Mid-Atlantic Fishery Management Council
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Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: May 22, 2023

To: Council

From: Jessica Coakley, Staff

Subject: Atlantic Surfclam and Ocean Quahog 2024 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 2024 specifications is warranted.

The following is included for Council consideration on this subject:

1) Report of the May 2023 SSC Meeting – See Committee Reports Tab

2) Staff Recommendations Memo (dated April 24, 2023)

3) Surfclam and Ocean Quahog Advisory Panel Fishery Performance Report (April 2023)

4) Surfclam Fishery Information Document (April 2023)

5) Ocean Quahog Fishery Information Document (April 2023)

Neither staff nor the SSC recommended any changes to the 2024 specifications for surfclam and ocean quahog.

To maintain status quo measures for 2024, 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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Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: April 27, 2023

To: Chris Moore, Executive Director

From: Jessica Coakley, Staff

Subject: 2024 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 2024 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.

Based on a review of the information provided, staff recommends no change to the 2024 fishing year specifications. To maintain status quo measures for 2024, 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).

Last year, the Greater Atlantic Regional Fisheries Office reviewed the landings information and biological sampling data for surfclams and determined the proportion of surfclams in the fishery smaller than 4.75 inches did not exceed the 30 percent trigger for the minimum size requirement. An estimated 27.6 percent of the coast wide surfclam landings to date in 2022 (August 2021 through July 2022) were undersized. The lower and upper 95 percent confidence bounds for this estimate were 25.4 percent and 29.8 percent.

If the Council requests the minimum size be suspended in 2024, the Regional Office will analyze the data from August 2022 to July 2023.

In 2024, the Council will again review available information and may consider modifications to the 2025 specifications, if warranted.

Atlantic Surfclam and Ocean Quahog Fishery Performance Report

April 2023

The Mid-Atlantic Fishery Management Council's (Council) Atlantic Surfclam and Ocean Quahog (SCOQ) Advisory Panel (AP) met via webinar on April 13, 2023, to review the Fishery Information Documents and develop the following Fishery Performance Report (FPR). 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, differences in opinions may be noted.

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

Others present: Jessica Coakley and José Montañez (Council staff), Doug Potts (GARFO), Ed Houde (SSC Member), Matthew Moraller, Ron Larsen, and Will Shoup.

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)

Requests for Action to Council: The SCOQ advisors have raised several issues in past FPR documents that they would like to see the Council act on. They are concerned about the relevance of this document to the Council and its ability to manage these fisheries if the Council is not responsive to these issues and requests. The advisors request an update from the Council on how their requests are being followed up on or taken up for action.

Georges Bank Biotoxin Closures: Regulations for shellfish safety ("model ordinance regs.") have been updated by the Food and Drug Administration (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 hold a meeting with NOAA Fisheries

leadership (Regional Administrator or others) and the appropriate public heath safety groups (NOAA Seafood Inspection), and its SCOQ advisors, to discuss prioritizing the implementation of the 2019 model ordinance regs. The advisors and industry are frustrated with the pace of work on this issue and are requesting additional support to expedite this process in this region for these clam fisheries.

Co-occurrence of Surfclam and Quahog: This continues to be an issue of concern for these fisheries given the increased frequency of mixed catches and the advisors concerns about enforcement of the requirements to target these species separately on fishing trips. The advisors are working to address the accountability issue for this fishery (monitoring and enforcement) while working through modifications to the outdated species separation requirement regulations through the SCOQ Species Separation Requirements Amendment under development by the Council.

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 industry and has negatively impacted catch rates in these fisheries. 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 (EFP) 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 properly 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 for fish habitat 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 Essential Fish Habitat (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 EFH/Habitat Management Area (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. In addition, the advisors note that HMAs tend to remain static, and dynamic range shifts of species occur, which can make the use of static HMA areas problematic.

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 Fishery Management Act Teams (FMATs) be conveyed jointly with the AP 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). The quotas are set on the best available science and not necessarily economic conditions, and should continue to be set in that manner.

Market/Economic Conditions

In 2022, the Atlantic Surfclam and Ocean Quahog Fisheries were recertified through the Marine Stewardship Council (MSC). The MSC Fisheries Standard is used to assess if a fishery is well-managed and sustainable. To become MSC certified, fisheries voluntarily apply to be assessed against the MSC Fishery Standard. Fisheries are assessed by an independent, third-party auditor (not the MSC) and must prove they meet all three principles of the standard.

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 – those vessels are now fishing out of Cape May, NJ. There are some landings out of Wildwood, NJ. 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 reduced over the last few months. Cape Charles, VA is a revived port of landings targeting surfclam 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. at a cheaper price 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 of clams, tariff, and sanitation equivalency issues. 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. There are two federal growing areas that are on the EU list – looking to expand the listing of approved federal waters for clams landed in Massachusetts. Exports for surfclam will be limited because there are not enough surfclam to meet domestic demand.

In 2022 the Bumble Bee Seafoods clam processing factory in Cape May experienced continued difficulty in securing the volume of clams needed to meet demand. While clam deliveries to the plant picked up in the later portion of 2022 due to improved weather conditions and availability of crew and vessels, for the first quarter of 2023 the plant is still making up for 2022 orders. Clam supply continues to slowly improve but at a drastically higher cost.

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. The co-occurrence of surfclam and ocean quahog has led to issues for the industry because of the current specific separation requirements for fishing vessels.

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. 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. Two fishing vessels were granted an EFP to operate in Closed Area II Scallop Access Area for– this activity will harvest and test clams in this area for Paralytic Shellfish Poisoning.

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. The need for a safe transit zone for fishing vessels between the abutting Atlantic Shores and Ocean Wind 1 Wind Energy Areas is a priority.

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 fund 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.

Active projects that have been funded over 2022 address HMA, impacts from wind energy areas (WEA) and understanding the extent and future of commingled clam grounds. Two projects on HMAs aim to improve the ability of clam companies to discuss HMA access to commercial fisheries using models on sea water temperature on cod spawning and association of charismatic biota occupation of hard bottom. A project to assess stranded capital and capital devaluation, such as vessels and portside facilities because of wind energy development. An interactive GIS tool to characterize clam distribution aims to improve the ability to target fishing effort and inform the ongoing management efforts on commingled landings.

Ongoing requests for proposals by the members of the SCEMFIS Industry Advisory Board (IAB) in the SCOQ industry continue to focus on projects focusing on wind energy areas, comingled clam harvests, clam survey improvement, climate change impacts, and improving dredge efficiency. These include not only traditional research projects led by University researchers, but also opportunities for graduate student interns, community college instructors and veterans of the armed forces to embed with member companies and the Northeast Fisheries Science Center.

In addition, it is noted that there is an EFP application that has been submitted to NMFS to conduct multibeam sonar work, benthic sled sampling, etc. in the Great South Channel Habitat Management Area. There are two entities participating in that submitting EFP.

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.

Suggested Revisions to the Public Hearing Document for the Council's SCOQ Species Separation Requirements Amendment

6.1.1.1.2 Ocean Quahog

"Growth tends to slow after age 20"

> *Ocean quahog growth rate slows as the animal ages, but not in a von-Bertalanffy way, as the animal never stops growing. The best growth curve to use is Tanaka, but we have a modified von-Bertalanffy that also does ok. See: "A growth model for Arctica islandica: the performance of Tanaka and the temptation of von Bertalanffy – can the two coexist?"*

J.M.Klinck, E.N. Powell, K.M. Hemeon, J.R. Sower, D.R. Hennen (in press Journal of Shellfish Research). Furthermore, growth rates have increased over the last 150 years by a factor of 2-4, depending on location. These data are available in a dissertation by Hemeon and a thesis by Sower available on the SCEMFIS website: see also, Pace, S.M., E.N. Powell, R. Mann. 2018. Two-hundred-year record of increasing growth rates for ocean quahogs (Arctica islandica) from the northwestern Atlantic Ocean. J. Exp. Mar. Biol. Ecol. 503:8-22.

"Major recruitment events appear to be separated by periods of decades."

This statement originally made by Mann and Powell based on the number of observed small animals south of Hudson Canyon has turned out to be of limited value. Recent detailed evaluations by Pace, Hemeon, and Sower have shown that recruitment is relatively routine yearly over much of the range of the stock from Georges Bank to New Jersey, with occasional periods of lower or higher recruitment as might be expected by year-to-year variation. For details, see Pace, S.M., E.N. Powell, R. Mann, M.C. Long. 2017. Comparison of age-frequency distributions for ocean quahogs Arctica islandica}on the western Atlantic US continental shelf. Mar. Ecol. Prog. Ser. 585:81-98; Hemeon, K.M., E.N. Powell, S.M. Pace, R. Mann, T.E. Redmond. 2023. Population dynamics of Arctica islandica off Long Island (USA): an analysis of sex-based demographics and regional comparisons. Mar. Biol. 170:34; Hemeon, K.M., E.N. Powell, S.M. Pace, T.E. Redmond, R. Mann. 2021. Population dynamics of Arctica islandica}at Georges Bank (USA): an analysis of sex-based demographics. J. Mar. Biol. Assoc. U. K. 101:1003-1018; and Sower, J.R., E.N. Powell, R. Mann, K.M. Hemeon, S.M. Pace, T.E. Redmond. 2023. Examination of spatial heterogeneity in population age frequency and recruitment in the ocean quahog (Arctica islandica Linnaeus 1767). Mar. Biol. 170:38.

"ocean quahog are relatively unproductive and able to support only low levels of fishing."

Ocean quahogs live for a long time. Recent relatively direct estimates of mortality rates (see the above papers) are consistent with the value long used in the stock assessment. Fishing mortality rates are consistently lower than the natural mortality rate. Furthermore, the present assessment presumes a growth rate typical of animals born in the early 1800s. This has been shown to underestimate by a considerable degree the growth rates observed recently. Recent estimates summarized by Sower (see her thesis) show that growth rates have increased by 2-4 times, depending on location relative to the estimate originally used; that is, the species is much more resilient to overfishing than presently estimated in the assessment. We note that a recent workshop to evaluate needed research for ocean quahogs identified the issue of changing growth rate over time as one of the primary research needs in addressing uncertainty in the assessment. At present the assessment is distinctly precautionary in using growth rates typical of early 19th century animals.

7.5.4.2.2 Global Climate Change

“The distributional vulnerability of surfclam was ranked as "high," as surfclam mortality is higher at higher temperatures”

> *At the time that Hare summarized species vulnerabilities to climate change, the estimate was defensible as we did not know the ability of this species to change its range boundaries. Much more information is available now and this information shows that surfclams change their range rapidly in response to increasing temperatures, with significant responses on 5-year time scales. See Powell, E.N., J.M. Trumble, R.L. Mann, M.C. Long, S.M. Pace, J.R. Timbs, K.M. Kuykendall. 2020. Growth and longevity in surfclams east of Nantucket: range expansion in response to the post-2000 warming of the North Atlantic. Cont. Shelf Res. 195:#104059; and Evaluation of the degree of co-occurrence of Atlantic surfclams (Spisula solidissima) and ocean quahogs (Arctica islandica) in the expanding Northwestern Atlantic boreal/temperate ecotone: implications for their fisheries. Stephanie L. Stromp, Eric N. Powell, Roger Mann (in press, J. Shellfish Res.). The surprisingly high resilience of the species to climate change is noteworthy; recent unpublished projections for the remainder of the century suggest an increase biomass, rather than a decrease. Surfclams are likely to be winners rather than losers.*

“Also similar to surfclam, the distributional vulnerability was ranked as “high” as growth slows at higher temperatures. Ocean quahog was determined to have a “very high” biological sensitivity to climate due to population growth rate, sensitivity to ocean acidification, adult mobility, slow growth, from calcium carbonate shell, and adults are sessile (Hare et al. 2016).”

> *This is also the expectation based on the Hare analysis, recognizing the long age span of individuals and relatively slow growth. Recent information, however, has suggested that ocean quahogs are more resilient to climate change than other boreal animals due to their ability to estimate and thus escape high late-summer temperatures. This is the reason why little evidence of range recession exists and, in fact, is the reason why the overlap between surfclams and ocean quahogs has increased so dramatically in the last half-decade. The dynamics of ocean quahog range shifts are discussed in a thesis by LeClaire (see SCEMFIS website), which shows that range recessions occur on half-century time scales or longer. Thus, little evidence of a range shift would be expected over the ~40-yr NMFS survey time series, even if sample density was sufficient to resolve the inshore range boundary, which is unlikely: see Powell, E.N., R. Mann. 2016. How well do we know the infaunal biomass of the continental shelf? Cont. Shelf Res. 115:27-32. Thus, we should not be surprised that the species as of today shows little response to rising temperatures in the northwestern Atlantic.*

Atlantic Surfclam Fishery Information Document

April 2023

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 2022. Data sources for Fishery Information Documents are generally from unpublished National Marine Fisheries Service (NMFS) databases with fishery-dependent and fishery independent information (i.e., surveys) 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 2022 federal harvest was approximately $28 million, higher than the $24 million in 2021.
- In 2022, 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, although they have resumed fishing on clam beds in the Delmarva.

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/.

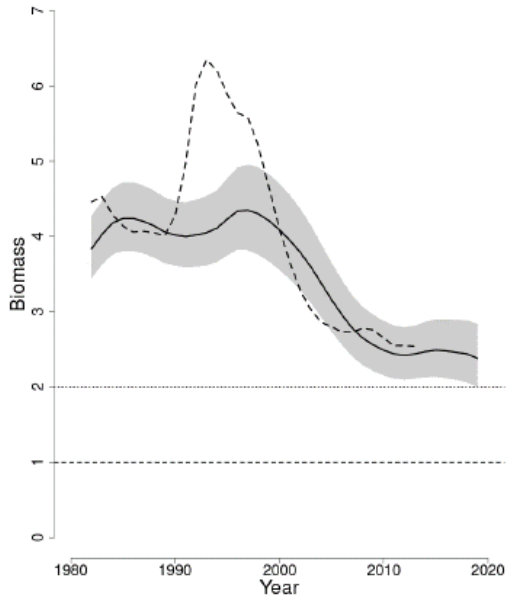

Figure 1. Trends in spawning stock biomass of Atlantic surfclam between 1982 and 2019 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{Threshold}$ (½ $_{SSBMSY\ proxy}$; horizontal dashed line) as well as SSB_{Target} ($SSB_{MSY\ proxy}$; horizontal dotted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

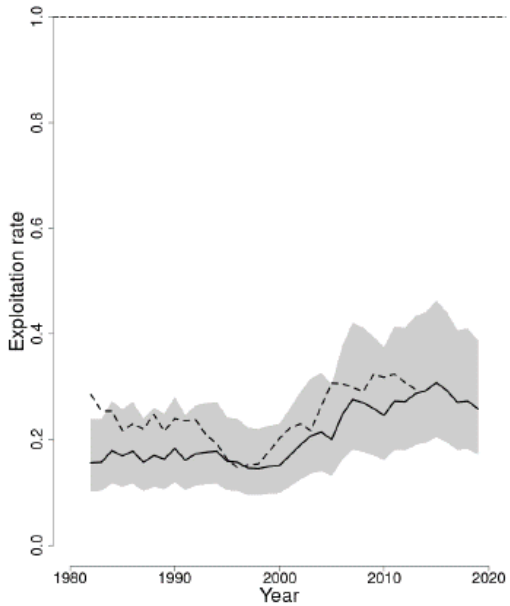

Figure 2. Trends in the fully selected fishing mortality (F_{Full}) of Atlantic surf-clam between 1982 and 2019 from the current (solid line) and previous (dashed line) assessment and the corresponding $F_{Threshold}$ ($F_{MSY\ proxy}$=0.141; horizontal dashed line), based on the 2020 assessment. Units 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, and overall landings per unit effort are given in Table 1 and Figures 3-5. Because of recent database changes, the following sources were used for landings and are reflected in the tables and figures. Total landings for 1965-1981 are from NEFSC (2003) and other years were from a dealer database (CFDBS). CAMS landings are the CAMS LNDLB landings converted to mt. EEZ landings for 1965-1982 are from NEFSC (2003) while later years are from a logbook database (SFOQVR). Landings for state waters are approximated as total landings – EEZ landings and may not accurately reflect state landings. All calculations use the CAMS LNDLB values for total landings. The distribution of the fishery has changed over time, as shown in Figures 6-8, with a shift to increased landings in Southern New England and Georges Bank areas, although fishing has increased in an area off the Delmarva.

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 2022 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]

Non-target species are those caught incidentally and they may be retained or discarded. The estimated bycatch of non-targeted species by the surfclam and ocean quahog fisheries is based on observer data, which is very limited. The dominant bycatch species generally include sea scallops, skates, monkfish, stargazers, crabs, and snails. The surfclam fishery also discards ocean quahog, and the ocean quahog fishery discards surfclam.

The Greater Atlantic Regional Fisheries Office reviews landings information and biological sampling data for surfclams each year. In the regulations, the Regional Administrator may suspend the surfclam minimum size at the request of the Council, if the data indicate that 30 percent or less of the surfclams landed are smaller than 4.75 inches (12.065 cm). An estimated 27.6 percent of the coast wide surfclam landings to date in 2022 (August 2021 through July 2022) were undersized. The lower and upper 95 percent confidence bounds for this estimate were 25.4 percent and 29.8 percent.

Port and Community Description

Communities from Maine to Virginia are involved in the harvesting and processing of surfclam and ocean quahog. 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 Point Pleasant and Atlantic City, NJ, Oceanview, NY, and New Bedford and Fairhaven, MA. Hyannis, MA (surfclam only) landings have been recently reduced. 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.

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.

Table 1. Federal surfclam catch limits and landings: 2018-2024. Landings for state waters can be approximated as total landings – EEZ landings and may not accurately reflect state landings.

Year	OFL (mt)	ABC/ ACL (mt)	Total Landings[d] (mt meats; w/state waters)	Total CAMS Landings[e] (mt meats w/state waters)	EEZ Landings (mt meats)	EEZ Landings[a,f] ('000 bu)	EEZ Quota ('000 bu)	% Quota Harvested
2018	Not specified[b]	29,363[b]	17,114	17,169	16,287	2,112	3,400	62%
2019	74,281[c]	56,419[c]	16,502	16,899	14,986	1,943	3,400	57%
2020	74,110[c]	56,289[c]	12,897	16,480	12,034	1,561	3,400	46%
2021	51,361	47,919	13,055	13,266	12,785	1,658	3,400	49%
2022	48,202	44,522	343[g]	12,378	11,813	1,532	3,400	45%
2023	45,959	42,237	NA	NA	NA	NA	3,400	NA
2024	44,629	40,946	NA	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] Total landings for 2018-2022 were from a dealer database (CFDBS). [e]CAMS landings for 2018-2022 are the CAMS LNDLB landings converted to mt. [f]EEZ landings for 2018-2022 are from a logbook database (SFOQVR). [g]Not up to date/accurate.

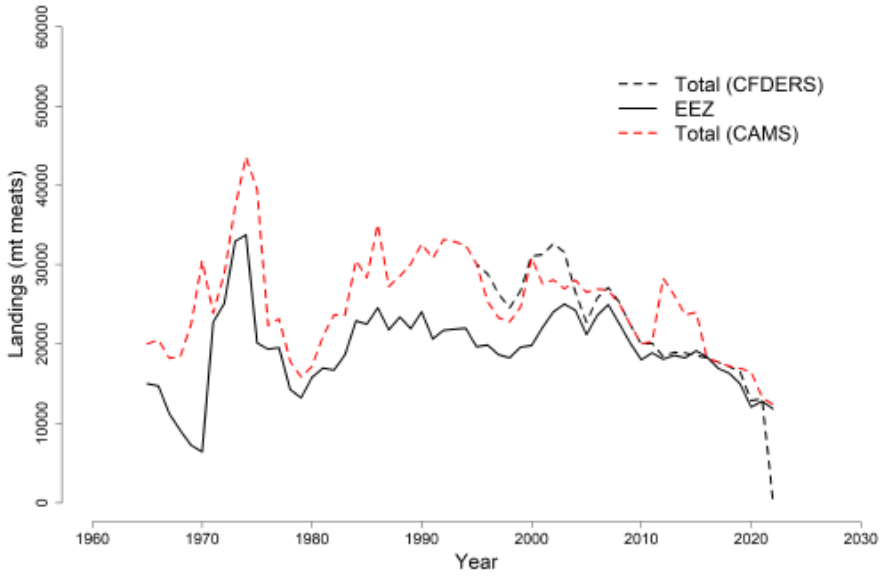

Figure 3. Surfclam landings (total and EEZ) during 1965-2022. EEZ landings for 1965-1982 are from NEFSC (2003) while later years are from a logbook database (SFOQVR). Total CAMS landings are the CAMS LNDLB landings converted to mt.[4]

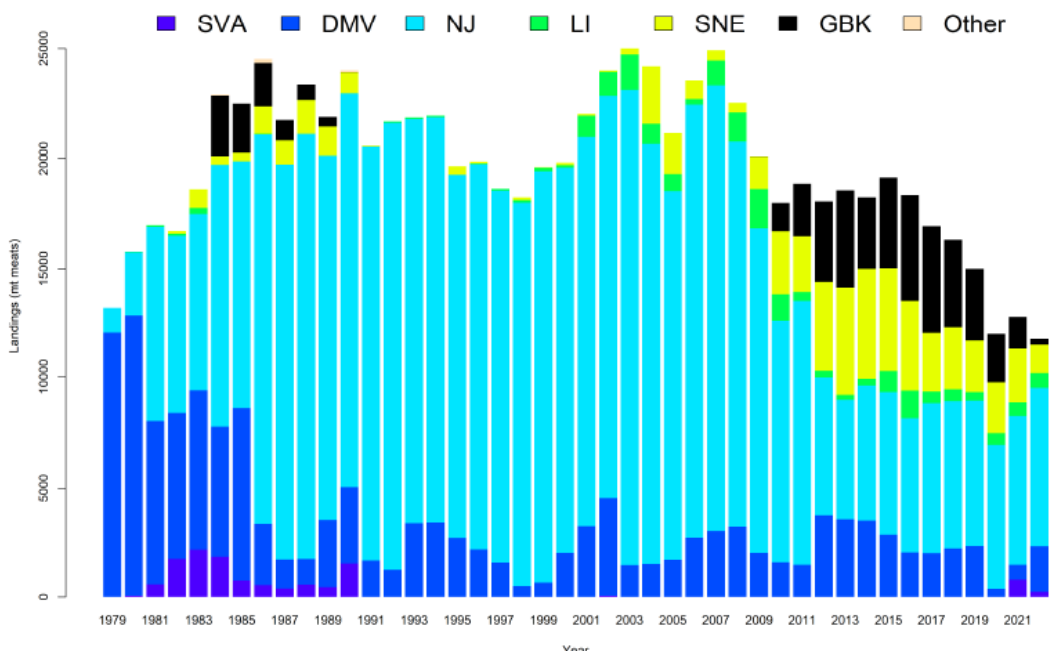

Figure 4. Surfclam landings from the US EEZ during 1979-2022. Landings are from are from a logbook database (SFOQVR).[4]

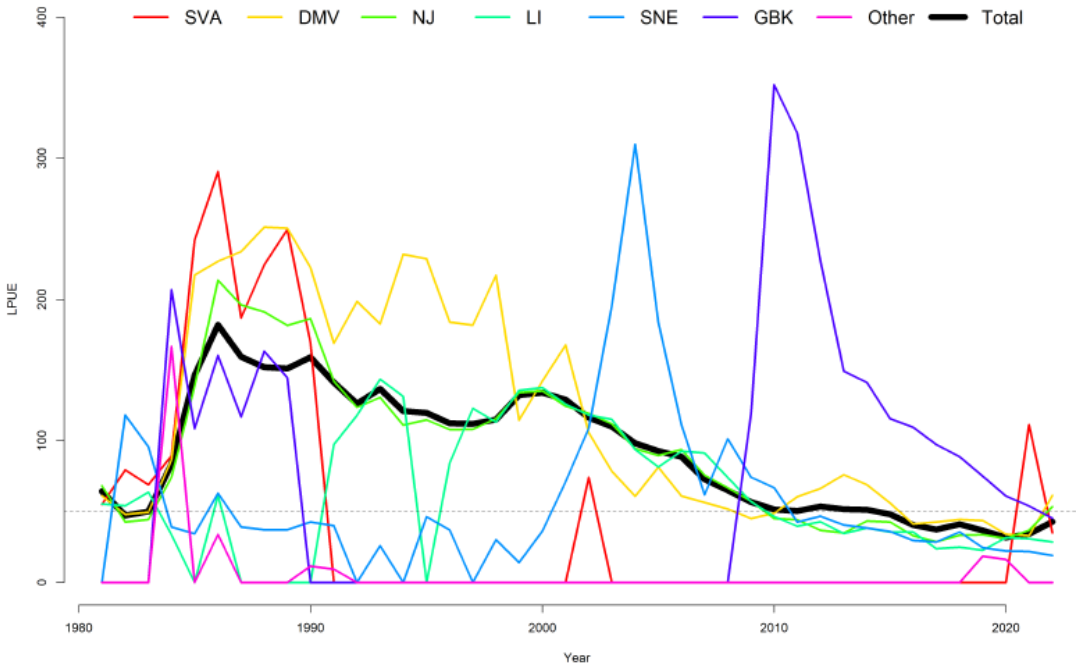

Figure 5. Nominal landings per unit effort (LPUE in bushels landed per hour fished) for surfclam, by region, during 1981-2022. LPUE is total landings in bushels divided by total fishing effort, as calculated from a logbook database (SFOQVR).[4]

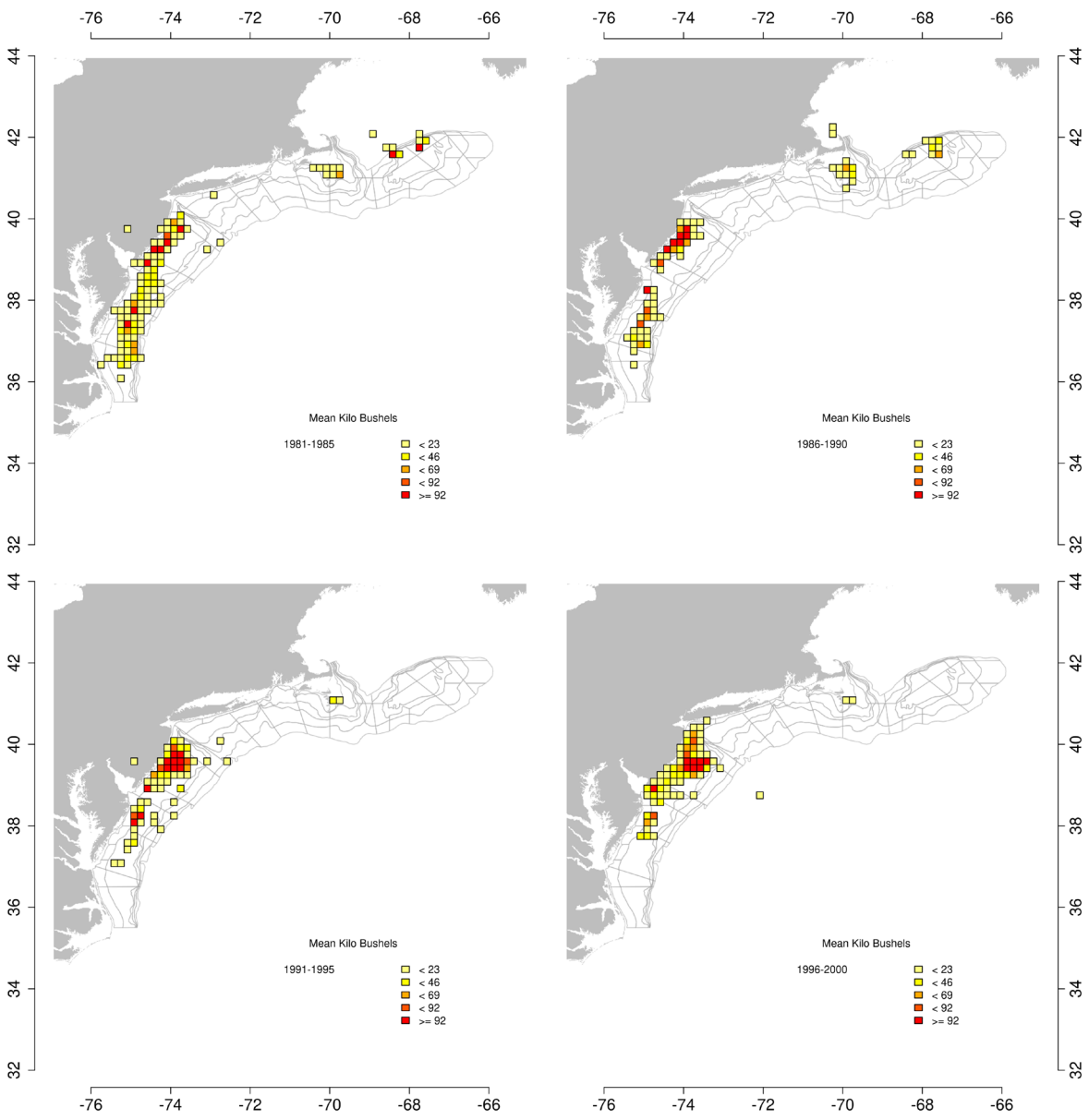

Figure 6. Average surfclam landings by ten-minute squares over time, 1981-2000 calculated from a logbook database (SFOQVR). Only squares where more the 5 kilo bushels were caught are shown.[4]

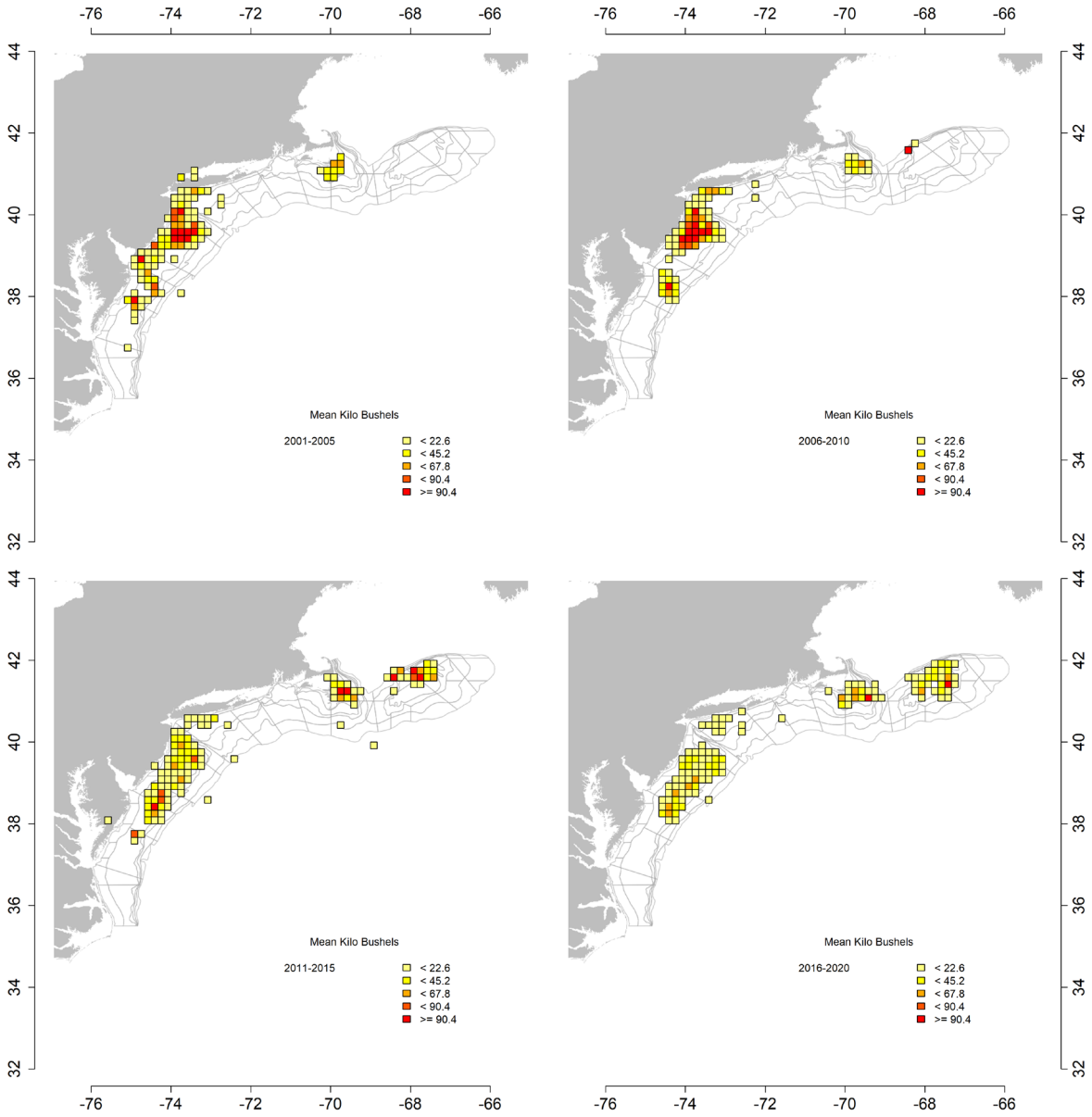

Figure 7. Average surfclam landings by ten-minute squares over time, 2001-2020 calculated from a logbook database (SFOQVR). Only squares where more the 5 kilo bushels were caught are shown.[4]

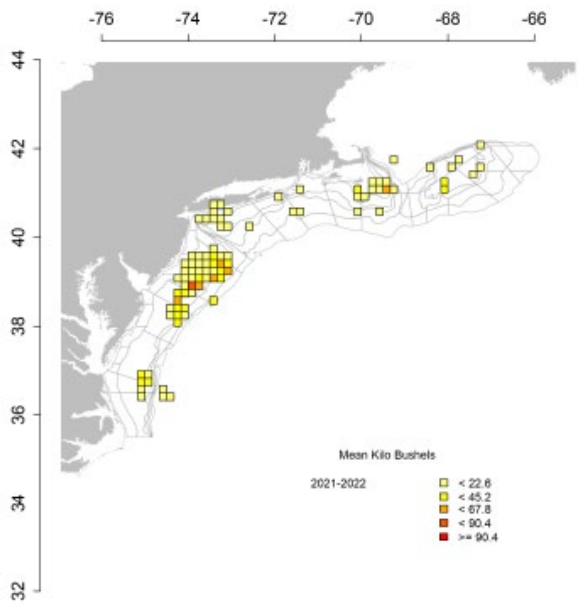

Figure 8. Average surfclam landings by ten-minute squares over time, 2021-2022 calculated from a logbook database (SFOQVR). Only squares where more the 5 kilo bushels were caught are shown.[4]

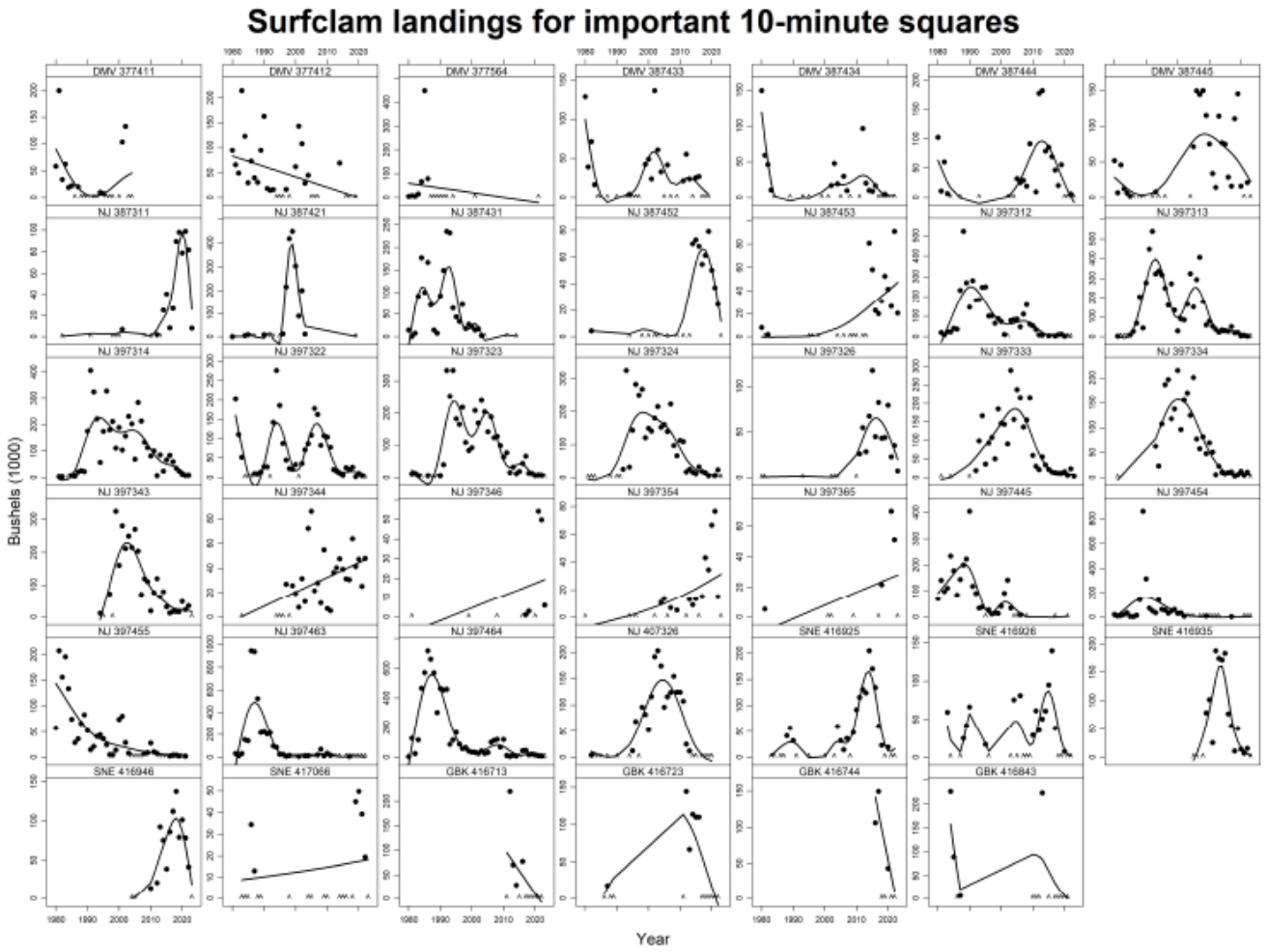

Figure 9. Annual surfclam landings in "important" ten minute squares (TNMS) during 1980-2022 based on logbook data. Important means that a square ranked in the top 10 TNMS for total landings during any five-year period (1980-1984, 1985-1989, ...). Data for 2022 are incomplete and preliminary. To protect 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.[4]

Federal Fleet Profile

The total number of vessels participating in the surfclam fishery has remained relatively stable in the recent decade, however there were fewer vessels harvesting surfclam or surfclam and ocean quahog in 2022 (Table 2). The average ex-vessel price of surfclams reported by processors was $17.84 in 2022, higher than the $14.88 per bushel seen in 2021. The total ex-vessel value of the 2021 federal harvest was approximately $28 million, which is higher than $24 million in 2021. Industry has described several factors that have affected their industry in their fishery performance reports. The distribution of LPUE in bushels per hour over time is shown in Figures 10-12.

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 2022, 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 2022, these companies bought approximately $28 million worth of surfclam and $21 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.

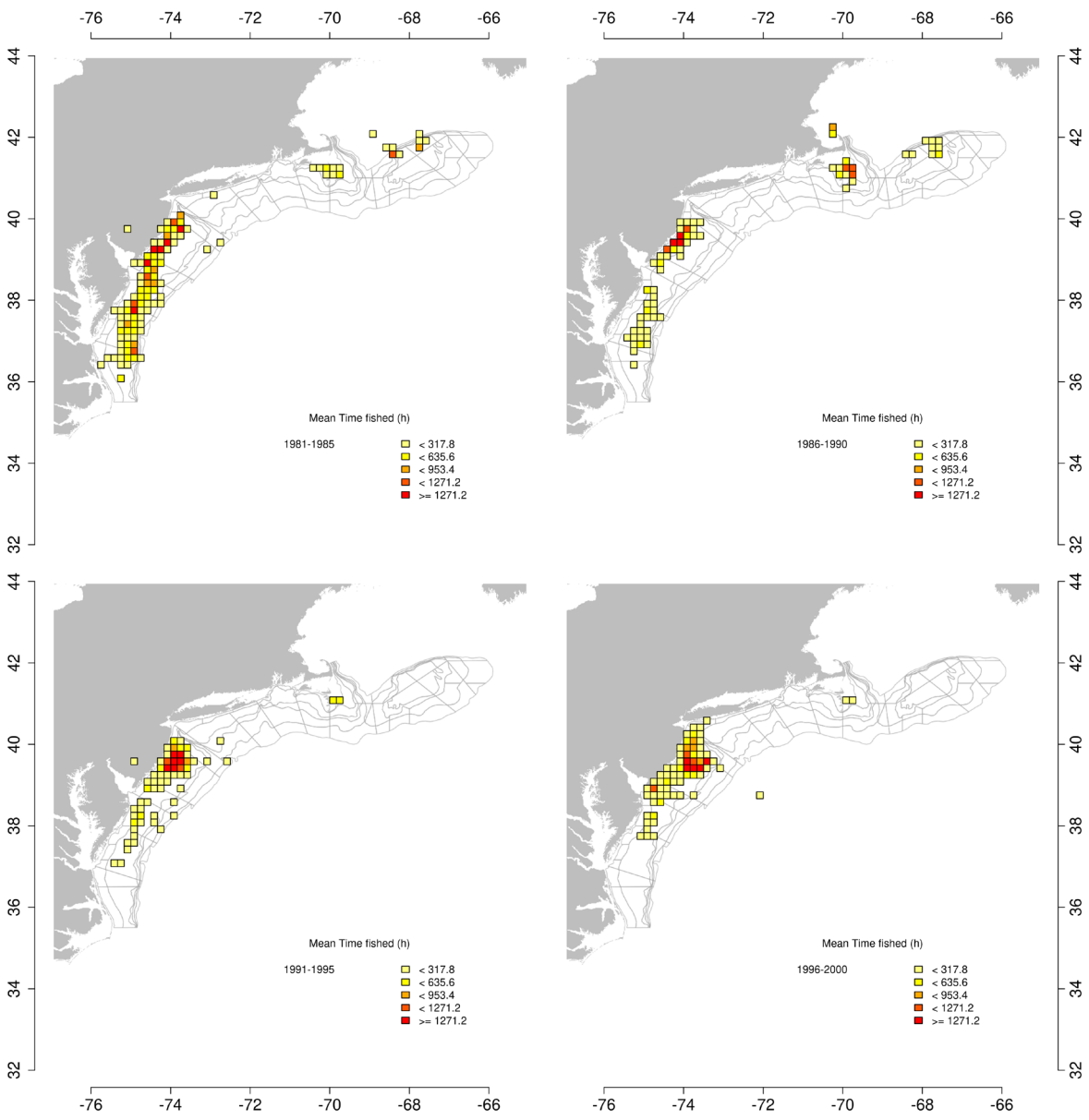

Figure 10. Average surfclam landings per unit effort (LPUE; bu. h^{-1}) by ten-minute squares over time, 1981-2000, as calculated from a logbook database (SFOQVR). Only squares where more the 5 kilo bushels were caught are shown.[4]

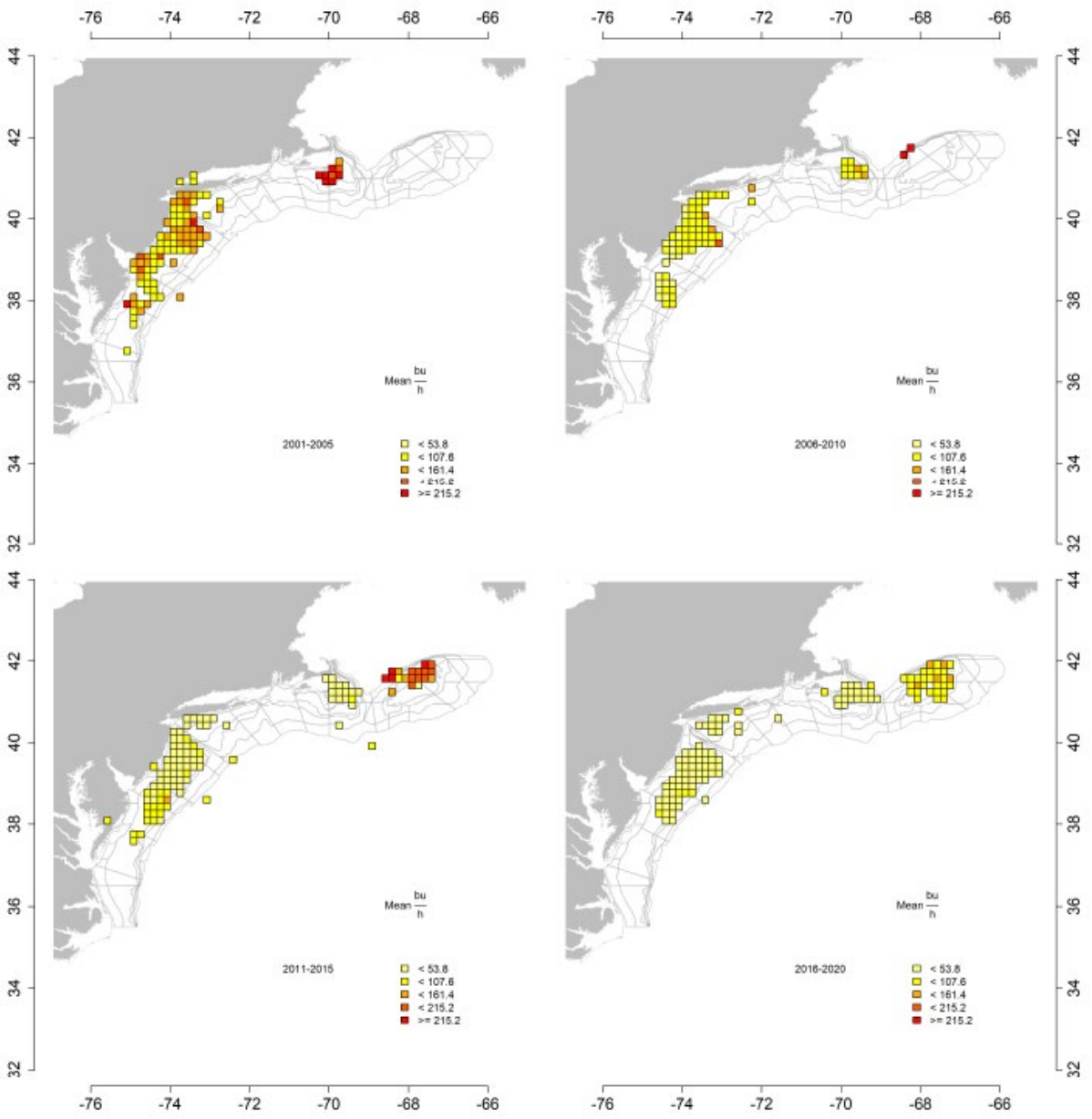

Figure 11. Average surfclam landings per unit effort (LPUE; bu. h-1) by ten-minute squares over time, 2001-2020, as calculated from a logbook database (SFOQVR). Only squares where more the 5 kilo bushels were caught are shown.[4]

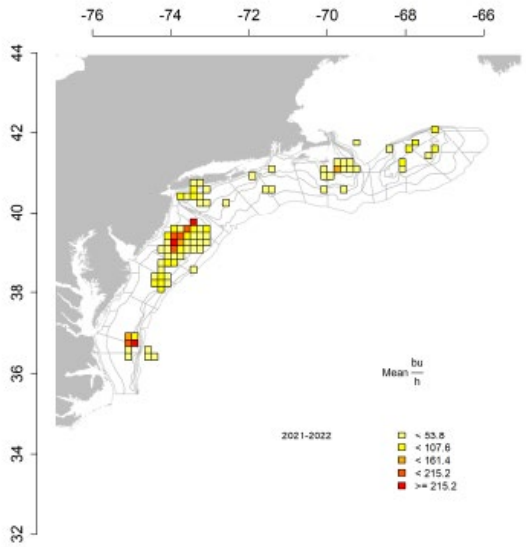

Figure 12. Average surfclam landings per unit effort (LPUE; bu. h-1) by ten-minute squares over time, 2021-2022, as calculated from a logbook database (SFOQVR). Only squares where more the 5 kilo bushels were caught are shown.[4]

Table 2. Federal fleet profile, 2012 through 2022.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Harvesting BOTH surfclam & ocean quahog	13	7	7	6	8	14	8	7	8	10	5
Harvesting only surfclam	29	33	31	31	30	26	31	36	35	31	28
Total Vessels	42	40	38	37	38	40	39	43	43	41	33

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 27, 2023. NOAA Fisheries, Northeast Fisheries Science Center, 166 Water St., Woods Hole, MA 02543.

Ocean Quahog Fishery Information Document

April 2023

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 2022. Data sources for Fishery Information Documents are generally from unpublished National Marine Fisheries Service (NMFS) databases with fishery-dependent and fishery independent information (i.e., surveys) 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 ocean quahog stock. The stock was not overfished, and overfishing was not occurring in 2019.
- The total ex-vessel value of the 2022 federal harvest was approximately $21 million, higher than the $18 million in 2021.
- In 2022, 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] 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.

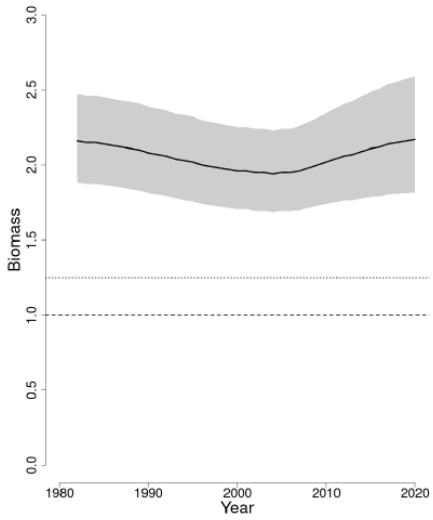

Figure 1. Trends in spawning stock biomass of ocean quahog between 1982 and 2020 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{Threshold}$ (horizontal dashed line) as well as SSB_{Target} ($SSB_{MSY\ proxy}$; horizontal dotted line) based on the 2020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

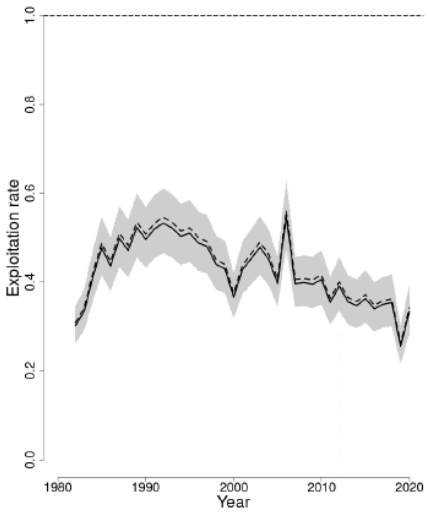

Figure 2. Trends in the fully selected fishing mortality (F_{Full}) of ocean quahog between 1982 and 2020 from the current (solid line) and previous (dashed line) assessment and the corresponding $F_{Threshold}$ ($F_{MSY\ proxy}$=0.019; horizontal dashed line), based on the 2020 assessment. Units of 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. Because of recent database changes, the following sources were used for landings and are reflected in the tables and figures. Total landings for 1965-1981 are from NEFSC (2003) and other years were from a dealer database (CFDERS). CAMS landings are the CAMS LNDLB landings converted to mt. EEZ landings for 1965-1982 are from NEFSC (2003) while later years are from a logbook database (SFOQVR). All calculations use the CAMS LNDLB values for total landings.

The distribution of the fishery has changed over time (Figures 4-8). The bulk of the fishery from 1980-1990 was being prosecuted off the Delmarva but is now being prosecuted in more Northern areas. 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 2022 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]

Non-target species are those caught incidentally and they may be retained or discarded. The estimated bycatch of non-targeted species by the surfclam and ocean quahog fisheries is based on observer data, which is very limited. The dominant bycatch species generally include sea scallops, skates, monkfish, stargazers, crabs, and snails. The surfclam fishery also discards ocean quahog, and the ocean quahog fishery discards surfclam.

Port and Community Description

Communities from Maine to Virginia are involved in the harvesting and processing of surfclam and ocean quahog. 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 Point Pleasant and Atlantic City, NJ, Oceanview, NY, and New Bedford and Fairhaven, MA. Hyannis, MA (surfclam only) landings have been recently reduced. 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.

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Table 1. Federal ocean quahog catch limits and landings (excluding Maine): 2018-2024.

Year	OFL (mt)	ABC/ ACL (mt)	Total Landings[c] (mt meats)	CAMs Landings[d] (mt meats)	EEZ Landings[a,e] (mt meats)	EEZ Landings[a,b,e] ('000 bu)	EEZ Quota ('000 bu)	% Quota Harvested
2018	61,600	44,695	14,541	14,565	14,606	3,220	5,333	60%
2019	63,600	46,146	11,199	11,176	11,178	2,464	5,333	46%
2020	63,100	45,783	8,430	11,509	9,101	2,006	5,333	38%
2021	44,960	44,031	10,361	10,502	10,384	2,289	5,333	43%
2022	45,001	44,072	2[f]	11,200	11,098	2,447	5,333	46%
2023	45,012	44,082	NA	NA	NA	NA	5,333	NA
2024	44,994	44,065	NA	NA	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] Total landings for 2018-2022 were from a dealer database (CFDERS). [d]CAMS landings for 2018-2022 are the CAMS LNDLB landings converted to mt. [e]EEZ landings for 2018-2022 are from a logbook database (SFOQVR). [f]Not accurate/up to date.

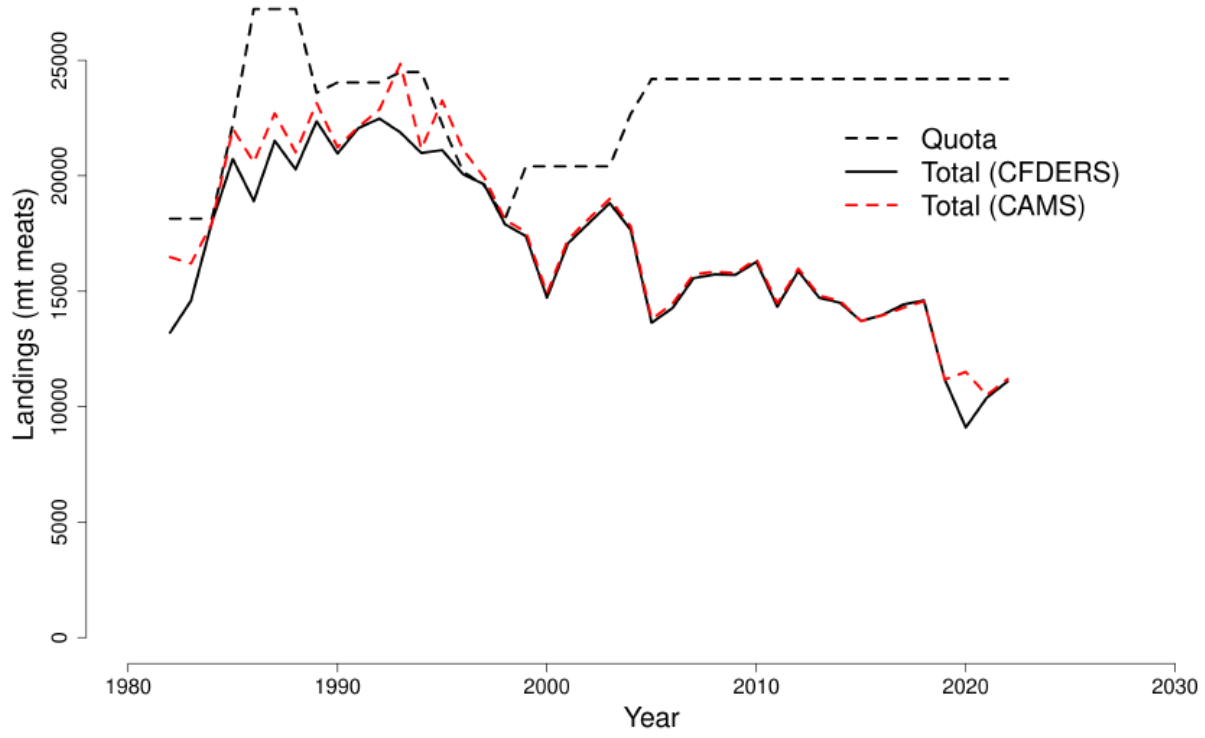

Figure 3. Total ocean quahog landings (from CFDERS and CAMS) and quotas during 1980-2022.[4]

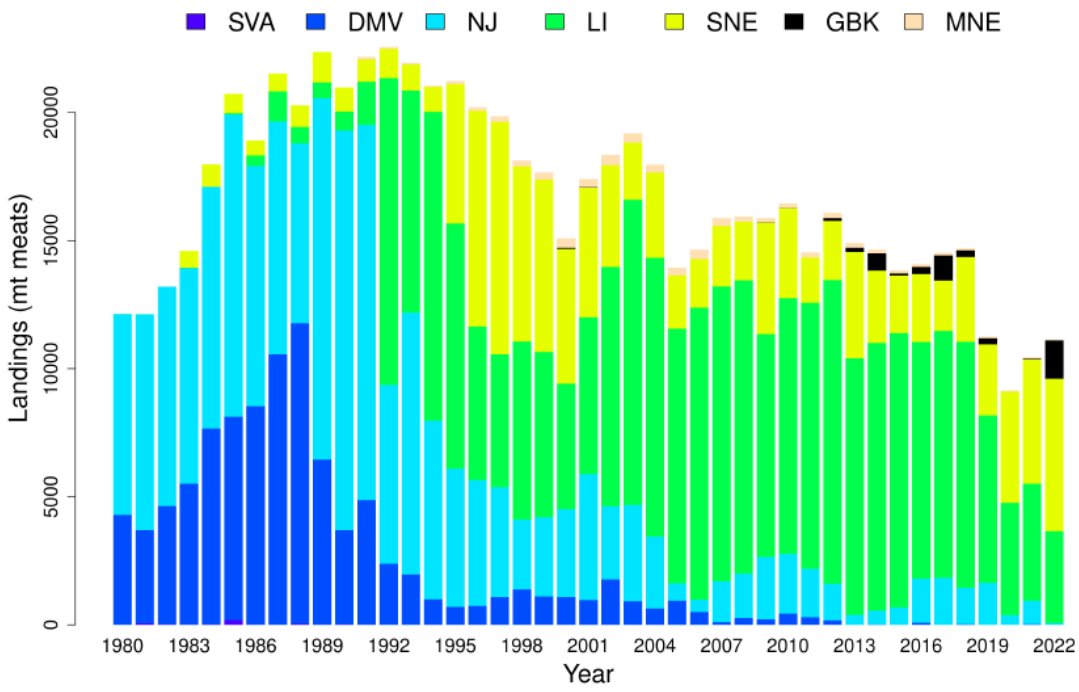

Figure 4. Ocean quahog landings from the US EEZ during 1980-2022 by region. Landings are from a logbook database (SFOQVR).[4]

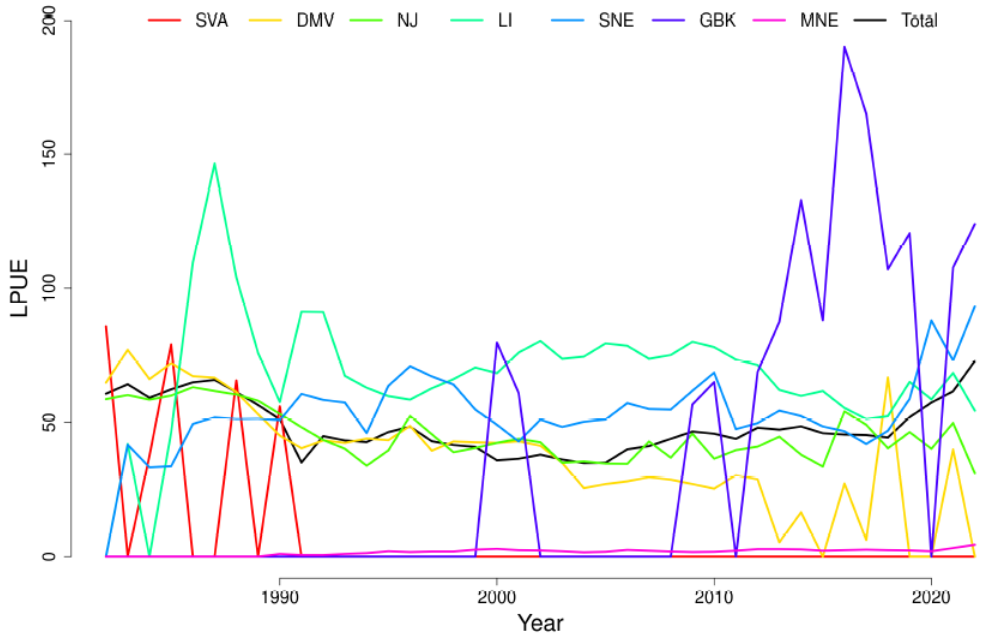

Figure 5. Nominal landings per unit effort (LPUE in bushels landed per hour fished) for ocean quahog, by region, during 1981-2022. LPUE is total landings in bushels divided by total fishing effort. Landings are from a logbook database (SFOQVR).[4]

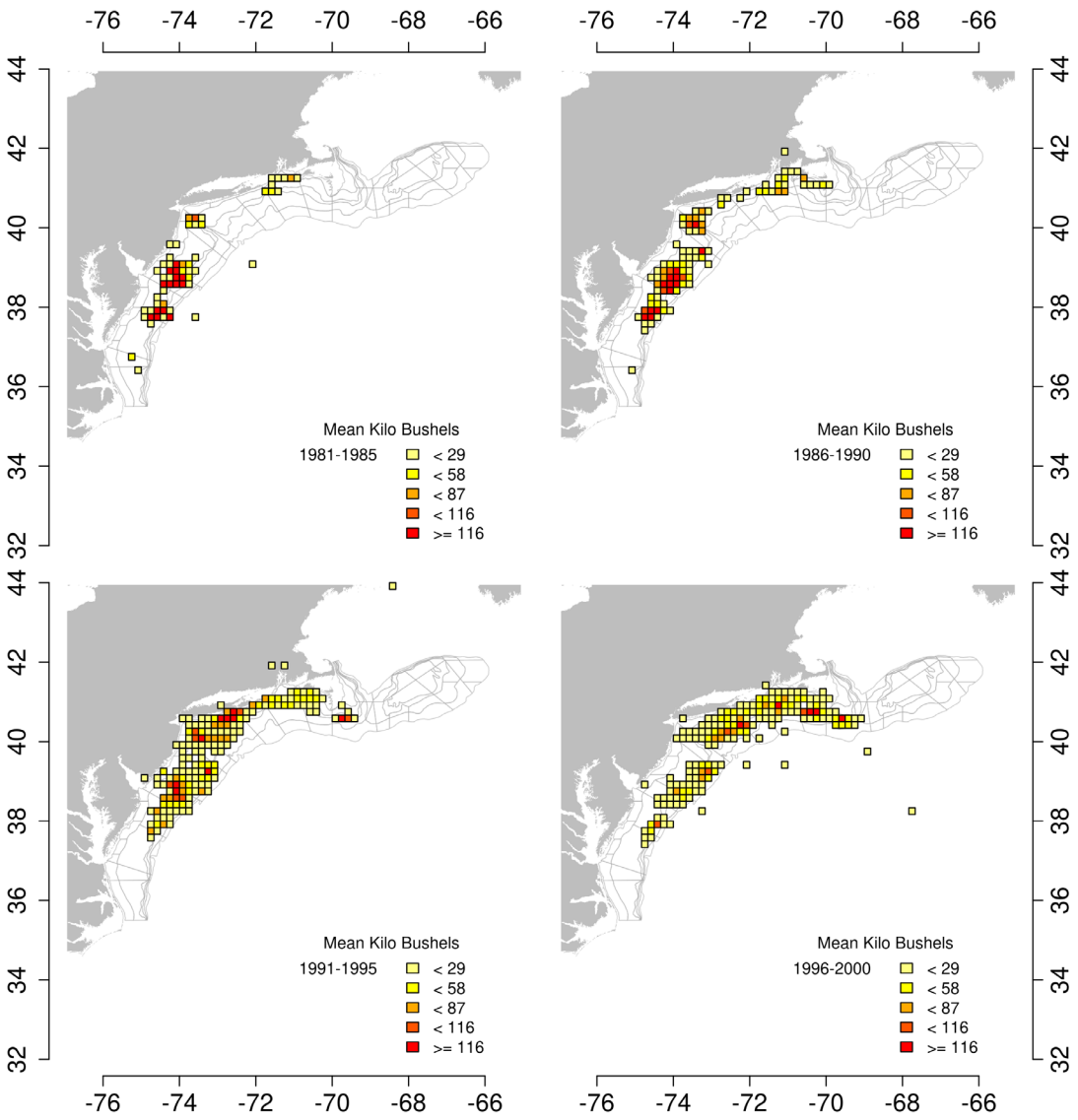

Figure 6. Average ocean quahog landings by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown. Landings are from a logbook database (SFOQVR).[4]

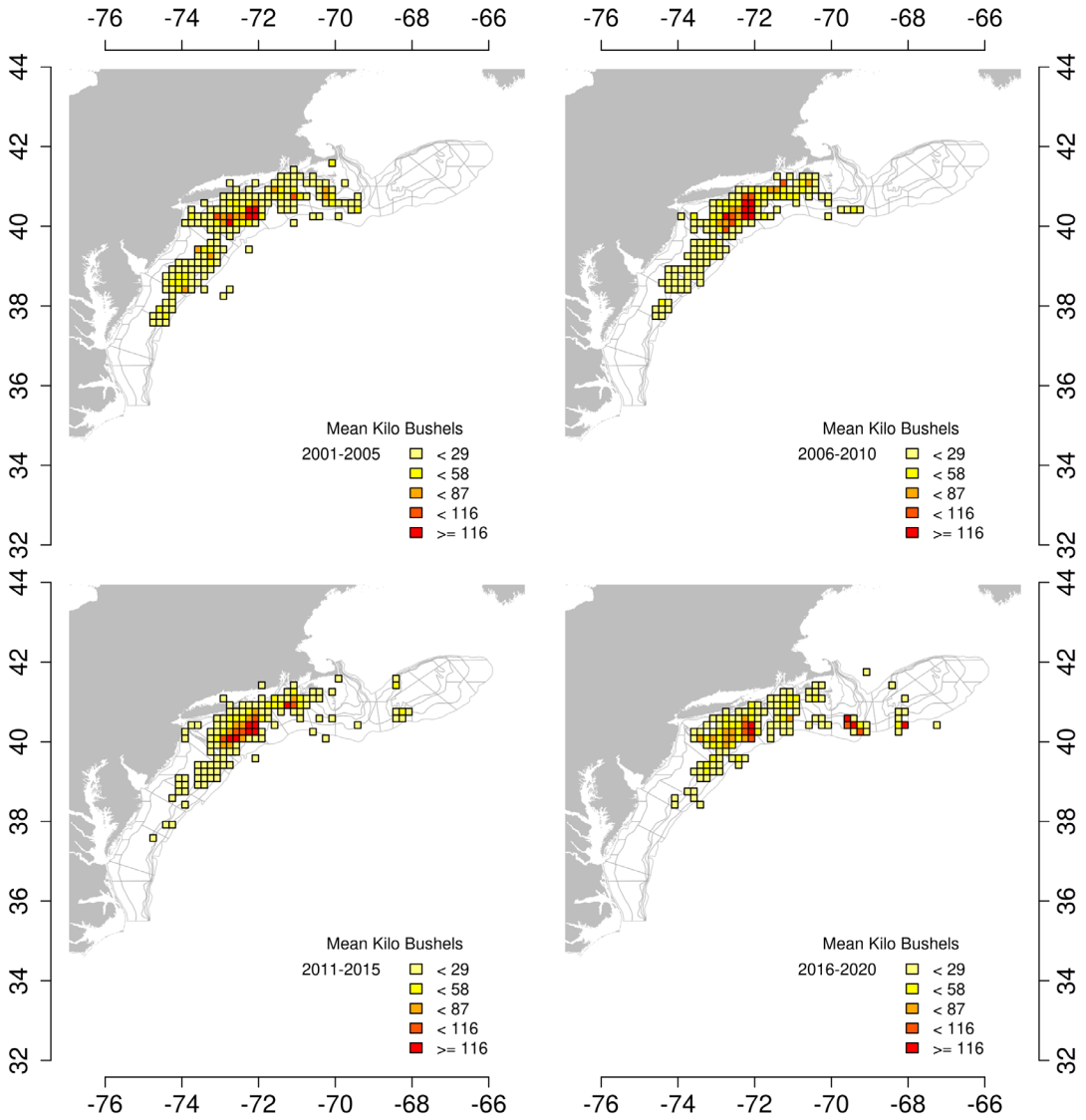

Figure 7. Average ocean quahog landings by ten-minute squares over time, 2001-2020. Only squares where more the 5 kilo bushels were caught are shown. Landings are from a logbook database (SFOQVR).[4]

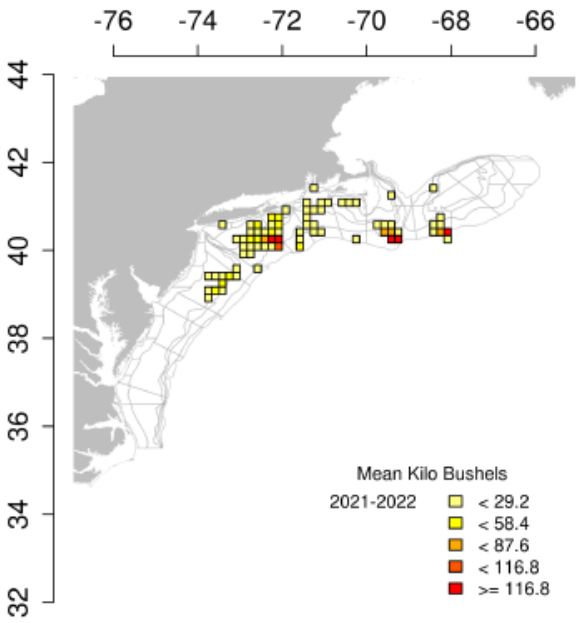

Figure 8. Average ocean quahog landings by ten-minute squares over time, 2021-2022. Only squares where more the 5 kilo bushels were caught are shown. Landings are from a logbook database (SFOQVR).[4]

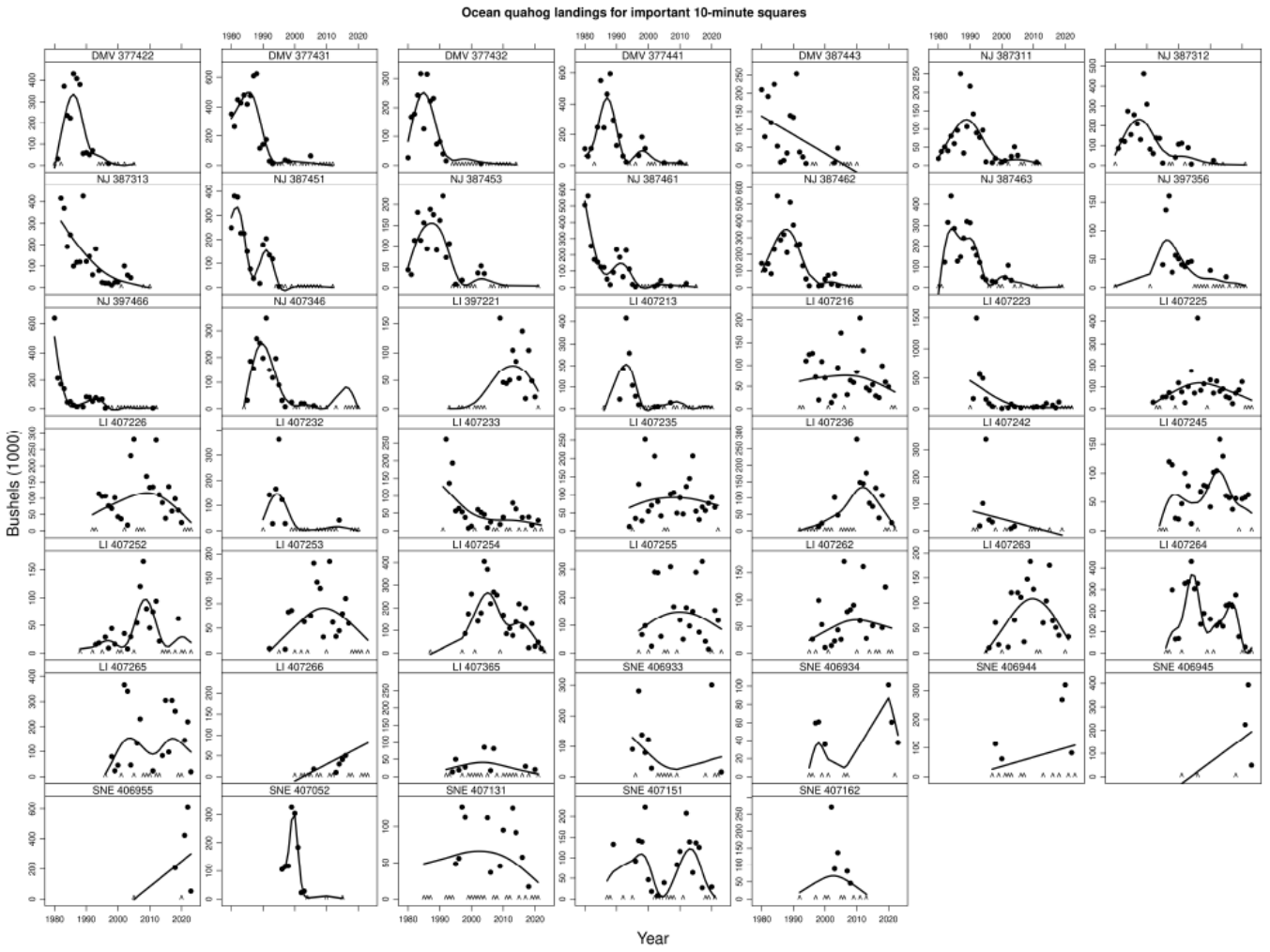

Figure 9. Annual ocean quahog landings in "important" ten minute squares (TNMS) during 1980-2022 based on logbook data. Important means that a square ranked in the top 10 TNMS for total landings during any five-year period (1980-1984, 1985-1989…). Data for 2022 are incomplete and preliminary. To protect 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.[4]

Federal Fleet Profile

The total number of vessels targeting ocean quahog outside of Maine has decreased over time (Table 2). The distribution of LPUE in bushels per hour over time for the non-Maine fishery is shown in Figures 5 and 10-12.

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 2022 was $8.50 per bushel, slightly higher than the 2021 price ($7.79 per bushel). In 2022, about 2.5 million bushels of non-Maine ocean quahog were landed, an increase from 2.3 million bushels in 2021. The total ex-vessel value of the 2022 federal harvest outside of Maine was approximately $21 million, higher than the $18 million in 2021. In 2022, the Maine ocean quahog fleet harvested a total of 12,711 Maine bushels, a sunstantial decrease from the 124,839 bushels harvested in 2006, and a decrease from the prior year (2021; 17,387 bushels).

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 2022, 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 2022, these companies bought approximately $28 million worth of surfclam and $21 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.

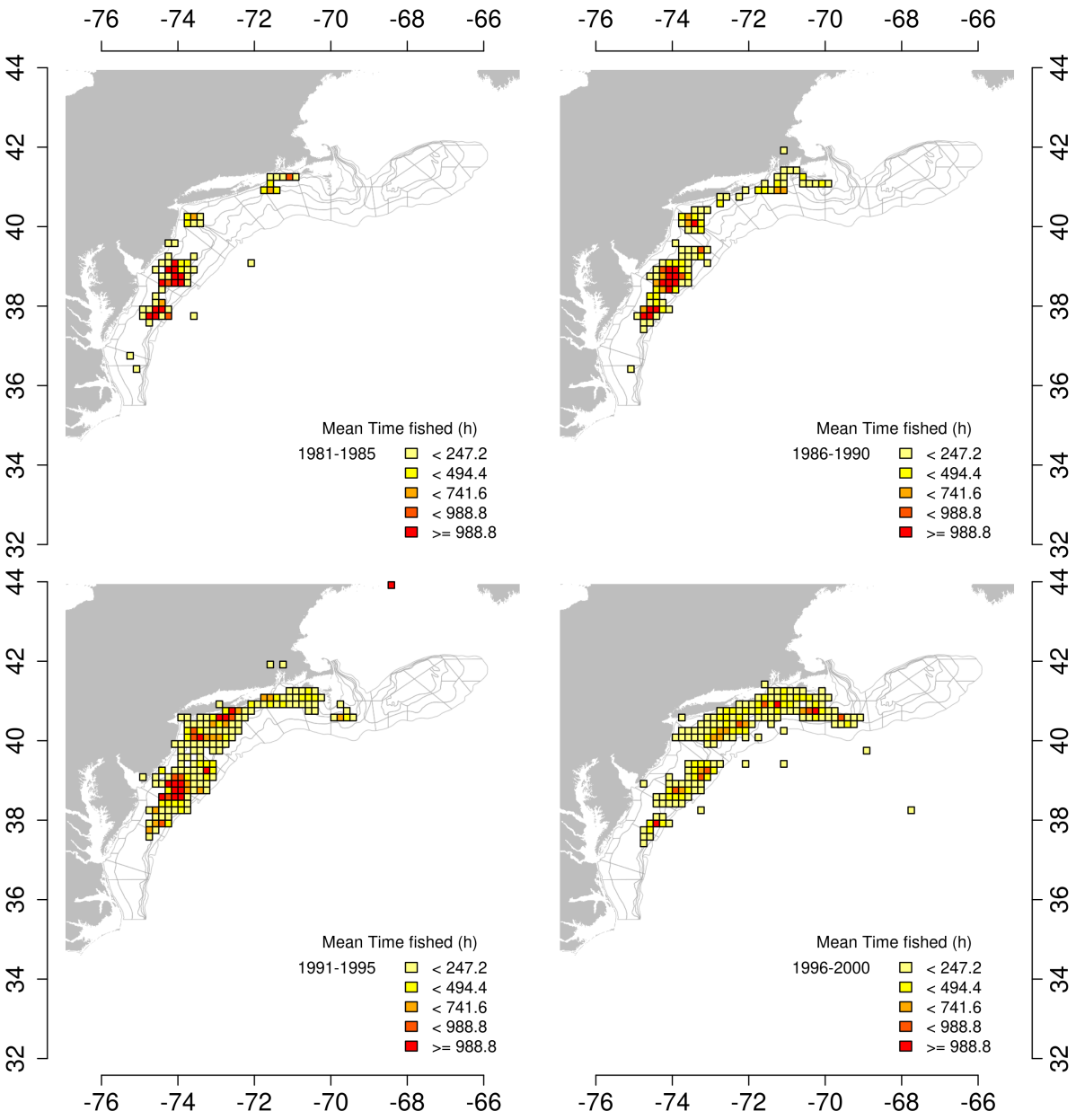

Figure 10. Average ocean quahog landings per unit effort (LPUE; bu. h^{-1}) by ten-minute squares over time, 1981-2000. Only squares where more the 5 kilo bushels were caught are shown. LPUEs are from a logbook database (SFOQVR). [4]

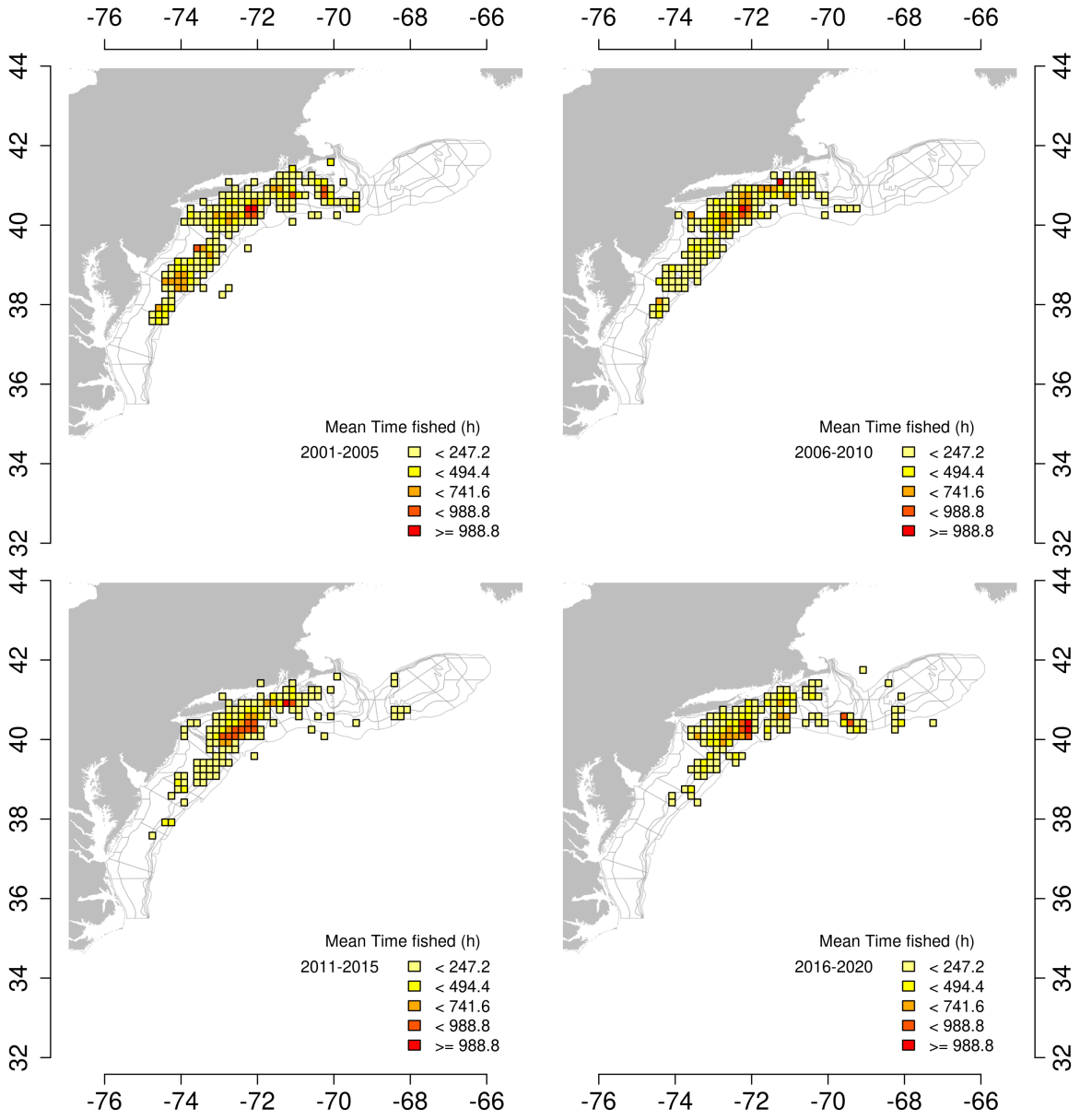

Figure 11. Average ocean quahog landings per unit effort (LPUE; bu. h-1) by ten-minute squares over time, 2001-2020. Only squares where more the 5 kilo bushels were caught are shown. LPUEs are from a logbook database (SFOQVR).[4]

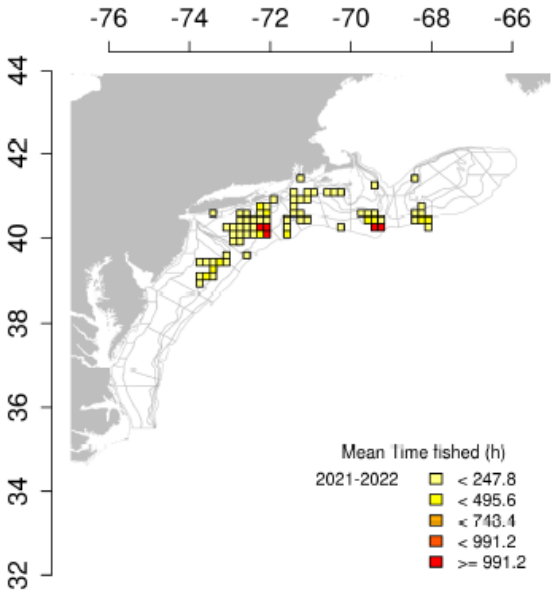

Figure 12. Average ocean quahog landings per unit effort (LPUE; bu. h-1) by ten-minute squares over time, 2021-2022. Only squares where more the 5 kilo bushels were caught are shown. LPUEs are from a logbook database (SFOQVR).[4]

Table 2. Federal fleet profile, 2012 through 2022.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Non-Maine Vessels Harvesting BOTH surfclam & ocean quahog	13	7	7	6	8	14	8	7	8	10	5
Non-Maine Vessels Harvesting only ocean quahog	7	6	9	9	10	9	8	8	8	6	7
Total Non-Maine Vessels	19	19	16	16	16	17	22	16	15	16	12
Maine Ocean Quahog Vessels	13	12	11	9	8	8	8	8	6	3	C

Source: NMFS clam vessel logbooks (SFOQVR). C = Confidential.

References

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

2. Fisheries Science Center. 2017. 63rd Northeast Regional Stock Assessment Workshop (63rd SAW) Assessment Summary Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 17-09; 28 p.

Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/publications.

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

4. Hennen, Dan. Personal Communication. April 5, 2023. NOAA Fisheries, Northeast Fisheries Science Center, 166 Water St., Woods Hole, MA 02543.