



## Atlantic Surfclam Fishery Information Document

April 2021

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 2020. Data sources for Fishery Information Documents are generally from unpublished National Marine Fisheries Service (NMFS) survey, dealer, vessel logbook, and permit databases and should be considered preliminary.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 <https://www.mafmc.org/surfclams-quahogs>.

### Key Facts

- There has been no change to the status of the Atlantic surfclam stock. The stock is not overfished and overfishing was not occurring in 2019.
- The total ex-vessel value of the 2020 federal harvest was approximately \$23 million, lower than the \$28 million in 2019.
- In 2020, there were 7 companies reporting purchases of surfclam and/or ocean quahog in 3 states outside of Maine.
- In 2020, COVID-19 impacted the fishing sector - information on those impacts can be found here and in recent fishery performance reports: <https://media.fisheries.noaa.gov/2021-02/Northeast-COVID-19-Impact-Snapshot-webready.pdf>
- Overall, surfclam landings per unit effort continues to decline as more dense areas are fished down including declines on Georges Bank. The fishery appears to continue 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).<sup>1</sup> An electronic version is available at the following website: <https://www.fisheries.noaa.gov/new-england-mid-atlantic/habitat-conservation/essential-fish-habitat-efh-northeast>. Additional information on this species is available at the following website: <https://www.fishwatch.gov/>. A summary of the basic biology is provided below.

Atlantic surfclam are distributed along the western North Atlantic Ocean from the southern Gulf of St. Lawrence to Cape Hatteras. Surfclam occur in both the state territorial waters ( $\leq 3$  miles from shore) and within the Exclusive Economic Zone (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, surfclam 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 surfclam is about 22.5 cm (8.9 inches) shell length, but surfclam larger than 20 cm (7.9 inches) are rare. The maximum age exceeds 30 years and surfclam of 15-20 years of age are common in many areas. Surfclam 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 surfclam are suspension feeders on phytoplankton and use siphons which are extended above the surface of the substrate to pump in water. Predators of surfclam include certain species of crabs, sea stars, snails, and other crustaceans, as well as fish predators such cod and haddock.

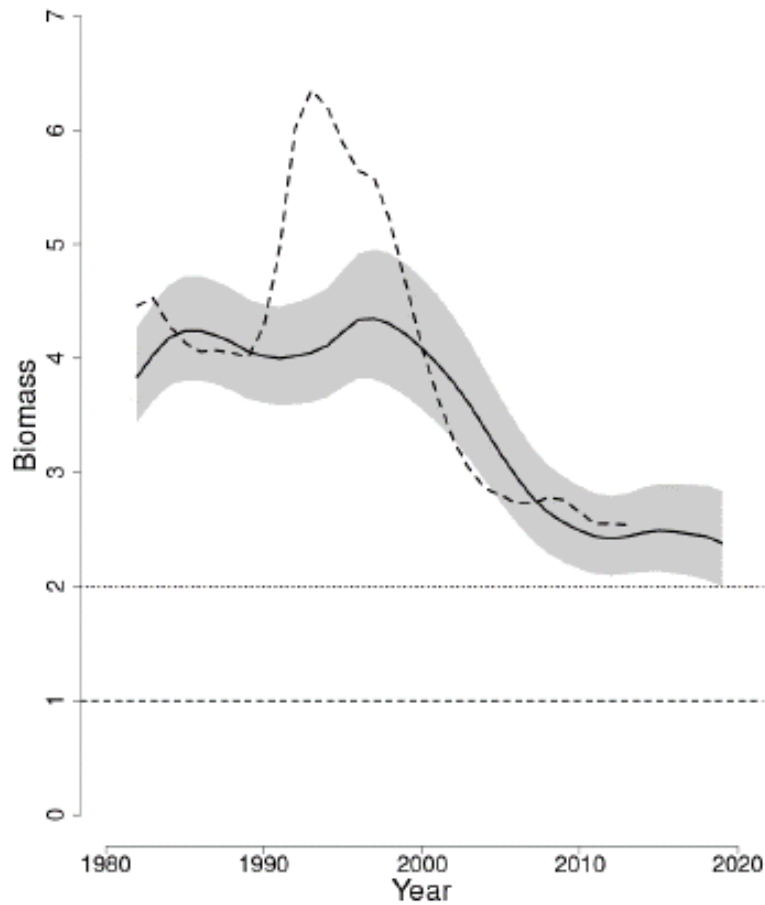
### **Status of the Stock**

The most recent assessment of the Atlantic surfclam (*Spisula solidissima*) stock is a management track assessment of the existing 2016 benchmark Stock Synthesis (SS) assessment (SAW 61; NEFSC 2017).<sup>2,3</sup> This management track assessment indicated the stock is not overfished and overfishing is not occurring (Figures 1-2). Retrospective adjustments were not made to the model results. Spawning stock biomass (SSB) in 2019 was estimated to be 1,222 ('000 mt) which is 119% of the biomass target ( $SSB_{MSY\ proxy} = 1,027$ ; Figure 1). The 2019 fully selected fishing mortality was estimated to be 0.036 which is 25.8% of the overfishing threshold proxy ( $F_{MSY\ proxy} = 0.141$ ; Figure 2).

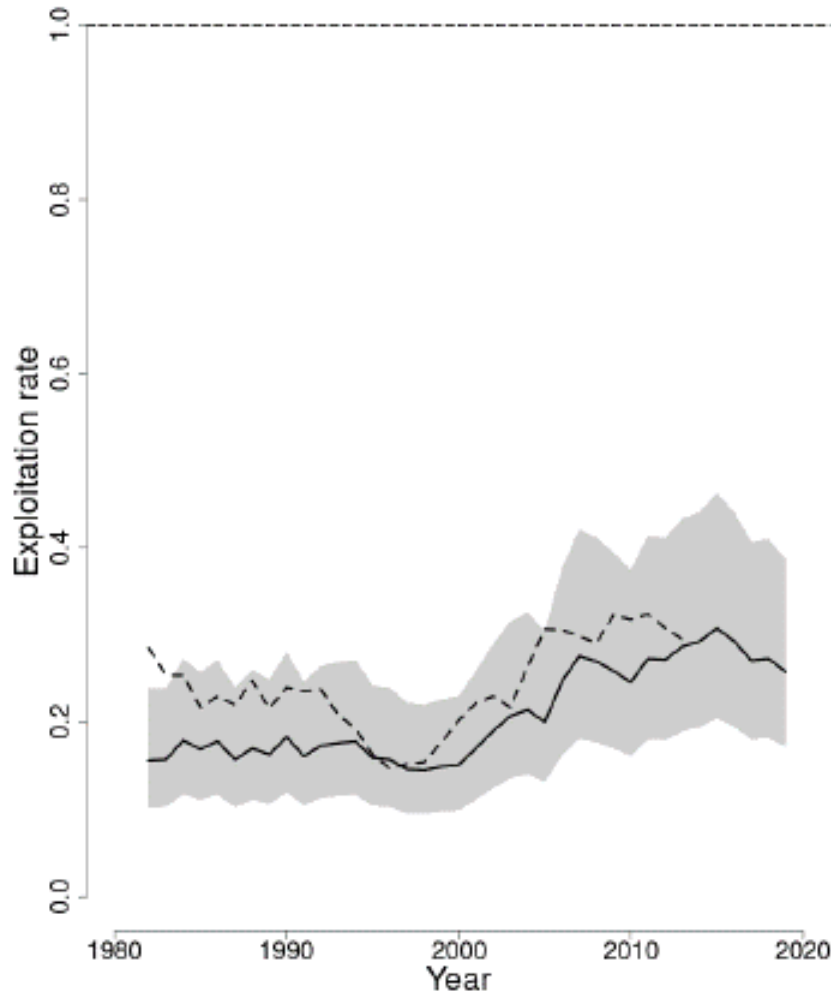
### **Management System and Fishery Performance**

#### *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 surfclam in the Atlantic 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: <https://www.mafmc.org/>.



**Figure 1. Trends in spawning stock biomass of Atlantic surfclam between 1982 and 2019 from the current (solid line) and previous (dashed line) assessment and the corresponding  $SSB_{Threshold}$  ( $\frac{1}{2} SSB_{MSY}$  proxy; horizontal dashed line) as well as  $SSB_{Target}$  ( $SSB_{MSY}$  proxy; horizontal dotted line) based on the 2020 assessment. Units of SSB are the ratio of annual biomass to the biomass threshold ( $SSB/SSB_{Threshold}$ ). The approximate 90% lognormal confidence intervals are shown.<sup>3</sup>**



**Figure 2. Trends in the fully selected fishing mortality ( $F_{Full}$ ) of Atlantic surf-clam between 1982 and 2019 from the current (solid line) and previous (dashed line) assessment and the corresponding  $F_{Threshold}$  ( $F_{MSY\ proxy}=0.141$ ; horizontal dashed line), based on the 2020 assessment. Units of fishing mortality are the ratio of annual  $F$  to the  $F$  threshold ( $F/F_{Threshold}$ ). The approximate 90% lognormal confidence intervals are shown.<sup>3</sup>**

### *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 3. The areas where surfclam are found is shown in Figure 4. The distribution of the fishery has changed over time, as shown in Figures 5-8, with a shift to increased landings in Southern New England and Georges Bank areas. In 2020, COVID-19 impacted the fishing sector - information on those impacts can be found here and in recent fishery performance reports: <https://media.fisheries.noaa.gov/2021-02/Northeast-COVID-19-Impact-Snapshot-webready.pdf>.

**Table 1. Federal surfclam quotas and landings: 1998-2021. 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; w/state waters)	EEZ Landings (mt meats)	EEZ Landings <sup>a</sup> ('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	3,400	64%
2018	Not specified <sup>b</sup>	29,363 <sup>b</sup>	17,114	16,269	2,110	3,400	62%
2019	74,281 <sup>c</sup>	56,419 <sup>c</sup>	16,502	14,986	1,943	3,400	57%
2020	74,110 <sup>c</sup>	56,289 <sup>c</sup>	13,182 <sup>d</sup>	11,956 <sup>d</sup>	1,550 <sup>d</sup>	3,400	46%
2021	51,361	47,919	NA	NA	NA	3,400	NA

<sup>a</sup> 1 surfclam bushel is approximately 17 lb. <sup>b</sup> Revised previous 2018 values due to new stock assessment. <sup>c</sup> Revised previous 2019-2020 values due to new analyses. <sup>d</sup> Preliminary, incomplete 2019 data Source: NMFS clam vessel logbook reports.<sup>3</sup>

Figure 9 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, 2010-2019). Data for 2020 are incomplete and preliminary, and included in the last time block.

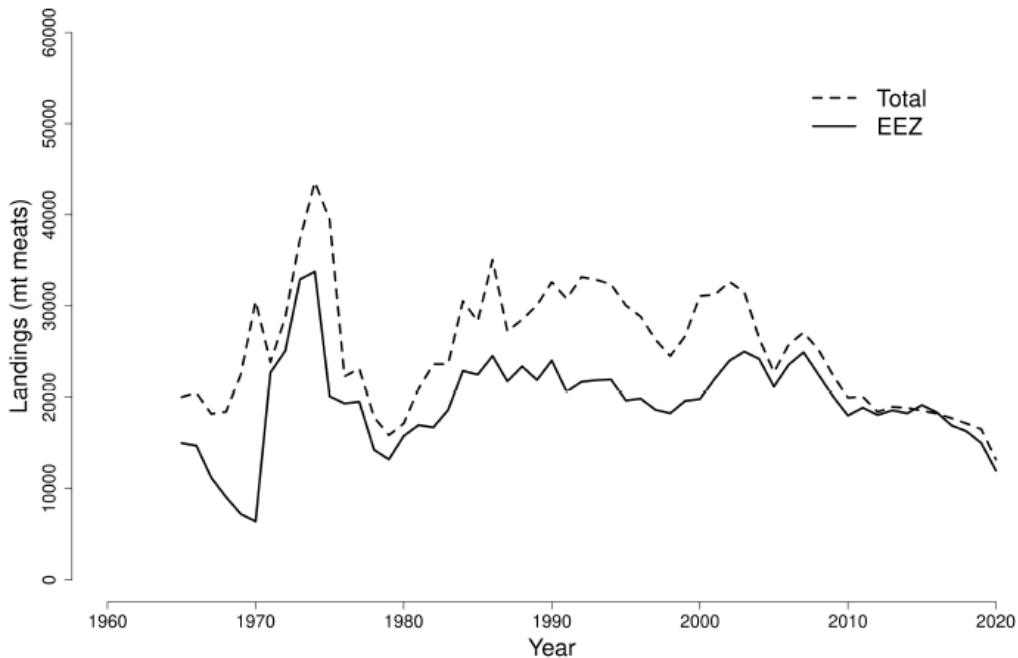
Additional information of the length composition of port sampled surfclam, and their associated sample sizes by area, are available in the stock assessment reports and management track assessment provided.<sup>3</sup>

*Port and Community Description*

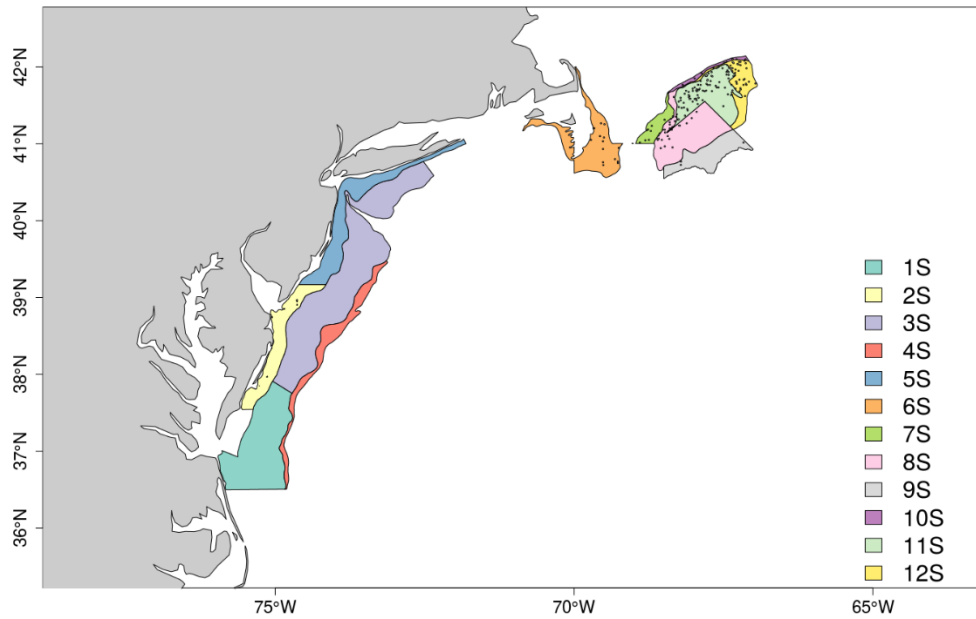
When Amendment 13 to the FMP was developed, the Council hired Dr. Bonnie McCay and her associates at Rutgers University to describe the ports and communities that are associated with the surfclam and ocean quahog fisheries. The researchers did an extensive job characterizing the three main fisheries (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 surfclam and ocean quahog. 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.

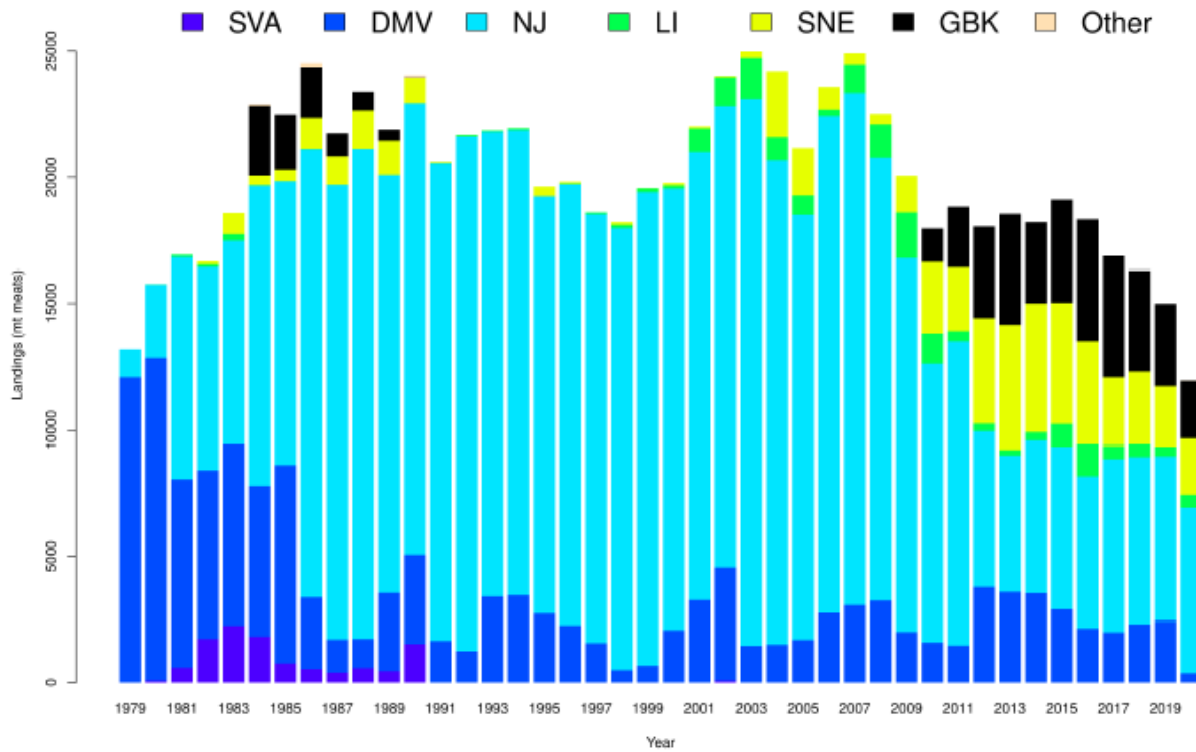
Additional information on "Snapshots of Human Communities and Fisheries in the Northeast" can be found at: <https://fish.nefsc.noaa.gov/read/socialsci/communitySnapshots.php>.



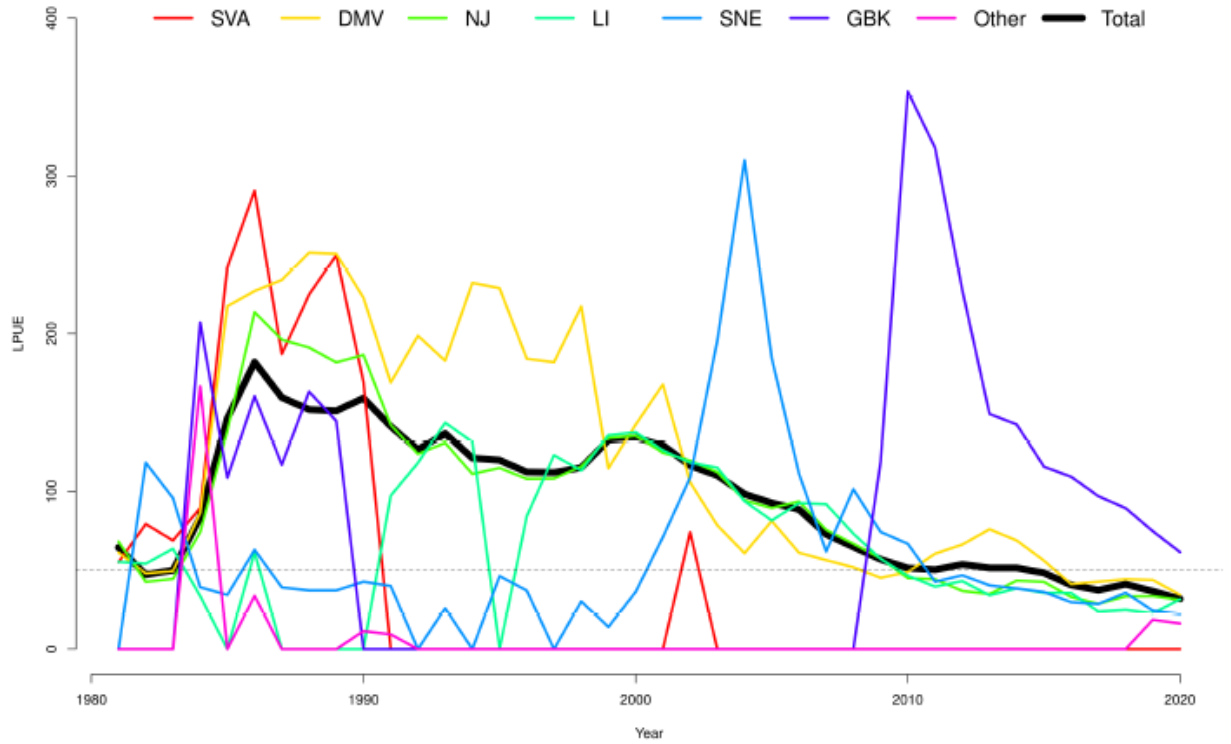
**Figure 3. Surfclam landings (total and EEZ) during 1965-2020, and preliminary 2020.<sup>4</sup>**



**Figure 4. Surfclam stock assessment regions and NEFSC shellfish survey strata. The shaded strata are where surfclam are found.**



**Figure 5. Surfclam landings from the US EEZ during 1979-2019, and preliminary 2020.<sup>4</sup>**



**Figure 6. Nominal landings per unit effort (LPUE in bushels landed per hour fished) for surfclam, by region, during 1981-2019, and preliminary 2020. LPUE is total landings in bushels divided by total fishing effort.<sup>4</sup>**



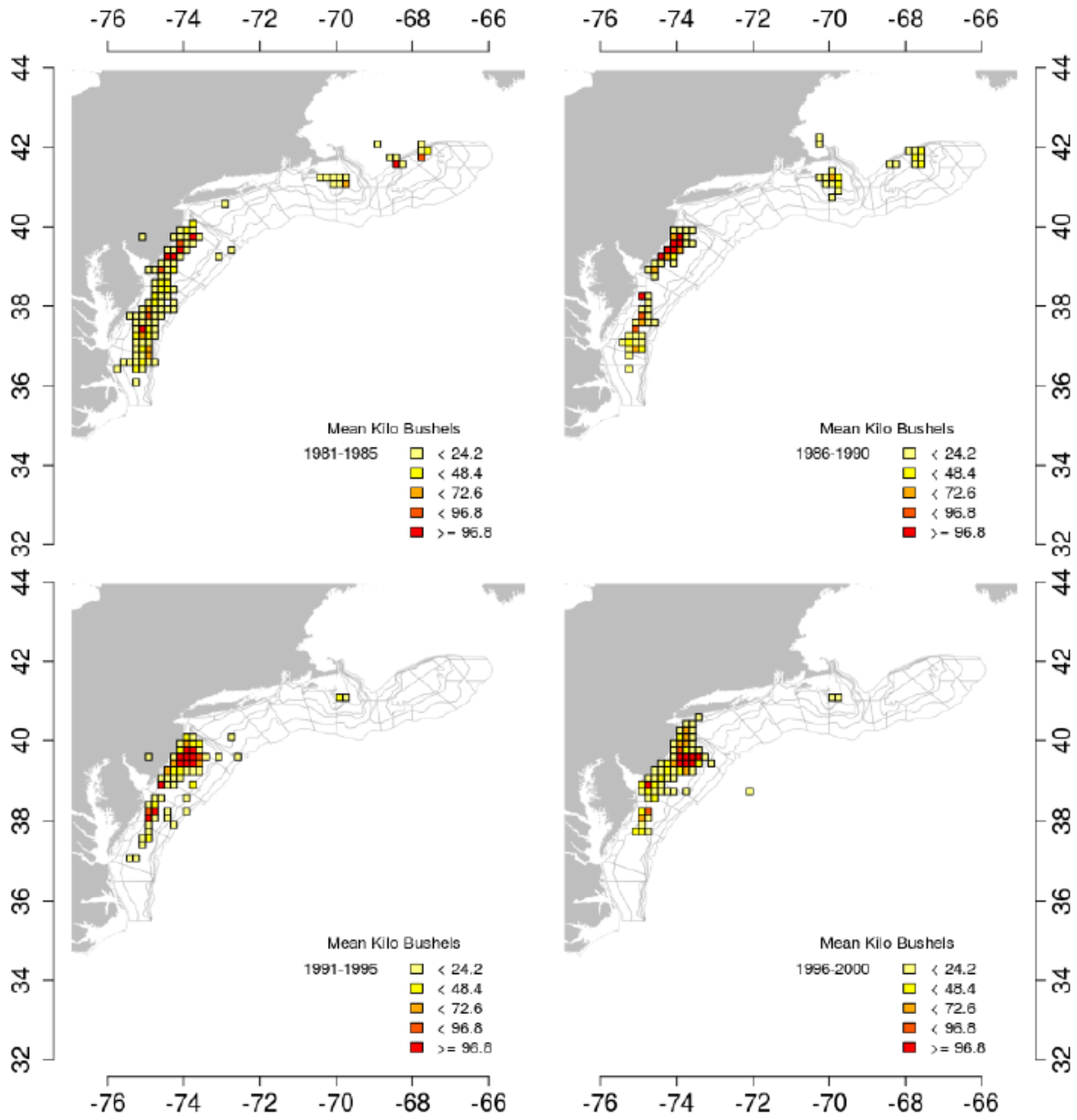
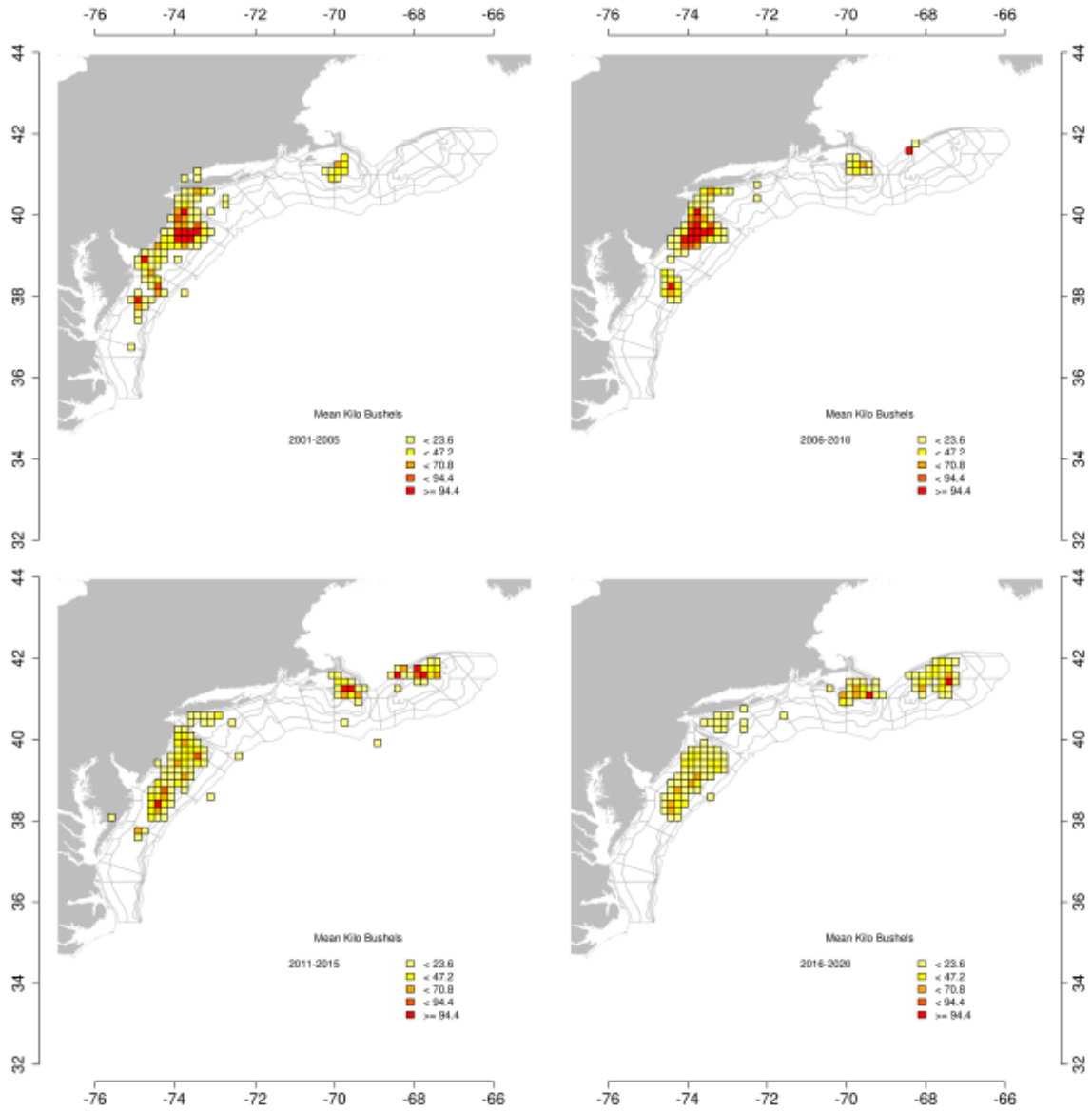
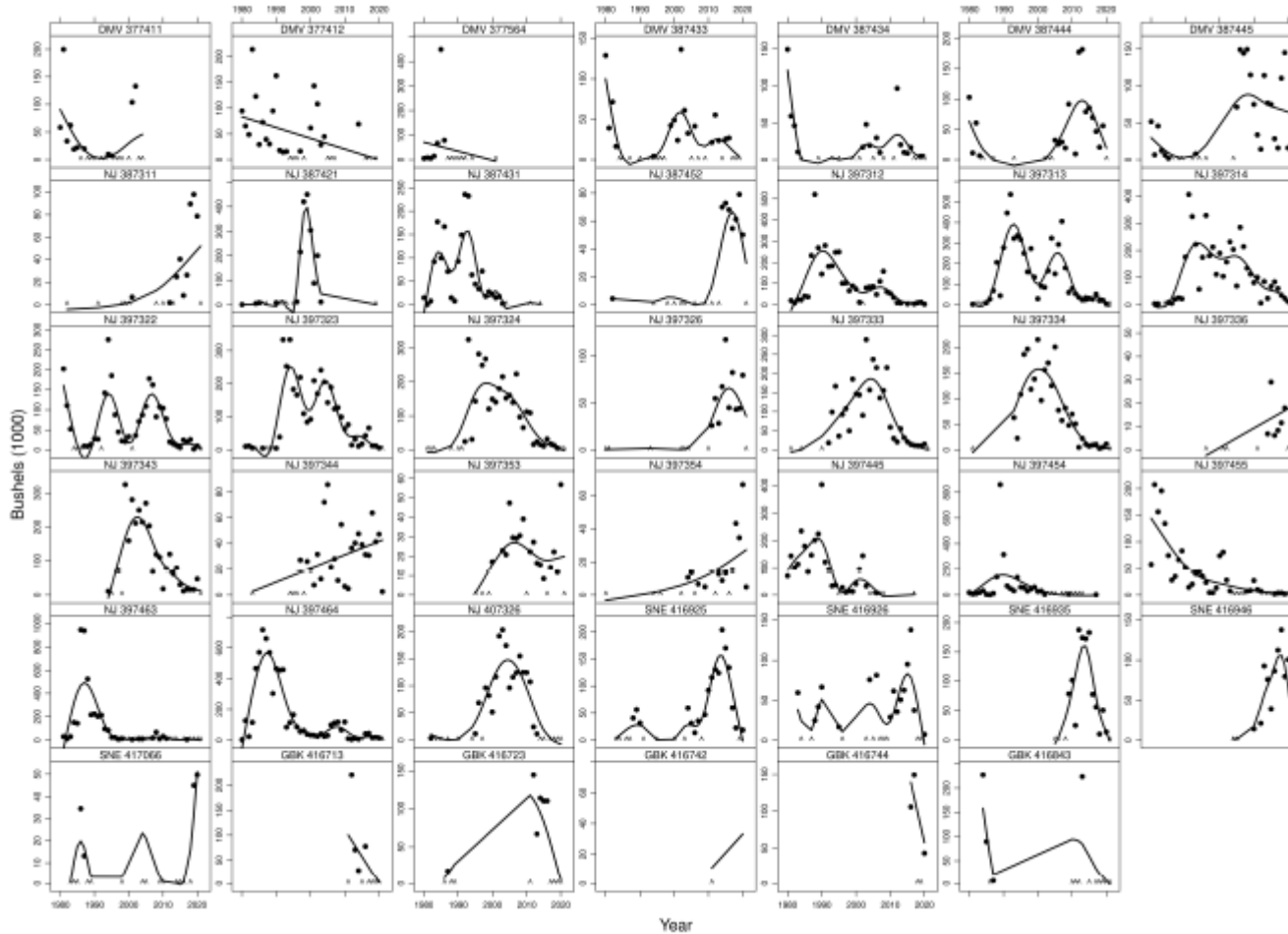


Figure 7. Average surfclam landings by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown.<sup>3</sup>



**Figure 8. Average surfclam landings by ten-minute squares over time, 2001-2019, and preliminary 2020. Only squares where more the 5 kilo bushels were caught are shown.<sup>4</sup>**

### Surfclam landings for important 10-minute squares



**Figure 9. 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, ...). Data for 2020 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.<sup>3</sup>**

### *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 surfclam or surfclam and ocean quahog (Table 2). The average ex-vessel price of surfclams reported by processors was \$14.48 in 2020, slightly higher than the \$14.37 per bushel seen in 2019. The total ex-vessel value of the 2020 federal harvest was approximately \$23 million, which is lower than \$28 million in 2019. Industry has described several factors that have affected their industry. Trips harvesting surfclam have increased in length as catch rates have declined. The distribution of LPUE in bushels per hour over time is shown in Figures 6 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 surfclam and ocean quahog as some of these facilities purchase/process both species.

In 2020, there were 7 companies reporting purchases of surfclam and/or ocean quahog in 3 states outside of Maine. Employment data for these specific firms are not available.

In 2020, these companies bought approximately \$23 million worth of surfclam and \$16 million worth of ocean quahog.

### *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.

Fishing areas can also be closed for public health related issues due to environmental degradation or the toxins that cause paralytic shellfish poisoning (PSP). PSP is a public health concern for surfclam. PSP is caused by saxitoxins, produced by the alga *Alexandrium fundyense* (red tide). Surfclam 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 quahog 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.

New England Fishery Management Council's Omnibus Essential Fish Habitat (EFH) Amendment 2 (OHA2) implemented measures that restricted access to the Great South Channel and Georges Shoal Habitat Management Areas. The surfclam fishery and mussel dredge fishery can operate in specific exemption areas year-round or seasonally in specific exemption areas. For additional information see: <https://www.fisheries.noaa.gov/action/habitat-clam-dredge-exemption-framework>.

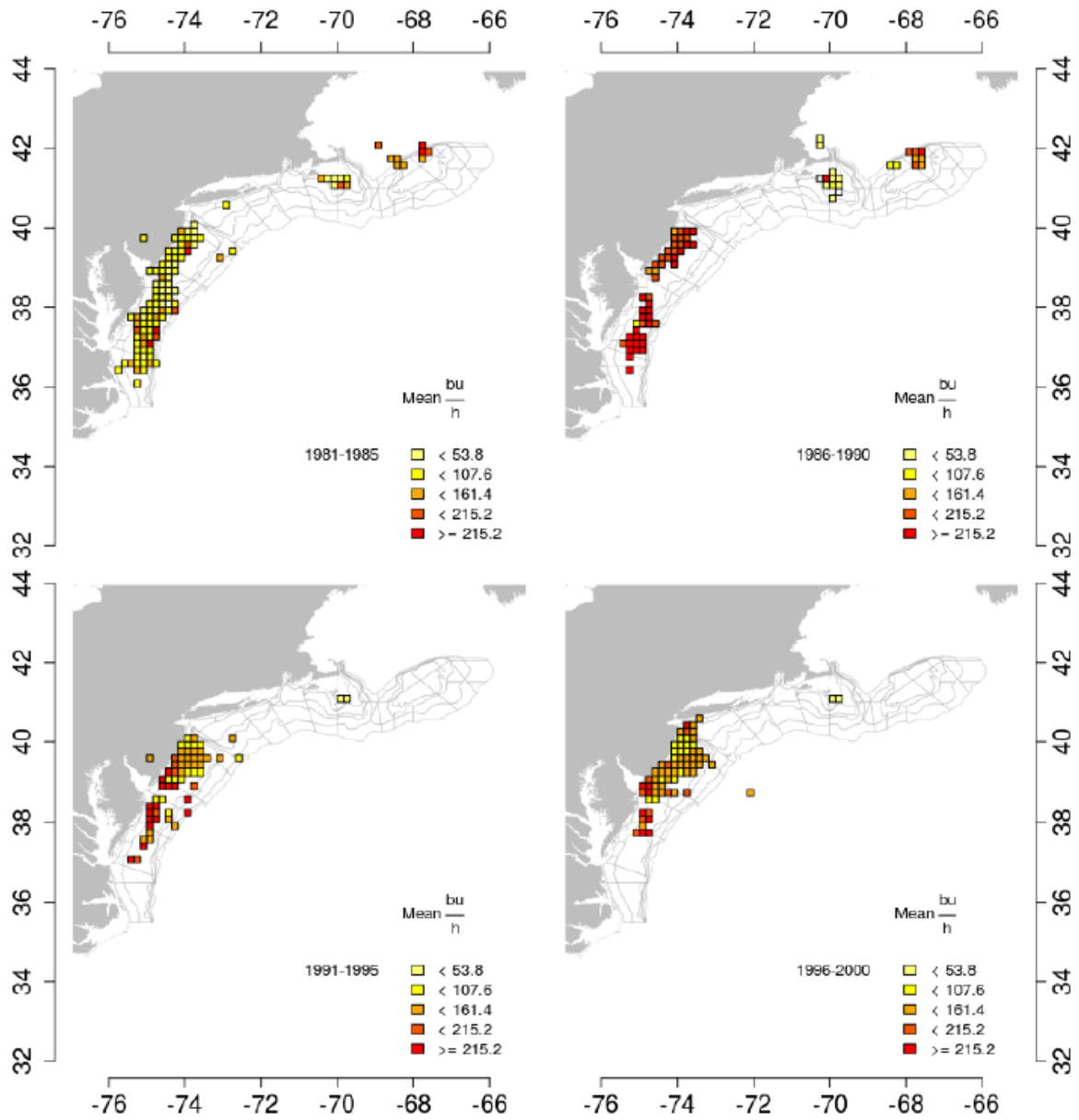


Figure 11. Average surfclam landings per unit effort (LPUE;  $bu \cdot h^{-1}$ ) by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown.<sup>4</sup>

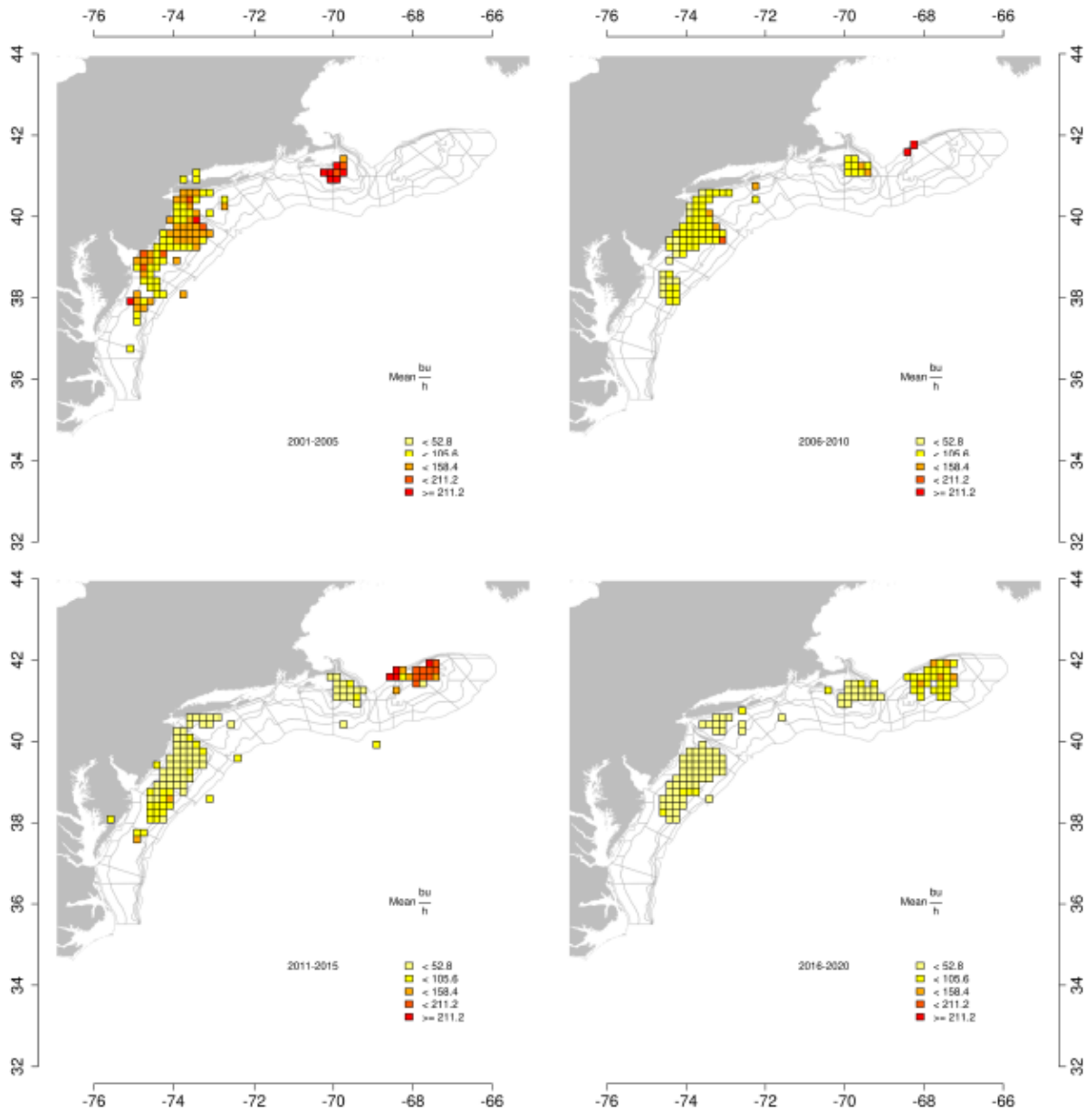


Figure 12. Average surfclam landings per unit effort (LPUE; bu. h-1) by ten-minute squares over time, 2001-2019 and preliminary 2020. Only squares where more the 5 kilo bushels were caught are shown.<sup>4</sup>

**Table 2. Federal fleet profile, 2011 through 2020.**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Harvesting BOTH surfclam &amp; ocean quahog</b>	12	13	7	7	6	8	14	8	7	8
<b>Harvesting only surfclam</b>	24	29	33	31	31	30	26	31	36	35
<b>Total Vessels</b>	36	42	40	38	37	38	40	39	43	43

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. June 14, 2020. NOAA Fisheries, Northeast Fisheries Science Center, 166 Water St., Woods Hole, MA 02543.
4. Hennen, Dan. Personal Communication. March 12, 2021. NOAA Fisheries, Northeast Fisheries Science Center, 166 Water St., Woods Hole, MA 02543.