Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: May 20, 2022

To: Council

From: Jessica Coakley, Staff

Subject: Atlantic Surfclam and Ocean Quahog 2023 Specifications Review

As part of the 2021-2026 multi-year specification process for Atlantic surfclam and ocean quahog, the Scientific and Statistical Committee (SSC) and Council review the most recent information available to determine whether modification of the 2023 specifications is warranted.

The following is included for Council consideration on this subject:

1) Report of the May 2022 SSC Meeting – See Committee Reports Tab

2) Staff Recommendations Memo (dated April 11, 2022)

3) Surfclam and Ocean Quahog Advisory Panel Fishery Performance Report (April 2022)

4) Surfclam Fishery Information Document (April 2022)

5) Ocean Quahog Fishery Information Document (April 2022)

Neither staff nor the SSC recommended any changes to the 2023 specifications for surfclam and ocean quahog.

To maintain status quo measures for 2023, the Council would need a motion recommending the surfclam minimum size be suspended by the Regional Administrator (i.e., an annual requirement in the regulations).

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Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: April 25, 2022

To: Chris Moore, Executive Director

From: Jessica Coakley, Staff

Subject: 2023 Specifications Review for Surfclam and Ocean Quahog

As part of the 2021-2026 multi-year specification process for Atlantic surfclam and ocean quahog, the Scientific and Statistical Committee (SSC) and Council will review the most recent information available to determine whether modification of the 2023 specifications is warranted. The NMFS Northeast Fisheries Science Center provided an update of the commercial fishery data for surfclam and ocean quahog to support this review. The 2021 clam survey was not completed; therefore, no survey data was available for review this year. The survey is scheduled to be conducted in 2022.

Based on a review of the information provided, staff recommends no change to the 2023 fishing year specifications. To maintain status quo measures for 2023, the Council would need a motion recommending the surfclam minimum size be suspended by the Regional Administrator (i.e., an annual requirement in the regulations). The Greater Atlantic Regional Fisheries Office reviewed the landings information and biological sampling data for surfclams since the previous size analysis (August 2020 through July 2021) and determined the proportion of surfclams in the fishery smaller than 4.75 inches does not exceed the 30 percent trigger for the minimum size requirement.

In 2023, the Council will again review available information and may consider modifications to the 2024 specifications, if warranted.

Atlantic Surfclam and Ocean Quahog Fishery Performance Report

April 2022

The Mid-Atlantic Fishery Management Council's (Council) Atlantic Surfclam and Ocean Quahog (SCOQ) Advisory Panel (AP) met via webinar on April 19, 2022 to review the Fishery Information Documents and develop the following Fishery Performance Report. The primary purpose of this report is to contextualize catch histories for the Scientific and Statistical Committee (SSC) and Council by providing information about fishing effort, market trends, environmental changes, and other factors. A series of trigger questions listed below were posed to the AP to generate discussion of observations in these fisheries. Please note: Advisor comments described below are not necessarily consensus or majority statements; in those cases, the differences in opinions are noted.

Advisory Panel members present: Thomas Dameron, Peter deFur, Peter Himchak, David O'Neill, Samuel Martin, Jeffrey Pike, Monte Rome, Guy Simmons, and David Wallace.

Others present: Jessica Coakley and José Montañez (Council staff), Doug Potts (GARFO), Peter Hughes (Council member), Wendy Gabriel and Ed Houde (SSC Members), and Emily Roberts, Peter Kendall, and K. Whitmore.

Trigger questions:

1. What factors have influenced recent catch (markets/economy, environment, regulations, other factors)?
2. Are the current fishery regulations appropriate? How could they be improved?
3. What would you recommend as research priorities?
4. What else is important for the Council to know?

Critical Issues (not in any priority order)

Regulations for shellfish safety ("model ordinance regs.") have been updated by the FDA. However, NOAA Fisheries has not addressed these FDA changes on Georges Bank, which has hampered the ability of the clam fishing industry to access some fishing areas unnecessarily. NOAA Fisheries/GARFO has not yet coordinated with the FDA and acted to modify these unnecessary shellfish safety area closures in a timely manner. The AP requests the Council send a letter to NOAA Fisheries and the appropriate public heath safety groups (in NOAA and FDA) to prioritize addressing this issue.

COVID-19: Sales to restaurants (foodservice) was very low year-on-year for 2020 and in 2021, with the expectation that the effects of this may be ongoing and/or longer lasting. The clam industry has seen a ramp up in the food service industry demand, so they don't see COVID as a

huge issue in 2022 in this sector of the industry. The demand is high but there are limitations in terms of the amount of product available (i.e., able to sell more than can be produced). Industry anticipates that as if inventories grow, they would be able to sell the addition product. The clam industry does not have an excess of inventory right now.

Research: It is important that the Mid-Atlantic Council, and their representatives on the Habitat Committee and Habitat Plan Development Team (PDT), continue to support any research projects that would increase harvest opportunities within the Great South Channel Habitat Management Area (GSCHMA). The lack of access in this area is a challenge for the industry and has negatively impacted catch rates. The advisors would like to see the Councils continue to work on this issue. Industry members are frustrated with their lack of ability to work through the Exempted Fishing Permit program. The time components of the access areas (seasonal restrictions for cod) should be revisited. The SCOQ AP recognizes that the Councils have taken initial steps in this discussion, but this continues to be an issue and the industry does not feel it is being addressed. The AP requests that the MAFMC make this issue a priority under their responsibilities to the SCOQ Fishery Management Plan. The AP also recommends that the MAFMC follow up with NEFMC to conduct a cross Council workshop to, 1) review the management process in the GSCHMA, 2) better understand what research is being conducted in the area, 3) describe the process for ongoing management of these areas (as things change related to climate), and 4) develop a common understanding what this means for the process of managing these clam access areas in the GSCHMA. It is unclear what is essential in these areas and what data might be needed to address modifications to these clam access/HMA areas going forward. One of the areas that is presently allowed to be fished by clam vessels in the GSCHMA is called the Fishing Rip. This area, although open to fishing, is not a viable location due to the how hard the bottom structure is with boulders; it destroys gear. This highlights the critical nature of collecting and analyzing accurate data to identify effective areas for clam vessels to harvest surfclam.

In terms of MSA reauthorization, stronger requirements to review the EFH designations and any associated management measures (e.g., gear restricted areas, habitat closures) should be included in the statute to ensure these provisions are more responsive to the climate-related changes to the quality of the fish habitat, as well as changing conditions in the clam fisheries and other fisheries the Council manages.

Research should support a structure of ongoing Essential Fish Habitat (EFH)/HMA review that is responsive to new data collection, regardless of the source, and climate-driven species distributional changes. The development of a question driven process to periodically review EFH/HMA status is needed and is not presently in place.

Access to Fishing Grounds: The development of wind energy and aquaculture areas, protected marine areas and historic monuments, and other offshore ocean uses have become an even more critical issue for our industry. All these activities have the potential to reduce safe access to historically used fishing ground resulting in a greater concentration of fishing effort in smaller areas. There is a tremendous amount of overlap between the wind leases areas, wind call areas, and the current and potential future surfclam fishing grounds. This also has the potential to impact fishery independent survey operations.

Other Important Issues

The SCOQ AP would like to request that surfclam and ocean quahog AP members have two seats on Fishery Management Act Teams (FMATs) for issues related to these fisheries.

Quotas

The advisors would like to see status quo quotas and the suspension of the surfclam minimum size limit for the upcoming fishing years. Surfclam are not overfished and overfishing is not occurring (in 2019).

Market/Economic Conditions

For surfclam and ocean quahog, there used to be occasional landings in Ocean City, MD, but with fuel prices and trucking issues they are not occurring anymore. It used to be significant but is no longer. Cape May and Wildwood, NJ are no longer significant. Most of the fleet is fishing out of Pt. Pleasant and Atlantic City, NJ, Oceanview, NY, and New Bedford and Fairhaven, MA. Hyannis, MA (surfclam only) landings have been recently reduced over the last few months. Cape Charles, VA is a revived port of landings targeting surclams off the Virginia coast. Trucking costs and the distance needed to travel to harvest clams has put greater economy on scale and location.

Increasing foreign imports and foreign competition puts a constraint on price, and the price cannot be increased to absorb all the additional costs and still be competitive in the marketplace. Clearwater (clam company in Canada) has been sold to a new syndicate, so it has gone from a public to private entity – they are selling their product in the U.S. and it is competing with domestic product. This is exerting additional pressure on the marketplace. The limits to demand for clams in the market is driven by many market factors including foreign seafood competition, other products in the marketplace (e.g. chicken, etc.), shifting toward healthier market products (e.g. clam sushi, etc. versus a fried or cream-based product), and competition with other ingredients, as clams typically are not a center of the plate product. There are also some complicating factors related to U.S. relationships with China and the EU/Europe in terms of marketing and sales, including trade tariffs. Massachusetts and Washington State clam landings can export now to certain European markets if on the FDA register – as other states are added, federal clams landed in those states could also export to Europe. Exports for surfclam will be limited because there are not enough surfclam to meet domestic demand.

COVID-19 dominated issues related to the market and economic conditions. It is unclear how and when this will change the markets going forward. Processors looked into ways to adjust to current market conditions with ready-to-eat product lines as the fresh retail and restaurant sales declined; although processors are expecting increases in going forward.

Because of COVID, LaMonica Fine Foods created an online retail store to sell directly to consumers.

In 2021 and the start of 2022 the Bumble Bee Seafoods clam processing factory in Cape May experienced continued demand resulting from the COVID pandemic. Volume increased due to Shelter In Place orders, and new consumers purchased canned clams to try recipes at home. However, many retailer shelves are now empty and customer orders are being cut due to an overall shortage of raw material (ocean quahogs) for the plant to process due to several factors, including weather, unavailability of vessels to harvest the clams and crew shortages. Clam supply is improving slowly but at much higher cost driven by rising fuel prices. The supply shortages have also made it difficult to retain talented employees critical to the supply. Steeply rising cost coupled with supply shortages will continue to make 2022 a very challenging year.

Environmental Conditions

Many species (including surfclam and ocean quahog) are moving northward and into deeper waters. This movement is temperature driven. Historically, about half the quota for quahog used to be taken in the Southern area. Surfclam are increasing in these Southern areas, possibly because of the faster growth rates for surfclam settling when compared to quahog. The natural shift in the stock distribution northwards has driven the movement of the fishery. For more details, see the Surfclam Fishery Information Document.

General Fishing Trends

The landings per unit effort (LPUE) is not indicative of stock abundance because it only reflects the fishing occurring in a few ten-minute squares (see Fishery Information Documents). The LPUE has leveled off in recent years. The LPUE continues to be higher on Georges Bank and there are 4 permitted vessels in the open portion of the Georges Banks closed area. Vessels fishing in Nantucket Shoals (which tend to be smaller vessels) are operating on seasonal closures - and must fish in other areas when access is not available.

Fleet Capacity

Fleet capacity continues to stay static. The overall quotas are not being harvested. The driving factors are not from the marketplace. The issues are related to an inability to catch the quota to meet demand. While some processors indicated they are unable to demand the prices at which the products are sold because of contractual agreements, because the vendors essentially dictate the prices to the processors, other have indicated that in the current high demand environments that consumers/purchasers are willing to pay more for the product and are negotiable. Fishing restrictions and regulations have limited the amount of capitalization that can be done in this fishery. The fleet continues to age, and there have been limited new builds, which has resulted in increased maintenance time spent to refurbish vessels.

Optimum Yield (OY)

The industry was comfortable with a maximum OY (maximum quota) of 3.4 million bushels for surfclam in terms of production. For ocean quahog a maximum OY of 6 million bushels is reasonable in terms of production. Considerations for optimum yield should be a priority. The industry/management should try to achieve those levels of production; regulations/closures such as Nantucket Shoals for surfclam and Georges Bank for quahogs have impacted the ability to

achieve OY to meet demand. Regulations for shellfish (model ordinance) on Georges Bank have hampered the ability to access some of these areas unnecessarily; NMFS has not acted and removed some of these closures and worked with the FDA on this issue in a timely manner.

Wind Development

The clam advisors are concerned about the BOEM (Bureau of Ocean Energy Management) wind farm leasing process and potential impacts to historically important fishing areas. The industry's opportunities to engage with developers on wind array siting relative to the most productive clam fishing beds has not been productive.

This resistance in cooperation lends to the notion that the clam fishery and the ocean wind developers cannot coexist as the developers have made no attempt to give the clam industry any consideration in their layout of their arrays and the spacing between the turbines which will make it unsafe for clam vessels to work within wind farms. Siting is critical in terms of ensuring reasonable fishing access. It has been the experience of the clam industry that any communications by BOEM, wind energy developers, or state regulators is purely perfunctory and true mitigation efforts will not be made.

In the New England and Mid-Atlantic region, offshore wind development is out of control. The industry feels that no matter how hard they try to engage with developers on these issues, their input is not being considered or incorporated into the siting and development process. The spatial and operation requirements of the fishery (considering things like weather, tides, safety, etc.) need to be accounted for to ensure access to the wind arrays, but at present that is not happening. These arrays become de-facto Marine Protected Areas and the Councils and industry have nothing to say about how the fishing grounds are managed within the arrays. **Unlike finfish, clams do not move, so once the vessels cannot fish in an area those resources are lost to the fishery and the value it brings to the economy. These areas are also likely to be lost to survey data further impacting the biomass estimates of the fishery**.

The Council needs to consider the biological impacts on the fishery itself, and other cumulative environmental effects that may occur. These should include things like productivity of the resource, larval displacement, scour and sediment suspension, hydrographic changes, and effects of sounds and other pressures on the zooplankton community (which includes food for clams). In addition, in water structures from offshore wind or other types of closures (e.g., GSCHMA) will result in vessels having to travel further and having a larger carbon footprint.

Science and Research Initiatives

Industry continues to do research with the Science Center for Marine Fisheries (SCeMFiS), an industry, university, and National Science Foundation (NSF) supported research center and that has several completed, ongoing and recently funded research projects: http://scemfis.org

There are ongoing projects led by Rutgers University to identify economic impacts and develop economic models associated with wind energy development on the surfclam industry.

There is an ongoing RODA Knowledge Trust project (funded by NYSERDA) for surfclam and ocean quahog (as well as some other fisheries) designed to identify economic exposures of lost access for harvesters, processer and shoreside facilities of as a result of future build out of wind energy lease sites.

Research Priorities

The AP feels that MAFMC and NEFSC needs to consider how the fisheries independent surveys will take place within wind energy arrays once constructed.

Atlantic Surfclam Fishery Information Document

April 2022

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 2021. 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 was not overfished and overfishing was not occurring in 2019.
- The total ex-vessel value of the 2021 federal harvest was approximately $24 million, higher than the $23 million in 2020.
- In 2021, there were 8 companies reporting purchases of surfclam and/or ocean quahog in 5 states outside of Maine.
- Overall, surfclam landings per unit effort has declined over time 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).[1] 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 (≤ 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).[2,3] This management track assessment indicated the stock was not overfished and overfishing was 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/.

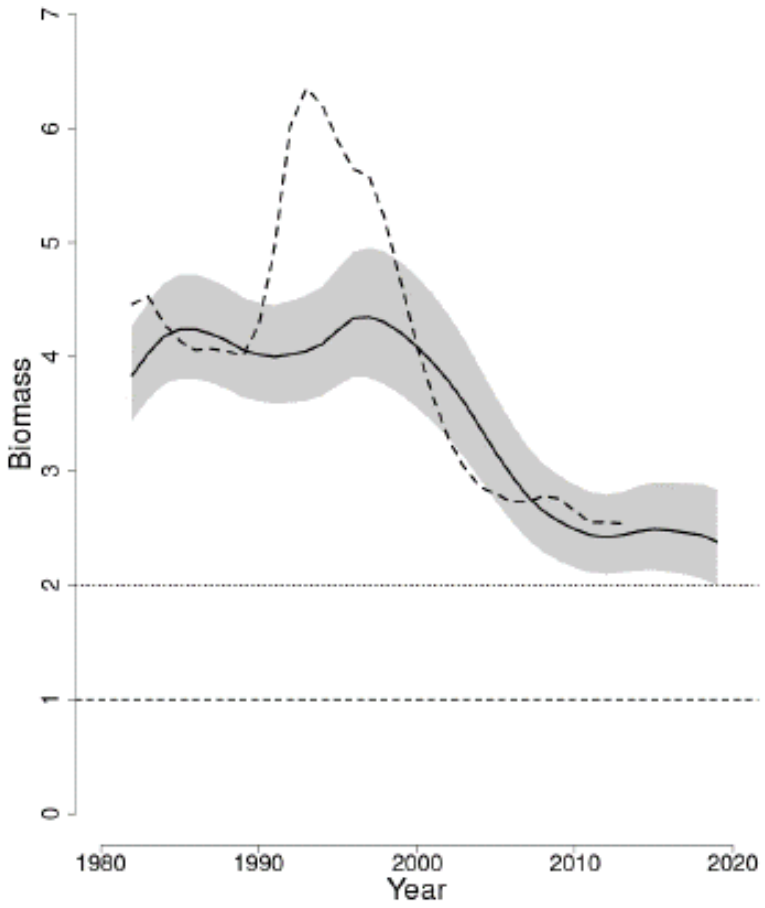


Figure 1. Trends in spawning stock biomass of Atlantic surfclam between 1982 and 2019 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{Threshold}$ (½ $_{SSBMSY\ proxy}$; horizontal dashed line) as well as SSB_{Target} ($SSB_{MSY\ proxy}$; horizontal dotted 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.[3]

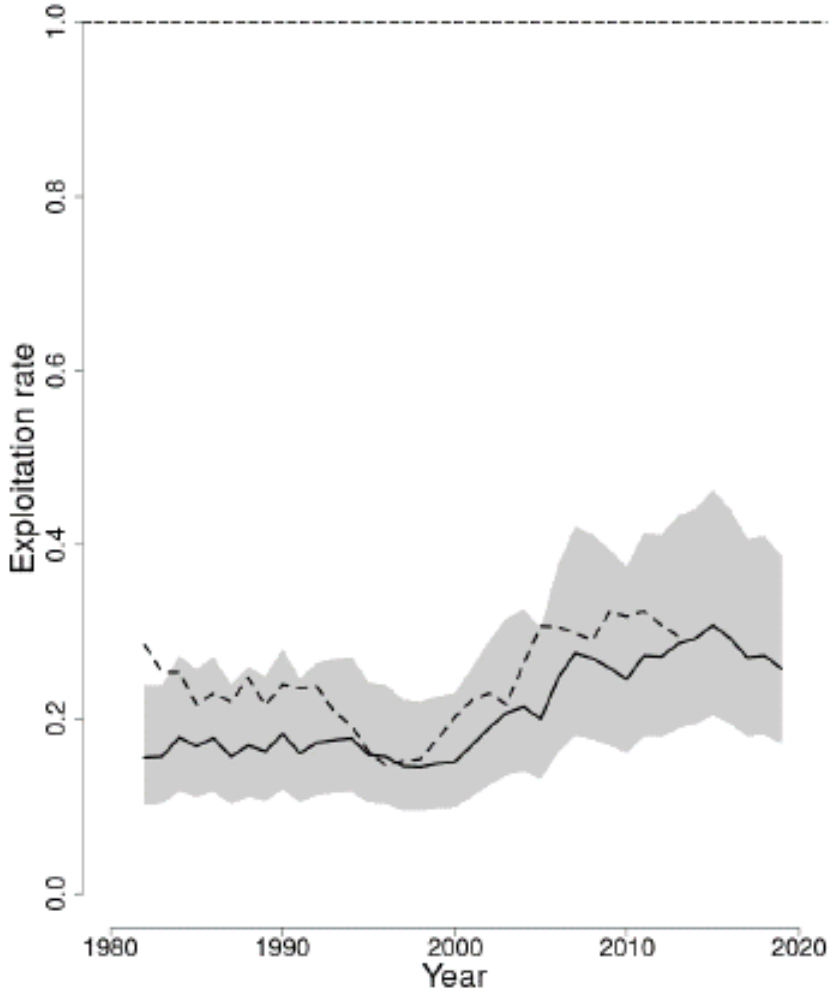


Figure 2. Trends in the fully selected fishing mortality (F_{Full}) of Atlantic surf-clam between 1982 and 2019 from the current (solid line) and previous (dashed line) assessment and the corresponding $F_{Threshold}$ ($F_{MSY\ proxy}$=0.141; horizontal dashed line), based on the 2020 assessment. Units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

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: 1999-2022. Landings for state waters are approximated as total landings - EEZ landings and may not accurately reflect state landings. SSC determined OFLs and ABCs included.

Year	OFL (mt)	ABC/ ACL (mt)	Total Landings (mt meats; w/state waters)	EEZ Landings (mt meats)	EEZ Landings[a] ('000 bu)	EEZ Quota ('000 bu)	% Harvested
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[b]	29,363[b]	17,114	16,269	2,110	3,400	62%
2019	74,281[c]	56,419[c]	16,502	14,986	1,943	3,400	57%
2020	74,110[c]	56,289[c]	12,897	12,034	1,560	3,400	46%
2021	51,361	47,919	808[e]	12,351[d]	1,602[d]	3,400	47%
2022	48,202	44,522	NA	NA	NA	3,400	NA

[a] 1 surfclam bushel is approximately 17 lb. [b] Revised previous 2018 values due to new stock assessment. [c] Revised previous 2019-2020 values due to new analyses. [d] Preliminary, incomplete 2021 data. Source: NMFS clam vessel logbook reports.[3] [e] Due to incomplete/unavailable CAMS data in 2021, the Total for 2021 is not accurate.

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, ...). Data for 2021 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.[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 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 2021.[4] Note: Due to incomplete/unavailable CAMS data in 2021, the Total for 2021 is not accurate.

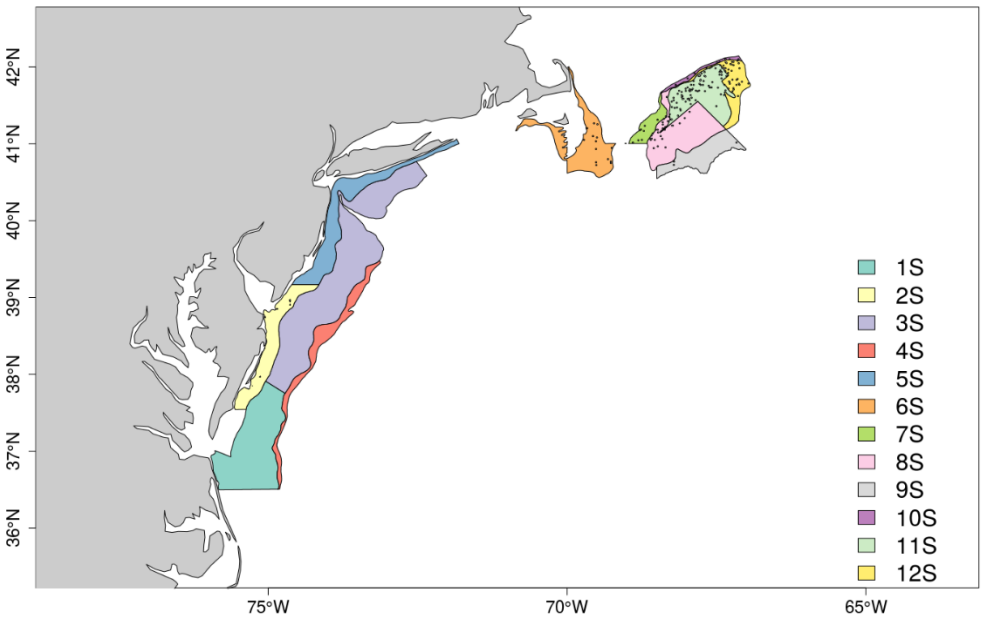


Figure 4. Surfclam stock assessment regions and NEFSC shellfish survey strata. The shaded strata are where surfclam are found.

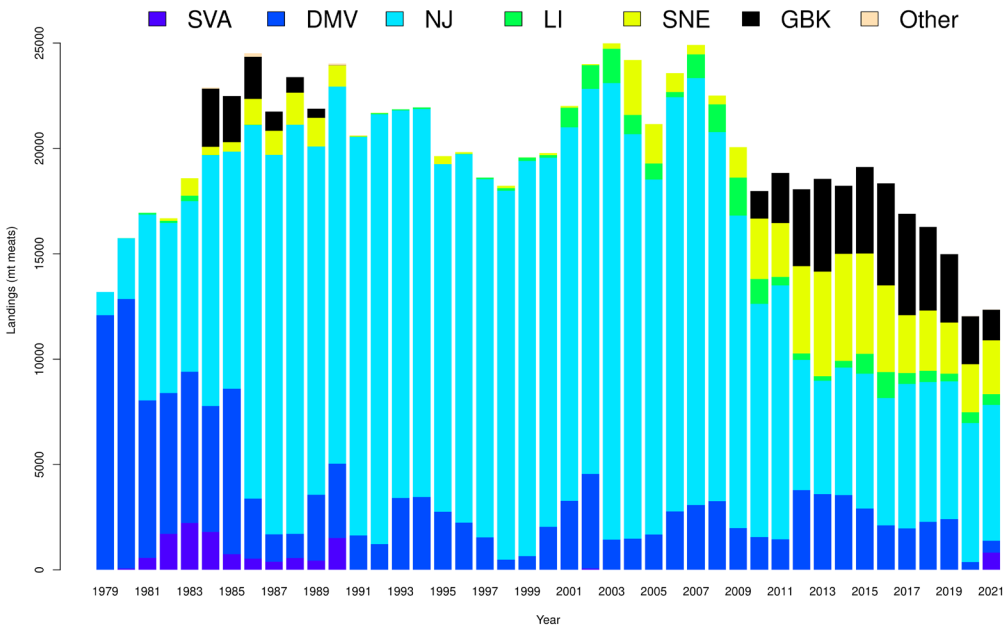


Figure 5. Surfclam landings from the US EEZ during 1979-2020, and preliminary 2021.[4]

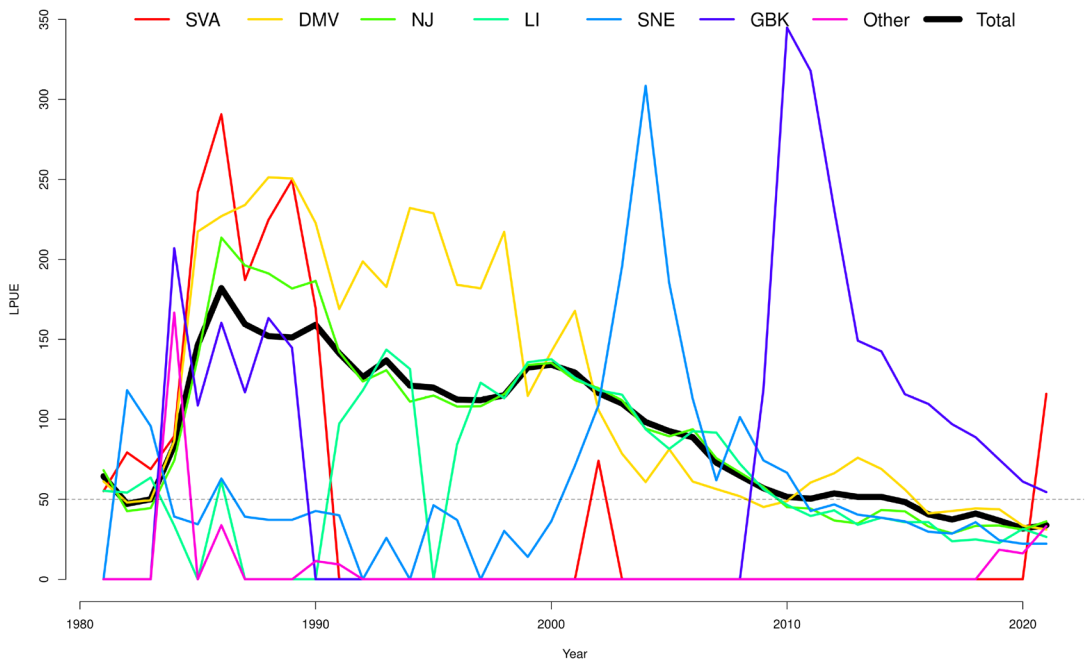


Figure 6. Nominal landings per unit effort (LPUE in bushels landed per hour fished) for surfclam, by region, during 1981-2020, and preliminary 2021. LPUE is total landings in bushels divided by total fishing effort.[4]

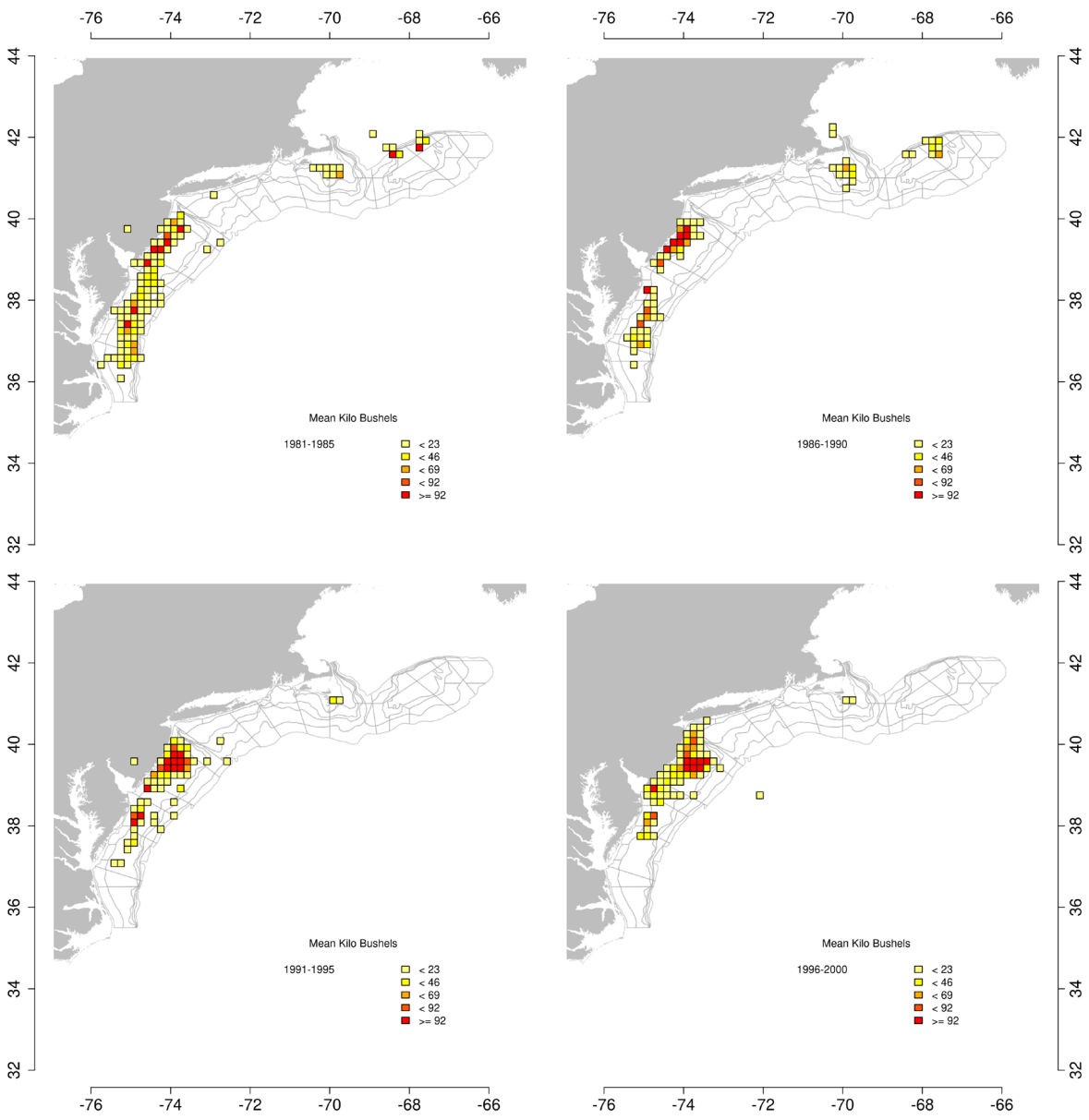


Figure 7. Average surfclam landings by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown.[3]

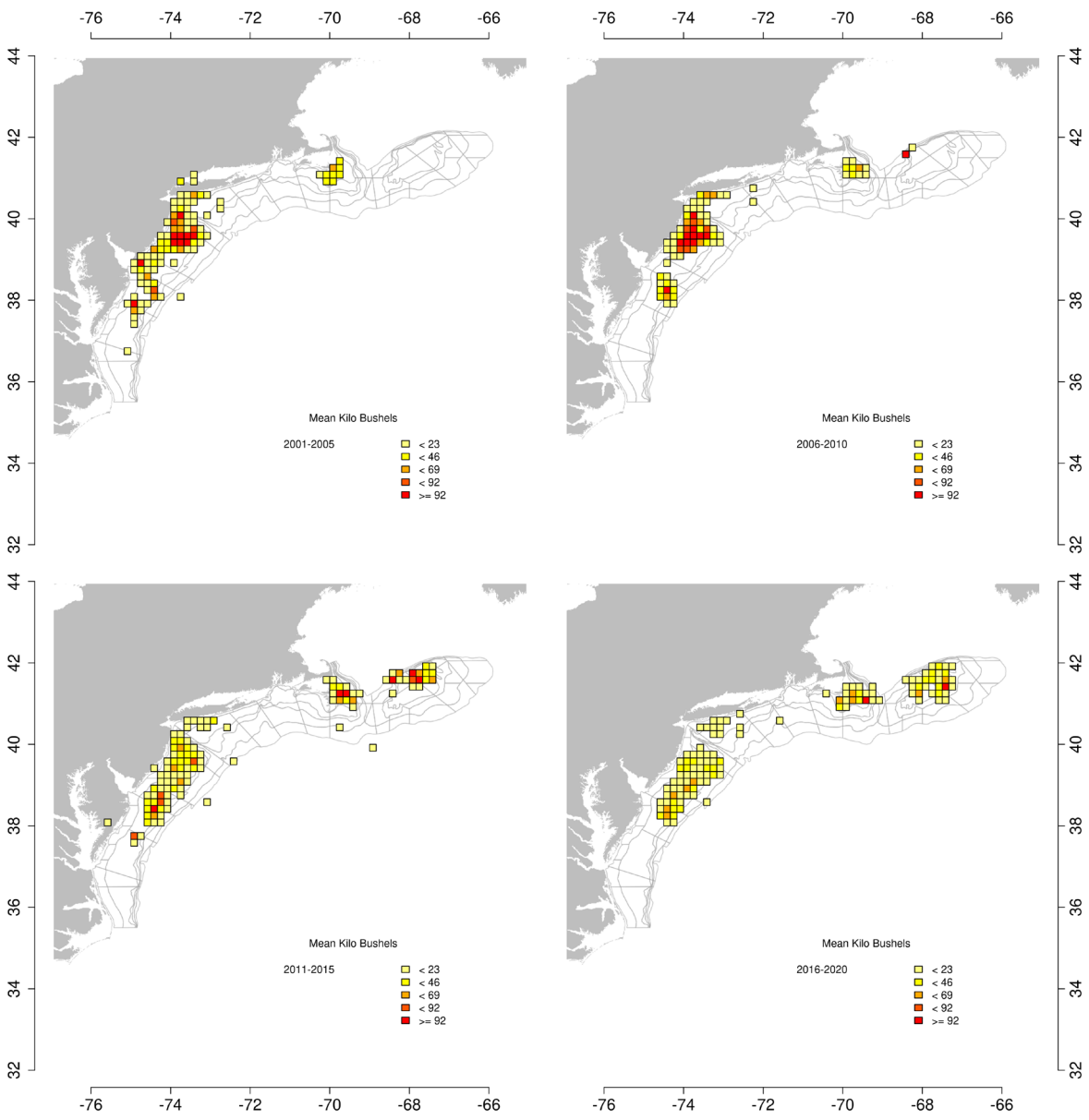
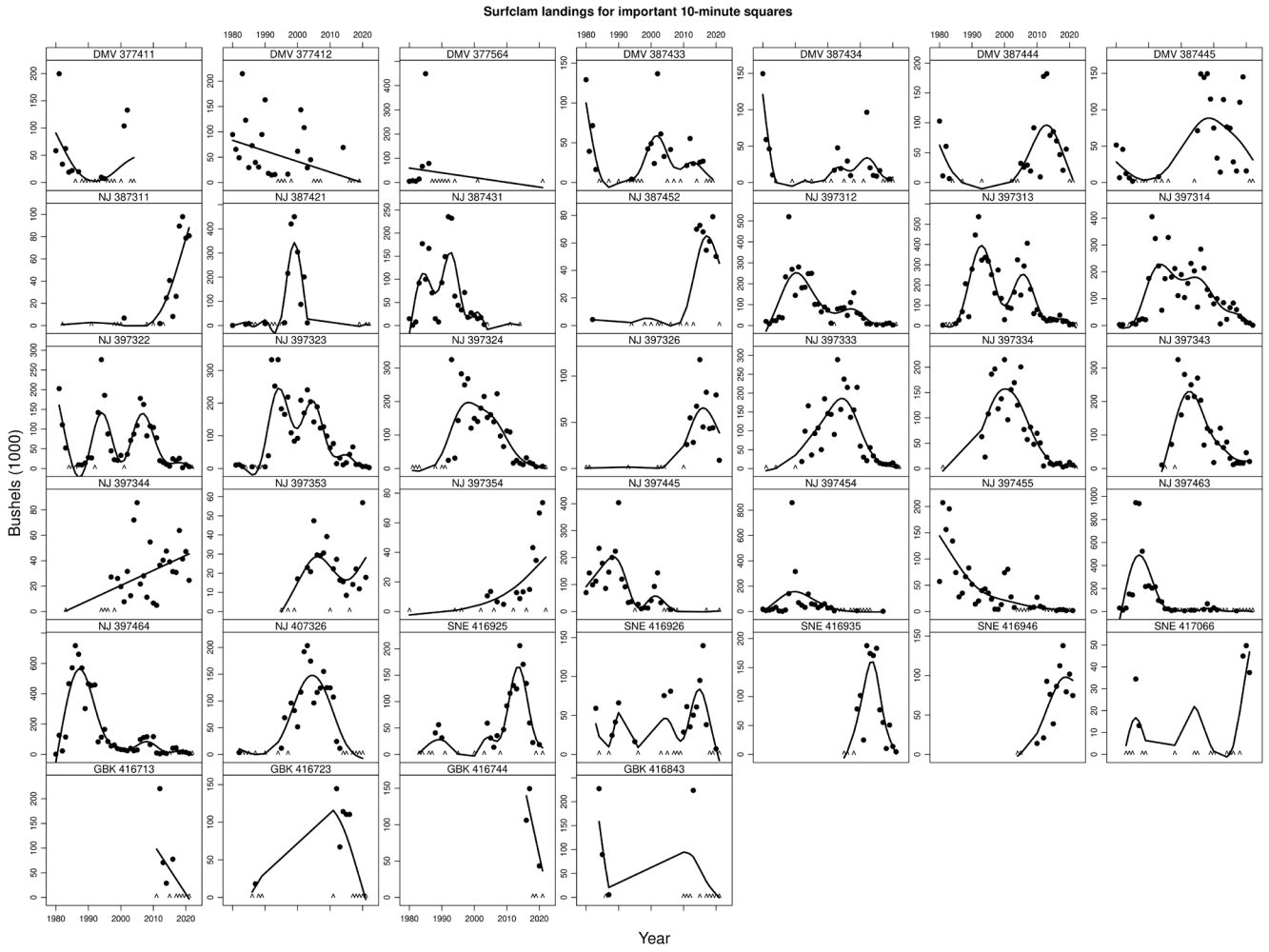


Figure 8. Average surfclam landings by ten-minute squares over time, 2001-2020. Only squares where more the 5 kilo bushels were caught are shown.[4]



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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 $14.90 in 2021, slightly higher than the $14.48 per bushel seen in 2020. The total ex-vessel value of the 2021 federal harvest was approximately $24 million, which is higher than $23 million in 2020. 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 2021, there were 8 companies reporting purchases of surfclam and/or ocean quahog in 5 states outside of Maine. Employment data for these specific firms are not available.

In 2021, these companies bought approximately $24 million worth of surfclam and $18 million worth of ocean quahog.

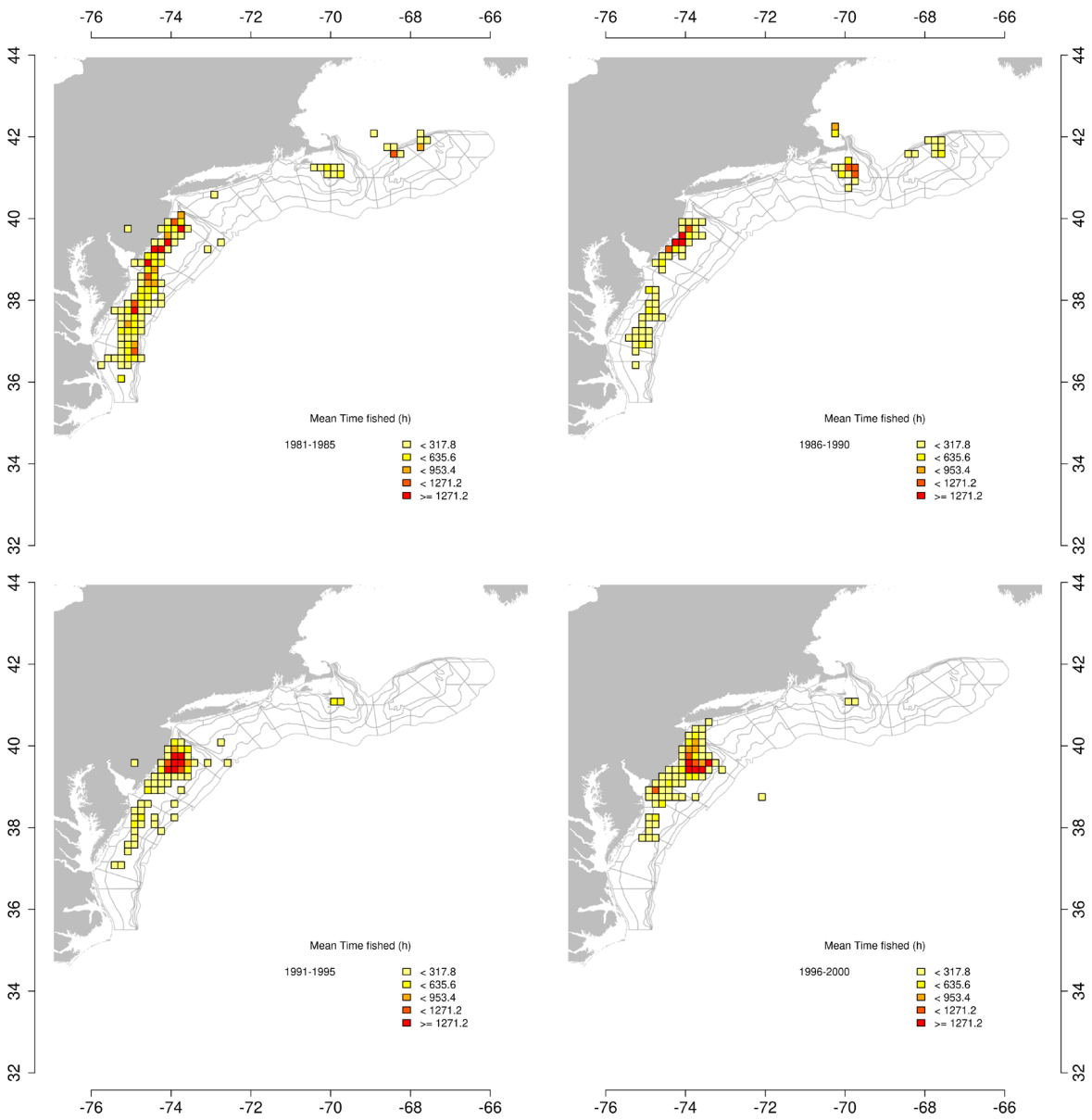
Area Closures

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 parayltic 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, although those LPUEs have recently declined.

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.



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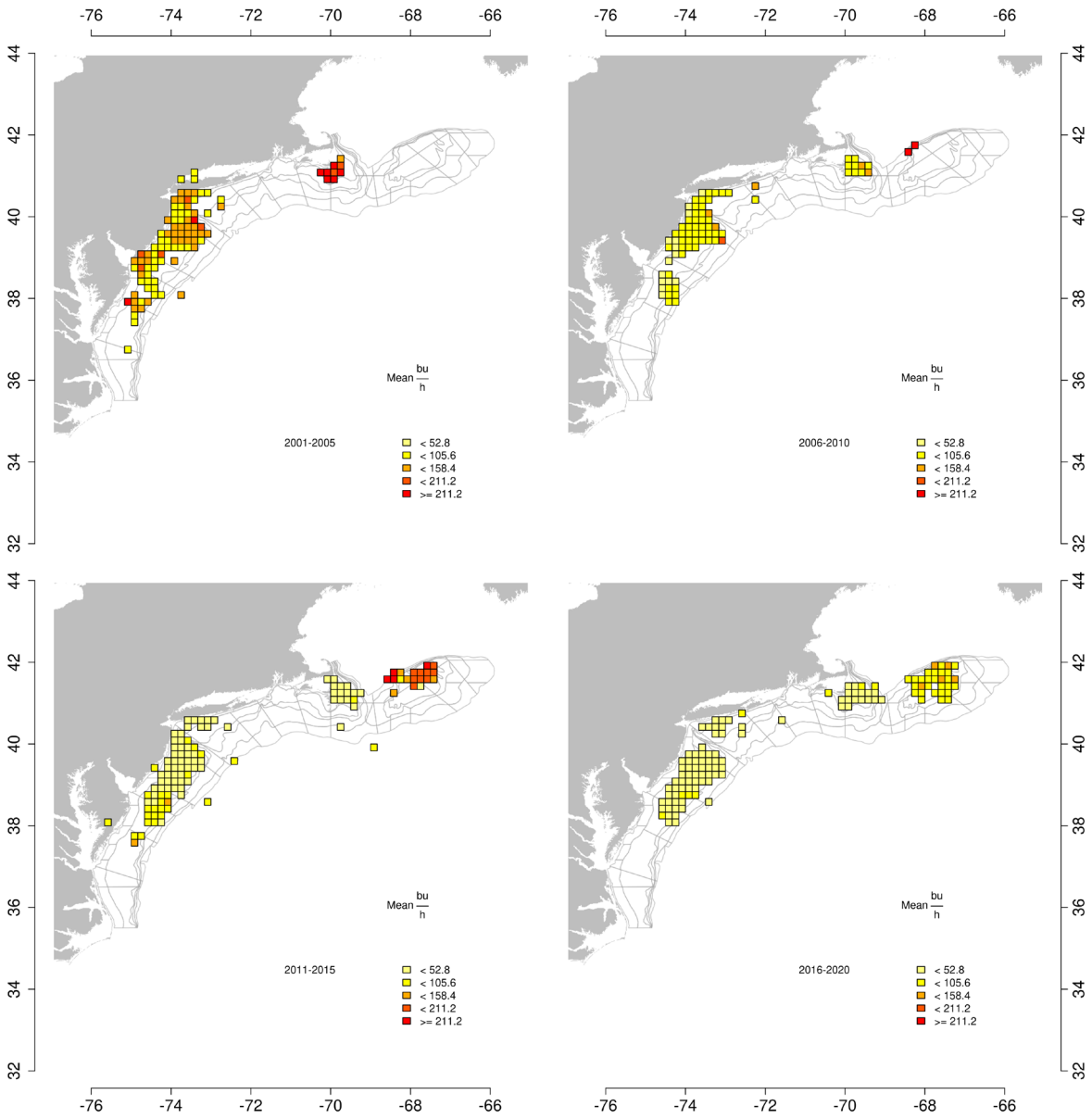


Figure 12. Average surfclam landings per unit effort (LPUE; bu. h-1) by ten-minute squares over time, 2001-2020. Only squares where more the 5 kilo bushels were caught are shown.[4]

Table 2. Federal fleet profile, 2012 through 2021.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Harvesting BOTH surfclam & ocean quahog	13	7	7	6	8	14	8	7	8	10
Harvesting only surfclam	29	33	31	31	30	26	31	36	35	31
Total Vessels	42	40	38	37	38	40	39	43	43	41

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 30, 2022. NOAA Fisheries, Northeast Fisheries Science Center, 166 Water St., Woods Hole, MA 02543.

Ocean Quahog Fishery Information Document

April 2021

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 2021. 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. The stock was not overfished and overfishing was not occurring in 2019.
- The total ex-vessel value of the 2021 federal harvest was approximately $18 million, higher than the $16 million in 2020.
- In 2020, there were 8 companies reporting purchases of surfclam and/or ocean quahog in 5 states outside of Maine.
- The fishery appears to continue to shift its effort Northward, and has shown increased effort in the Southern New England and 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: 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.

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, quahog occur from Newfoundland to Cape Hatteras from depths of about 8 to 400 meters (26 to 1,312 ft). Ocean quahog further north occur closer to shore. The US stock resource is almost entirely within the Exclusive Economic Zone (EEZ; 3-200 miles from shore), outside of state waters, and at depths between 20 and 80 meters (66 and 262 ft). However, in the northern range, ocean quahog 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 quahog burrow in a variety of substrates and are often associated with fine sand.

Ocean quahog 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 quahog 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 quahog 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 quahog are relatively unproductive and able to support only low levels of fishing. The current resource consists of individuals that accumulated over many decades.

Ocean quahog are suspension feeders on phytoplankton and use siphons which are extended above the surface of the substrate to pump in water. Predators of ocean quahog 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 most current assessment of the ocean quahog (*Arctica islandica*) stock is a management track assessment of the existing 2017 benchmark Stock Synthesis (SS) assessment (SAW 63; NEFSC 2017).[2,3] Based on the previous assessment the stock was not overfished, and overfishing was not occurring. The management track assessment updates commercial fishery catch data, and commercial length composition data, as well as the analytical SS assessment model and reference points through 2019. No new survey data have been collected since the last assessment. Stock projections have been updated through 2026.

Based on this updated assessment, the ocean quahog 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 3,651 (’000 mt) which is 172.8% of the biomass target ($SSB_{MSY\ proxy}$ = 2,113; Figure 1). The 2019 fully selected fishing mortality was estimated to be 0.005 which is 25.5% of the overfishing threshold proxy ($F_{MSY\ proxy}$ = 0.019; Figure 2).

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 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.

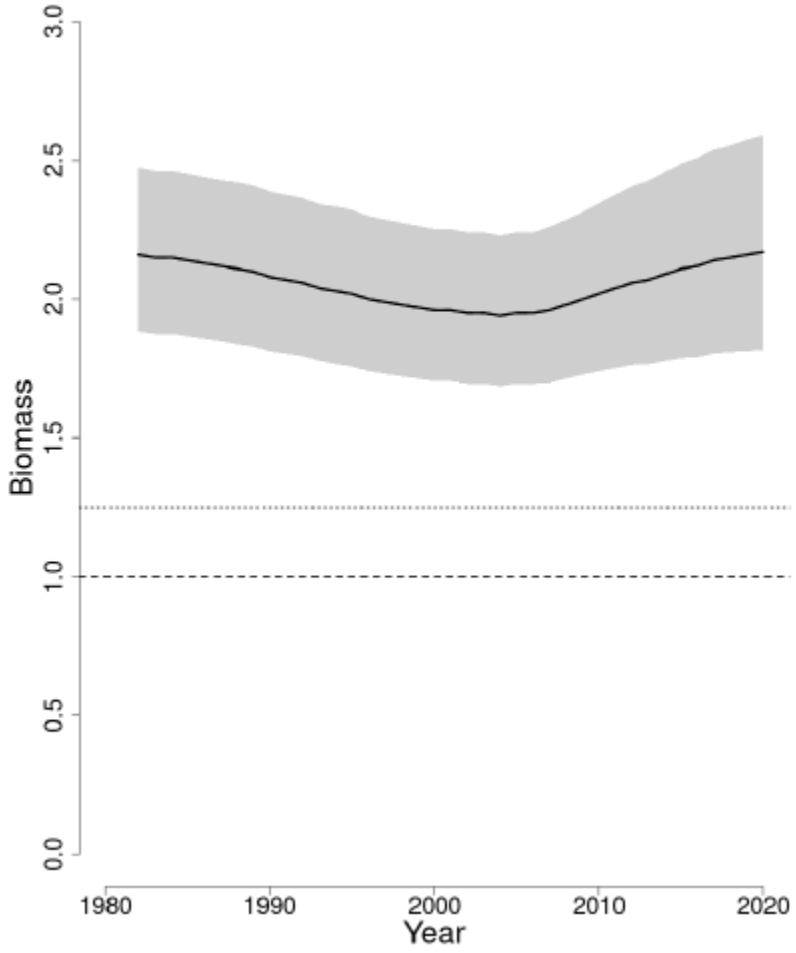


Figure 1. Trends in spawning stock biomass of ocean quahog between 1982 and 2020 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{Threshold}$ (horizontal dashed line) as well as SSB_{Target} ($SSB_{MSY\ proxy}$; horizontal dotted line) based on the 2020 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.[3]

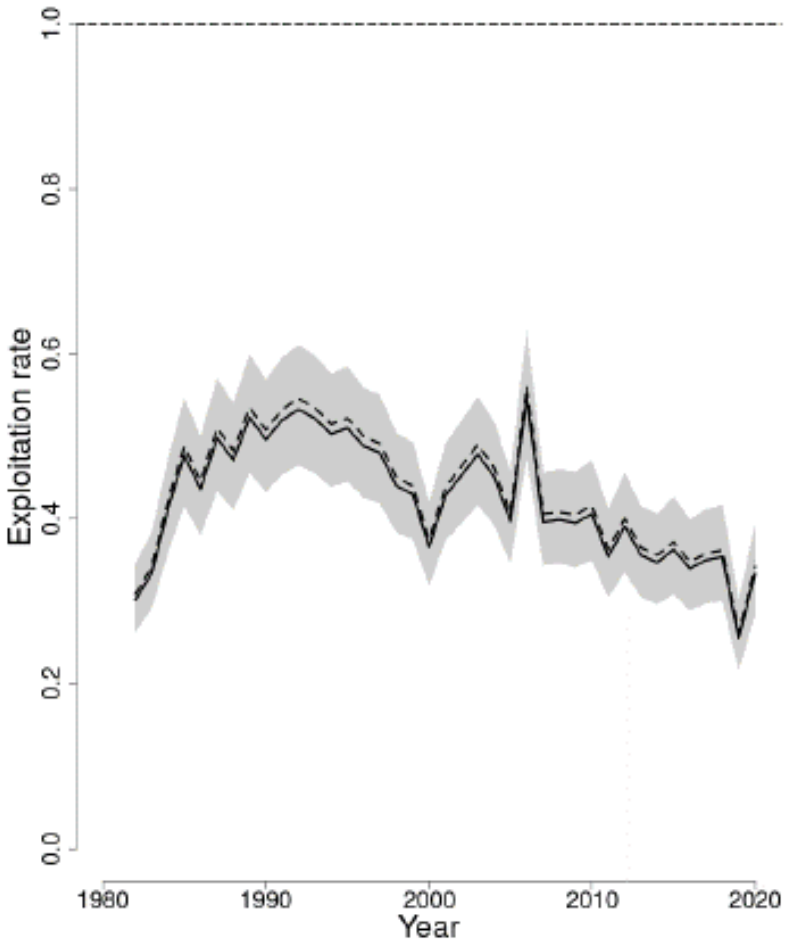


Figure 2. Trends in the fully selected fishing mortality (F_{Full}) of ocean quahog between 1982 and 2020 from the current (solid line) and previous (dashed line)assessment and the corresponding $F_{Threshold}$ ($F_{MSY\ proxy}$=0.019; horizontal dashed line), based on the 2020 assessment. Units of fishing mortality are the ratio of annual F to the F threshold ($F/F_{Threshold}$). The approximate 90% lognormal confidence intervals are shown.[3]

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 quahog for the local fresh, half shell market. Ocean quahog landings and commercial quotas are given below in Table 1 and Figure 3. 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.

The areas where ocean quahog are found is shown in Figure 4. The distribution of the fishery has changed over time (Figures 5-8). The bulk of the fishery from 1980-1990 was being prosecuted off the Delmarva but is now being prosecuted in more Northern areas. 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, ….). Data for 2021 are incomplete and preliminary, and included in the last time block. Additional information of the length composition of port sampled ocean quahog, and their associated sample sizes by area, are available in the stock assessment reports and data updates.[4]

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.

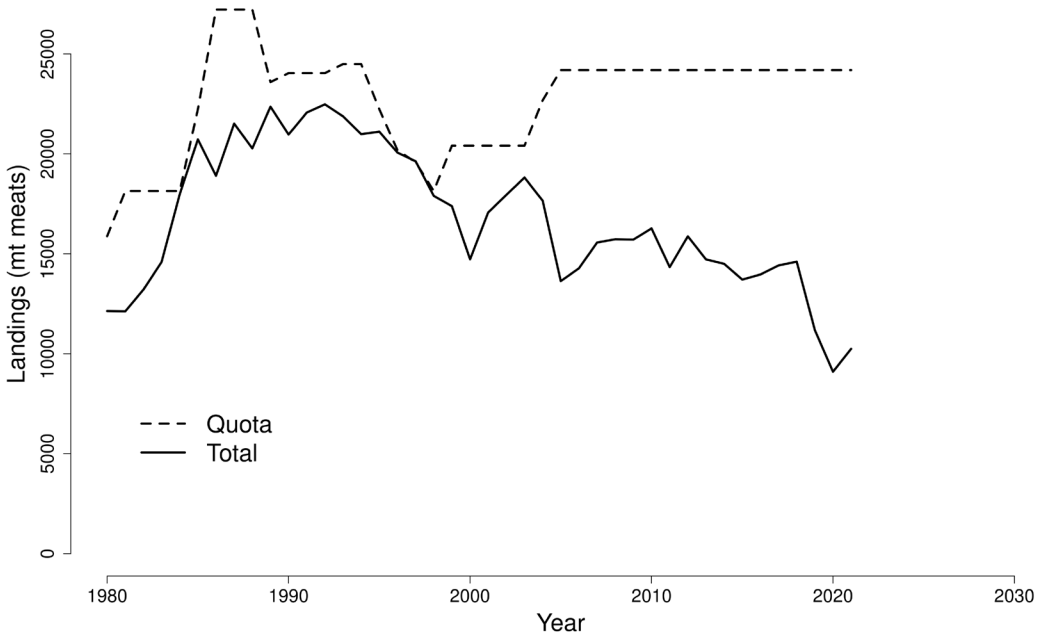


Figure 3. Ocean quahog landings (total and EEZ) during 1965-2020, and preliminary 2021.[4]

Table 1. Federal ocean quahog quotas and landings: 1999-2022. SSC determined OFLs and ABCs included.

Year	OFL (mt)	ABC/ ACL (mt)	EEZ Landings[a] (mt meats)	EEZ Landings[a,b] ('000 bu)	EEZ Quota ('000 bu; excludes 100,000 ME bu)	% Harvested
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	14,417	3,178	5,333	59%
2018	61,600	44,695	14,606	3,220	5,333	60%
2019	63,600	46,146	11,178	2,464	5,333	46%
2020	63,100	45,783	9,101	2,006	5,333	38%
2021	44,960	44,031	10,246[c]	2,259[c]	5,333	42%
2022	45,001	44,072	NA	NA	5,333	NA

[a] Column excludes Maine Landings which have varied from 48-387 mt per year from 1998-2021 (see assessment for additional details on the Maine fishery). [b] 1 ocean quahog bushel is approximately 10 lb. [c] Preliminary, incomplete 2021 data. Source: NMFS clam vessel logbook reports.

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. The small scale Maine fishery is entirely for ocean quahog, which are sold as shellstock for the half-shell market. The other fisheries are industrialized ones for surfclam and ocean quahog, which are hand shucked or steam-shucked and processed into fried, canned, and frozen products.

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

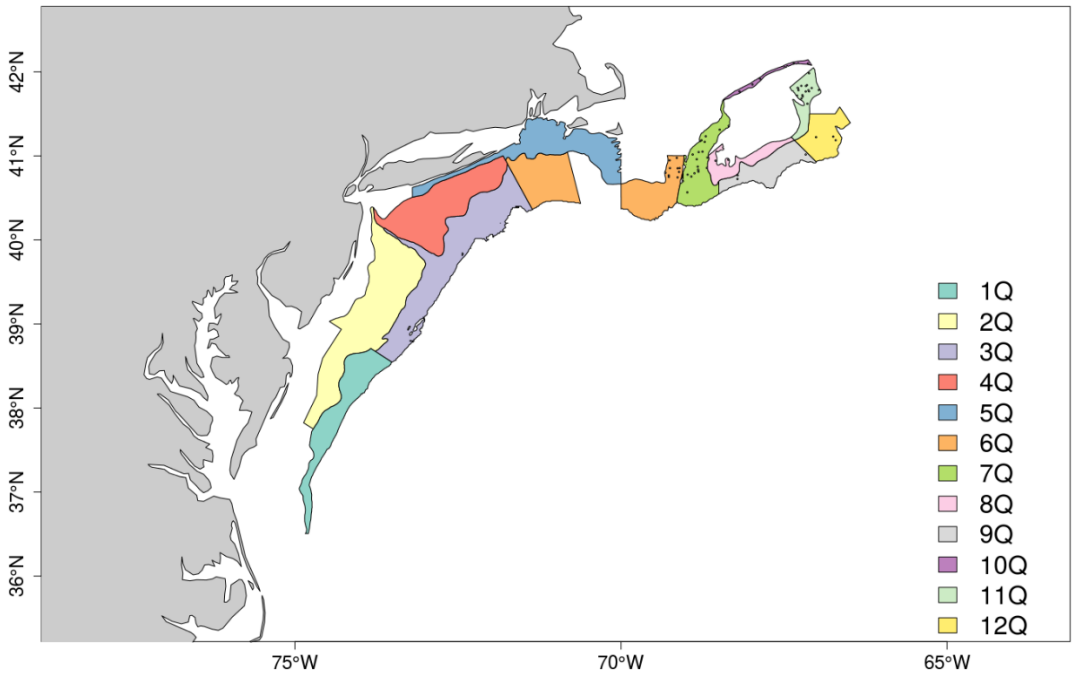


Figure 4. Ocean quahog stock assessment regions and NEFSC shellfish survey strata. The shaded strata are where quahog are found.

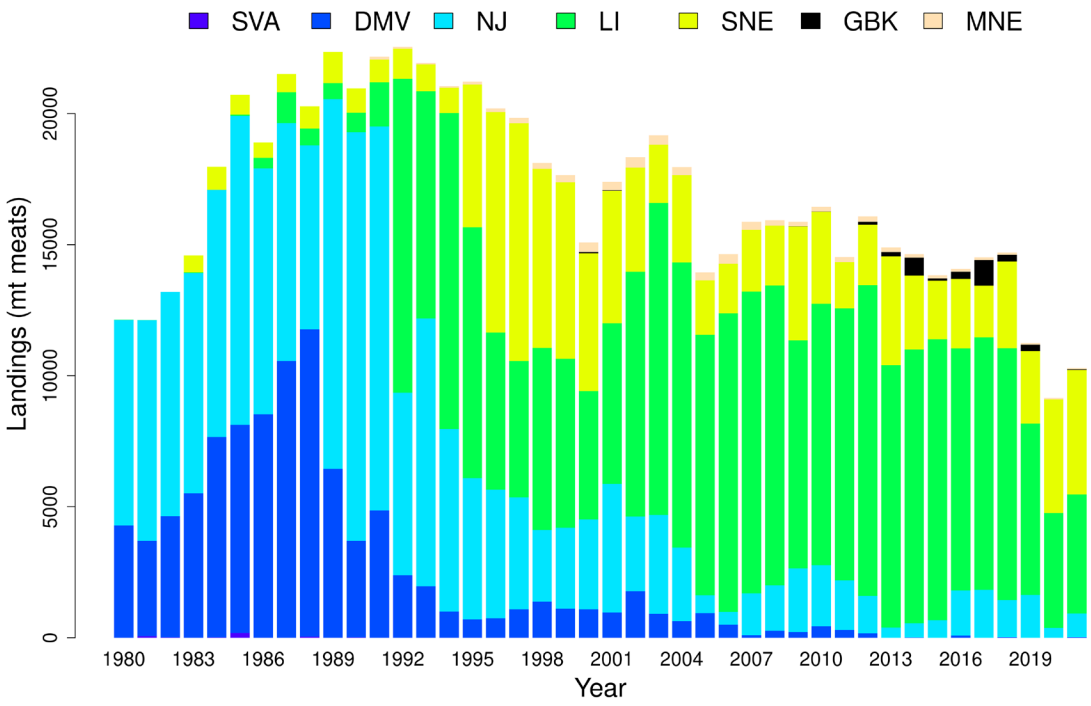


Figure 5. Ocean quahog landings from the US EEZ during 1980-2020, and preliminary 2021.[4]

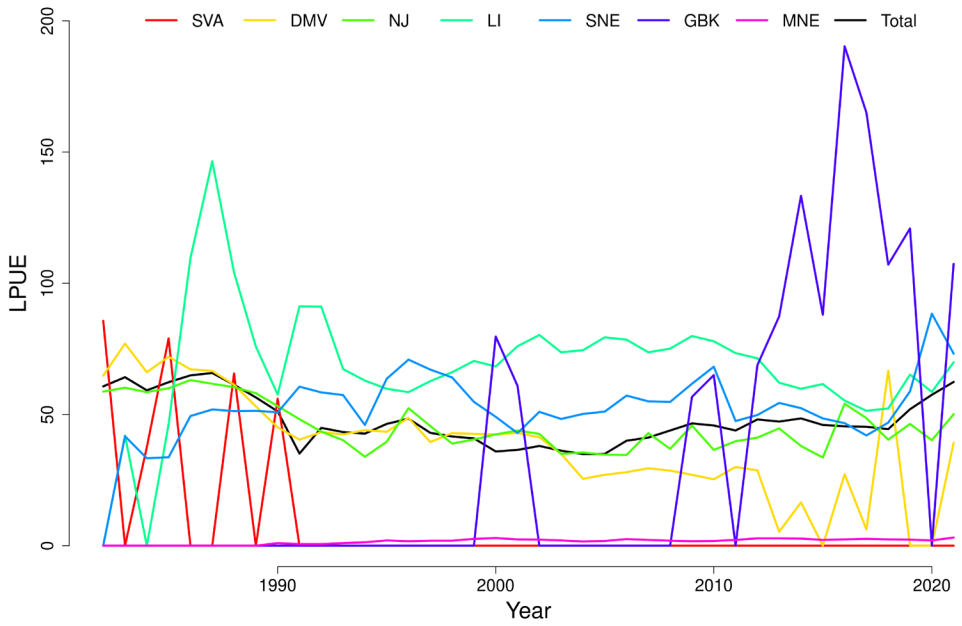


Figure 6. Nominal landings per unit effort (LPUE in bushels landed per hour fished) for ocean quahog, by region, during 1981-2020, and preliminary 2021. LPUE is total landings in bushels divided by total fishing effort.[4]

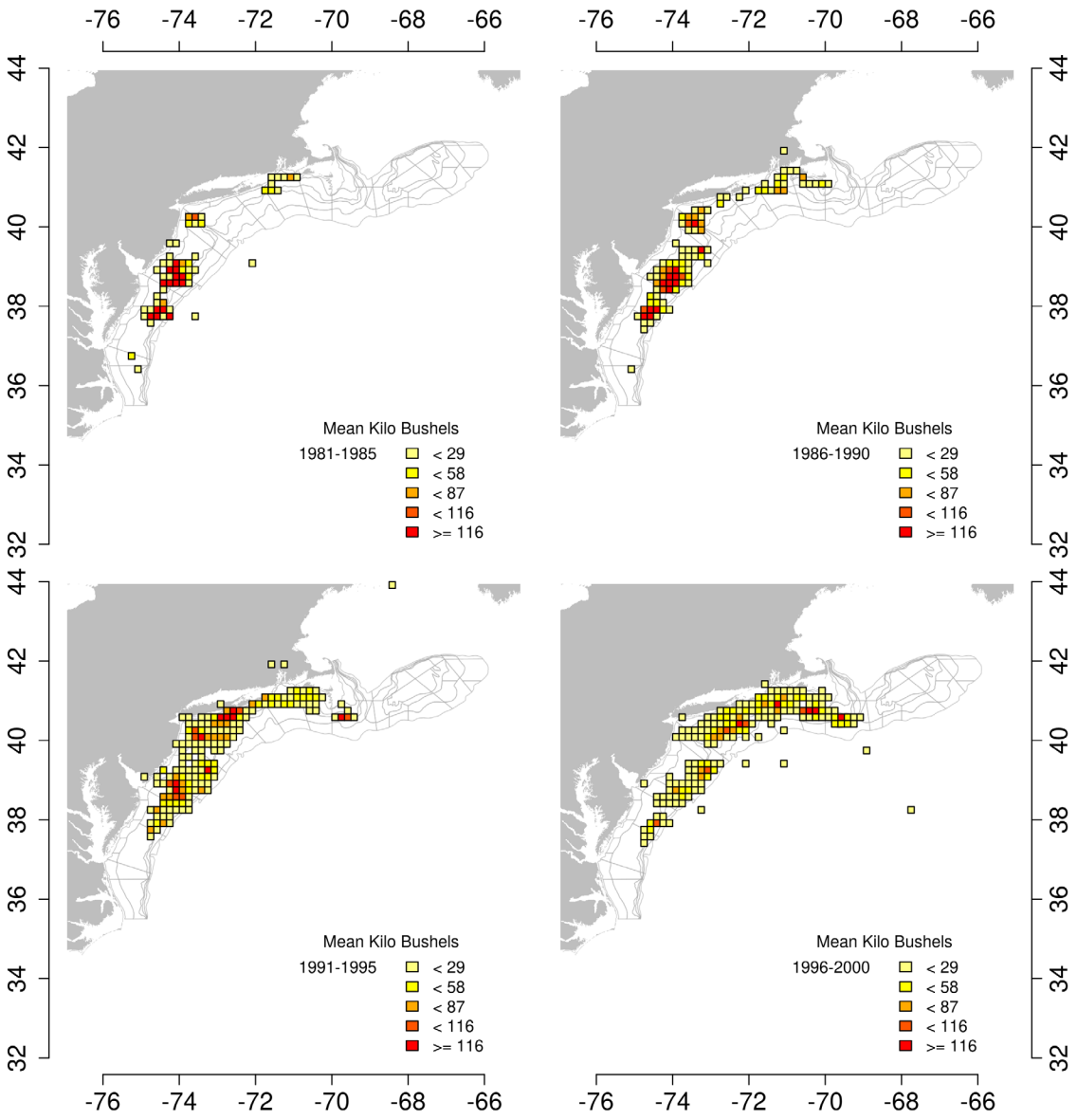
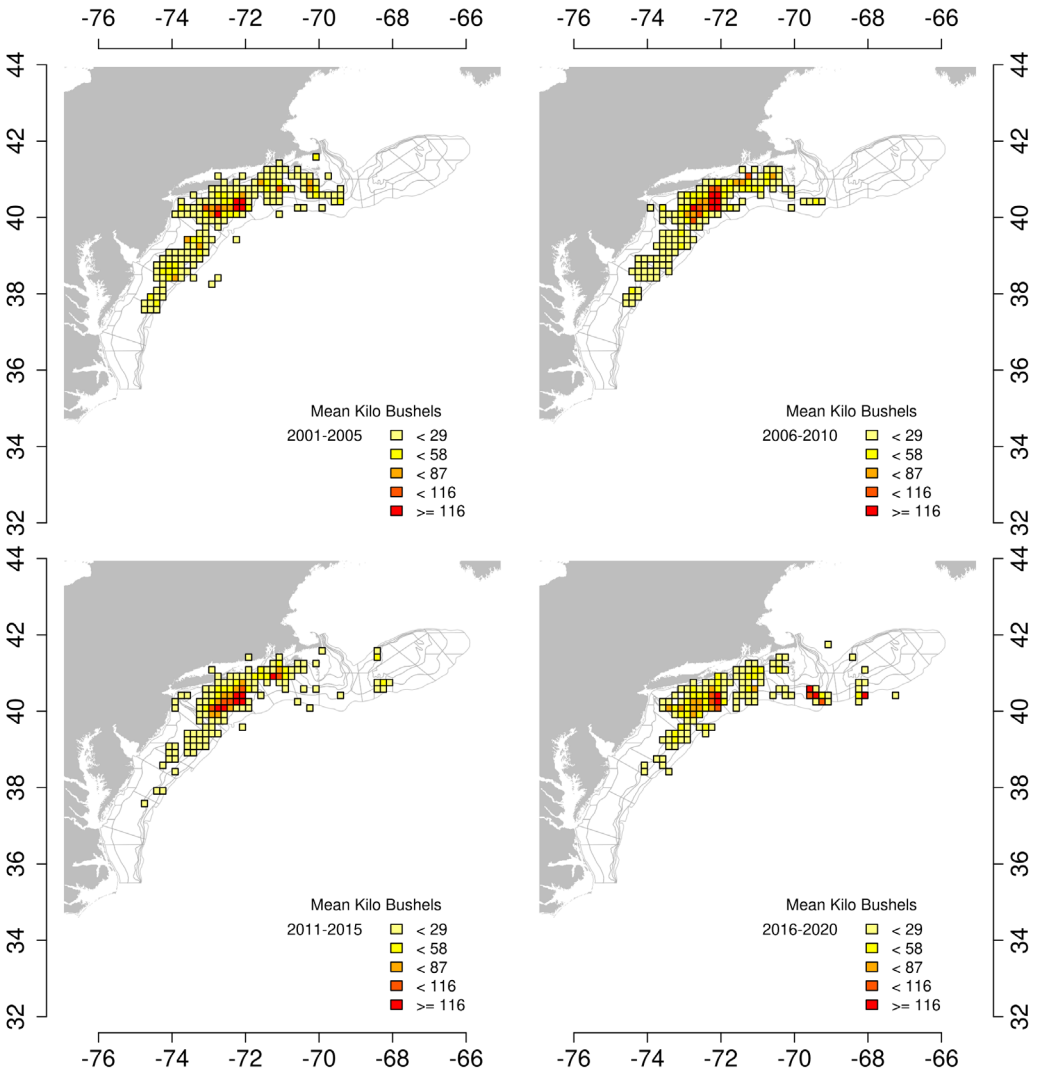


Figure 7. Average ocean quahog landings by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown.[4]



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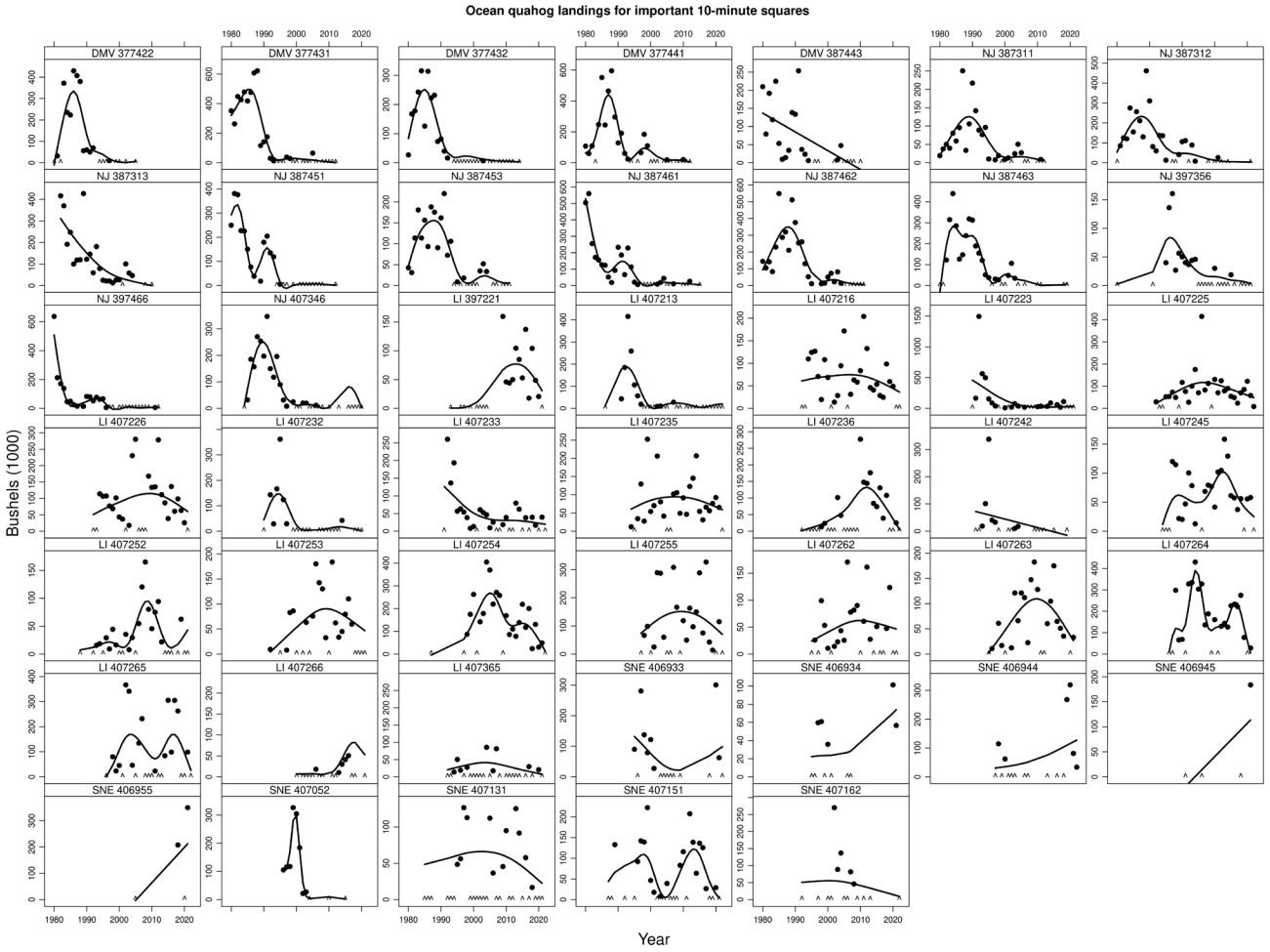

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Federal Fleet Profile

The total number of vessels targeting ocean quahog outside of Maine has remained about the same in recent years; with 19 vessels in 2012 increasing to 22 in 2017, then declining to 16 in 2019 (Table 2). 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 3 vessels in 2021 (Table 2). The average ex-vessel price of non-Maine ocean quahog reported by processors in 2021 was $7.79 per bushel, slightly lower than the 2020 price ($7.81 per bushel). In 2021, about 2.3 million bushels of non-Maine ocean quahog were landed, an increase from 2.0 million bushels in 2020. The total ex-vessel value of the 2021 federal harvest outside of Maine was approximately $18 million, higher than the $16 million in 2020. In 2021, the Maine ocean quahog fleet harvested a total of 17,387 Maine bushels, a 86% decrease from the 124,839 bushels harvested in 2006, but a slight increase from the prior year (2019; 16,621 bushels). Average prices for Maine ocean quahog had declined substantially over time but have recently show an increasing trend. 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 2021, the mean price was $39.44 per Maine bushel. The value of the 2021 harvest reported by the purchasing dealers totaled $0.69 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 surfclam and ocean quahog as some of these facilities purchase/process both species.

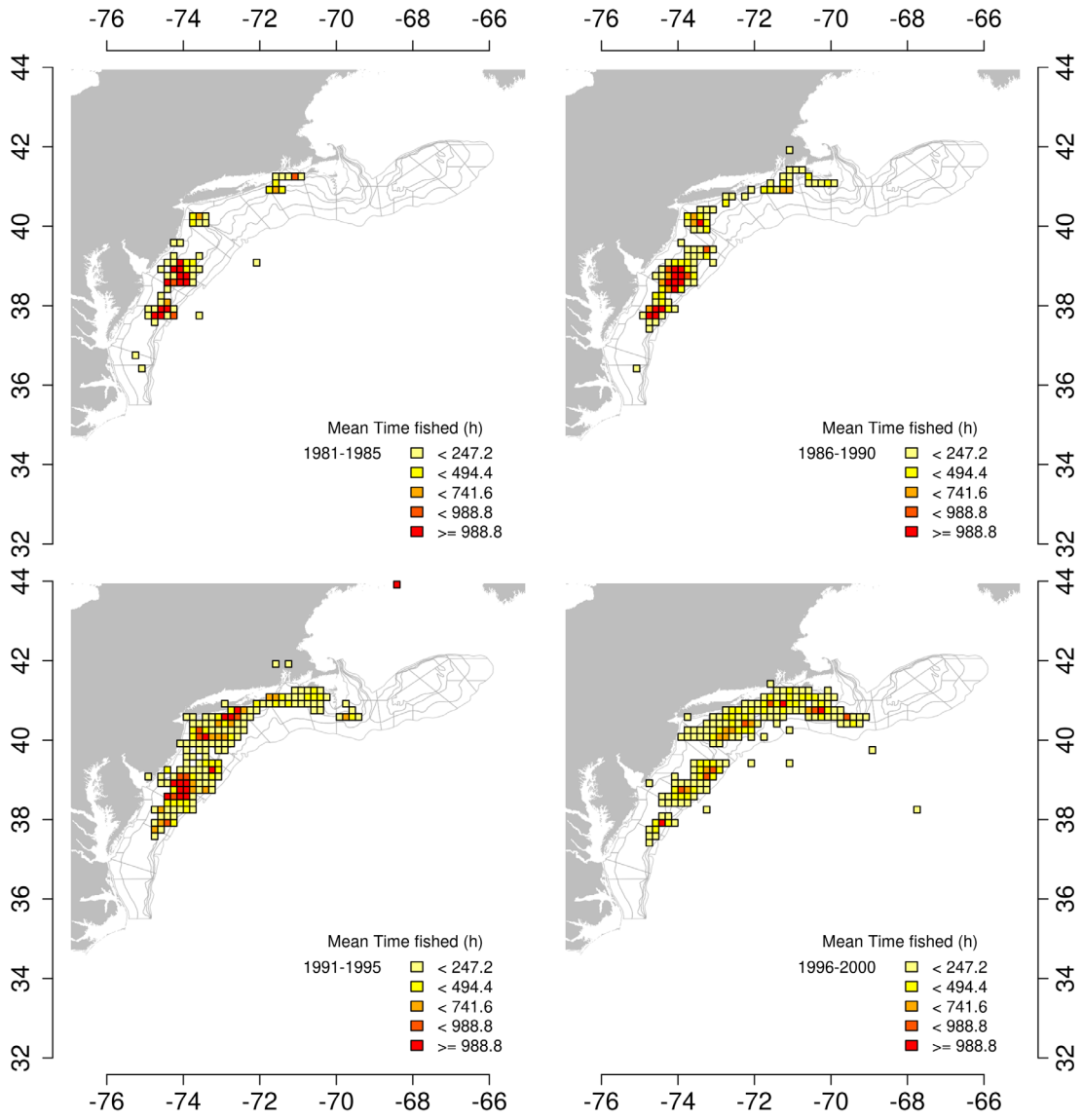
In 2021, there were 8 companies reporting purchases of surfclam and/or ocean quahog in 5 states outside of Maine. Employment data for these specific firms are not available.

In 2021, these companies bought approximately $24 million worth of surfclam and $18 million worth of ocean quahog.

Area Closures

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 ocean quahog. PSP is caused by saxitoxins, produced by the alga Alexandrium fundyense (red tide).Surfclam and ocean quahog 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.



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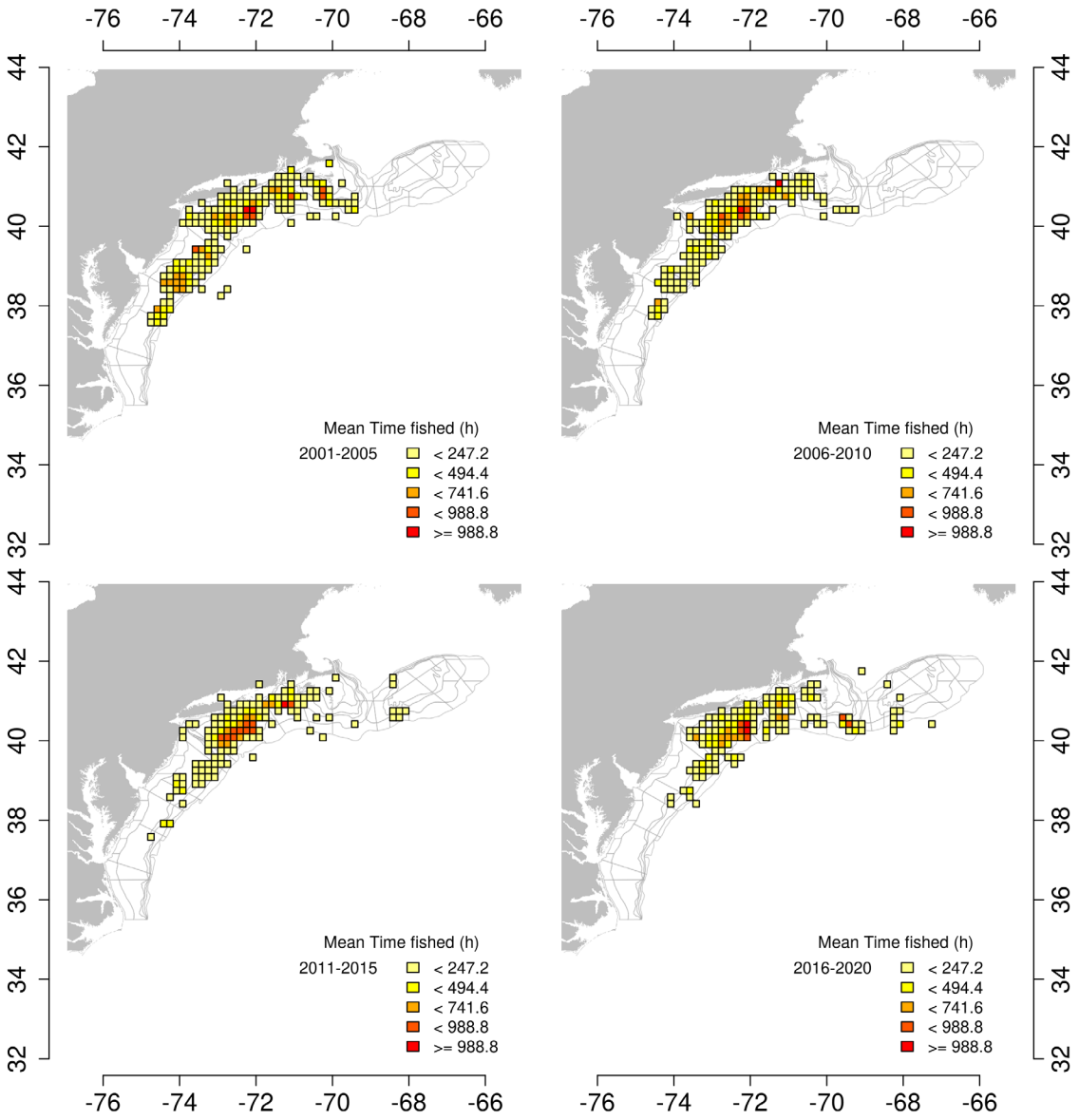

Figure 11. Average ocean quahog landings per unit effort (LPUE; bu. h-1) by ten-minute squares over time, 2001-2020 and preliminary 2021. Only squares where more the 5 kilo bushels were caught are shown.[4]

Table 2. Federal fleet profile, 2012 through 2021.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Non-Maine Vessels Harvesting BOTH surfclam & ocean quahog	12	13	7	7	6	8	14	8	7	10
Non-Maine Vessels Harvesting only ocean quahog	7	6	9	9	10	9	8	8	8	6
Total Non-Maine Vessels	19	19	16	16	16	17	22	16	15	16
Maine Ocean Quahog Vessels	13	12	11	9	8	8	8	8	6	3

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.

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