Atlantic Surfclam Fishery Information Document

April 2019

This Fishery Information Document provides a brief overview of the biology, stock condition, management system, and fishery performance for Atlantic surfclam 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 Data sources for Fishery Information Documents are generally from unpublished National Marine Fisheries Service (NMFS) survey, dealer, vessel logbook, and permit databases and should be considered preliminary.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 Atlantic surfclam 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 $30 million, slightly lower than $31 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, and the numbers of vessels and dealers participating in this fishery. However, the landings per unit effort continues to decline, and the fishery appears to continues to shift its effort Northward.

Basic Biology

Information on Atlantic surfclam biology can be found in the document titled, "Essential Fish Habitat Source Document: Surfclam, *Spisula solidissima*, 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.

Atlantic surfclams are distributed along the western North Atlantic Ocean from the southern Gulf of St. Lawrence to Cape Hatteras. Surfclams occur in both the state territorial waters (≤ 3 mi from shore) and within the EEZ (3-200 miles from shore). Commercial concentrations are found primarily off New Jersey, the Delmarva Peninsula, and on Georges Bank. In the Mid-Atlantic region, surfclams are found from the intertidal zone to a depth of about 60 meters (197 ft), but densities are low at depths greater than 40 meters (131 ft).

The maximum size of surfclams is about 22.5 cm (8.9 inches) shell length, but surfclams larger than 20 cm (7.9 inches) are rare. The maximum age exceeds 30 years and surfclams of 15-20

years of age are common in many areas. Surfclams are capable of reproduction in their first year of life, although full maturity may not be reached until the second year. Eggs and sperm are shed directly into the water column. Recruitment to the bottom occurs after a planktonic larval period of about three weeks.

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

Status of the Stock

There has been no change to the status of the Atlantic surfclam stock in 2018. The stock is not overfished and overfishing is not occurring. The surfclam stock assessment was peer reviewed and approved for use by management at Stock Assessment Workshop 61 (SAW 61; NEFSC 2016).[2] A statistical catch at age and 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.

New reference points were developed for SAW 61 which are more justified scientifically. The new biomass reference points and measures of stock biomass are ratios rather than absolute biomass in weight. This approach allows for conclusions about the status of the surfclam stock despite substantial uncertainty in the actual biomass of the stock.

The Atlantic surfclam stock was not overfished in 2015 (Figure 1; NEFSC 2016).[2] Based on recommended reference points for the whole stock which use spawning stock biomass (SSB), estimated $SSB2015/SSB_{Threshold} = 2.54$ (probability overfished < 0.01). For surfclam, SSB is almost equal to total biomass. Trends expressed as the ratio $SSB/SSB_{Threshold}$ are more reliably estimated than SSB. For the whole stock, relative SSB ($SSB/SSB_{Threshold}$) declined during the last fifteen years but is still above the target.

Overfishing did not occur in 2015 (Figure 2; NEFSC 2016).[2] Based on new recommended reference points, estimated $F2015/F_{Threshold} = 0.295$ (probability overfished < 0.01). Trends expressed as the ratio $F/F_{Threshold}$ are more reliably estimated than absolute fishing mortality rates. For the whole stock the trend in relative F ($F/F_{Threshold}$) generally increased during the last fifteen years (despite recent declines in the south) but is still below the threshold.

Trends expressed as the ratio of recruitment (R) and mean recruitment in an unfished stock (R0) are more reliably estimated than absolute recruitment (Figure 3; NEFSC 2016).[2] The trend in relative recruitment is measured using the ratio R/R0. Recruitment generally increased over the last decade, and in 2015 R/R0 was 0.57 in the north, 0.97 in the south, and 0.75 for the stock as a whole, indicating recruitment in 2015 was about 57%, 97% and 75% of the maximum long-term average in the three regions. These recruitment patterns are probably normal in a surfclam stock at relatively high biomass and with low fishing mortality. Recruitment for the whole stock is measured as the geometric mean of R/R0 in the northern and southern areas and is more uncertain than estimates for either area.

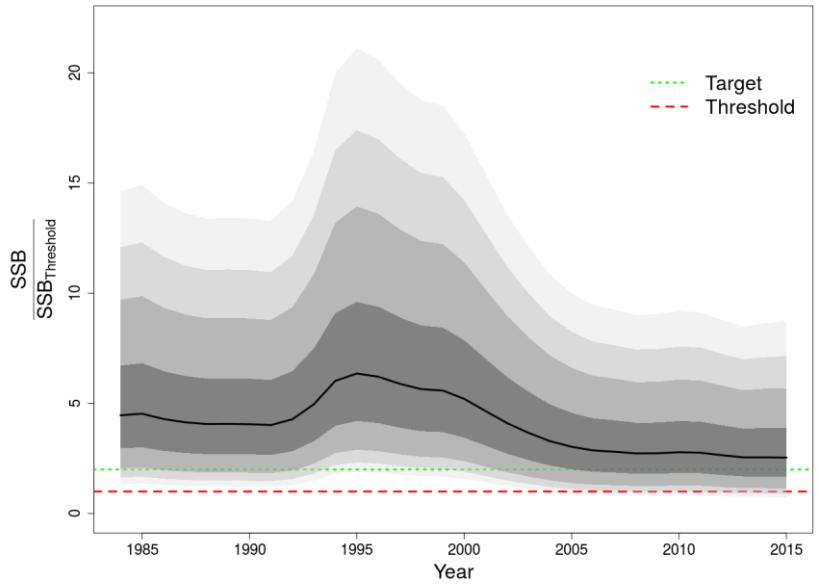

Figure 1. Trends in relative spawning stock biomass ($SSB/SSB_{Threshold}$) for the Atlantic surfclam stock during 1984-2015 (NEFSC 2016).[2] The solid line shows estimates from this assessment with approximate 50, 80, 90, and 95th percentile lognormal confidence intervals in shades of grey. The green short-dash line at $SSB/SSB_{Threshold} = 2$ is the management target. The red long-dash line at $SSB/SSB_{Threshold} = 1$ is the level that defines an overfished stock.

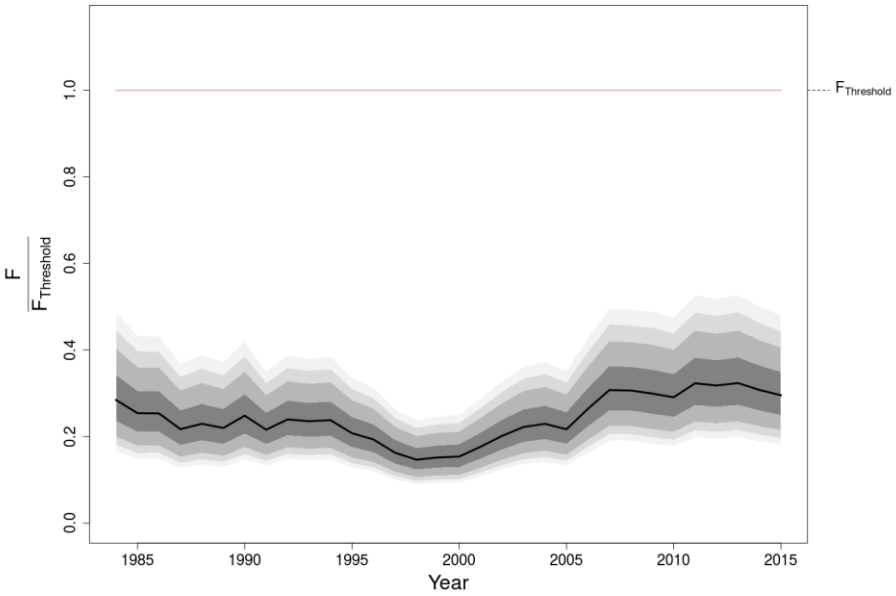

Figure 2. Trends in relative fishing mortality $F/F_{Threshold}$ for the Atlantic surfclam stock 1984-2015 (NEFSC 2016).[2] The solid line shows estimates from this assessment with approximate 50, 80, 90, and 95th percentile lognormal confidence intervals in shades of grey. The solid line at $F/F_{Threshold} = 1$ is the new fishing mortality threshold reference point.

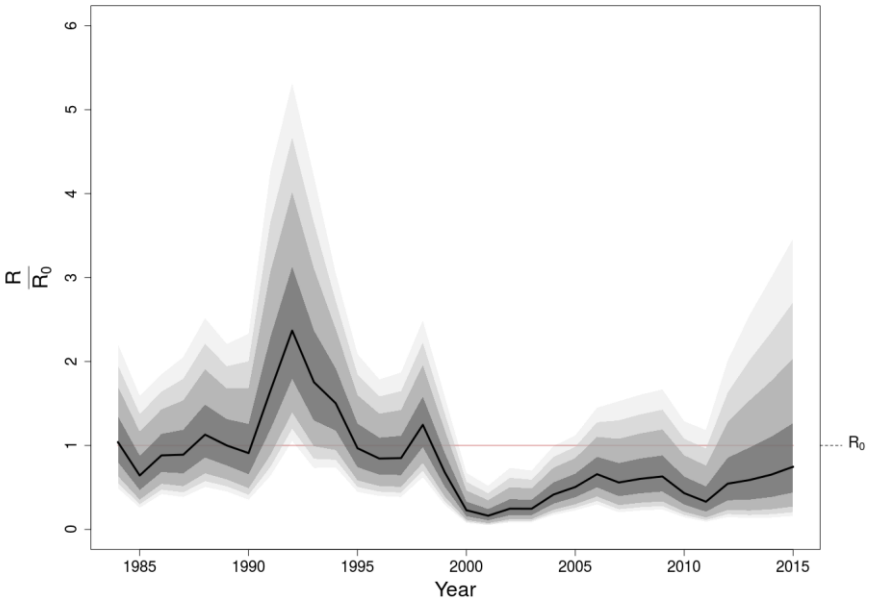

Figure 3. Trends in relative recruitment (R/R_0 for age zero recruits) for the Atlantic surfclam stock during 1984-2015 (NEFSC 2016).[2] The solid line shows estimates from this assessment with approximate 50, 80, 90, and 95th percentile lognormal confidence intervals in shades of grey. The horizontal line is mean recruitment in an unfished stock.

Management System and Fishery Performance

Management

There have been no major changes to the overall management system since the Individual Fishing Quota (ITQ) system was implemented in 1990. The Fishery Management Plan (FMP) for Atlantic surfclam (*Spisula solidissima*) became effective in 1977. The FMP established the management unit as all Atlantic surfclams in the Atlantic Exclusive Economic Zone (EEZ). The FMP is managed by the Mid-Atlantic Fishery Management Council (Council), in conjunction with the 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 (ITQs) at the beginning of each calendar year as specified in Amendment 8 to the FMP (1988). In addition to the Federal water fishery, there is a small fishery prosecuted in the state waters of New York, New Jersey, and Massachusetts. The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org.

Commercial Fishery

The commercial fishery for surfclam in Federal waters is prosecuted with large vessels and hydraulic dredges. Surfclam landings and commercial quotas are given in Table 1 and Figure 4. The distribution of the fishery has changed over time, as shown in Figures 5-9, with a shift to increased landings in Southern New England and Georges Bank areas.

Table 1. Federal surfclam quotas and landings: 1998-2020. Landings for state waters are approximated as total landings - EEZ landings and may not accurately reflect state landings. SSC determined OFLs and ABCs included for years specified.

Year	OFL (mt)	ABC/ACL (mt)	Total Landings (mt meats; includes state waters)	EEZ Landings (mt meats)	EEZ Landings[a] ('000 bu)	EEZ Quota ('000 bu)	% Harvested
1998	NA	NA	24,506	18,234	2,365	2,565	92%
1999	NA	NA	26,677	19,577	2,539	2,565	99%
2000	NA	NA	31,093	19,788	2,566	2,565	100%
2001	NA	NA	31,237	22,017	2,855	2,850	100%
2002	NA	NA	32,645	24,006	3,113	3,135	99%
2003	NA	NA	31,526	24,994	3,241	3,250	100%
2004	NA	NA	26,463	24,197	3,138	3,400	92%
2005	NA	NA	22,734	21,163	2,744	3,400	81%
2006	NA	NA	25,779	23,573	3,057	3,400	90%
2007	NA	NA	27,091	24,915	3,231	3,400	95%
2008	NA	NA	25,223	22,510	2,919	3,400	86%
2009	NA	NA	22,396	20,065	2,602	3,400	77%
2010	129,300	96,600	19,941	17,984	2,332	3,400	69%
2011	114,000	96,600	20,044	18,839	2,443	3,400	72%
2012	102,300	96,600	18,393	18,054	2,341	3,400	69%
2013	93,400	96,600	18,924	18,551	2,406	3,400	71%
2014	81,150	60,313	18,834	18,227	2,364	3,400	70%
2015	75,178	51,804	18,517	18,154	2,354	3,400	69%
2016	71,512	48,197	18,202	18,039	2,339	3,400	69%
2017	69,925	44,469	17,690	16,902	2,192[c]	3,400	64%[c]
2018	Not specified[b]	29,363[b]	17,116[c]	16,128[c]	2,092[c]	3,400	62%[c]
2019	74,281[d]	56,419[d]	NA	NA	NA	3,400	NA
2020	74,110[d]	56,289[d]	NA	NA	NA	3,400	NA

[a] 1 surfclam bushel is approximately 17 lb. [d] Revised previous 2018 values due to new sock assessment.[c] Preliminary, incomplete 2018 data. [d] Revised previous 2019-2020 values due to new analyses. Source: NMFS clam vessel logbook reports.[3]

Figure 10 provides the distribution of surfclam 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 surfclams, 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.

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.

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

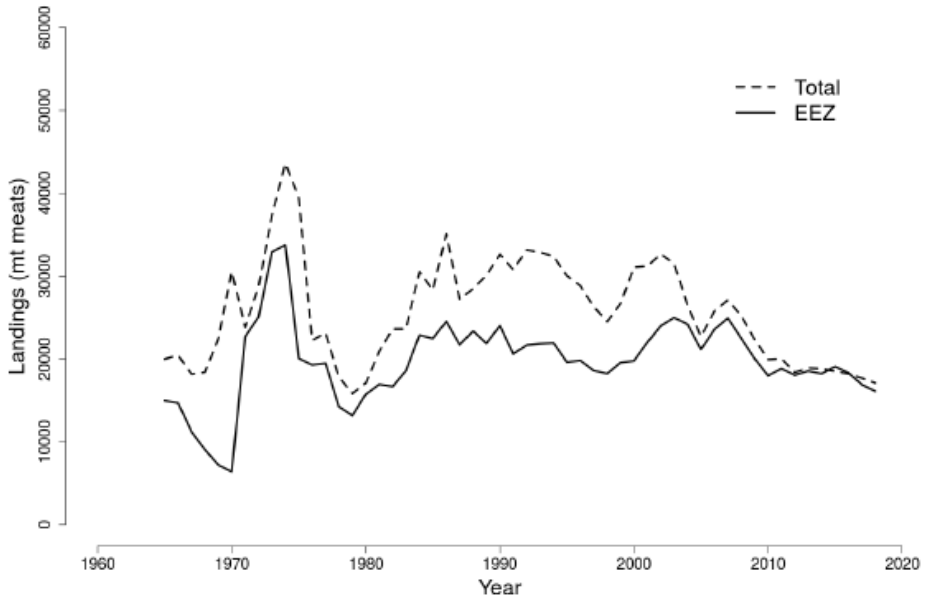

Figure 4. Surfclam landings (total and EEZ) during 1965-2017, and preliminary 2018.[3]

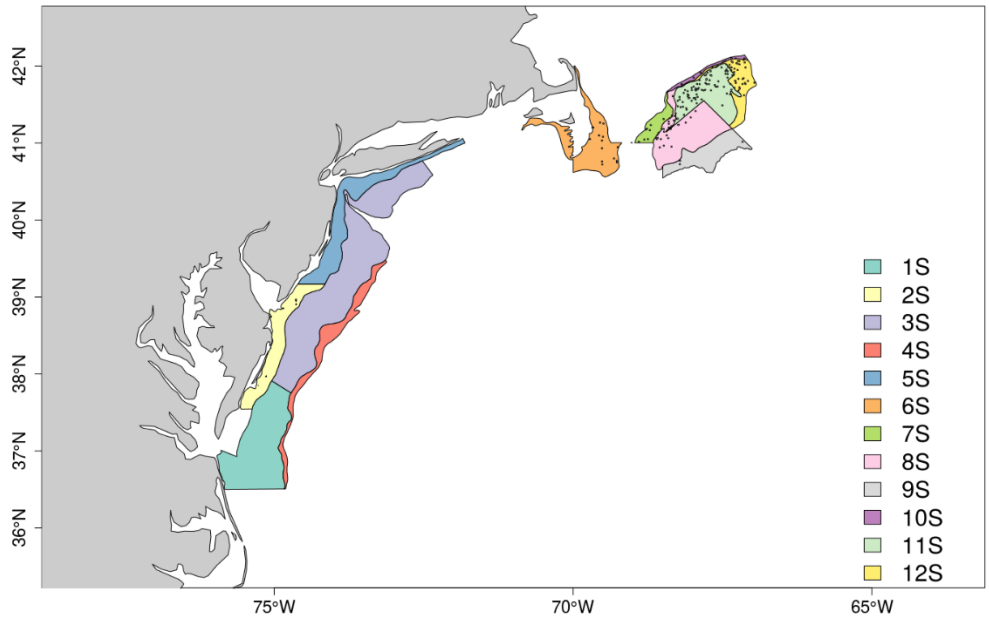

Figure 5. Surfclam stock assessment regions and NEFSC shellfish survey strata. The shaded strata are where surfclams are found.

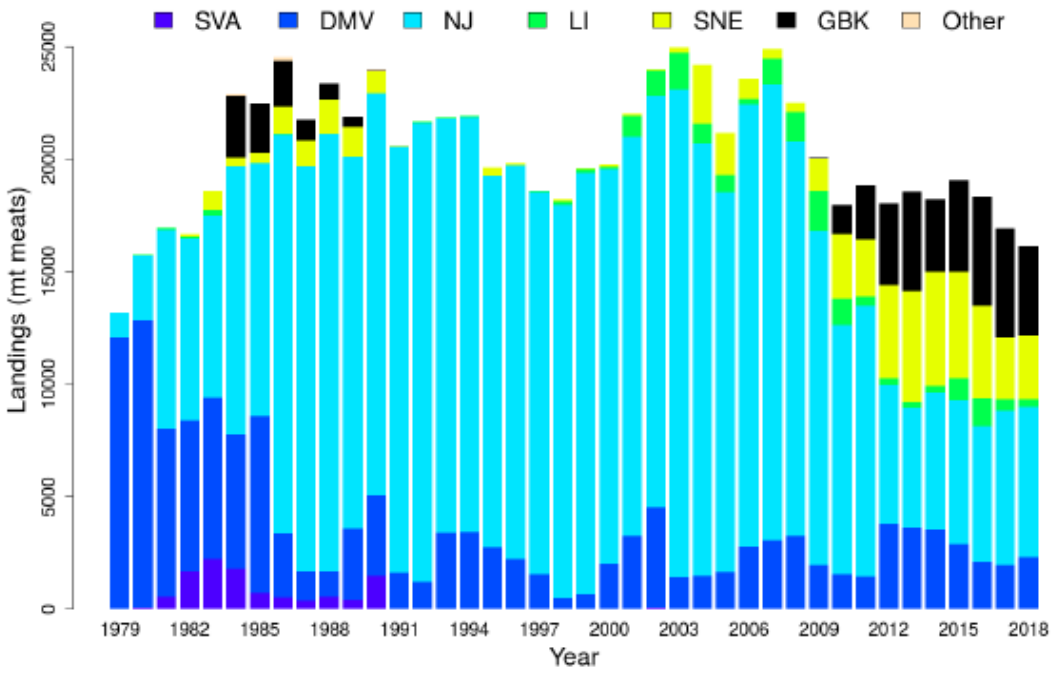

Figure 6. Surfclam landings from the US EEZ during 1979-2017, and preliminary 2018.[3]

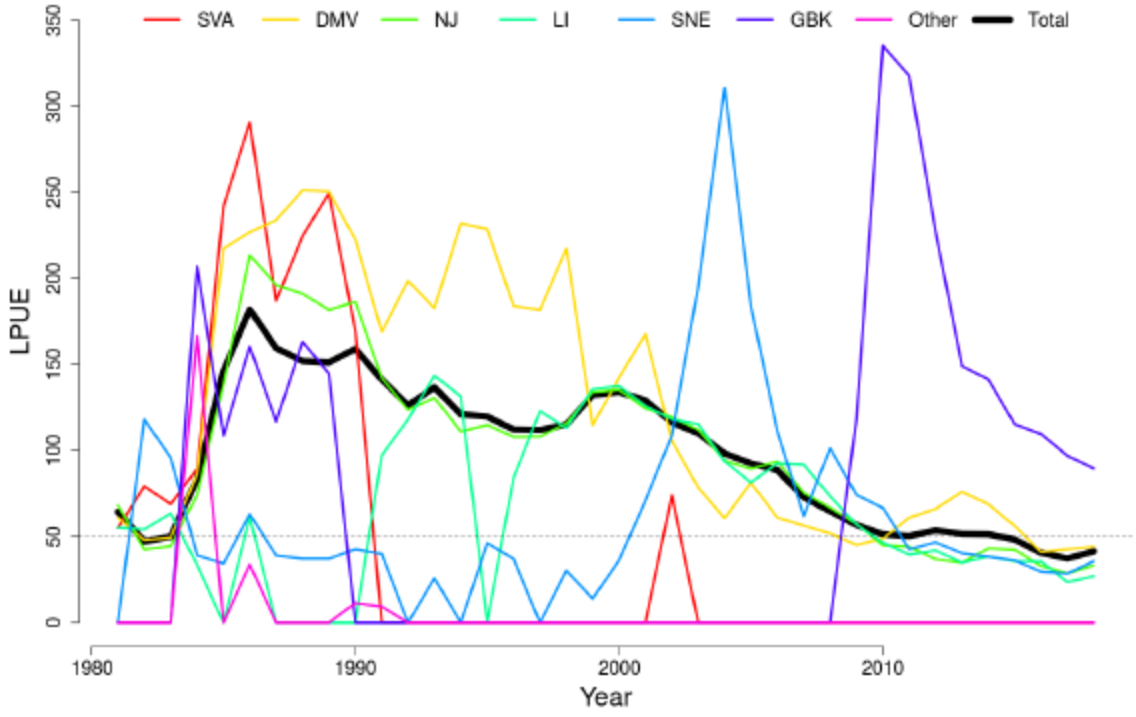

Figure 7. Nominal landings per unit effort (LPUE in bushels landed per hour fished) for surfclam, by region, during 1981-2017, and preliminary 2018. LPUE is total landings in bushels divided by total fishing effort.[3]

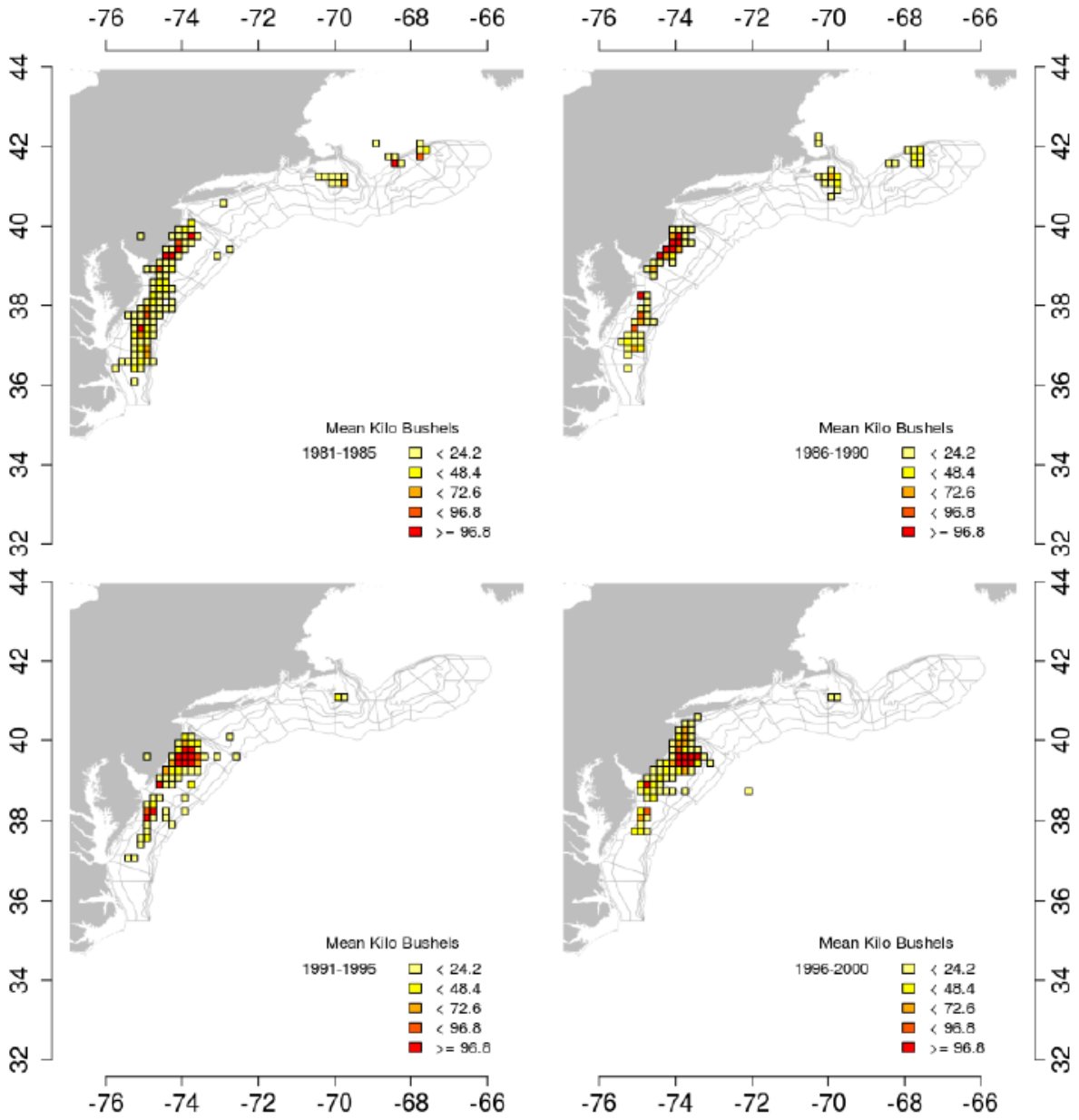

Figure 8. Average surfclam landings by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown.[3]

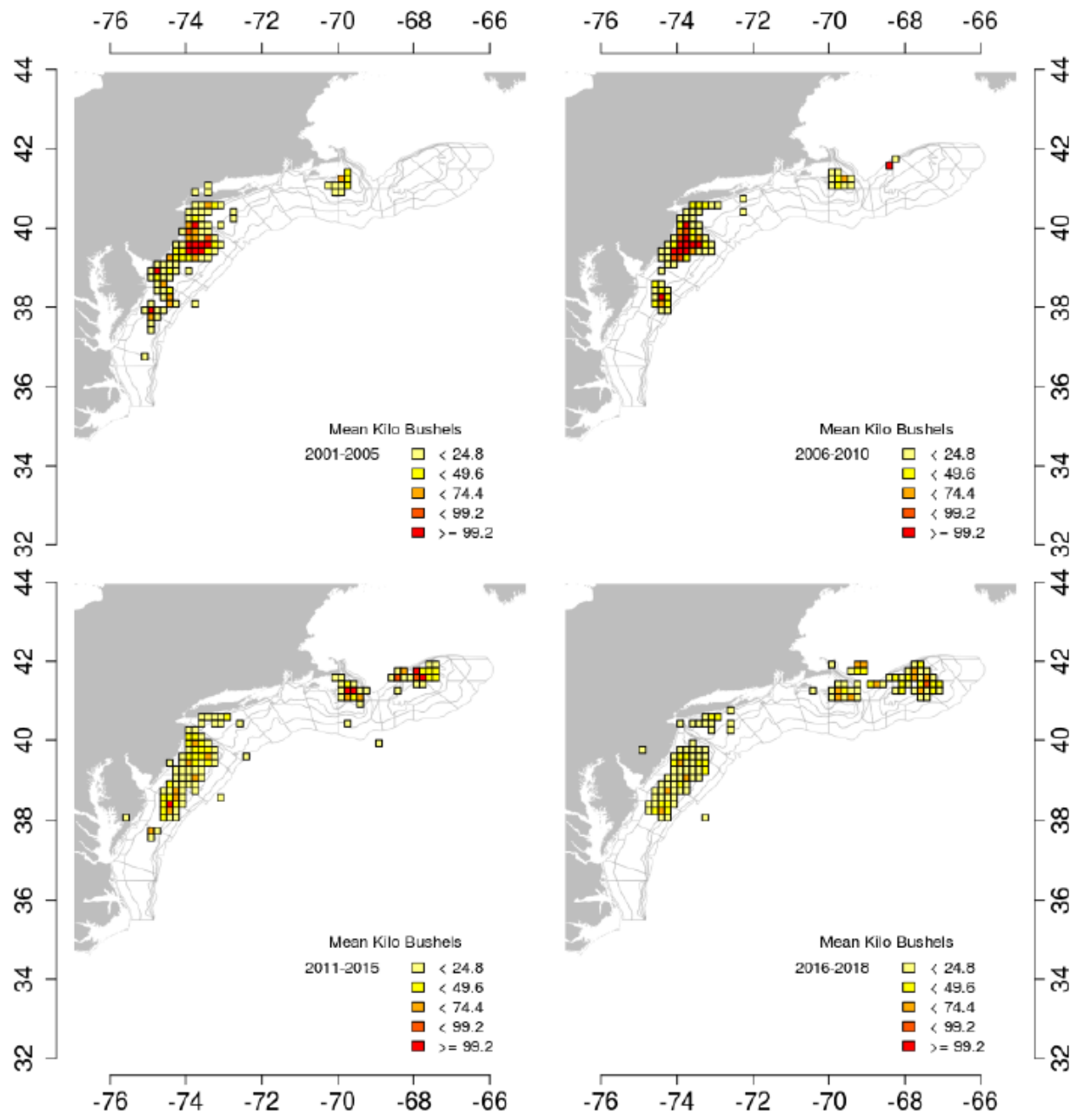

Figure 9. Average surfclam landings by ten-minute squares over time, 2001-2017, and preliminary 2018. Only squares where more the 5 kilo bushels were caught are shown.[3]

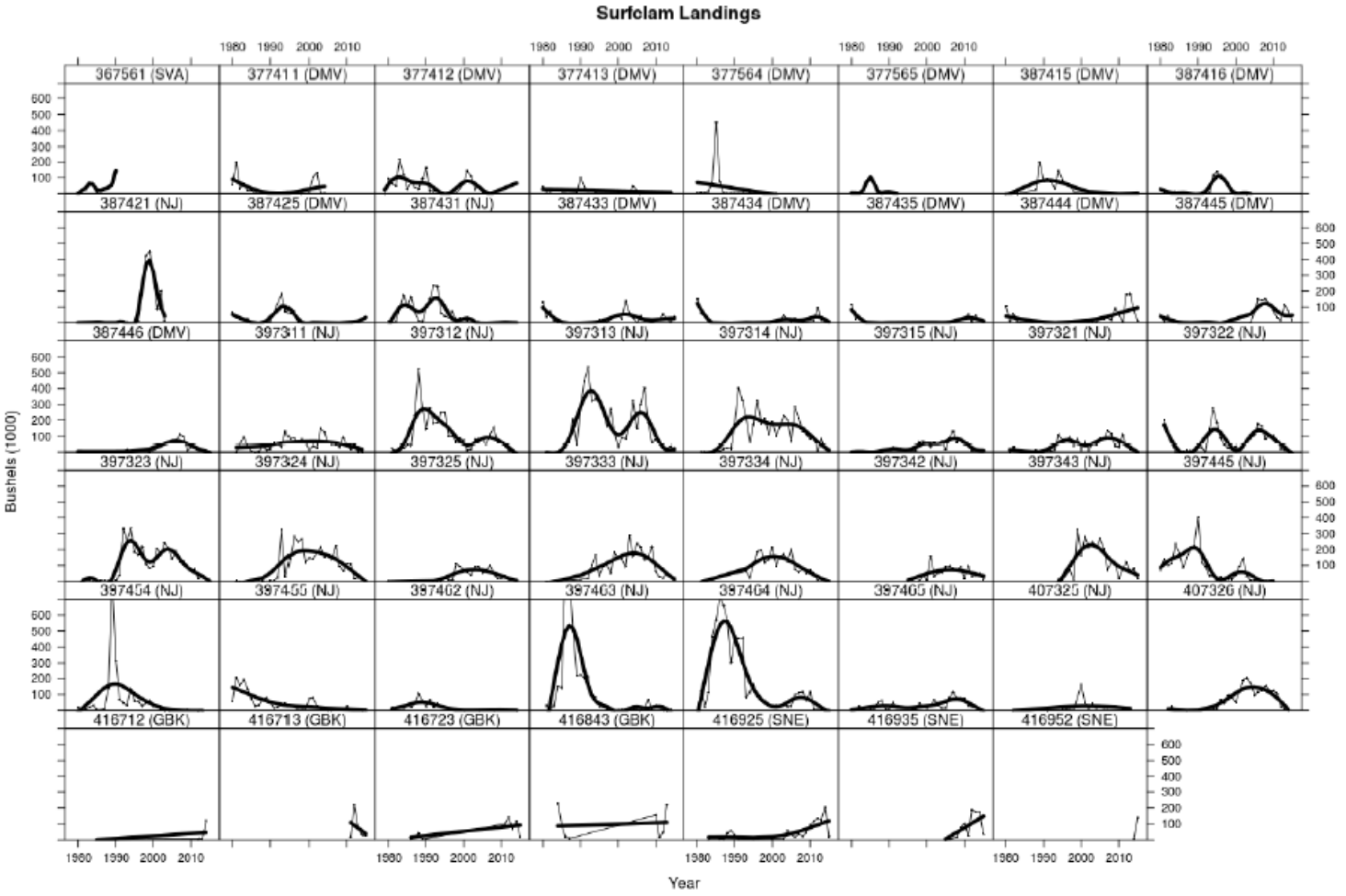

Figure 10. Annual surfclam landings in "important" ten minute squares (TNMS) during 1980-2017 based on logbook data. Important means that a square ranked in the top 10 TNMS for total landings during any five-year period (1980-1984, 1985-1989, ..., 2000-2004, 2005-2009, 2010-2018). Data for 2018 are incomplete 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 participating in the surfclam fishery has remained relatively stable in the recent decade, with vessels shifting between harvesting surfclams or surfclams and ocean quahogs (Table 2). The average ex-vessel price of surflcams reported by processors was $14.18 in 2018, slightly higher than the $13.90 per bushel seen in 2017. The total ex-vessel value of the 2018 federal harvest was approximately $30 million, slightly lower than $31 million in 2017. Industry has described several factors that have affected their industry. Trips harvesting surfclams have increased in length as catch rates have declined. The distribution of LPUE in bushels per hour over time is shown in Figures 7 and 11-12.

Processing Sector

Even though this document describes the surfclam 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

Areas can be closed to surfclam fishing if the abundance of small clams in an area meets certain threshold criteria. This small surfclam closure provision was applied during the 1980's with three area closures (off Atlantic City, NJ, Ocean City, MD, and Chincoteague, VA), with the last of the three areas reopening in 1991. Industry has indicated that in 2015 they implemented two large, voluntary closures off Ocean City, MD and Point Pleasant, NJ (250 square miles) to protect small surfclams and to maximize their use of the resource. Details on the specific location of these closures have not been provided by industry and are unknown.

Fishing areas can also be closed for public health related issues due to environmental degradation or the toxins that cause parayltic shellfish poisoning (PSP). PSP is a public health concern for surfclams. PSP is caused by saxitoxins, produced by the alga Alexandrium fundyense (red tide). Surfclams 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 and LPUE in that area was substantially higher (5-7 times higher) than in other traditional fishing grounds.

The Greater Atlantic Regional Fisheries Office reopened a portion of Georges Bank to the harvest of surfclam 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.

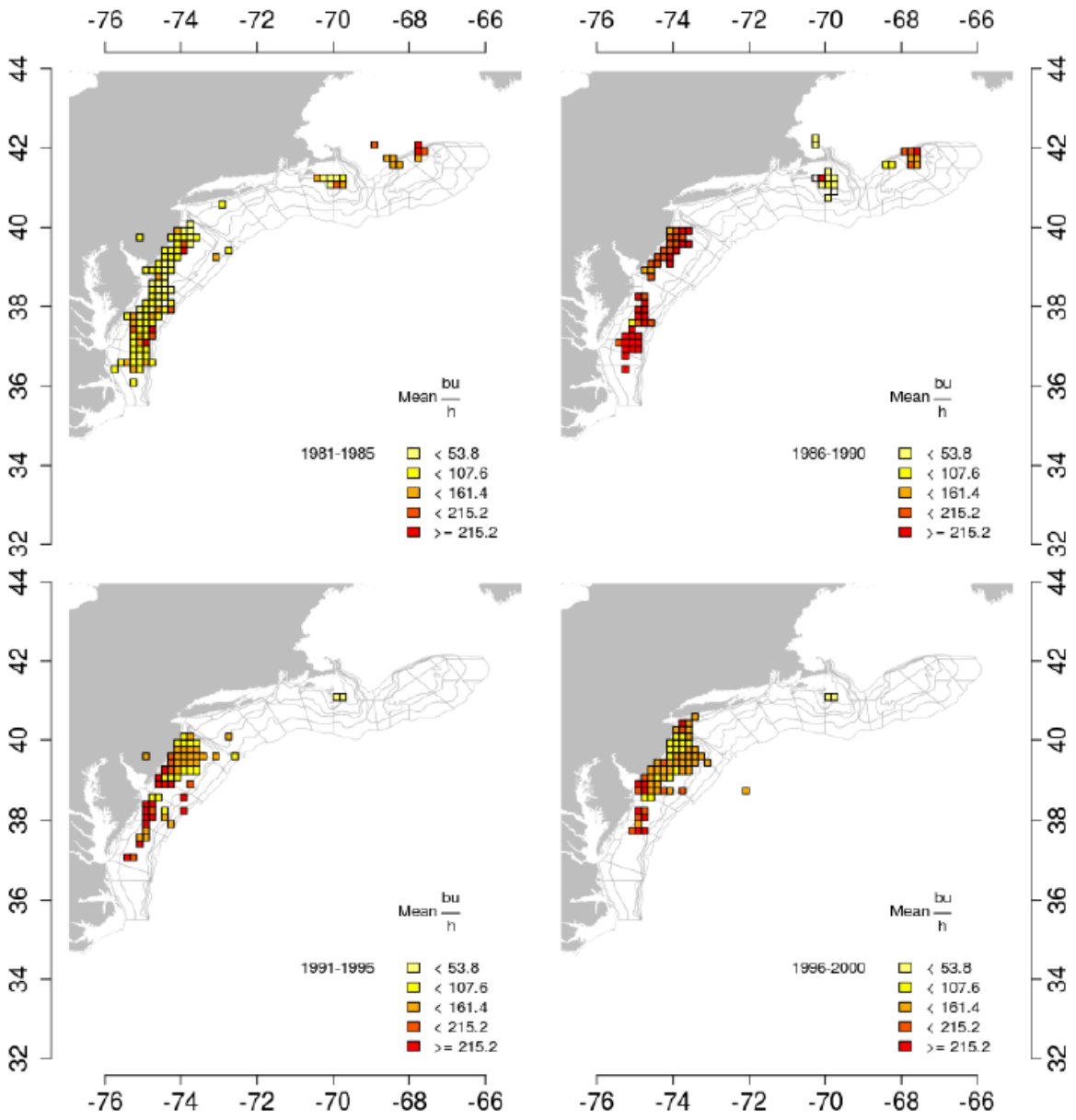

Figure 11. Average surfclam landings per unit effort (LPUE; bu. h^{-1}) by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown.[3]

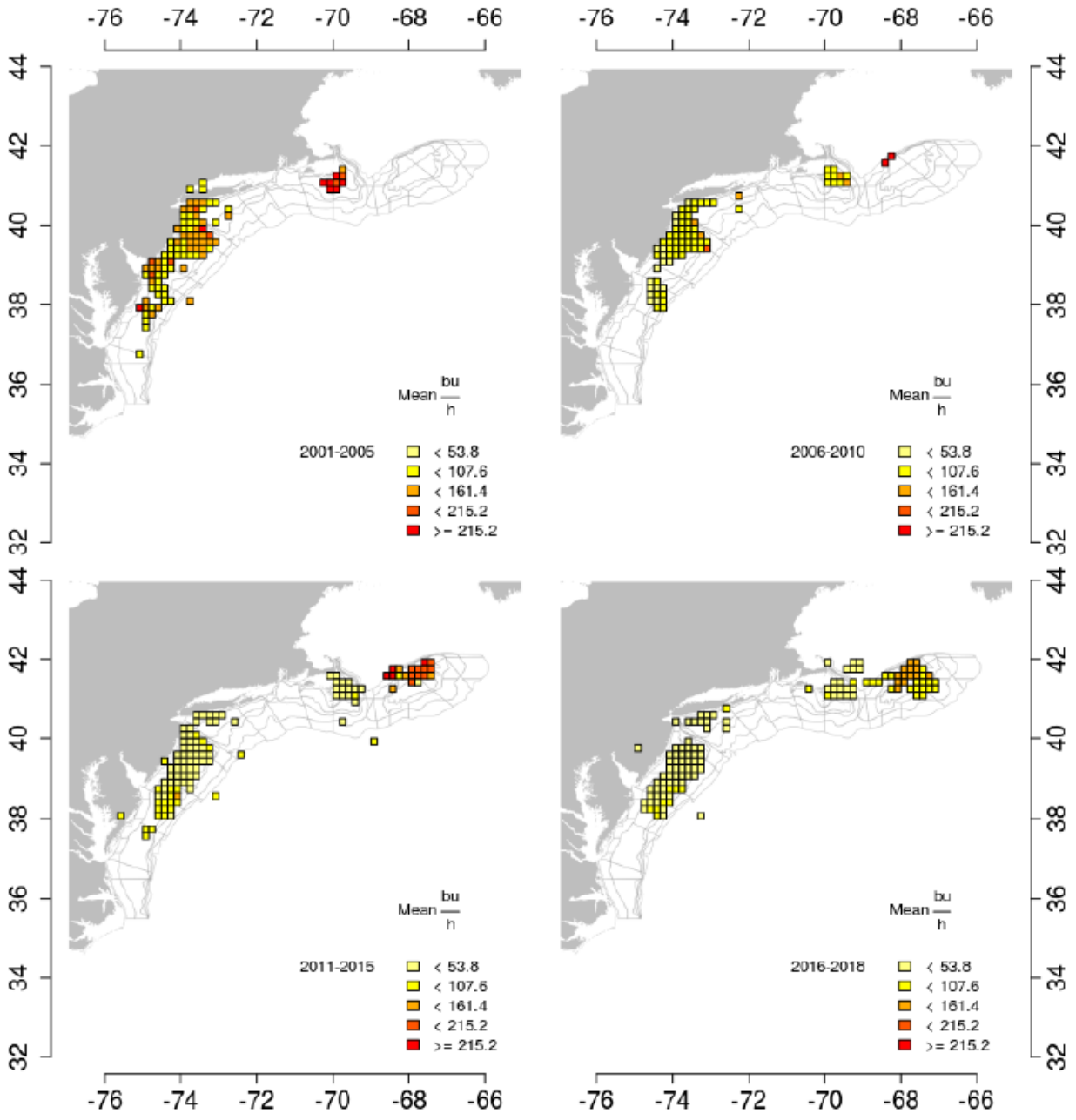

Figure 12. Average surfclam landings per unit effort (LPUE; bu. h-1) by ten-minute squares over time, 2001-2016 and preliminary 2017. Only squares where more the 5 kilo bushels were caught are shown.[3]

Table 2. Federal fleet profile, 2009 through 2018.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Harvesting BOTH surfclams & ocean quahogs	8	12	12	13	7	7	6	8	14	8
Harvesting only surfclams	28	22	24	29	33	31	31	30	26	31
Total Vessels	36	34	36	42	40	38	37	38	40	39

Source: NMFS clam vessel logbooks.

References

1. Cargnelli, L., S. Griesbach, D. Packer, and E. Weissberger. 1999. Essential Fish Habitat Source Document: Atlantic Surfclam, *Spisula solidissima*, Life History and Habitat Characteristics. NOAA Tech. Memo. NMFS-NE-142.

2. Northeast Fisheries Science Center. 2016. 61st Northeast Regional Stock Assessment Workshop (61st SAW) Assessment Summary Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 16-13; 26 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.