Ocean Quahog Fishery Information Document

April 2019

This Fishery Information Document provides a brief overview of the biology, stock condition, management system, and fishery performance for ocean quahog with an emphasis on 2018. Data sources for Fishery Information Documents are generally from unpublished National Marine Fisheries Service (NMFS) survey, dealer, vessel logbook, and permit databases and should be considered preliminary. For more resources, including previous Fishery Information Documents, please visit http://www.mafmc.org/surfclams-quahogs.

Key Facts

- There has been no change to the status of the ocean quahog stock in 2018. The stock is not overfished and overfishing is not occurring.
- The total ex-vessel value of the 2018 federal harvest was approximately $24 million, slightly higher than $23 million in 2017.
- In 2018, there were 6 companies reporting purchases of surfclams and/or ocean quahogs in 4 states outside of Maine.
- Overall, from 2017 to 2018, there have been no major changes and only slight variation in the fishery landings, prices, the numbers of dealers and vesels participating in this surfclam and ocean quahog fisheries.
- The fishery appears to continue to shift its effort Northward, and has shown increased effort in the Geroges Bank area in recent years.

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).[1] 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).[2] 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).[2] 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).[2] 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).[2]

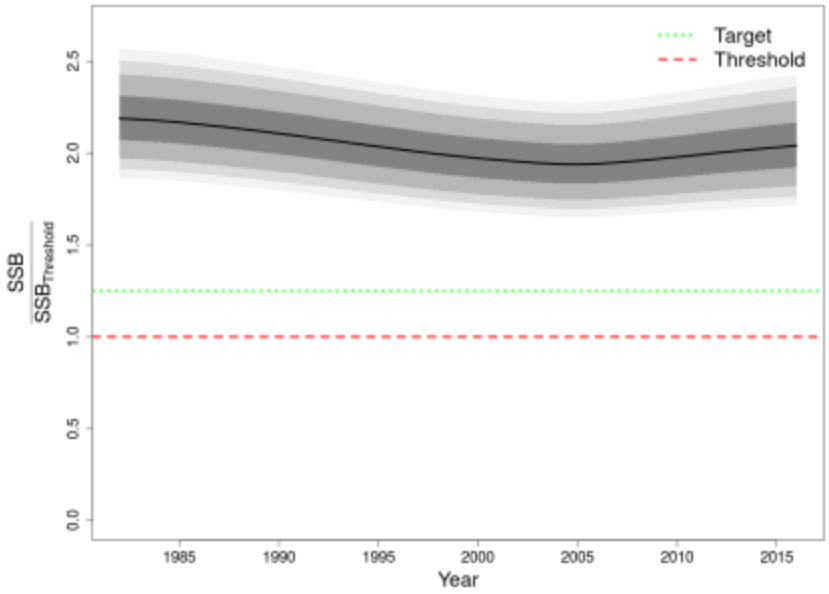

Figure 1. Trends in relative spawning stock biomass ($SSB/SSB_{Threshold}$) for the ocean quahog stock during 1982-2016 (NEFSC 2017).[2] The solid line shows estimates from this assessment with approximate 50, 80, 90, and 95th percentile lognormal confidence intervals in shades of grey. The green short-dash line at $SSB/SSB_{Threshold} = 1.25$ is the management target.

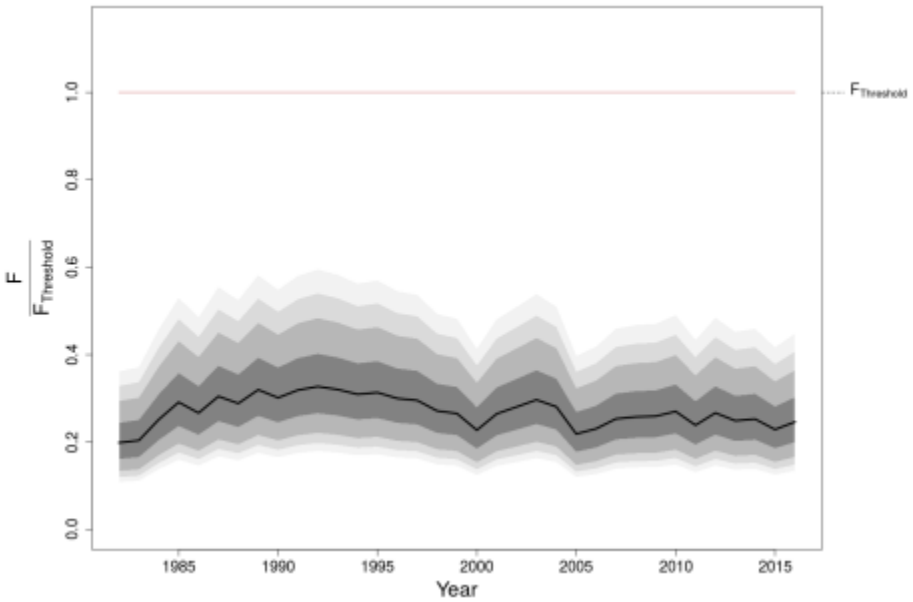

Figure 2. Trends in relative fishing mortality $F/F_{Threshold}$ for ocean quahog stock 1982-2016 (NEFSC 2017).[2] The solid line shows estimates from this assessment with approximate 50, 80, 90, and 95th percentile lognormal confidence intervals in shades of grey. The solid line at $F/F_{Threshold}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

Management System and Fishery Performance

Management

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, are available on the Council website at: http://www.mafmc.org.

Commercial Fishery

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 4-8). 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). Figure 9 provides the distribution of ocean quahog 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, 2010-2018). Data for 2018 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 provided.[3]

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.

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	13,709	3,022	5,333	56%
2016	Not specified	26,100	13,965	3,079	5,333	58%
2017	Not specified	26,100	14,386	3,172	5,333	59%
2018	61,600[b]	44,695[b]	14,497[c]	3,196[c]	5,333	60%
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.[3] [d] Column excludes Maine Landings which have varied from 103-387 mt per year from 1998-2018 (see assessment or data update for additional details on the Maine fishery).

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.

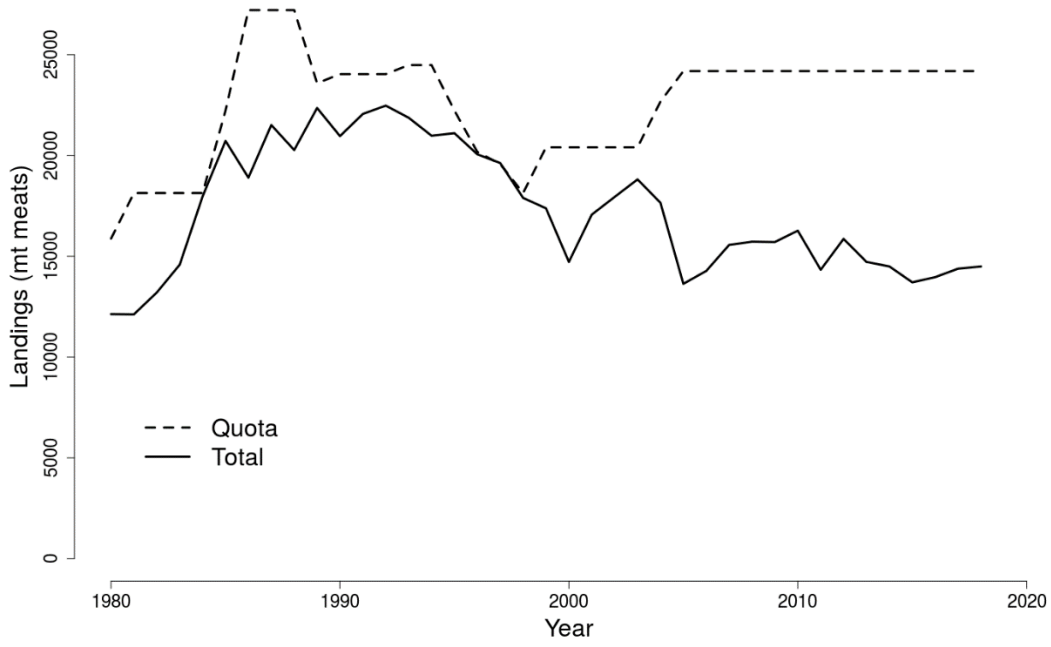

Figure 3. Ocean quahog landings (total and EEZ) during 1965-2017, and preliminary 2018.[3]

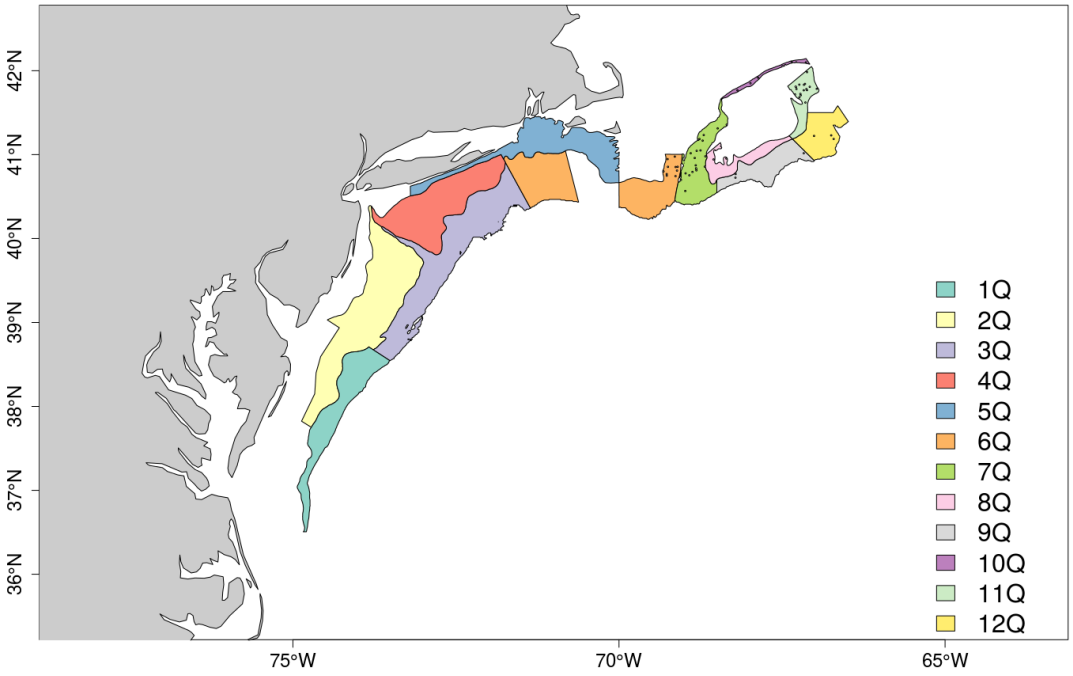

Figure 4. Ocean quahog stock assessment regions and NEFSC shellfish survey strata. The shaded strata are where quahogs are found.

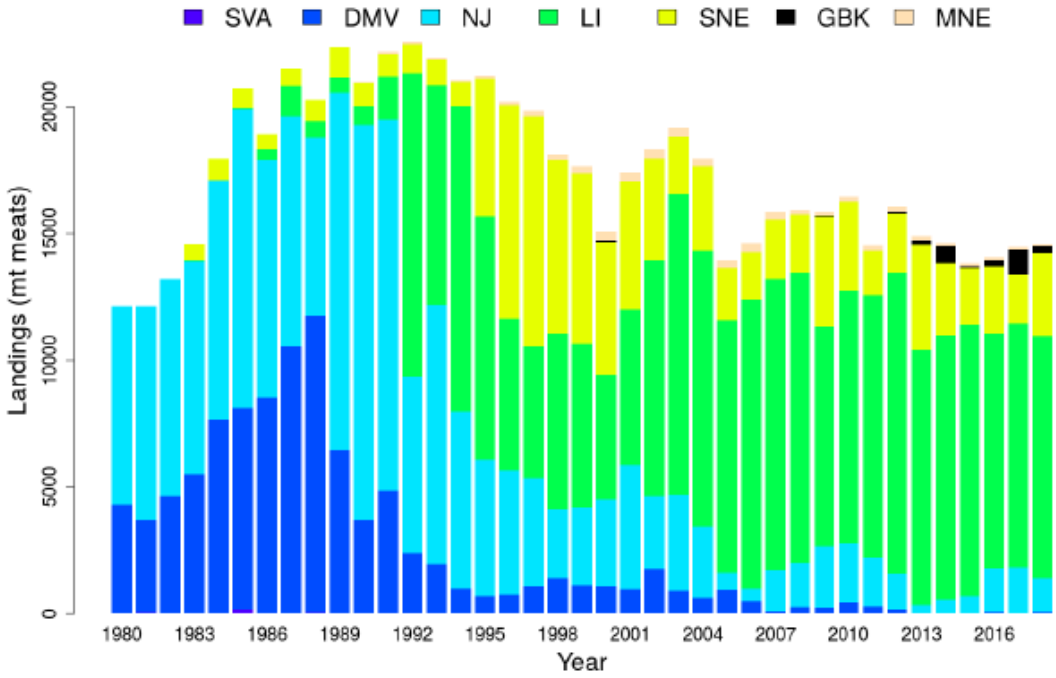

Figure 5. Ocean quahog landings from the US EEZ during 1979-2017, and preliminary 2018.[3]

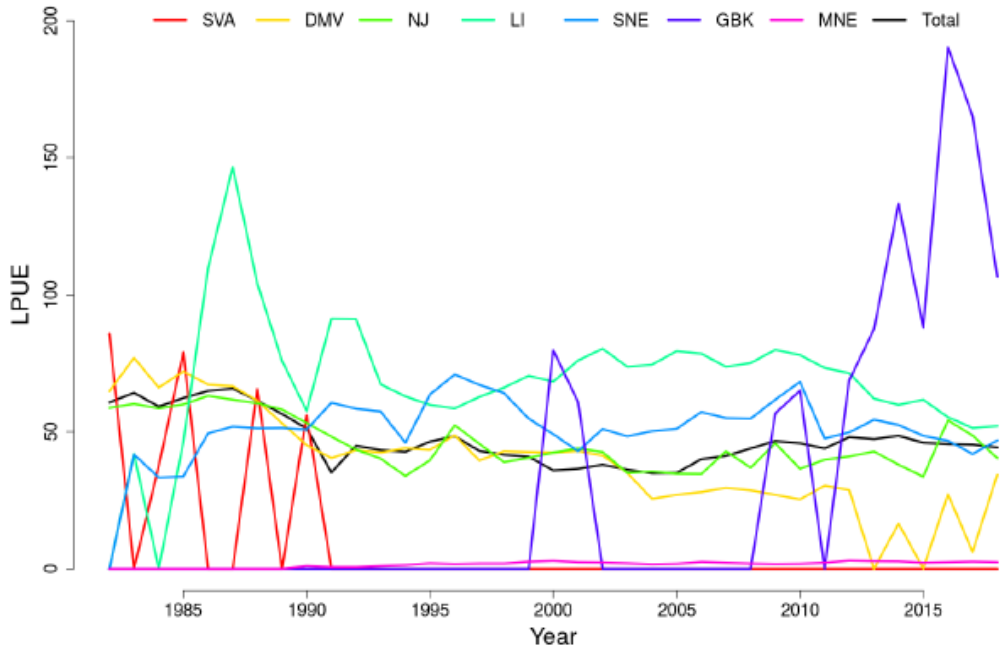

Figure 6. Nominal landings per unit effort (LPUE in bushels landed per hour fished) for ocean quahog, by region, during 1981-2017, and preliminary 2018. LPUE is total landings in bushels divided by total fishing effort.[3]

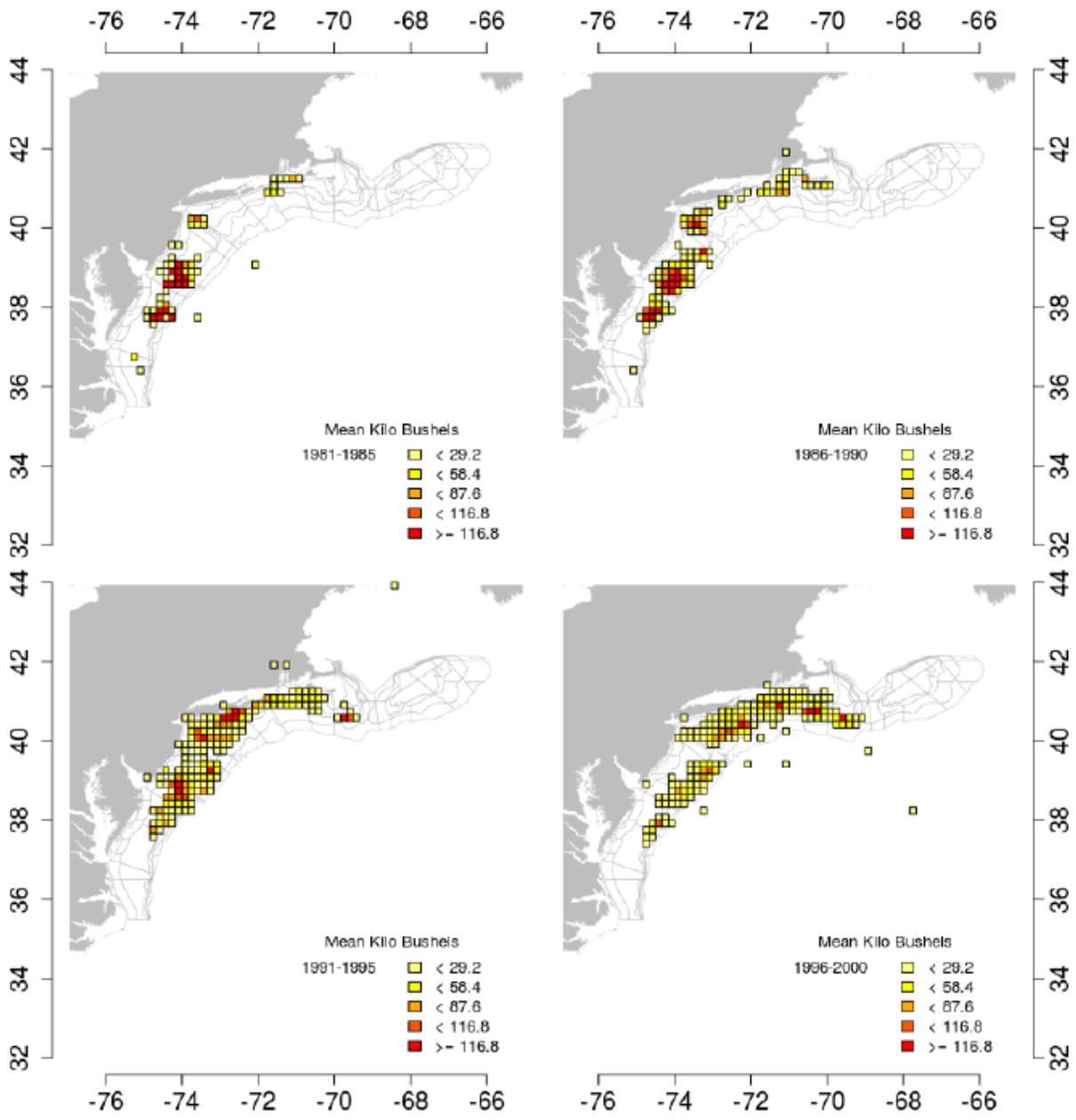

Figure 7. Average ocean quahog landings by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown.[3]

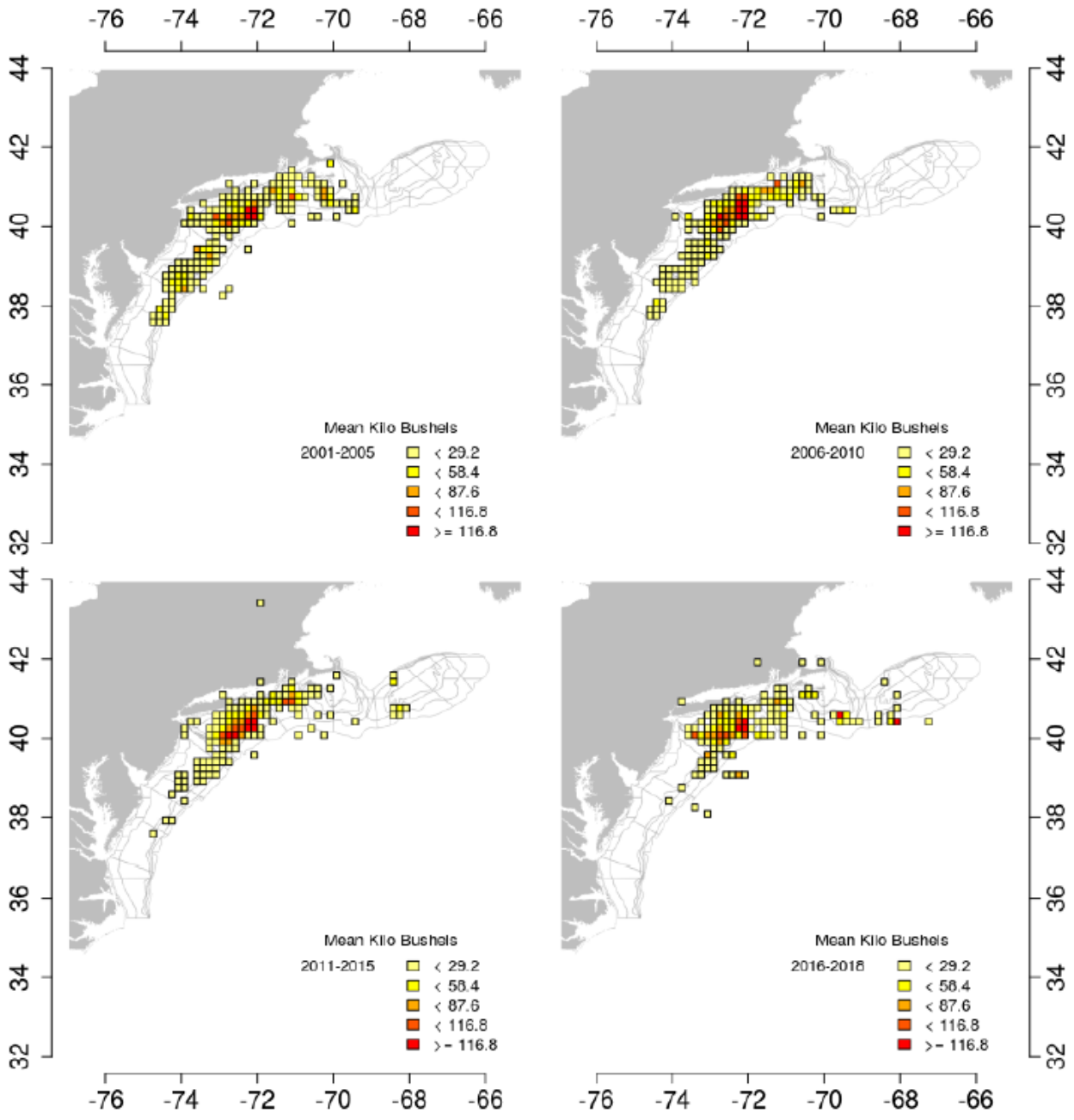

Figure 8. Average ocean quahog landings by ten-minute squares over time, 2001-2017, and preliminary 2018. Only squares where more the 5 kilo bushels were caught are shown.[3]

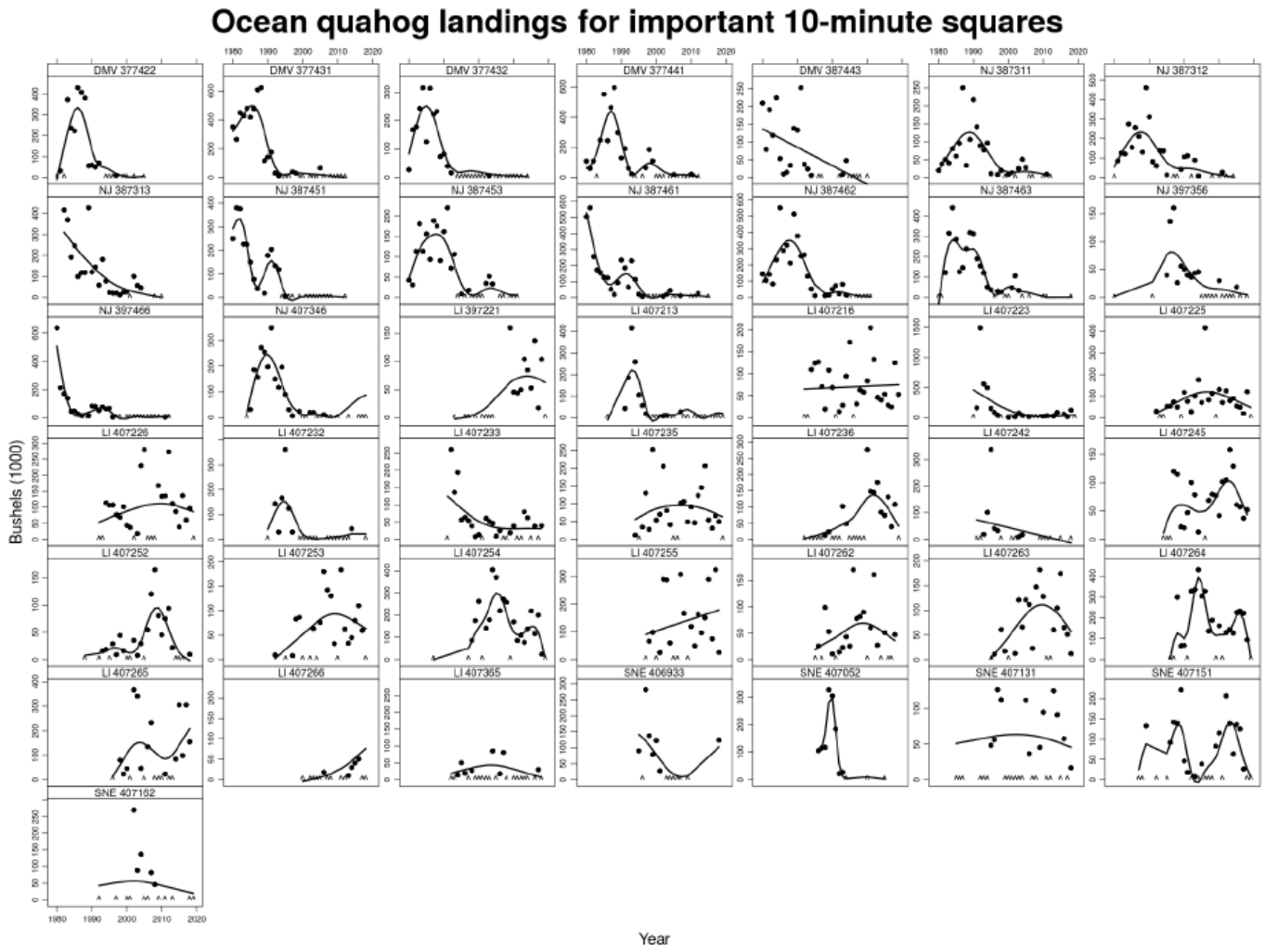

Figure 9. Annual ocean quahog landings in "important" ten minute squares (TNMS) during 1980-2017 based on logbook data. Important means that a square ranked in the top 10 TNMS for total landings during any five-year period (1980-1984, 1985-1989, ..., 2000-2004, 2005-2009, 2010-2018). Data for 2018 are 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.[3]

Federal Fleet Profile

The total number of vessels targeting ocean quahog only has remained about the same in recent years; however, while vessels harvesting both surfclams and ocean quahogs declined in 2018, while the number of vessels targeting surfclams increased (see Surfclam Fishery Information Document April 2019). The total number of vessels non-Maine vessels has remained about the same in recent years but the targeting behavior of those vessels changes from year to year. The distribution of LPUE in bushels per hour over time for the non-Maine fishery 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 2018 (Table 2). The average ex-vessel price of non-Maine ocean quahogs reported by processors in 2018 was $7.53 per bushel, slightly higher than the 2017 price ($7.18 per bushel). In 2018, about 3.2 million bushels of non-Maine ocean quahog were landed similar to 2017. The total ex-vessel value of the 2018 federal harvest outside of Maine was approximately $24 million, slightly higher than the $23 million in 2017. In 2018, the Maine ocean quahog fleet harvested a total of 29,447 Maine bushels, a 77% decrease from the 124,839 bushels harvested in 2006, and a 16% decrease from the prior year (2017; 35,079 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. In 2018, the mean price was $35.95 per Maine bushel. The value of the 2018 harvest reported by the purchasing dealers totaled $1.06 million.

Processing Sector

Even though this document describes the ocean quahog fishery, 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 2018, there were 6 companies reporting purchases of surfclams and/or ocean quahogs in 4 states outside of Maine. Employment data for these specific firms are not available.

In 2018, these companies bought approximately $30 million worth of surfclam and $24 million worth of ocean quahogs.

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 quahos 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.

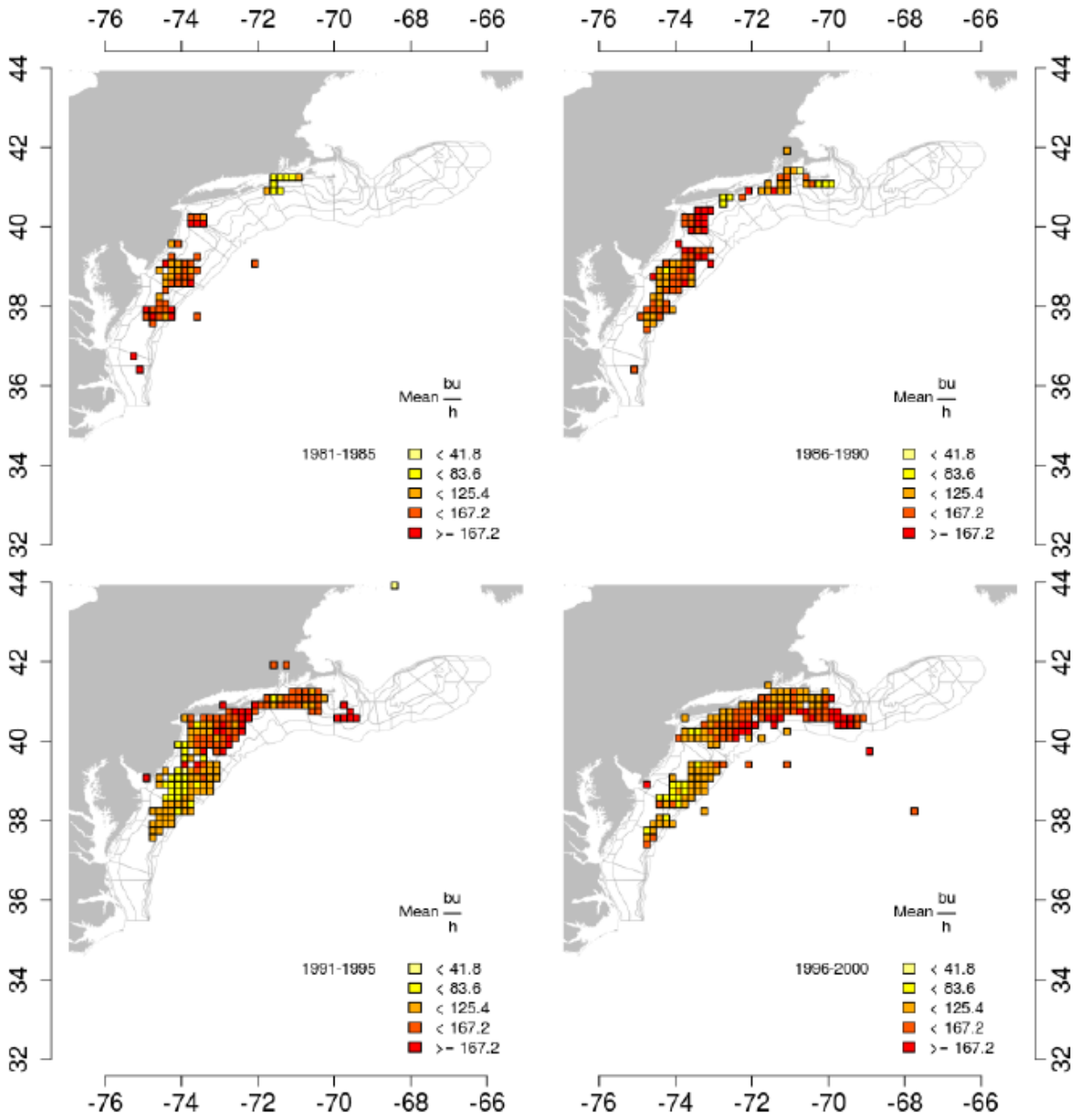

Figure 10. Average ocean quahog landings per unit effort (LPUE; bu. h^{-1}) by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown.[3]

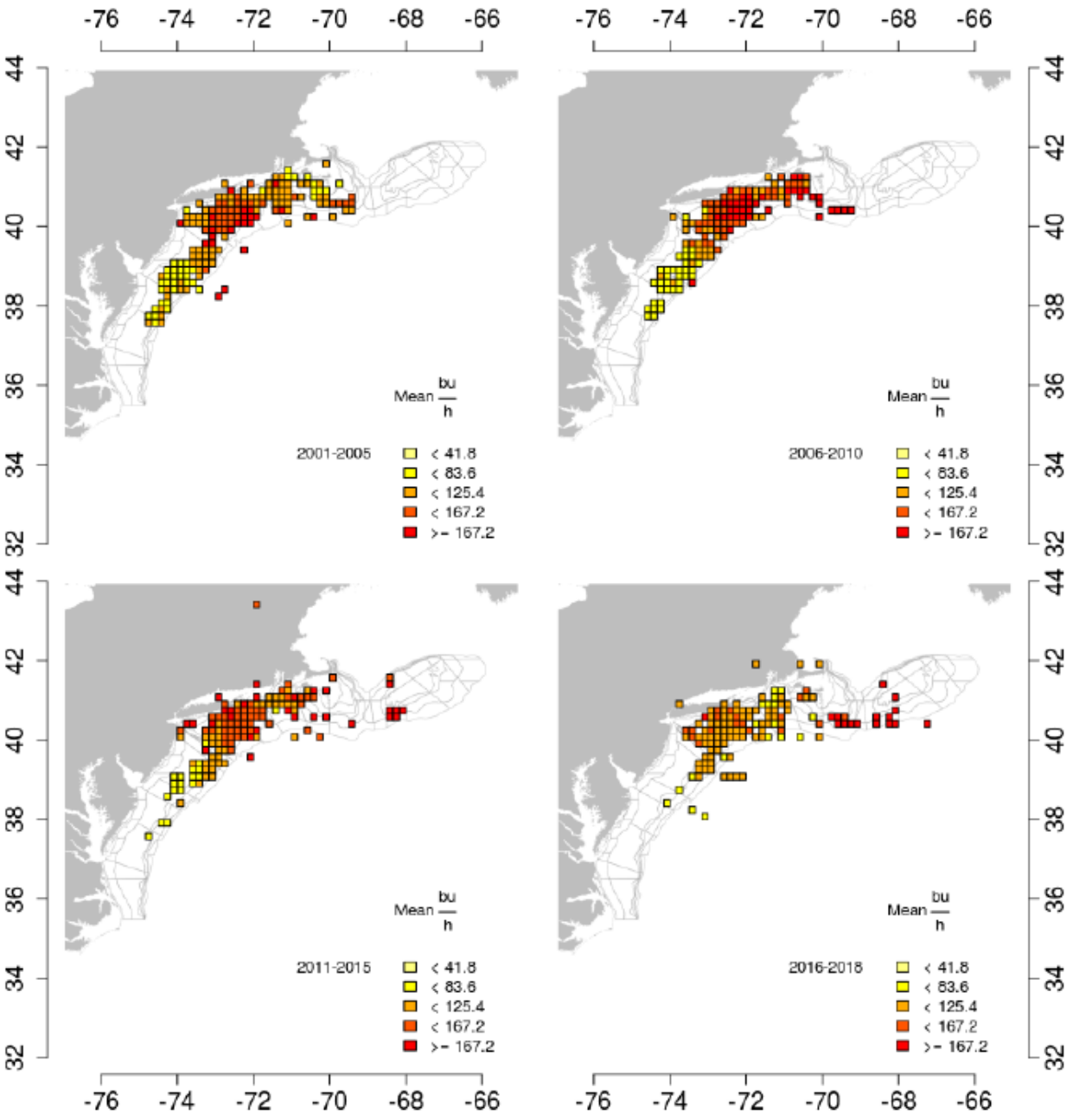

Figure 11. Average ocean quahog landings per unit effort (LPUE; bu. h-1) by ten-minute squares over time, 2001-2016 and preliminary 2017. Only squares where more the 5 kilo bushels were caught are shown.[3]

Table 2. Federal fleet profile, 2009 through 2018.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Non-Maine Vessels Harvesting BOTH surfclams & ocean quahogs	8	12	12	13	7	7	6	8	14	8
Non-Maine Vessels Harvesting only ocean quahogs	7	9	7	6	9	9	10	9	8	8
Total Non-Maine Vessels	15	21	19	19	16	16	16	17	22	16
Maine Ocean Quahog Vessels	19	15	13	12	11	9	8	8	8	8

Source: NMFS clam vessel logbooks.

References

1. 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.

2. 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.

3. Hennen, Dan. Personal Communication. March 26, 2019. NOAA Fisheries, Northeast Fisheries Science Center, 166 Water St., Woods Hole, MA 02543.