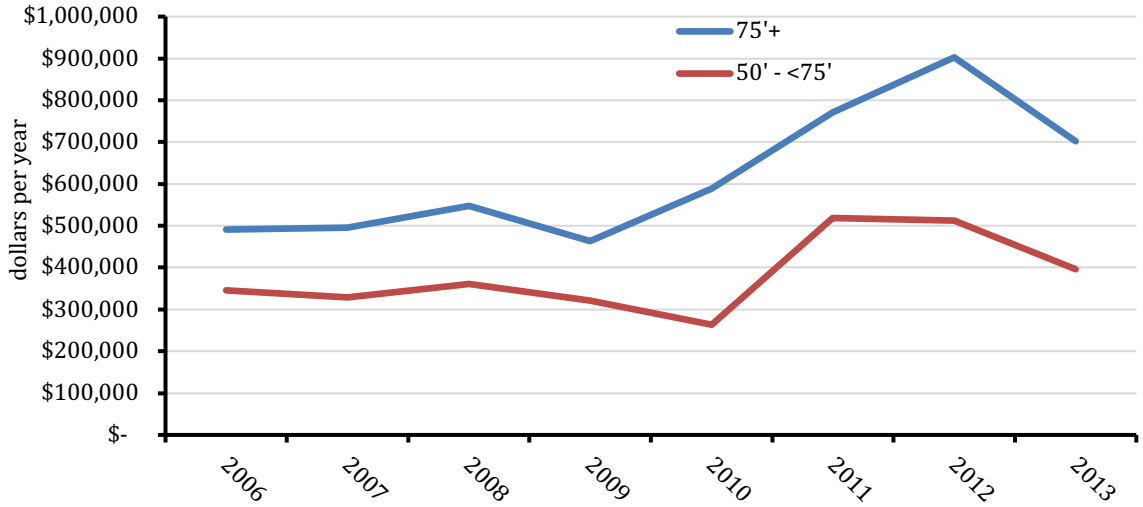

Figure 12. Average annual value landed in New Bedford per active sector vessel by vessel length.

The average annual value of landings per vessel based on all sector vessels (active and inactive) did not change significantly from 2006 to 2013 for either vessel class (Figure 13). The average value landed by between 50 feet and 75 feet trended down from 2006 through 2013, but this trend was not statistically significant. Sector management had no significant effect on average value landed in New Bedford per vessel for all sector vessels.

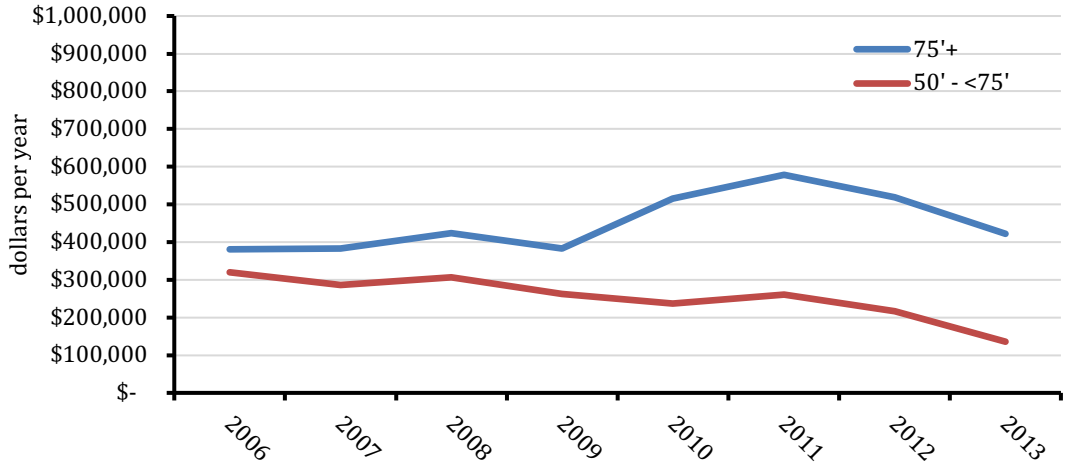

Figure 13. Average annual value landed in New Bedford per sector vessel (active and inactive) by vessel length.

The difference between average annual value of landings per vessel for all vessels for both vessel classes (Figure 13) vs. the average for active vessels (Figure 12) reflects the impact of the large number of vessels that have stopped landing their catches in the Port as compared with the continuing relative success of the vessels that have maintained active landings.

Discussion

In terms of groundfish landings, number of active vessels, and average revenue per vessel, the groundfish fishery declined in New Bedford over the recent period. The value of groundfish landed in the Port declined by 44 percent from 2011 though 2013, and the value landed from all species by groundfish vessels declined by 28 percent over the same period. There are fewer than half of the active groundfish vessels landing in the Port in 2013 than there were in 2006. The number of active sector vessels has fallen from 72 in 2010 to 39 in 2013. The significant increases in average value per trip and average annual value landed for vessels 75 feet and greater in from 2010 through 2012 were not sustained in 2013. The average values per trip and per vessel in 2013 were not statistically different from those values before sector management.

The number of non-sector vessels that landed any species in the Port declined from 13 vessels to five vessels, with average total landings from all species declining from $23,878 per vessel in 2010 to $957 per vessel in 2013.

This report examines prosperity of the groundfish fishery in New Bedford using landing data by vessel for New Bedford. We did not have sufficient data, time or resources to examine the entire Northeast groundfish fishery.

The Northeast Fisheries Science Center recently released 2012 Performance Report looks at similar variables in estimating the changes in the groundfish fishery for the entire region[14]. Comparisons between the 2012 Performance Report and this report (Groundfish Recovery) are not exact because the 2012 Performance Report is based on Fishing Year that covers 5/1/2012 to 4/30/2013 and Groundfish Recovery uses calendar year. The closest approximation to groundfish vessels defined as vessels that land groundfish as their majority of landings (Recovery Plan) are groundfish trips in the 2012 Performance Report. A groundfish trip was defined as a dealer record that reported at least one pound of groundfish landed.

Given these differences between the reports, many of the trends between 2012 and 2013 for the Port of New Bedford are similar in the reports. Table 6 in the 2012 Performance Report, for example, shows 28% drop in value of groundfish landings in New Bedford in FY2012, the Recovery Plan estimates a decline of 44% from 2011 through 2013.

The estimates for revenue per trip and per year are similar in the two reports for vessels greater than 75 feet. Using Table 15 for average number of days per trip and Table 46 for average revenue per day the 2012 Performance Report estimates for average revenue per groundfish trip for these vessels in the Northeast fishery for FY2011 and FY2012 were almost the same with our estimated average revenues per trip for active sector vessels in New Bedford for 2012 and 2013. The percentage decline between the two years in each of the reports was nearly identical.

Average revenue per year for groundfish trips on vessels greater than 75 feet in FY2012 in the 2012 Performance Report was less than we estimated for similar active sector vessels of that size for 2013, but the percentage decrease was about the same (a decline of 25 percent for Recovery Plan and a decline of 19 percent from Table 16 in the 2012 Performance Report).

The two reports did not estimate similar average revenues per trip or per year for vessels 50 feet to 75 feet, but both reports showed a decline in annual average revenue. The Recovery Plan shows a much larger decline in the number of groundfish vessels that landed in New Bedford than the 2012 Performance Report shows in the decline in groundfish vessels that declared New Bedford as their home port (Table 12). More vessels land in New Bedford than declare New Bedford as their home port as shown by the larger value of groundfish landed by all vessels (Table 6 of the Performance Report) than the value of groundfish landed by home port vessels in New Bedford (Table 7).

We did not have landings data to estimate groundfish vessels switching to other ports. As a test of the sensitivity of our results to changes in the number of transient vessels, we estimated the results for average number of trips per year, revenue per trip per year, and revenue per year for active sector vessels eliminating vessels that landed less than 6 trips and less than 10 trips in New Bedford from that year's data. The results of revenue per trip per year were almost identical comparing results from the three data sets. The results for revenue per trip per year and revenue per year were similar.

We could not estimate trip costs because the MA DMF landings data does not contain cost data. The 2012 Performance Report used vessel observer data to estimate trip costs per day for groundfish trips by vessels greater than 75 feet for the Northeast fishery. For vessels 75 feet and longer average trip costs for groundfish trips increased from $1,791 per day in FY2009 to $4,614 per day in FY2012 (Table 46). Using their estimations of average trip length (Table 15), the 2012 Performance Report estimates that costs per trip increased from $9,833 in FY2009 to $29,714 in FY2012 (Table 46). These estimates did not include leasing costs for quota per trip, which were not estimated in the 2012 Performance Report.

Much of this increase in trip costs was probably due to increasing fuel costs. From 2009 to 2013, the annual average price for diesel fuel increased from $2.63 per gallon to $4.10 per gallon in New England, which were similar to fuel costs that we obtained from New Bedford fuel suppliers[15]. This is a substantial increase in costs for large vessels that use between 2,000 and 4,000 gallons of fuel per trip.

Using landings, bycatch and species quotas allocated to sectors, the Performance Report estimates that 32 percent of the allocated quota was caught by sectors in FY2012, down from 41 percent in FY2011. For example, only 4 per of the Georges Bank haddock ACE, the largest stock in the groundfish complex, were caught in FY2012.

While we have not analyzed the causes of this decline in New Bedford groundfish landings and groundfish vessels, the low and declining percent of quota caught is consistent with the decline in groundfish landings.

The central question is what is causing the low percent of quota caught. Several possibilities have been offered to answer this question. The bycatch of choke species, such as yellowtail flounder, may restrict the catch of haddock. Fishermen have told us that they saved yellowtail quota for catching haddock in expectation of their usual movement south from Canada during the winter months, but this year the haddock moved into a closed area, which doesn't allow fishing for groundfish. Mesh size minimums may also allow legal sized haddock to escape. Stock assessment may also have overestimated haddock stock, leading to overstatement of quota for the fishery. Other fisheries may have offered better financial opportunities to groundfish vessel owners.

The complex and inflexible U.S. fishery management system that moves very slowly warrants examination. Emergency actions that restrict the catch as precaution against overfishing far outnumber actions that would allow fishermen to increase their catch without harming fish stocks.

In a recent op-ed column in the Boston Globe (3/13/2014), groundfish industry leaders compared the low percent quota of haddock caught in the U.S. and the high percentage caught in Canada from the same stock, which they credited to Canada's more flexible and more fishery-centered management system.[16]

The Council at its February 2014 meeting considered proposals to allow limited access in the closed areas of Georges Bank. Two proposals were adopted for consideration. One continues to disallow trawl fishing for groundfish in the closed areas, and the other allows limited access to these areas. The Council is scheduled to consider these proposals at its September 2014 meeting.

Fewer vessels fishing in the groundfish fishery imply loss of employment in the fishery. The loss of 41 groundfish vessels landing in New Bedford from 2010 through 2013 imply a loss of 164 crew positions assuming a average crew size of four. Crew positions are not the same as employment. Fishermen may switch between vessels, and crews may work on more than one vessel. Unfortunately, no data exist to estimate employment in any U.S. fishery because crewmembers' identifications are not recorded for fishing trips.

The MA Office of Labor and Workforce Development estimates a loss of 116 employees in fishing in Bristol County, which includes New Bedford and Fairhaven, from 2010 through 2012[17]. This estimate includes scalloping and all other New Bedford fisheries.

Major Findings

The major findings from the analysis of landings data by vessel for the Port of New Bedford and in the Port are as follows:

- Value of groundfish landed in New Bedford by all vessels declined from $31 million in 2011 to $19 million in 2013, a decline of 44 percent in two years.
- Value of landings from all species by groundfish vessels (defined as vessels that land the majority of their value in groundfish) declined from $33 million in 2011 to $22 million in 2013, with most of this decline from groundfish species.
- Average price per pound for groundfish landed by groundfish vessels increased from 2009 through 2012 but dropped in 2013. The decline in average price per pound of groundfish in 2013 reflects both declining prices for some species and a change in the composition of groundfish landings by groundfish vessels, with an increasing share generated by lower-value species. The actual average price per pound of groundfish was roughly the same in 2012 and 2013 as it was in 2006 and 2007, but the average price adjusted for inflation declined over this period from $2.15 per pound in 2006 (in 2013 dollars) to $1.41 in 2013.
- The number of groundfish vessels actively landing any species in New Bedford declined from 97 vessels in 2006 to 47 vessels in 2013.
- Groundfish sector vessels actively landing groundfish in New Bedford declined from 72 vessels in 2010 to 39 vessels in 2013. Groundfish non-sector vessels declined from 13 to 5 over the same period with their average landings per vessel from all species less than $1,000 in 2013.
- The average value landed per trip and annual value landed per vessel 75 feet and longer increased significantly in 2010 through 2012 relative to years before sectors. Following the drop in landings in 2013, average annual value landed by these vessels was not significantly different from the years before sector management. There were no significant differences between before and after sectors for average annual value landed in New Bedford per vessel for vessels between 50 feet and 75 feet.
- Data on trips costs were not available to us. The 2012 Final Performance of the Multispecies (Groundfish) Fishery estimated trips costs from observer data for groundfish trips. That analysis estimated that average costs for groundfish trips on vessels 75 feet and longer increased from $9,833 in FY2009 to $29,714 in FY2012 (Tables 15 and 46). Much of this increase in costs was due to fuel prices. These costs do not include leasing costs for species quotas.
- The loss of 41 groundfish vessels landing in New Bedford from 2010 through 2013 implies a loss of 164 crew positions assuming a average crew size of four. The MA Office of Labor and Workforce Development estimates a loss of 116 employees in fishing from all fisheries from 2010 through 2012 in Bristol County, which includes New Bedford and Fairhaven.

John Robson

VI. IMPACT OF DECLINING GROUNDFISH LANDINGS ON SHORESIDE BUSINESSES

In coastal communities, the vessels and the businesses that support them act in concert with one another, for example, a business supplying net will go to another net supplier to make up a full order. Captains and vessel owners will frequently go to several suppliers to gear up his vessel and to pick up supplies as needed, even though one supplier may carry all his needs. Fish dealers and processors who buy the catch also buy from and sell to other dealers, processors, and wholesalers. This process spreads the business among them all. One never knows in the fishing business, when something is needed quickly, so it is in everyone's interest to keep all suppliers economically viable and available. As with other local business networks, friendship intersects with business considerations in the fishing industry.

Choosing the categories and assigning businesses to each category was a challenge due to the complexity of fishing supply. There are a few large firms in the Port that own separate businesses to supply products and services to fishing vessels, but most firms that supply inputs or receive outputs from the commercial fisheries are small firms that supply in a specific product category. In order to separate businesses from the products they sell, we defined "business" as a named business that supplies goods and services, and we used "products" to mean the goods and services they supply.

We began the list of shoreside businesses and categories of products with the list compiled by Rodney Avila in 2004 for the HDC website. We showed key members of the fishing industry the list of shoreside businesses to identify the businesses that had left the industry, merged, or changed addresses. We also phoned all businesses on Rodney's list to check if the phone number was still connected to the business. We used Google to check websites that listed addresses, phone numbers, and products for these businesses and followed through with phone calls. We also verified the status of the business by visiting its physical location in order to determine if the business was still active.

Over the course of this project, we compiled a list of shoreside businesses that served the fishing industry in the Port by product category in 2014 (Table 3). While most businesses supply products in a single category, some businesses supply products in more than one product category. For example, most dockage locations are connected to another business, usually processing or vessel repair. We listed

businesses that supply product in more than one product category in each product category that they supply. Seventeen businesses supply products in more than one category. The other 135 businesses supply products in a single category for a total of 148 shoreside businesses that supply the fishing industry.

Table 3. The number of shoreside businesses in the Port of New Bedford by product category in 2014 and the number of shoreside businesses that have gone out of business between 2004 and 2014 by product category.

Categories	Number of Current Businesses by Product Category	Number Out of Business by Product Category
Marine Equipment Service & Supplies	23	6
Insurance, Surveyor, and Financial Services	17	0
Welding Supplies & Services	8	4
Vessel & Equipment Repair Services	17	5
Dockage	16	1
Fishing Gear	12	2
Fuel & Other Trip Supplies	14	5
Processing, Wholesaling & Retailing	55	28
Other	8	1
TOTALS	170	52

The numbers and diversities of these businesses show New Bedford as a full service port. Only welding had fewer than twelve businesses supplying products. We didn't count as businesses welders on staff for large shipyards. Many other individuals also work as welders in the Port. The "other" category included groundfish sectors and regulatory and research organizations.

We estimated the businesses that have left the fishing industry since 2004 through the processes explained above. We investigated if these businesses had merged with other businesses in the industry in order to distinguish between businesses that merged with other businesses and those that have closed.

Only two of the businesses that closed supplied products in more than one category. Adjusting for these two businesses, we estimated that 50 businesses that supplied products to the fishing industry in the port have not merged with another business but closed (Table 3). More than half of the total businesses that have closed were processors, wholesalers, or retailers, which reflects the loss of fresh groundfish supplied to processors that formerly specialized in fresh products.

John Robson

Many other businesses supply products to the fishing industry in the Port but not as their main customer. At least five banks supply credit to fishing industry businesses. Several food suppliers fill orders for food and prepared meals for fishing trips, and many machine shops and metal shops supply the fishing industry with metal fabrications. We did not include these businesses in Table 3 of shoreside fishing businesses.

We designed separate questionnaires for processing, wholesaling, and retailing businesses, other shoreside businesses, and sector managers. We tested the questionnaire on at least one business in each category and adjusted the questionnaire according to their suggestions. We mailed a letter from New Bedford Mayor Jon Mitchell to the 220 businesses that we thought still operated. Eleven were returned to us for no address, which we investigated to determine if they had closed. We phoned businesses that we assumed had received the letter to schedule interviews or we simply visited the business. During the interview, we asked for names of businesses that had closed and the names of active businesses that we may have missed in our list.

We interviewed 47 businesses that supply a total of 57 products by category (Table 4). We were not able to stratify the sample of businesses interviewed by business size. Most of the businesses that we interviewed were relatively small businesses. Of the 47 businesses that we interviewed, 16 derived 40 percent or more of their total revenues from groundfish. Fourteen of these 16 businesses responded that the percentage of their revenues from groundfish had declined. For most of these businesses, the groundfish share of their business had been cut in half or more. Most recorded fewer employees in 2012 than in 2008. We could not estimate a decline in employment from these data due to the predominance of small businesses interviewed.

Table 4. New Bedford shoreside fishing businesses interviewed by product category.

Categories	Businesses Interviewed
Marine Equipment Service & Supplies	10
Insurance, Surveyor, and Financial Services	6
Welding Supplies & Services	3
Vessel & Equipment Repair Services	2
Dockage	4
Fishing Gear	8
Fuel & Other Trip Supplies	5
Processing, Wholesaling & Retailing	12
Other	7
TOTALS	57

Every business owner or manager that we interviewed was angry and frustrated by federal groundfish management. Shore side businesses said that they are at the mercy of federal government agencies with little knowledge of the way that the industry works, little consideration for fishing businesses, and almost no information on the fish available to be caught.

One business owner told an interviewer, “We make the gear ahead of time ready for the upcoming season. The ruling agencies hand down regulations at the drop of a hat, and we are left with tens of thousands of

dollars worth of useless gear. It just sits here. This is specialized gear meant for a particular kind of harvesting. One minute we are making shrimp pots then we're told there's no shrimping this season so we make conch pots. Then we're told that the size is going to change. It never ends."

Businesses that depend on groundfish vessels have suffered sharp declines in sales. However, our interviewers saw a committed determination to survive. One business owner told us, "I know the industry is changing. It has to, and I am willing to do whatever it takes to keep working." Another business owner told an interviewer, "I will die working here before they take this from me and my kids."

Owners and managers of businesses that depend upon groundfish are looking for new business either in other fisheries, such as scalloping, service to vessels from other ports, new fishery products such as frozen products, or business outside fishing, such as trucking and packaging.

Sector managers of the four sectors that operate from New Bedford told us that estimating, finding and allocating quota for fishing trips is the most difficult parts of their job. They can't find quota for choke species to lease when they need quota at prices that make trips profitable. Managers of three sectors told an interviewer, "There is not enough fish in the leasing market. Fishermen and sector managers save quota because it is often difficult to buy quota when you need it."

Sector managers plan on discard rates by area that are charged to fishermen regardless of the amount of the fish they actually discard. These discard rates change during the fishing year, leaving some fishermen and sector managers scrambling for quota and other fishermen with quota they can't use. One sector manager told an interviewer, "It would be better if they (fishery managers) picked one discard rate and stuck with it." Another sector manager said, "Discard rates don't match areas where these species are. Fishermen are charged discards where these fish can't be caught."

Sector managers told an interviewer that the fishing year ends on the wrong data (April 30). Most bad storms come in late winter, so that vessels can't fish, and they lose leased quota at the end of the fishing year. One manager said, "One year, major storms in February stopped trips that would have used up leased quotas. Fishermen bought quota that they couldn't use and couldn't carry over leased quota into the next year." The sector managers recommended that the fishing year begin on January 1.

Major Findings

- Fifty businesses that supplied products to the New Bedford's fishing industry or purchased fish from vessels have gone out of business between 2004 and 2013. More than half of these businesses were in processing, wholesaling and retailing.
- The loss of 50 businesses, as well as reductions in employment in surviving businesses, translates to job loss. The MA Office of Labor and Workforce Development estimates a loss of 227 jobs between 2010 and 2012 in Seafood Product Preparation & Packaging in Bristol Country, which includes Fairhaven and New Bedford. The MA Office of Labor and Workforce Development does not estimate employment in other shoreside businesses because they are parts of much larger categories.
- The decline in the vessels, trips, and landings in groundfish fishery has created more dependence in the Port on the scallop fishery, which landed 85% of the port's value in 2012.

- Despite these recent declines, the Port of New Bedford remains a full-service port with numerous businesses in every category of shoreside services with a total of 148 shoreside businesses whose main customers are the fishing industry.
- We interviewed 47 shoreside business owners or managers. Every business owner or manager that we interviewed was angry and frustrated by federal groundfish management. These business owners and managers said that they are at the mercy of federal government agencies with little knowledge of the way that the industry works, little consideration for fishing businesses, and almost no information on the fish available to be caught.
- Sector managers of the four sectors that operate from New Bedford told interviewers that estimating, finding and allocating quota for fishing trips are the most difficult parts of their job. They can't find quota to lease when they need quota on choke species at prices that make fishing trips profitable.
- Interviews showed that businesses that remain in the port that depend on the groundfish fishery now rely more on other fisheries, vessels from other ports, other products (such as frozen fish inputs for processing), and other industries (such as trucking).

Peter Pereira Standard-Times

VII. RECOMMENDATIONS FOR REVITALIZING THE GROUNDFISH FISHERY

Develop a New Groundfish Video Survey Process to Generate Data for Stock Assessment

New England groundfish have the potential to produce approximately 150 thousand metric tons of annual yields (NEFSC 2008) worth $466 million at the dock at the 2013 average groundfish price. The scallop fishery value for 2012 neared $600 million in landings. For FY2014, both these industries will be severely curtailed due to yellowtail flounder bycatch on Georges Bank. The present stock estimate of yellowtail flounder is extremely low (820 metric tons) and the resulting low allowable catch will severely curtail landings in both the scallop and groundfish fleets causing major economic hardship in Massachusetts's fishing communities. There are several problems with the recent yellowtail flounder stock assessments, but a fundamental one is the limited spatial coverage of the NMFS surveys. Presently the NMFS completes 50 to 60 half hour tows to estimate fish stocks in Georges Bank, which covers an area greater than 11,000 square miles, roughly one tow for every 200 square miles of ocean.

To address this issue SMAST scientists, graduate students, and commercial fishermen are developing a new groundfish survey that combines traditional fishermen's knowledge with advanced video observations designed for nets and state-of-the art benthic imagery and sonar. Our objective is to estimate the abundance, spatial distribution, size structure, and length-weight relationship of the Georges Bank yellowtail flounder stock on the southern flank of Georges Bank. SMAST scientists will also estimate these parameters for cod, haddock, monkfish, skate and other groundfish. This will be a non-intrusive ecosystem-based sampling effort.

SMAST scientists conducted a pilot research cruise on commercial fishing vessels from April 14th through April 17th 2013. Three separate camera mounting locations were tested, the camera looking back into the codend, looking forward from the codend and looking down at the footrope. During the cruise, 11 tows were made totaling 6 hours of bottom time. Four tows had the codend closed to allow for validation of the species caught in the net. The video footage from many of the tows had large periods of the view hindered by a cloud of silt limiting the ability to count fish. The final tow had the clearest footage and was used to compare the number of fish caught in the net to those that were counted from the video. In the tow 720 flatfish were collected comprised of yellowtail, summer, windowpane, 4-spot and witch flounder. After the trip the video from this tow was reviewed and 653 flatfish were counted, representing 91% of the flatfish that were caught in the net during the tow.

Based on the information from the pilot cruise the survey design was changed to align the survey track with depth contours. This change enables the extrapolation of species composition observed within closed codend tows to open codend tows. The net was also redesign and rebuilt to reduce the silt cloud in the net. The second survey sampled the southern portion of Closed Area II from November 8th to November 13th, 2013. Ten tows with an open codend, covering approximately 175 km, and eight closed codend tows were conducted and filmed. In the closed codend samples yellowtail flounders were the most frequently observed flatfish and the third most observed fish group (dogfish and skate were first and second). A total of 1,993 yellowtail flounder were caught and measured. On average about 250 yellowtail flounder were caught per tow (standard deviation of 150). The closed codend samples provided preliminary swept area estimated of 870 mt of yellowtail in the sample area, which assumes the net operated with 100% efficiency, i.e., that it caught every fish in its path. The NMFS stock assessment

of 820 mt for all Georges Bank may be substantially underestimated given the SMAST estimation of 870 mt for a small proportion of Georges Bank.

SMAST scientists and fishermen continue to develop this sampling protocol. It has already served to expand examination of the data supporting the yellowtail flounder stock assessments. SMAST scientists will submit these data to NOAA Fisheries for use in stock assessments for groundfish stocks.

Improve Magnuson-Stevens Act

The Magnuson Stevens Act (MSA) is currently scheduled for reauthorization in Congress. There is widespread agreement that the current fisheries management system needs improvement because it is not producing the maximum benefit to the nation. Much of the problem stems from ambiguities in the language of the law and a focus on one phrase: "preventing overfishing" which does not take into account benefits to the nation including economic stability or growth of Ports like New Bedford. To achieve a balance between conservation and economic growth within the Port and its groundfish fishery, thoughtful changes to the MSA are necessary.

We propose that the often contradictory 10 National Standards for conservation and management measures be reduced to five prioritized standards[18]:

(1) Promote the safety of human life at sea, maximize yield (or some economic function of yield) subject to the constraint of keeping fishing mortality at or below a level specified by the Council, balanced with the importance of fishery resources to fishing communities.

(2) Base conservation and management measures upon the best scientific information available, determined by a collaborative effort of government, educational institutions, and private and non-profit scientists. Use the best technological mechanisms to gather and analyze samples and data.

(3) Take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches. Minimize bycatch and allow the remaining bycatch to enter the marketplace.

(4) Minimize costs and avoid duplication.

(5) Consider efficiency in the utilization of fishery resources, but economic allocation shall not be its sole purpose.

We also propose that the reauthorization of the MSA clearly define NOAA Fisheries' role in fisheries management; establish clear performance and accountability measures for all management processes; establish oversight committees to ensure accountability, efficiency and compliance; amend the arbitrary ten year stock rebuilding time frame to reflect biological realities; increase cooperative research and analysis; and create scientific working groups and national institutes to maintain checks and balances of scientific review.

Improve Scientific Support for Annual Catch Limits

In comparison to other fisheries management systems throughout the world, the catch limit system specified by the 2007 reauthorized Magnuson-Steven Fisheries Conservation and Management Act and associated Guidelines is much more demanding than other alternatives. The U.S. management system requires more intensive catch monitoring, more extensive process in fishery management decisions and more frequent and accurate scientific assessments. The current fishery science system in New England is not meeting those increased demands.

The New England fishery management system has made great strides over the last decade to end overfishing and has rebuild many stocks. However, there are major deficiencies in the quality and frequency of stock assessments and fishery statistics, such that the legal requirements and guidelines make unrealistic demands on the scientific system. The scientific system needs to be expanded or re-programmed to meet management requirements. Alternatively, the national strategy for fishery management needs to be reconsidered so that demands on the scientific system are more practically suited to the current scientific capacity, and performance of the management system is less dependent on the inherent uncertainties in fisheries science.

Recommendations for stock assessments to meet the needs of management:

- More accurate and frequent stock assessments and catch projections
- Greater consideration of alternative stock assessment approaches, including cooperative research with the fishing industry
- More timely and transparent catch monitoring, including collaborations with fishing vessels for data sharing and study fleets
- Greater consideration of environmental change in stock assessments and overfishing definitions
- A more open, inclusive and transparent stock assessment process

Examine the Effects of Individual Species Quotas on Commercial Landings

As stated earlier, in FY2012, only 32% of the total groundfish quota was caught, down from 41% in FY2011. Only 4% of the Georges Bank haddock stock was caught in FY2012. What has caused the decline in the percentage of total groundfish quotas that are caught?

There are many possible explanations for this large and increasing percentage of quota not caught. Stock assessments or projections may be overestimated. Inadequate quota or high lease prices for choke species may restrict the catch of plentiful stocks. Underestimated biomass of choke species, such as yellowtail flounder, would compound the problem, as the choke species may be difficult to avoid, causing reductions in future quotas. Changing weather patterns, rising water temperature and other environmental changes may have affected species' patterns of locations in time and space. Captains may be forced to search for fish in unknown areas, an expensive task given high fuel costs. Cash may have been wrung out of the groundfish fishery after 20 years of permit, effort, and quota restrictions, with equity and credit unavailable to most groundfish vessel owners. Groundfish trips yielding little revenue due to reduced landings and low prices may make options in other fisheries more profitable.

Areas closed to fishing and minimum mesh size restrictions that allow legal size haddock to escape have reduced the percentage of haddock caught. Canada, which does not close large areas of its fishing ground and has recently reduced mesh size, catches a much larger percentage of its haddock quota from the same Georges Bank haddock stock. Making these same changes in the U.S. portion of Georges Bank would not threaten overfishing on the abundant Georges Bank haddock stock.

Answering these questions require a concerted effort of scientists using biological and economic models with data from a wide variety of sources, for example, a model that predicts apparent or available abundance as a function of costs, regulation, availability, catchability, and stock size. This is a traditional approach, but it has not been implemented. This type of research is well suited for cooperative research between scientists and fishermen.

Use Conservation Engineering to Develop More Effect Fishing Gear

Developing an innovative semi-pelagic trawl for groundfish would provide immediate benefits to the commercial fishing industry in terms of successful harvesting of their allocations, while reducing the catch of choke species and reducing operating costs (saving fuel). Both groundfish and scallop fisheries are severely challenged by the low quotas of yellowtail flounder and winter flounder, and more recently, windowpane flounder. Developing fishing gear that avoids capture of these species will allow the groundfish and scallop fisheries to harvest relatively healthy stocks and allow these flounder stocks to recover quickly. SMAST and MA DMF scientists, commercial fishermen and gear suppliers are developing trawl gear for haddock, pollock, hake and redfish that will fish more effectively. This new gear can reduce flounder bycatch, reduce impact to fish escapees, lower intrusiveness on the seabed, and save fuel. Preliminary tests of a semi-pelagic trawl door indicated fuel saving of more than 20%, compared with traditional trawl door, without loss of target fish catch.

Provide Funds to Fishermen for Licensing in Other Marine Services

Licenses and training for Master/Mate, Able Body Seaman, Operating Engineer, and Deckhand are available for fishing and other maritime trades. The Master/Mate license covers different degrees, such as, 50Ton, 100ton Master/200ton Mate, 200ton Master/500ton Mate, and 1600ton Master/Mate Limited and Unlimited. These licenses would provide more job security and potentially higher pay because they would provide opportunities in other marine industries, such as, wind farm initiatives, tugs and barges, dredging companies, and ferry services.

Several schools and institutes offer training for licenses that cost from $2700 for the top license to about $1600 for other licenses and take from 6-8 weeks of intense training. It costs around $600 to upgrade a license, which generally are required every five years for renewal.

VIII. RECOMMENDATIONS FOR IMPROVING THE PORT

The recommendations for port improvements in this plan should be considered within context of the guidance and recommendations of Designated Port Areas and Chapter 91 of the Massachusetts General Laws, the New Bedford Fairhaven Municipal Harbor Plan, and the recommendations of the 2014 Massachusetts Department of Transportation Ports of Massachusetts Strategic Plan.

The overall strategy for improving the port is to aggressively promote economic growth and employment opportunities to support all existing port uses and develop new port industries as opportunities are created. Mayor Mitchell of New Bedford has called this an “All of the Above” strategy based on the recognition that the harbor can fully support the competiveness of commercial fishing and other maritime industries.

To remain and grow as the leading port for commercial fishing and processing in the Northeast is critical and essential to the port’s future and the future of the New Bedford and Fairhaven. The port should

continuously strive to improve infrastructure that supports the fishing industry as the industry increases its presence in the port and adjusts to new regulations for fisheries management. Our goal is to be the center of the Northeast fishing industry now and in the future.

Simultaneously the Port should support and grow other key marine industries – ship repair, break bulk cargo, bulk cargo, the offshore wind industry, short-sea shipping, cruise vessels, ferry operations, excursion vessels and recreational boating. These port industries provide work for businesses that support the fishing industry and the people working in those support businesses. These port industries also provide crossover employment opportunities. It is also important that the New Bedford central harbor offer areas of public accommodation in ways that tie the waterfront to the downtown while avoiding interference with marine industrial activities. If well managed, public access to the port can be increased in a manner that provides additional social and economic benefits and does not interfere with maintaining and growing existing industrial uses. The expansion of public access is both recognized and advocated by the Municipal Harbor Plan and can be accomplished within the Commonwealth's requirements for waterfront development contained in the Chapter 91 statute and regulations.

The capital investment recommendations presented in this plan include needed improvements to directly assist the fishing industry and improvements to increase the port's ability to host other maritime industries including cargo, passengers, offshore wind, and recreational vessel activity. Increased economic opportunities for maritime businesses and people with maritime skills can be best obtained by maximizing business activity in all port industries while increasing the ports ability to support the fishing industry.

With the exception of the shore power project on the New Bedford municipal piers, the exact source of funding for the capital improvements recommended below has not been identified. Of particular importance going forward is an assessment of the funding level necessary to fulfill the intent of the Ports Compact strategic planning process. Toward that end, the New Bedford HDC recommends an annual

level of investment to maintain and grow the capacity of the Commonwealth's deep-water ports. Specifically, the New Bedford HDC advocates that an annual capital spending target be established and incorporated into the Commonwealth's Five Year Capital Plan as well as the MassDOT Capital Improvement Plan such that no less than $20 million in deep water port construction contracts for marine industrial projects in the Commonwealth's five largest ports is advertised annually.

Capital Project Recommendations Specific to the Fishing Industry

1. Structural Repairs to New Bedford City Fishing Piers. Repairs to Fisherman, Steamship, Coal Pocket, Coast Guard Park, Homer's and Leonard's municipal piers are estimated to cost $5 million. (Recommended to MassDOT for inclusion in Ports of Massachusetts Strategic Plan in HDC letter dated November 14, 2013.)
2. Expansion of New Bedford Municipal Fishing Piers: Homer's and Leonard's. Recommended by the Harbor Plan and Ports of Massachusetts Strategic Plan.) Estimated cost: $9 million.
3. Phase V Dredging of Municipal and Private Berths. The State Enhanced Remedy (SER) process allows berth dredging to be completed with a fast track permitting process. The dredging of municipal berths and private berths will provide additional berthing capacity for fishing and other vessels. Estimated costs: $18 million with additional costs for dredging twenty private commercial properties.
4. Develop and Implement Plan for Fleet Use of Shoreside Power Installed at New Bedford Municipal Fishing Piers. The infrastructure for shoreside power at Fisherman's Wharf is complete and is nearing completion at Steamship wharf. HDC staff is working with interested vessel owners to design a system to allow use of shoreside power with minimal disruption of vessels choosing not to use shoreside power. Use of shore power will save electrical costs for vessels that choose to use the service.

Recommendations to Increase Overall Economic Activity in the Port

1. Repair of the North Side of the State Pier. A large portion of the north side of State Pier is condemned to pedestrian and vehicle traffic. Repairs are essential to the sustained operation of the ferry terminal and to allow the full range of access for emergency vehicles. Estimated cost: $3,200,000.
2. Maintenance Dredging of the Federal Channel. Shoaling, primarily in the approach channel, has reduced the effective harbor depth for vessels to 23 feet - six inches of draft at any time, and 26 feet of draft playing the tides. Authorized depth for the channel is 30 feet. The reduction in channel depth requires maintenance dredging, the bulk of which is paid with federal funds. The Army Corps has money and is proceeding with the design, plan and specifications. Approximately 650,000 cubic yards of material will be unsuitable for disposal offshore and will require Confined Aquatic Disposal (CAD cell) disposal. Once Congress has allocated the money, federal funds will pay 100 percent of dredging (digging) costs. A 35 percent match is required for the disposal of unsuitable material. The cost of this match is estimated at $12 million.

   Maintenance dredging is absolutely essential for the Commonwealth and New Bedford to realize the potential of the State Pier and the Marine Commerce Terminal. The approach channel to Marine

Commerce Terminal was dredged to 30 feet in anticipation of the maintenance dredging returning the main channel to its 30 foot authorized depth.

3. Bulkheading of State Pier. In the last six months, shippers have been turned away by Maritime International, Inc. because the pile supported East face cannot handle the combined weight of a mobile harbor crane carrying a loaded container on the pier. Recent marketing efforts have shown the State Pier needs the capability to offload a small number of containers from break bulk ships or from a marine highway vessel and to offload project cargo. A fill-supported pier will give the State Pier needed cargo capabilities it will never have with a pile-supported pier. Estimated Cost: $30 million.
4. State Pier Refrigeration Project. Refrigeration at the State Pier is needed to allow the handling of break bulk refrigerated projects year round.
5. Route 6 Bridge Replacement Study. Expansion of the navigational width of the Route 6 Bridge to the width of the Hurricane Barrier (150 feet) would open thousands of feet of deep draft berthing in the upper harbor. Presently Maritime Terminals' two deep-water berths north of the bridge are limited in their ability to attract cargo ships due to the 95-foot navigation width of the existing bridge. All three of the break bulk cargo ships using berths north of Route 6 in the 2013 season experienced delays of at least one full day due to the transit restrictions of the bridge. MassDOT Highway District 5 is currently conducting a study of bridge replacement options. Recommended by the Ports of Massachusetts Strategic Plan.
6. South Coast Rail. The Commonwealth and City of New Bedford should use state investment in South Coast Rail to create a mixed-use/visitor waterfront and improve freight rail to North Terminal, State Pier and South Terminal. The Whale's Tooth Station should be integrated into a waterfront, passenger and visitor environment. Recommended by the Ports of Massachusetts Strategic Plan.
7. South Terminal Rail Connection. Extend the MassDOT line from State Pier to the Marine Commerce Terminal in order to improve on-dock service to State Pier and support the transportation of wind turbine components and other cargo. Recommended by Ports of Massachusetts Strategic Plan.
8. Offshore Wind Business Development Strategy. Develop a joint City of New Bedford/Massachusetts Clean Energy Center/Mass Development business development strategy to capitalize on the South Terminal capital investment. Recommended by the Ports of Massachusetts Strategic Plan.
9. Excursion/Public Access Hub at Fisherman's Wharf/State Pier and Land Use Planning for State Pier and Adjacent Properties. In conjunction with the recommendation for fishing fleet berth expansion and the Ports Compact recommendation on port specific excursion markets, conduct land use planning for the State Pier and adjacent properties. Recommended by the Ports of Massachusetts Strategic Plan.
10. Recreational Vessel Dockage and Survey Study. Conduct an assessment of market demand, berthing sites, feasibility of needed investments, and implementation plan. Update engineering, cost estimates for Pope's Island marina repair and expansion. Recommended by Ports of Massachusetts Strategic Plan.
11. Buildout of Harbor Development Commission Offices and Regional Command Center. The HDC presently shares office space with the New Bedford Waterfront Visitor's Center. This arrangement is unacceptable for conducting planning and response operations with interagency participation.

IX. REFERENCES

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Rodney Avila

END NOTES

[1] NOAA Press Release.www.nmfs.noaa.gov/mediacenter/2012/09/13_secretary_of_commerce_declares_disaster_in_northeast_groundfish_fishery.html

[2] http://www.nero.noaa.gov/ro/fso/MultiMonReports.htm

[3] Not always successfully. Stokesbury et al 2011, show massive discard scallop mortality in Elephant Trunk Area in 2003-2004.

[4] Vessel owners designate home Port as the port where the vessel usually docks.

[5] Federal Register, April 27, 2004, Northeast (NE) Multispecies Fishery; Amendment 13; Final Rule. http://www.nero.noaa.gov/amend13/.

[6] For example, in 2005, scallops and monkfish comprised almost 20% of total revenue for New Bedford's offshore trawler fleet, more than double the value the fleet had landed in 2002 (Georgianna & Shrader, 2008). In 2006, some of these trawlers that caught scallops with a net did not qualify for a General Category Scallop Permit, which eliminated their open access to scallops because qualification for the permit required catching scallops with a dredge. In 2010, the quota allocated for the General Category scallop fishery was reduced from about 13 % to 5% of the total scallop quota and many draggers lost their General Category permit and reduced the scallop catch for those groundfish vessels that had qualified for a General Category permit. In a similar way, the monkfish catch for groundfish vessels was reduced through regulations that required monkfish DAS in addition to groundfish DAS to catch monkfish. In other words, vessels targeting monkfish lost some of their access to groundfish.

[7] Table 32, in the 2012 Final Report on the Performance of the Northeast Multispecies (Groundfish Fishery).

[8] We are indebted to Brant McAfee of MA DMF for providing these data. Responsibility for all presentations, aggregations, and analyses of the data are entirely the responsibility of the authors of this report, not MA DMF. Data were provided subject to agreements between MA DMF and each researcher on this project that we would not reveal individual vessel data.

[9] Fishing years differ for groundfish and scallops. The groundfish fishing year begins May 1 and ends the following April 30. The scallop fishing year begins March 1 and ends the following February 28. Because of the different fishing years and the need to coordinate our information with reports from shoreside businesses (that typically maintain records on a calendar year basis for tax reporting purposes), data shown in this Report are for calendar years.

[10] Jonathan M. Larabree, "Sector Management In New England's Groundfish Fishery: Dramatic Change Spurs Innovation," Gulf of Maine Research Institute, August 2012, p. 1

[11] Prices were adjusted for inflation using the Producer Price Index for Meat, Poultry and Fish, scaled to 2013 prices.

[12] Whaling City Seafood Display Auction average prices by species for 2012 and 2013.

[13] "Guests, like fish, begin to smell after three days." - Benjamin Franklin.

[14] See Murphy, et al 2014. 2012 Final Report on the Performance of the Northeast Multispecies (Groundfish) Fishery

[15] Annual average prices for low-sulfur diesel fuel from US Energy Information Administration. http://www.eia.gov/dnav/pet/pet_pri_gnd_a_epd2dxl0_pte_dpgal_a.htm

[16] R. Canastra, V. Giacalone & J. Odlin. "Handicapping our fishermen" Boston Globe, 3/13/2014.

[17] MA Office of Labor and Workforce Development, Employment and Wage (ES-202) data, various years. http://lmi2.detma.org/lmi/lmi_es_a.asp#IND_LOCATION

[18] The proposed rewritten and reorganized National Standards are available in their entirety at centerforsustainablefisheries.org/wp-content/uploads/MSA-Reauthorization-Policy-Paper.pdf

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