

Mid-Atlantic Fishery Management Council
Ocean Quahog Information Document - April 2018

Note: The ocean quahog stock was assessed and peer reviewed in February 2018. In addition to the stock assessment reports, the Northeast Fishery Science Center (Dan Hennen Pers. Comm., NEFSC 2018) has provided a data update that provides more recent fishery data available. The following summarizes some of the information from the stock assessment and data update, but not all; the full reports can be referenced for additional details and are available at: <http://www.mafmc.org/council-events/2018/may-2018-ssc-meeting>.

Management System

The Fishery Management Plan (FMP) for ocean quahog (*Arctica islandica*) became effective in 1977. The FMP established the management unit as all ocean quahog in the Atlantic Exclusive Economic Zone (EEZ). The FMP is managed by the Mid-Atlantic Fishery Management Council (Council), in conjunction with NMFS as the Federal implementation and enforcement entity. The primary management tool is the specification of an annual quota, which is allocated to the holders of allocation shares (Individual Transferable Quotas - ITQs) at the beginning of each calendar year as specified in Amendment 8 to the FMP (1988). In addition to the Federal waters fishery, there is a small fishery prosecuted in the state waters of Maine. The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: <http://www.mafmc.org>.

Basic Biology

Information on ocean quahog biology can be found in the document titled, “Essential Fish Habitat Source Document: Ocean Quahog, *Arctica islandica*, Life History and Habitat Requirements” (Cargnelli et al. 1999). An electronic version is available at the following website: <http://www.nefsc.noaa.gov/nefsc/habitat/efh>. Additional information on this species is available at the following website: <http://www.fishwatch.gov>. A summary of the basic biology is provided below.

The ocean quahog is a bivalve mollusk distributed in temperate and boreal waters on both sides of the North Atlantic Ocean. In the Northeast Atlantic, quahogs occur from Newfoundland to Cape Hatteras from depths of about 8 to 400 meters. Ocean quahogs further north occur closer to shore. The US stock resource is almost entirely within the EEZ (3-200 miles from shore), outside of state waters, and at depths between 20 and 80 meters. However, in the northern range, ocean quahogs inhabit waters closer to shore, such that the state of Maine has a small commercial fishery which includes beds within the state's territorial sea (≤ 3 miles). Ocean quahogs burrow in a variety of substrates and are often associated with fine sand.

Ocean quahogs are one of the longest-living, slowest growing marine bivalves in the world. Under normal circumstances, they live to more than 100 years old. Ocean quahogs have been aged well in excess of 200 years. Growth tends to slow after age 20, which corresponds to the size currently harvested by the industry (approximately 3 inches). Size and age at sexual maturity are variable and poorly known. Studies in Icelandic waters indicate that 10, 50, and 90 percent of

female ocean quahogs were sexually mature at 40, 64 and 88 mm (1.5, 2.5 and 3.5 inches) shell length or approximately 2, 19 and 61 years of age. Spawning occurs over a protracted interval from summer through autumn. Free-floating larvae may drift far from their spawning location because they develop slowly and are planktonic for more than 30 days before settling. Major recruitment events appear to be separated by periods of decades.

Based on their growth, longevity and recruitment patterns, ocean quahogs are relatively unproductive and able to support only low levels of fishing. The current resource consists of individuals that accumulated over many decades.

Ocean quahogs are suspension feeders on phytoplankton, and use siphons which are extended above the surface of the substrate to pump in water. Predators of ocean quahogs include certain species of crabs, sea stars, and other crustaceans, as well as fish species such as sculpins, ocean pout, cod, and haddock.

Status of the Stock

The ocean quahog stock assessment was peer reviewed and approved for use by management at Stock Assessment Workshop 63 (SAW 63; February 2017). A statistical catch at length model called Stock Synthesis was used. Reports on “Stock Status,” including assessment and reference point updates, SAW reports, and Stock Assessment Review Committee (SARC) panelist reports are available online at the NEFSC website: <http://www.nefsc.noaa.gov/saw>.

The ocean quahog was not overfished in 2016 (Figure 1; NEFSC 2017). Based on SAW/SARC-63 reference points from the 2017 assessment for the stock, estimated $SSB_{2016}/SSB_{Threshold} = 2.04$ (probability overfished < 0.01), where SSB is spawning stock biomass.

Overfishing did not occur in 2016 (Figure 2; NEFSC 2017). Based on SAW/SARC-63 reference points, estimated $F_{2016}/F_{Threshold} = 0.246$ (probability overfishing < 0.01), where F is fishing mortality rate.

There is little information about annual recruitment variability for ocean quahog. Model estimated recruitment has been stable and near unfished recruitment levels since 2000 (NEFSC 2017).

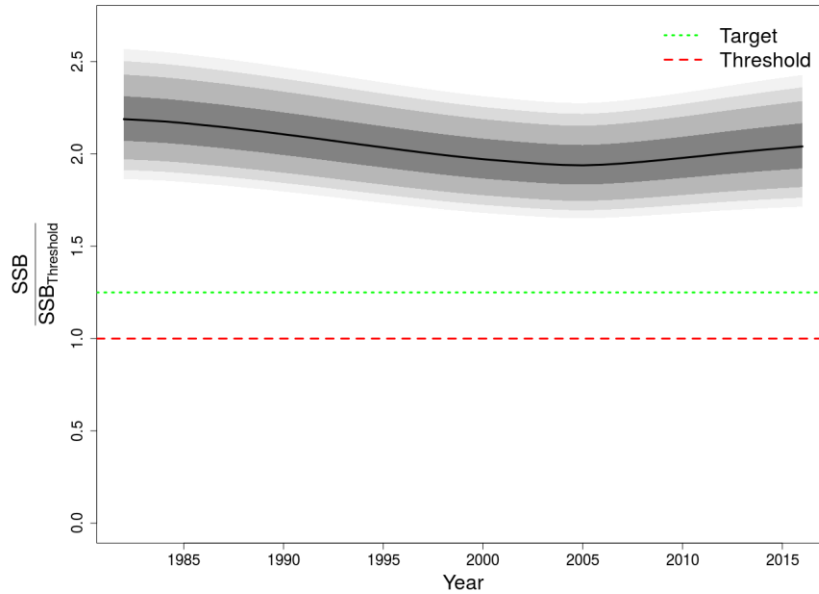


Figure 1. Trends in relative spawning stock biomass ($SSB/SSB_{Threshold}$) for the whole ocean quahog stock during 1982-2016 (NEFSC 2017). The solid line shows estimates from this assessment with approximate 50, 80, 90, and 95th percentile lognormal confidence intervals in shades of grey. The green short-dash line at $SSB/SSB_{Threshold} = 1.25$ is the management target. The red long-dash line at $SSB/SSB_{Threshold} = 1$ is the level that defines an overfished stock.

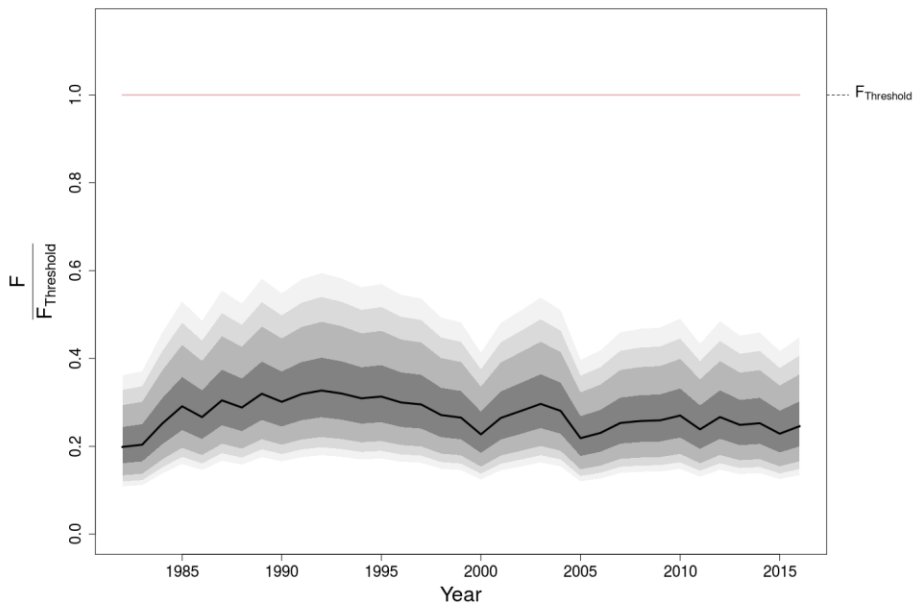


Figure 2. Trends in relative fishing mortality $F/F_{Threshold}$ for ocean quahog stock 1982-2016 (NEFSC 2017). The solid line shows estimates from this assessment with approximate 50, 80, 90, and 95th percentile lognormal confidence intervals in shades of grey. The solid line at $F/F_{Threshold} = 1$ is the new fishing mortality threshold reference point.

Description of the Fishery and Market

The commercial fishery for ocean quahog in Federal waters is prosecuted with large vessels and hydraulic dredges, and is very different from the small Maine fishery prosecuted with small vessels (35-45 ft) targeting quahogs for the local fresh, half shell market.

Ocean quahog landings and commercial quotas are given below in Table 1 and Figure 3. The distribution of the fishery has changed over time (Figures 4-9). The bulk of the fishery from 1980-1990 was being prosecuted off the Delmarva but is now being prosecuted in more Northern areas. surfclams and ocean quahogs on Georges Bank were not fished from 1990 to 2008 due to the risk of paralytic shellfish poisoning (PSP).¹

Figures 10 provides the distribution of landings in “important” ten minute squares (TMSQ). Important means that a square ranked in the top 10 TMSQ for total landings during any five-year period (1980-1984, 1985-1989, 1990-1994, 1995-1999, 2000-2004, 2005-2009, 2010-2016). Data for 2017 are incomplete and preliminary, and included in the last time block.

Additional information of the length composition of port sampled ocean quahogs, and their associated sample sizes by area, are available in the stock assessment reports and data update (Dan Hennen Pers. Comm., NEFSC 2018) at: <http://www.mafmc.org/council-events/2018/may-2018-ssc-meeting>.

¹ See Area Closure section for additional information.

Table 1. Federal Ocean Quahog Quotas and Landings: 1998 - 2020. SSC determined OFLs and ABCs included for years specified.

Year	OFL (mt)	ABC/ACL (mt)	EEZ Landings ^d (mt meats)	EEZ Landings ^{a,d} ('000 bu)	EEZ Quota ('000 bu; excludes 100,000 ME bu)	% Harvested
1998	NA	NA	17,897	3,946	4,000	99%
1999	NA	NA	17,381	3,832	4,500	85%
2000	NA	NA	14,723	3,246	4,500	72%
2001	NA	NA	17,069	3,763	4,500	84%
2002	NA	NA	17,947	3,957	4,500	88%
2003	NA	NA	18,815	4,148	4,500	92%
2004	NA	NA	17,655	3,892	5,000	78%
2005	NA	NA	13,635	3,006	5,333	56%
2006	NA	NA	14,273	3,147	5,333	59%
2007	NA	NA	15,564	3,431	5,333	64%
2008	NA	NA	15,727	3,467	5,333	65%
2009	NA	NA	15,710	3,463	5,333	65%
2010	NA	NA	16,271	3,587	5,333	67%
2011	34,800	26,100	14,332	3,160	5,333	59%
2012	34,800	26,100	15,864	3,497	5,333	66%
2013	34,800	26,100	14,721	3,245	5,333	61%
2014	Not specified	26,100	14,498	3,196	5,333	60%
2015	Not specified	26,100	13,639	3,007	5,333	56%
2016	Not specified	26,100	13,947	3,075	5,333	57%
2017	Not specified	26,100 ^c	14,284 ^c	3,149 ^c	5,333	59% ^c
2018 ^b	61,600	44,695	NA	NA	5,333	NA
2019	63,600	46,146	NA	NA	5,333	NA
2020	63,100	45,783	NA	NA	5,333	NA

^a 1 ocean quahog bushel is approximately 10 lb. ^b Revised previous 2018 values due to receipt of a new stock assessment. ^c Preliminary, incomplete 2017 data. Source: NMFS clam vessel logbook reports. Dan Hennen Pers. Comm., NEFSC 2018. ^d Column excludes Maine Landings which have varied from 102-387 mt per year from 1998-2017 (see assessment or data update for additional details on the Maine fishery).

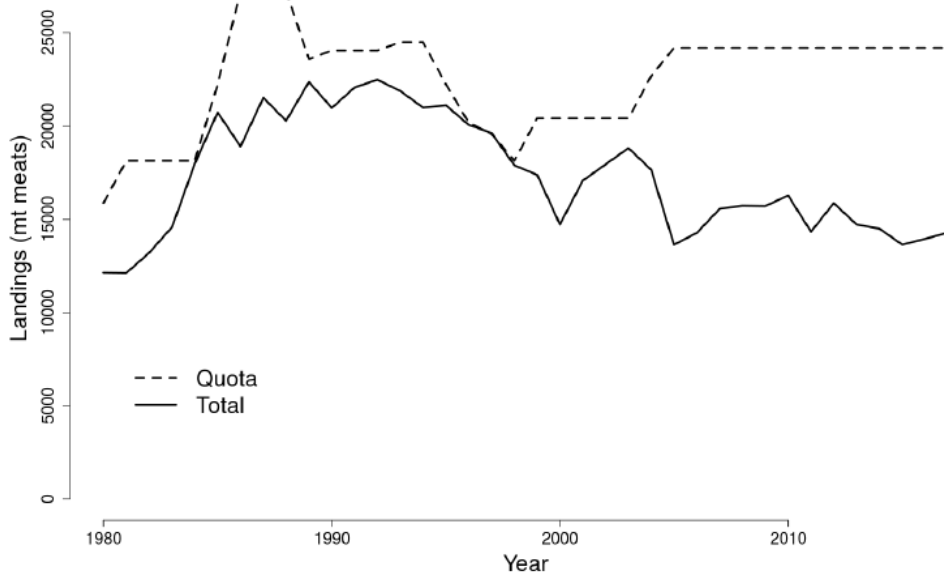


Figure 3. Ocean quahog landings during 1980-2016, and preliminary 2017. Source: Dan Hennen Pers. Comm., NEFSC 2018.

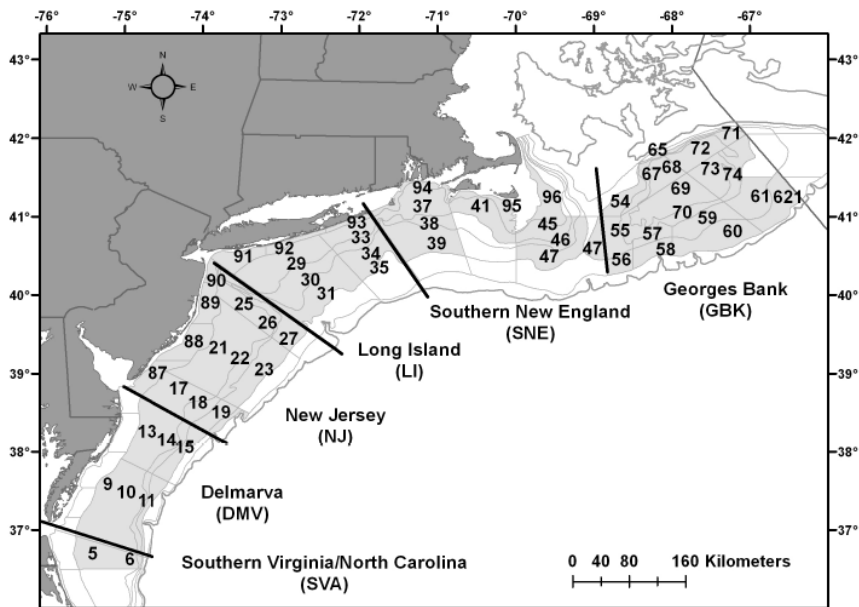


Figure 4. Ocean quahog stock assessment regions and NEFSC shellfish survey strata. The shaded strata are where ocean quahogs are found. Source: Dan Hennen Pers. Comm., NEFSC 2018.

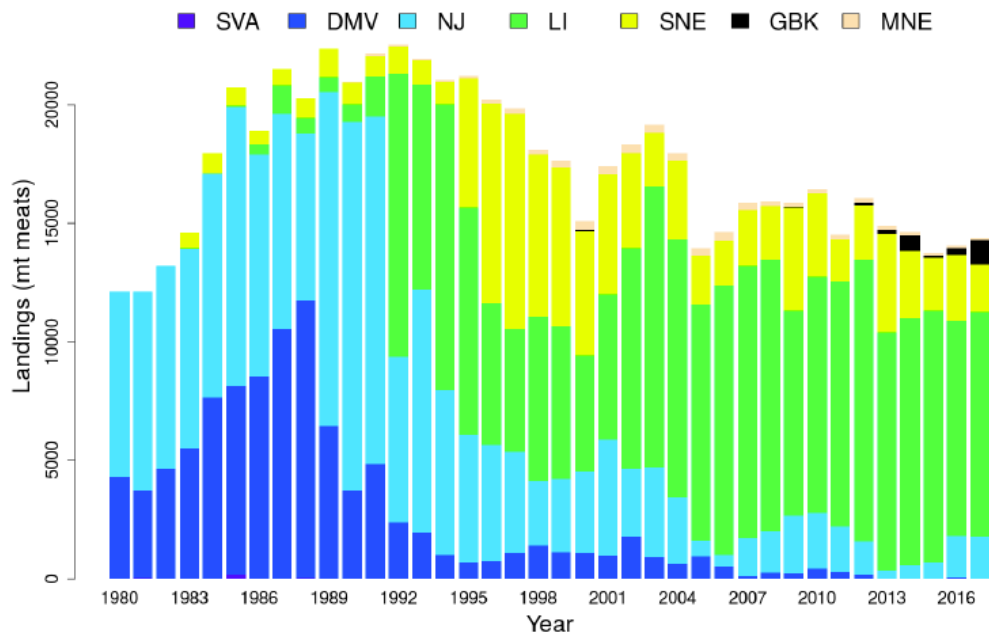


Figure 5. Landings for ocean quahogs by region during 1980-2016, and preliminary 2017. Regions from north to south are abbreviated with MNE for Maine, GBK for Georges Bank, SNE for Southern New England, LI for Long Island, NJ for New Jersey, DMV for Delmarva, and SVA for Southern Virginia. Source: Dan Hennen Pers. Comm., NEFSC 2018.

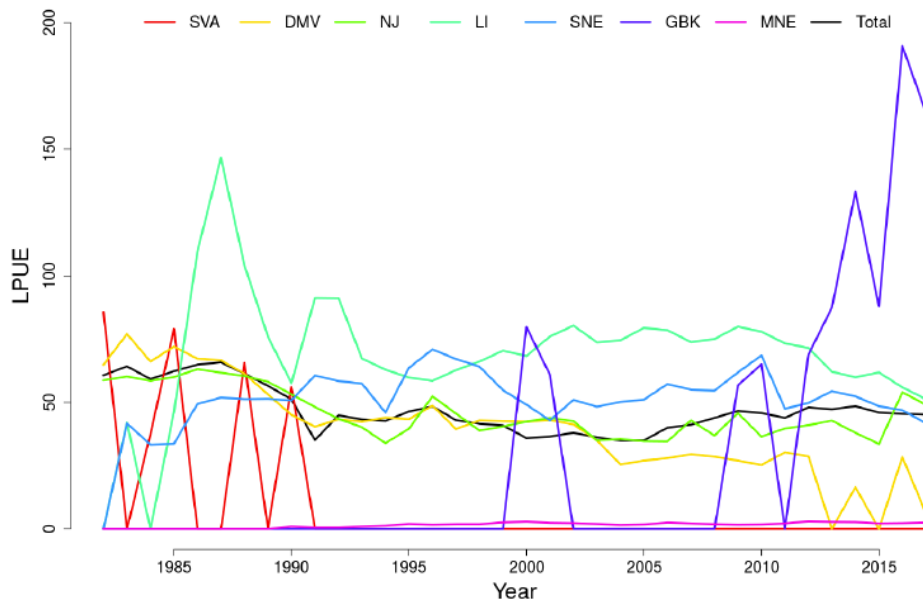


Figure 6. Nominal landings per unit effort (LPUE in bushels landed per hour fished) for ocean quahogs, by region, during 1981-2016, and preliminary 2017. LPUE is total landings in bushels divided by total fishing effort. Source: Dan Hennen Pers. Comm., NEFSC 2018.

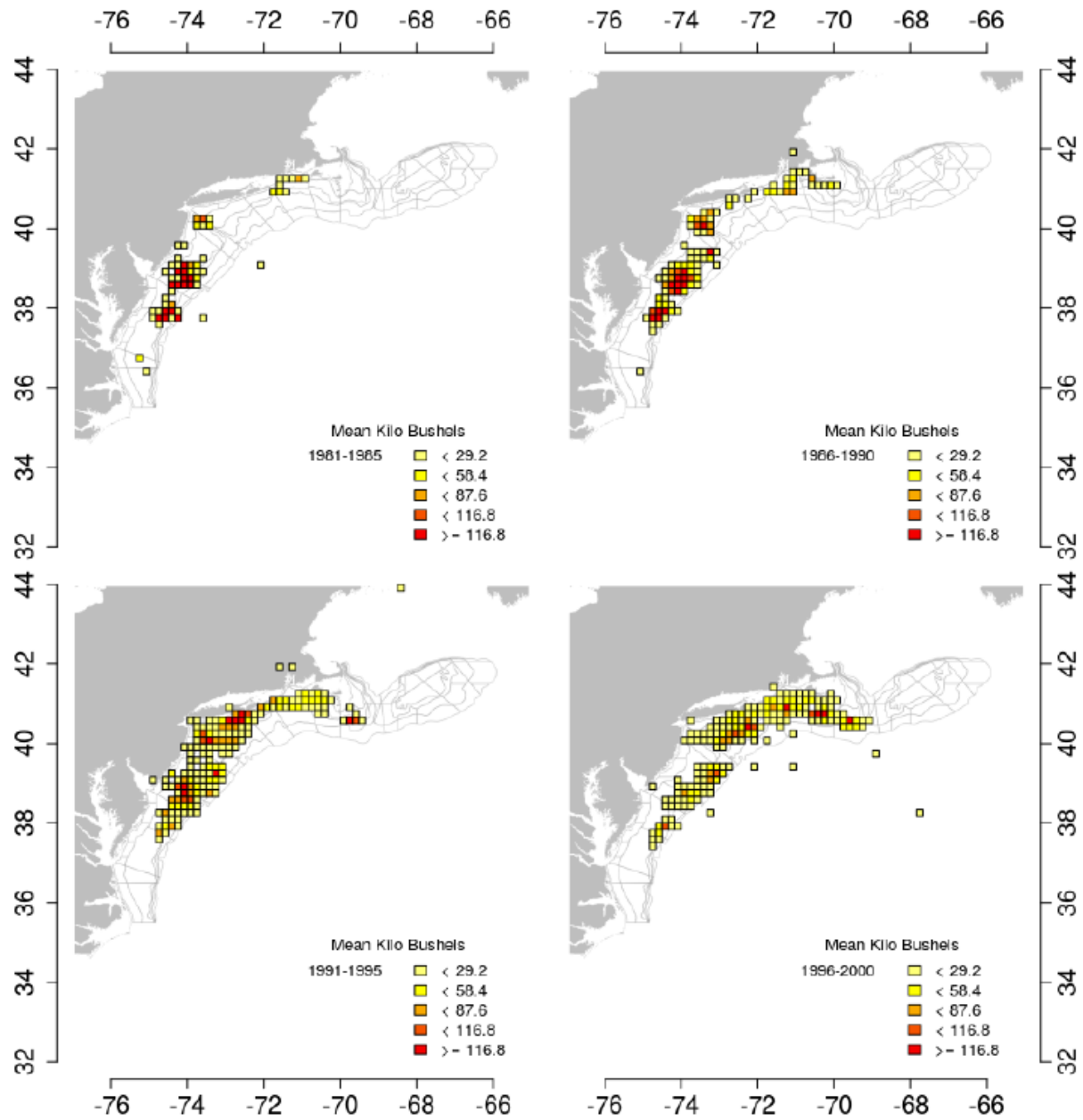


Figure 7. Average ocean quahog landings by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown. Source: Dan Hennen Pers. Comm., NEFSC 2018.

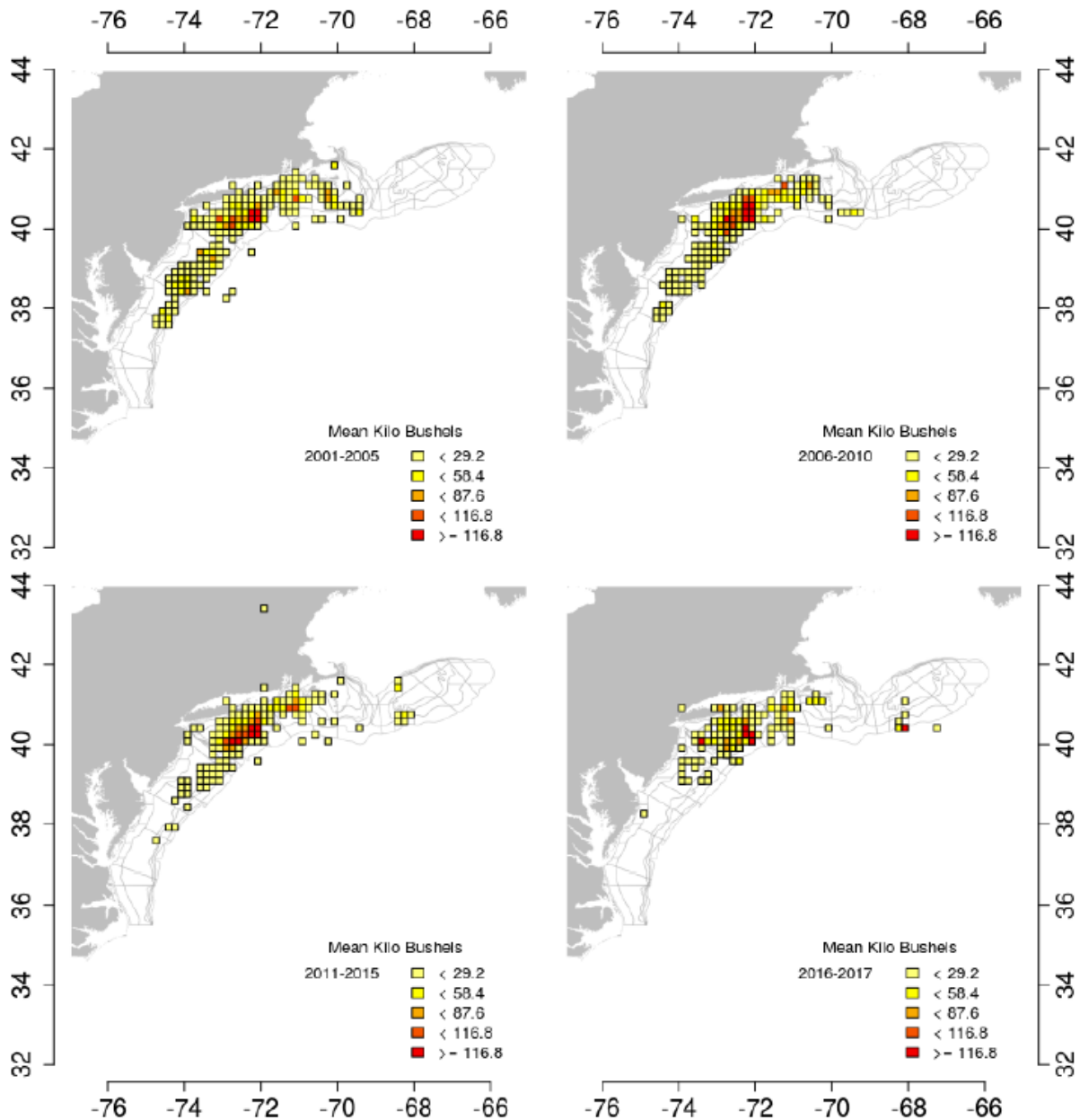


Figure 8. Average ocean quahog landings by ten-minute squares over time, 2001-2016, and preliminary 2017. Only squares where more the 5 kilo bushels were caught are shown. Source: Dan Hennen Pers. Comm., NEFSC 2018.

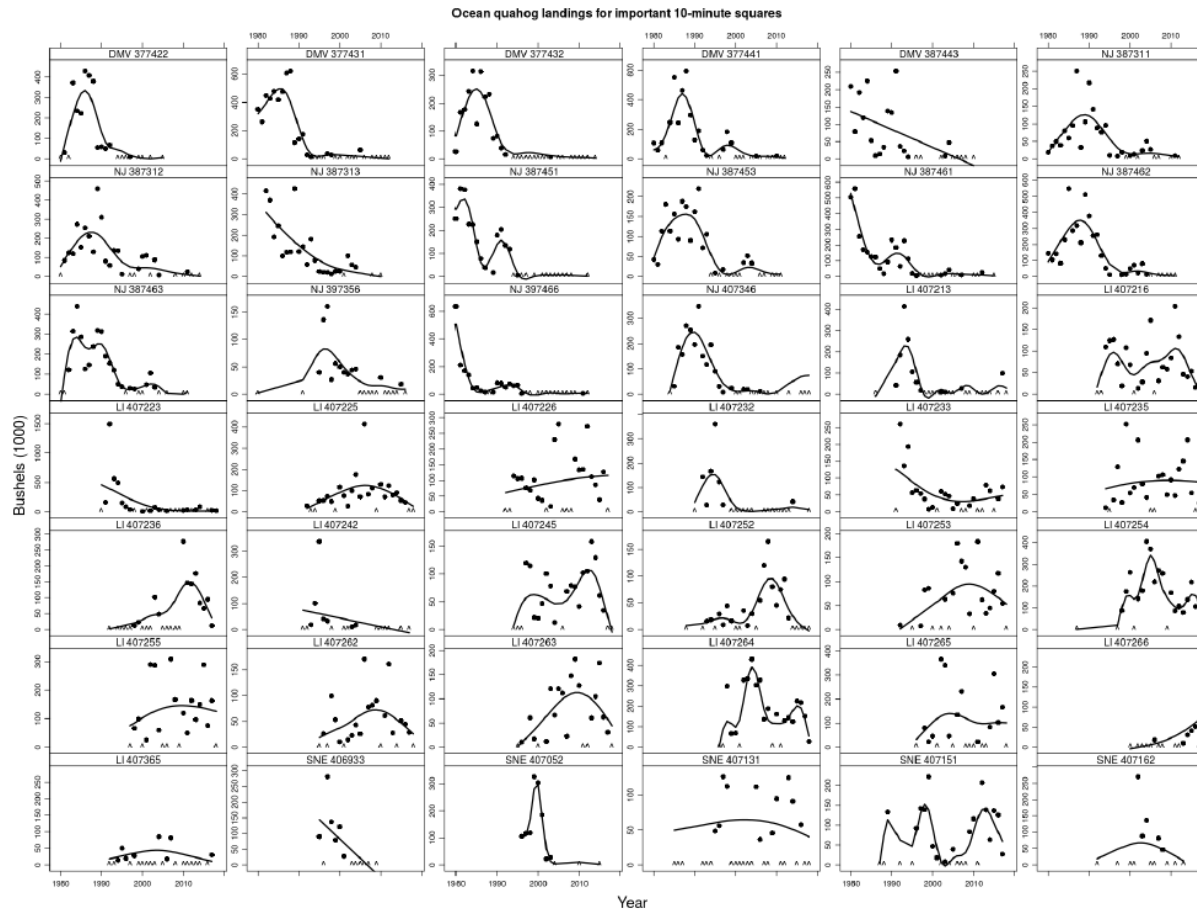


Figure 9. Annual ocean quahog landings in "important" ten minute squares (TNMS) during 1980-2017 based on logbook data. Important means that a square ranked in the top 10 TNMS for total landings during any five-year period (1980-1984, 1985-1989, ..., 2000-2004, 2005-2009, 2010-2017). Data for 2017 are incomplete and preliminary. To protect the privacy of individual firms, data are not plotted if the number of vessels is less than 2. Instead, a "^" is shown on the x-axis to indicate where data are missing. The solid dark line is a spline intended to show trends. The spline was fit too all available data, including data not plotted. Source: Dan Hennen Pers. Comm., NEFSC 2018.

Port and Community Description

When Amendment 13 to the FMP was developed, the Council hired Dr. Bonnie McCay and her associates at Rutgers University to describe the ports and communities that are associated with the surfclam and ocean quahog fisheries. The researchers did an extensive job characterizing the three main fisheries (non-Maine ocean quahog, Maine ocean quahog, and surfclam). The McCay team characterizations of the ports and communities are based on government census and labor statistics and on observations and interviews carried out during the late 1990s and in the fall of 2001. The description of the fishing gear, areas fished, etc. are fully described in Amendment 13. Communities from Maine to Virginia are involved in the harvesting and processing of surfclams and ocean quahogs. Ports in New Jersey and Massachusetts handle the most volume and value, particularly Atlantic City and Point Pleasant, New Jersey, and New Bedford, Massachusetts. There are also landings in Ocean City, Maryland, and the Jonesport and Beals Island areas of Maine. The small scale Maine fishery is entirely for ocean quahogs, which are sold as shellstock for the half-shell market. The other fisheries are industrialized ones for surfclams and ocean quahogs, which are hand shucked or steam-shucked and processed into fried, canned, and frozen products.

Additional information on "Community Profiles for the Northeast US Fisheries" can be found at: <https://www.nefsc.noaa.gov/read/socialsci/communitySnapshots.php>.

Federal Fleet Profile

The total number of vessels participating in the ocean quahog fisheries outside the state of Maine has experienced a downward trend as the fisheries moved beyond a market crisis in 2005 where major users of clam meats reduced their purchases from industry and stopped advertising products like clam chowder in the media. Industry members reported that imported meat from Canada and Vietnam contributed to an oversupply of clam meats in the marketplace. The costs to vessels harvesting clams has increased due to the rising costs of insurance; industry has also indicated price of diesel fuel in conjunction with distance traveled to fish is a big factor determining trip cost. Trips harvesting quahogs have also increased in length as catch rates have declined steadily. The 30 or so vessels that reported landings during 2004 and 2005 has consolidated over time into fewer vessels. The distribution of LPUE in bushels per hour over time is shown in Figures 6 and 10-11.

The Maine ocean quahog fleet numbers started to decline when fuel prices soared in mid-2008, and a decline in the availability of smaller clams consistent with the market demand (i.e., half-shell market), and totaled 8 vessels in 2017 (Table 2).

Table 2. Federal Fleet Profile, 2008 through 2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Non-Maine Vessels Harvesting BOTH surfclams & ocean quahogs	8	8	12	12	13	7	7	6	8	14
Non-Maine Vessels Harvesting only ocean quahogs	10	7	9	7	6	9	9	10	9	8
Total Non-Maine Vessels	18	15	21	19	19	16	16	16	17	22
Maine Ocean Quahog Vessels	22	19	15	13	12	11	9	8	8	8

Source: NMFS clam vessel logbooks.

The average ex-vessel price of non-Maine ocean quahogs reported by processors in 2017 was \$7.18 per bushel, one cent higher than the 2016 price (\$7.17 per bushel). In 2016, about 3.2 million bushels of non-Maine ocean quahog were landed, slightly higher than 2016 at 3.0. The total ex-vessel value of the 2017 federal harvest outside of Maine was approximately \$23 million, slightly higher than the \$22 million in 2016.

In 2017, the Maine ocean quahog fleet harvested a total of 34,550 Maine bushels, a 72% decrease from the 124,839 bushels harvested in 2006, and a 7% decrease from the prior year (2016; 37,051 bushels). Average prices for Maine ocean quahogs have declined substantially over the past 10 years. In 2003, there were very few trips that sold for less than \$37.00 per Maine bushel, and the mean price was \$40.66. Prices have since been lower; industry has indicated it was the result of aggressive price cutting. In 2017, the mean price was \$31.15 per Maine bushel. The value of the 2017 harvest reported by the purchasing dealers totaled \$1.09 million, a decrease of 78% when compared to 2003.

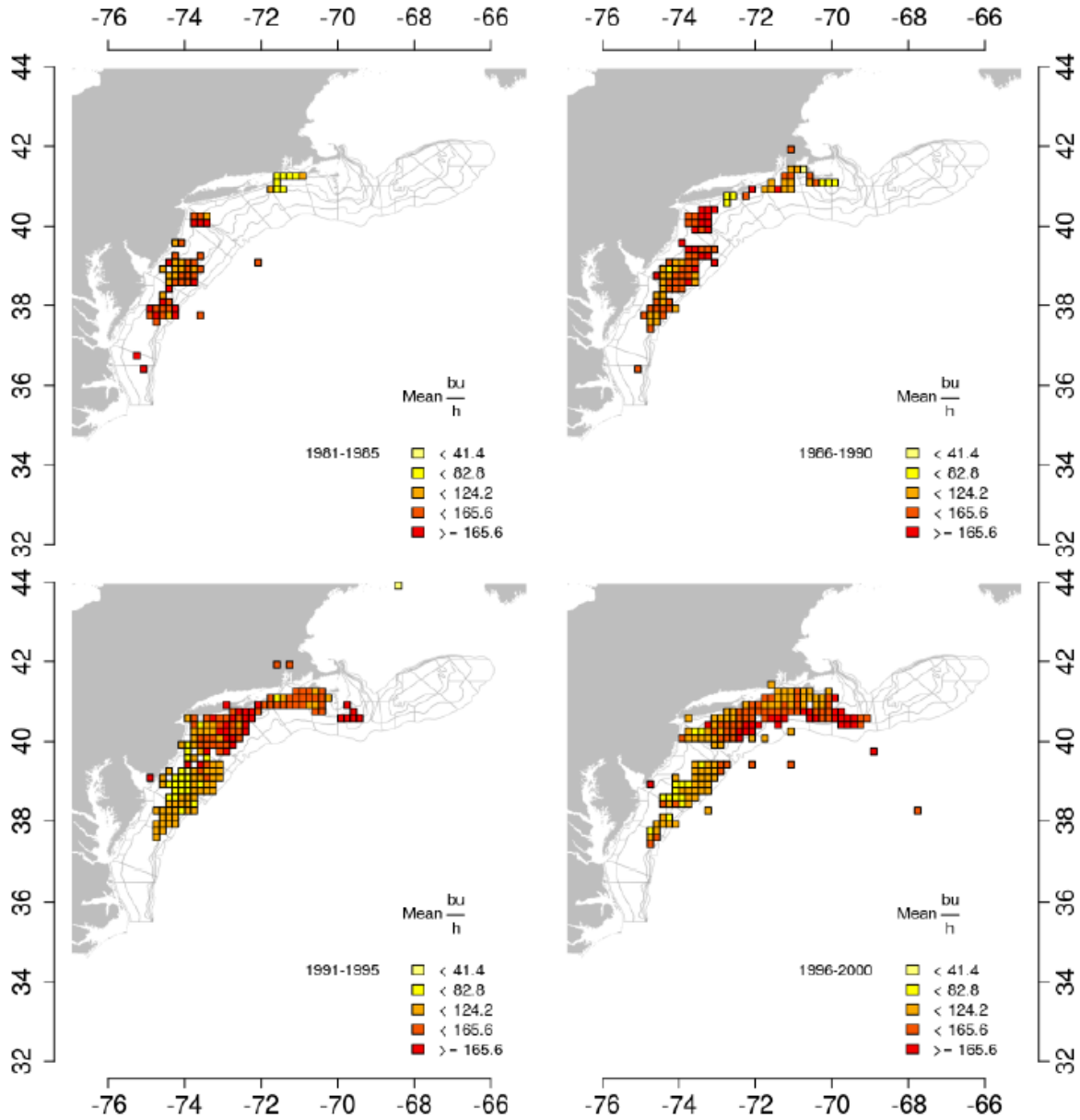


Figure 10. Average ocean quahog landings per unit effort (LPUE; $\text{bu. } h^{-1}$) by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown. Source: Dan Hennen Pers. Comm., NEFSC 2018.

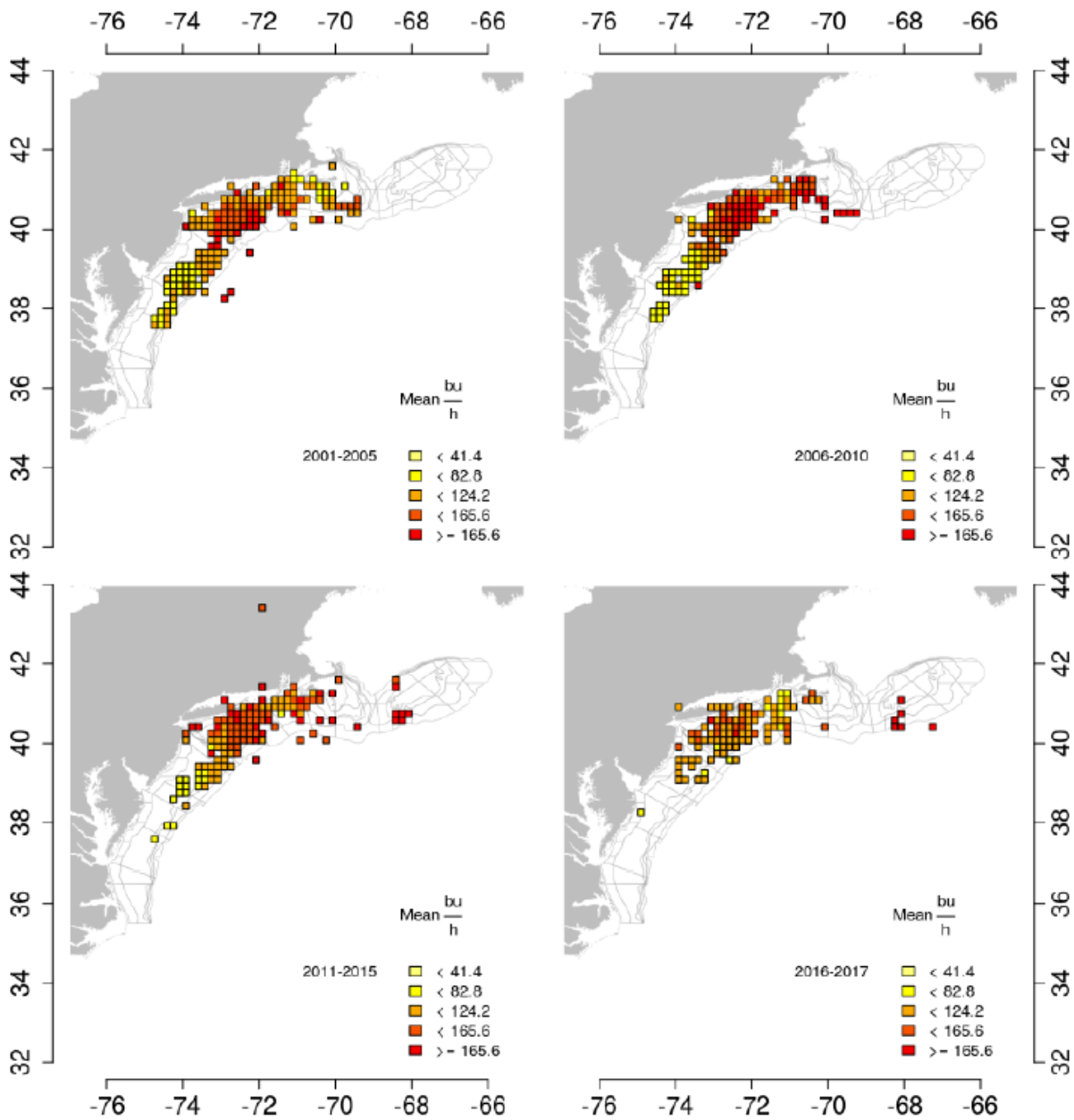


Figure 11. Average ocean quahog landings per unit effort (LPUE; bu. h-1) by ten-minute squares over time, 2001-2016 and preliminary 2017. Only squares where more the 5 kilo bushels were caught are shown. Source: Dan Hennen Pers. Comm., NEFSC 2018.

Processing Sector

Even though this document describes the ocean quahog fisheries, the information presented in this section regarding the processing sector is for both surfclams and ocean quahogs as some of these facilities purchase/process both species. In 2017, there were 9 companies reporting purchases of surfclams and/or ocean quahogs from the industrial fisheries outside of Maine. They were distributed by state as indicated in Table 3. Employment data for these specific firms are not available. In 2017, these companies bought approximately \$23 million worth of ocean quahogs and \$31 million worth of surfclams.

Area Closures

Fishing areas can also be closed for public health related issues due to environmental degradation or the toxins that cause PSP. PSP is a public health concern for surfclams and ocean quahogs. PSP is caused by saxitoxins, produced by the alga *Alexandrium fundyense* (red tide). Surfclams and ocean quahogs on Georges Bank were not fished from 1990 to 2008 due to the risk of PSP. There was light fishing on Georges Bank in years 2009-2011 under an exempted fishing permit. The Greater Atlantic Regional Fisheries Office reopened a portion of Georges Bank to the harvest of surfclams and ocean quahogs beginning January 1, 2013 (77 FR 75057, December 19, 2012) under its authority in 50 CFR 648.76. Harvesting vessels must adhere to the adopted testing protocol from the National Shellfish Sanitation Program.

Table 3. Companies that reported buying ocean quahogs and surfclams (from NMFS surfclam/ocean quahog dealer report database) in 2017.

Number of Companies	MA	Other
	7	2

References

Cargnelli, L., S. Griesbach, D. Packer, and E. Weissberger. 1999. Essential Fish Habitat Source Document: Ocean Quahog, *Arctica islandica*, Life History and Habitat Characteristics. NOAA Tech. Memo. NMFS-NE-148.

Hennen, Dan. Personal Communication. March 22, 2018. NOAA Fisheries, Northeast Fisheries Science Center, 166 Water St., Woods Hole, MA 02543.

Northeast Fisheries Science Center. 2017. 63rd Northeast Regional Stock Assessment Workshop (63rd SAW) Assessment Summary Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 17-09; 28 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at <http://www.nefsc.noaa.gov/publications>.