MEMORANDUM

DATE: May 29, 2014

TO: Surfclam and Ocean Quahog Committee and Council

FROM: Jessica Coakley, Staff

SUBJECT: Review of Atlantic Surfclam and Ocean Quahog Specifications 2014-2016 and Amendment 17 (Cost Recovery) to the Fishery Management Plan

As part of the 2014-2016 multi-year specification process for Atlantic surfclams and ocean quahogs, the Scientific and Statistical Committee (SSC) and Committee/Council review the most recent information available to determine whether modification of the current 2015 (or 2016) specifications is warranted. The following materials are enclosed on this subject:

1) Report of the May 2014 Meeting of the MAFMC SSC
2) Surfclam and Ocean Quahog Fishery Performance Report (April 2014)
3) Staff Recommendation Memo to Chris Moore (April 2014)
4) Atlantic Surfclam Information Document (April 2014)
5) Ocean Quahog Information Document (April 2014)

The Committee will review the alternatives under development in draft Amendment 17 (Cost Recovery) and provide input to the Fishery Management Action Team (FMAT) for continued Amendment development. The following materials are enclosed on this subject:

1) Action Plan to Develop Amendment 17 (Cost Recovery, Updating Biological Reference Points, Optimum Yield Range, and Essential Fish Habitat Updates; April 2014)
2) Draft Amendment 17 Alternatives (May 2014)
MEMORANDUM

DATE: 14 May 2014

TO: Richard M. Robins, Jr., MAFMC Chairman

FROM: John Boreman, Ph.D., Chair, MAFMC Scientific and Statistical Committee

SUBJECT: Report of the May 2014 Meeting of the MAFMC SSC

The SSC met in Baltimore, MD, on 7-8 May 2014 for the main purpose of developing ABC recommendations for Butterfish, Atlantic Mackerel, Longfin Squid, and Illex Squid in response to terms of reference provided by the MAFMC (Attachment 1), and reviewing ABC recommendations made previously for surfclams and ocean quahogs. The SSC also received updates on the newly revised National Standard 2 Guidelines as they pertain to SSCs, and discussed the list of MAFMC research priorities. The meeting agenda is attached (Attachment 2).

A total of 17 SSC members were in attendance on May 7th and 13 SSC members on May 8th (Attachment 3); a quorum was present for both days. Also in attendance were staff from the NMFS Northeast Fisheries Science Center, Council members and staff, and representatives from the fishing industry and general public.

All documents cited in this report can be accessed via the MAFMC SSC website (http://www.mafmc.org/ssc-meetings/2014/may-7-8-2014).

Butterfish

1) The materials considered in reaching its recommendations:

- NEFSC. 2014. SAW/SARC 58 panelist reports.
- NEFSC Fall index update, NEFSC Spring index update, and VIMS NEAMAP index update (spreadsheet files)
All documents are available on the MAFMC SSC website.

2) *The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the Omnibus Amendment:*

The SSC considers the Butterfish assessment to be a Level 3 assessment. The SSC noted that an OFL was provided by the assessment, but the SSC believed the estimates of uncertainty around the OFL developed in the assessment substantially underestimated the true level of uncertainty present.

To support this conclusion, the SSC notes that the CV on the natural mortality rate (M) from the assessment (0.05) is unrealistic given the life history of this species. The SSC also notes that the decision to use surveys from Fall only also reduces the apparent uncertainty in abundances estimated by the model.

3) *If possible, the level of catch (in weight) and the probability of overfishing associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy:*

The OFL developed in the assessment is an $F_{\text{msy}}$ proxy = $\frac{2}{3}M = 0.81$. The level of 2015 catch associated with this **OFL is 41,092 mt.**

4) *The level of catch (in weight) and the probability of overfishing associated with the acceptable biological catch (ABC) for the stock, the number of fishing years for which the ABC specification applies and, if possible, interim metrics that can be examined to determine if multi-year specifications need adjustment prior to their expiration:*

The SSC adopted a CV for the OFL of 100% based on a meta-analysis of OFL distributions that the SSC has used previously.

The SSC noted the role of Butterfish as a forage species that was not formally accounted for in the assessment. However, the SSC further noted that the foundation of the $F_{\text{msy}}$ proxy used Patterson’s (1992) paper, which considered forage species explicitly. Accordingly, the SSC considers Butterfish as exhibiting a typical life history.

The SSC applied the Council’s risk policy for $B/B_{\text{msy}} > 1$ and a $P^* = 0.4$ to generate a **2015 ABC = 33,278 mt.**

The SSC recommends a 3-year ABC specification. Using an F-based approach, which assumes the ABCs are harvested in each year, the SSC recommends the following ABCs:

<table>
<thead>
<tr>
<th>Year</th>
<th>Catch (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>31,412 mt</td>
</tr>
<tr>
<td>2017</td>
<td>30,922 mt</td>
</tr>
</tbody>
</table>
The SSC notes the historical performance of the fishery indicates that it has only rarely caught in excess of 30,000 mt. The SSC notes little empirical understanding exists of stock performance at the higher catch levels, as suggested by the ABCs. Therefore, the SSC will examine catch and updated indices in subsequent years. The SSC recommends that the projections used in subsequent years to calculate the ABCs for 2016 and 2017 be repeated using observed 2015 and 2016 catches.

5) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- The foundation for the OFL was *ad hoc* rather than being derived internally in the model.
- The application of an assumed q-value to estimate M, while novel and well thought out, contributes to uncertainty.
- The assessment was limited to a period of low stock productivity, well after a period of higher exploitation, which reduces the data contrast available to the model.
- Conflicting trends among seasonal surveys were not incorporated in the model.
- Model-based estimates of F are imprecise and particularly influenced by three years of low catch.
- There are residual trends in the survey data that might be explained by environmental or biotic (predation) factors that were not incorporated in the model.

6) Ecosystem considerations accounted for in the stock assessment, and any additional ecosystem considerations that the SSC took into account in selecting the ABC, including the basis for those additional considerations:

There were no specific ecosystem considerations in the population dynamic model. However, the OFL was based on a proxy that incorporated consideration of the role of Butterfish as a forage species. Additionally, the calculation of availability of the fish to the survey did incorporate considerations of temperature as a factor influencing fish distributions.

7) Prioritized research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level:

- Simulation studies to evaluate the uncertainty in the *ad hoc* $F_{msy}$ proxy;
- Develop reference points that are internal to the model;
- Develop a parallel catchability estimate for Spring surveys so that both Spring and Fall surveys could be included in the model;
- Evaluate approaches to include additional surveys, e.g., from States, in the assessment model;
- Analysis of spatial patterns in survey data to examine potential for changes in spatial distribution of the stock;
- Analyze additional estimation of consumptive demand of predators to identify critical periods of overlap of predators and prey; and
- Reconsider stock structure and degree of exchange with the South Atlantic stock component.

8) A certification that the recommendations provided by the SSC represent the best scientific information available.
To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

**Atlantic Mackerel**

1) *The materials considered in reaching its recommendations:*


All of the above documents are available on the MAFMC SSC website.

2) *The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the Omnibus Amendment:*

No new US assessment was presented to the SSC. A Canadian assessment was conducted in 2014. However, for both the prior US (Deroba, et al. 2010) and current Canadian (DFO 2014) assessments there is a substantial mismatch between the assessed area and the assumed total stock area. The SSC continues to judge assessments for Atlantic mackerel as Level 4 assessments.

3) *If possible, the level of catch (in weight) and the probability of overfishing associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy:*

Not possible. No acceptable estimate of OFL is available.

4) *The level of catch (in weight) and the probability of overfishing associated with the acceptable biological catch (ABC) for the stock, the number of fishing years for which the ABC specification applies and, if possible, interim metrics that can be examined to determine if multi-year specifications need adjustment prior to their expiration:*

The SSC concluded that the foundation that it used for developing its previous ABC – the average of the 2006-2008 catches – was inappropriate because 2006-2008 was a period of unusually high catches.

The SSC is unable to come up with a definitive ABC at this time because of concerns in the highly
periodic nature of historical catches. Therefore, the SSC proposes an interim 1-yr ABC equal to the median of the 1978-2013 joint Canadian and US harvests. This period was chosen as a time when fisheries operations have been relatively consistent and foreign fleets were not in operation. The median of these harvests is 40,165 mt (= ABC).

By next year the SSC, contingent on modest support from the Council, will extend analyses funded by the Council (Wiedenmann, et al. 2013) that considers the performance of data poor approaches to ABC determination to include highly periodic catch time series. Based on the results of these simulations the SSC expects to produce a revised 2016 ABC for this stock.

5) *The most significant sources of scientific uncertainty associated with determination of OFL and ABC:*

- Disparate trend between NEFSC trawl survey and both the commercial CPUE trend and landings together with Canadian egg survey data.
- Apparent, but not fully explainable changes in survey catchability, which may alias a number of unidentified factors.
- Surveys cover an unknown portion of entire range (variable availability).
- Using a bottom trawl survey gear for a semi-pelagic species may induce variation in the indices of abundance and obscure the signal.
- Lack of quantification of the linkage between US and Canadian catches.
- No Canadian discard information and poor precision of U.S. discard and recreational estimates (though likely low).
- Lack of progression of age classes in recent years.

6) *Ecosystem considerations accounted for in the stock assessment, and any additional ecosystem considerations that the SSC took into account in selecting the ABC, including the basis for those additional considerations:*

No additional ecosystem considerations were included.

7) *Prioritized research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level:*

- Conduct simulations of performance of data poor methods of ABC determination for stocks exhibiting periodic catches.
- Consider approaches to evaluate the potential for stock structure and movement throughout the species range.
- Evaluate egg production data from existing fishery independent surveys (e.g., Marmap and EcoMon) to evaluate patterns in reproduction of the stock in the US portion of its range, and to evaluate correlations in recruitment between US and Canadian reproduction.
- Give high priority to analyses and collection of fishery-dependent information (CPUE, age structure, etc.).
- Improve analyses of fishery-independent survey data to evaluate the distribution of positive tows and total catches.
- Explore patterns in consumption as an additional index of abundance.
- Collaborate with industry to explore the spatial and temporal pattern and variability in catch to evaluate issues of abundance and availability.
• Examine covariation among survey and fishery-dependent indices.
• Examine growth trajectories from different areas of the stock to evaluate possible stock structure.
• Evaluate spatial catch patterns in the small pelagic fisheries to identify “hot spots” of co-occurrence.
• Explore management complementarities among small pelagic fisheries (e.g., mackerel, Atlantic herring, and river herring).

The SSC also continues to endorse the research recommendations listed in the last TRAC assessment:

• Explore opportunities for the development of alternative indices of abundance.
• Attempt to develop total stock abundance.
• Initiate broad scale international egg surveys covering potential spawning habitat that is consistently representative of the total stock area, including the shelf break. Investigate potential to conduct work in cooperation with commercial fishing industry (priority: high, long term).
• Explore spatial distribution of stock relative to the mixing of the northern and southern ‘contingents’ of mackerel i.e. tagging, genetics, chemical assay, microchemistry of otoliths (priority: high, medium-long term).
• Explore influence of environmental factors on spatial distribution of the stock e.g. rate of mixing and distribution of stock relative to the survey area (high priority, short term).
• Extend predation estimates to include DFO data and entire predator spectrum (marine mammals, highly migratory species).
• Examine methodology for incorporating consumptions estimates in the assessment.
• Quantify the magnitude of additional sources of mortality in Canada including the bait fishery, recreational catch and discards (high priority; short term).
• Explore bottom trawl characteristics for catchability of mackerel.
• Participate with industry in investigating the contemporary overlap of survey stock area, commercial fishery, and mackerel distribution and explore historical databases for the same purpose to better understand interpretation of abundance indices (survey, cpue) (medium term).
• Collaborate with industry to investigate alternative sampling gear (i.e. jigging) to survey adult abundance (long term).
• Explore MARMAP database relative to spatial distribution of survey indices.
• Investigate alternative assessment models that incorporate spatial structure (i.e., northern and southern contingents, different age groups).
• Explore alternative assessment models that incorporate covariates.
• Initiate a technical TRAC WG in order to advance and monitor progress of research recommendations.

8) A certification that the recommendations provided by the SSC represent the best scientific information available.

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Following SSC agreement on responses to the terms of reference, Kiersten Curti led a discussion on what it would take to improve the assessment of Atlantic mackerel. She outlined shorter-term and longer-term projects that would provide scientific information useful in an assessment. Shorter-term projects involve studies of stock structure, availability, catchability, natural mortality, and an otolith exchange program with Fisheries and Oceans Canada. Efforts are already underway to address stock
structure and availability, but have not yet begun for the other shorter-term projects. Longer-term projects, also not yet begun, would include sampling the entire range of the stock and investigating approaches to ecosystem modeling of the stock’s dynamics.

**Longfin Squid**

1) The materials considered in reaching its recommendations:


All of the above documents are available on the MAFMC SSC website.

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the Omnibus Amendment:

The SSC determined that this is a Level 4 assessment. Although an assessment is available from 2010 (Northeast Fisheries Science Center 2011), it did not contain an OFL.

3) If possible, the level of catch (in weight) and the probability of overfishing associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy:

Not possible. No acceptable estimate of OFL is available.

4) The level of catch (in weight) and the probability of overfishing associated with the acceptable biological catch (ABC) for the stock, the number of fishing years for which the ABC specification applies and, if possible, interim metrics that can be examined to determine if multi-year specifications need adjustment prior to their expiration:

The SSC recommends an ABC for a three-year period (2015, 2016, and 2017) equal to the catch in the year of the highest exploitation ratio (1993). Thus, the recommended ABC is **23,400 mt**, the same as was previously set for 2012-2014 by the SSC, which occurred during a period of apparent relatively light exploitation (1976-2009) according to the 2010 longfin squid assessment.

5) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- Surveys cover unknown portion of entire range (variable availability) – the range may extend beyond survey coverage;
- Poor precision of U.S. discard estimates;
• Using a bottom trawl survey gear for a semi-pelagic species may induce variation in the indices of abundance and obscure the true signal;
• Highly variable survey trends;
• Highly variable natural mortality;
• Extremely short life-span (less than 1 year), and unknown, but likely high, impact of environmental factors on recruitment;
• Because of its short life span, its high rate of natural mortality and the delay in collating survey and catch information, there is an inherent lag in information pertaining to the current state of the stock; and
• Inability to distinguish between inter-seasonal differences in productivity and inter-seasonal differences in catchability.

6) Ecosystem considerations accounted for in the stock assessment, and any additional ecosystem considerations that the SSC took into account in selecting the ABC, including the basis for those additional considerations:

No ecosystem considerations were used in the 2010 assessment, nor used in the SSC’s ABC determination.

7) Prioritized research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level:

• Explore alternative weightings of semi-annual surveys other than simple averaging.
• Understanding the spatial coverage and availability to the surveys.
• Examine the performance of the squid fisheries and related fisheries in relation to the regulatory measures with a view towards improving the economics of the fisheries.
• Evaluate approaches to real time management including expanding age and growth studies to better estimate average growth patterns and to discern seasonal productivity/catchability patterns.
• Evaluate methods of incorporating ecological relationships, predation, and oceanic events that influence abundance and availability.
• Until real-time assessment is feasible, expand cohort analysis to refine stock assessments and their incorporation of seasonal indices (currently spring and fall are just averaged).
• Refine understanding of stock range and structure (especially proportion of stock inhabiting 400-800 m when NEFSC fall survey is conducted).
• Refine understanding of catchability in surveys (especially NEAMAP).

8) A certification that the recommendations provided by the SSC represent the best scientific information available.

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.
**Illex Squid**

1) The materials considered in reaching its recommendations:


All of the above documents are available on the MAFMC SSC website.

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the Omnibus Amendment:

The SSC decided that *Illex* is a Level 4 assessment. No acceptable estimate of OFL is available. The last benchmark assessment for *Illex* was conducted in 2006.

3) If possible, the level of catch (in weight) and the probability of overfishing associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy:

Not possible. No acceptable estimate of OFL is available.

4) The level of catch (in weight) and the probability of overfishing associated with the acceptable biological catch (ABC) for the stock, the number of fishing years for which the ABC specification applies and, if possible, interim metrics that can be examined to determine if multi-year specifications need adjustment prior to their expiration:

The SSC recommends a 2015-2017 multi-year ABC specification of **24,000 mt** (the same as was previously set for 2012-2014 by the SSC). This is based on the observation that landings of 24,000 - 26,000 mt do not appear to have caused harm to the *Illex* stock, based on indices and landings in years following when landings were in the range of 24,000 mt - 26,000 mt. Landings and indices vary within a wide range, although 2013 landings were low and indices have been trending lower in recent years and were below the long-term median in 2013. The SSC also notes that the observed decline in average size of *Illex* in the survey since 1985 suggests an increase in the exploitation rate as a possible explanatory factor. Other explanatory factors include changes in environmental variables, a possible change in the timing of the survey, and/or an increase in predation-related mortality.

The method used by the SSC for setting the ABC assumes that the stock has been lightly exploited.

The SSC recommends that a benchmark assessment or a research track examining the effects of environmental variables on survey trends in *Illex* be undertaken by 2017, which would be 11 years since the last benchmark assessment was conducted.
5) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- Surveys cover an unknown portion of the entire range (leading to variable availability);
- Poor precision of U.S. discard estimates (but of low magnitude);
- Using a bottom trawl survey gear for a semi-pelagic species may induce variation in the indices of abundance and obscure the true signal;
- LPUE values are sensitive to availability;
- Highly variable natural mortality;
- Extremely short life-span (less than 1 year), and unknown, but likely high, impact of environmental factors on recruitment and growth; and
- No available estimates of biological reference points (F & B), and no estimates of recent biomass and/or fishing mortality.

6) Ecosystem considerations accounted for in the stock assessment, and any additional ecosystem considerations that the SSC took into account in selecting the ABC, including the basis for those additional considerations:

No ecosystem considerations were taken into account by the SSC in setting the ABCs.

7) Prioritized research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level:

- Collect demographic information on growth, maturation, mortality, and reproduction by sex, season, and cohort.
- Consider a length-based assessment with a sub-annual time step, undertaking cooperative research with the fishing industry.
- Expand investigations into oceanographic correlates with trends in recruitment, growth, and abundance.
- Investigate range and range dynamics at depths >185 m.
- Refine between-vessel survey calibration estimate for Illex, and consider a size-based calibration.
- Analyze the change in availability of Illex to the survey and fishery, resulting from long-term changes in climate or other oceanographic factors.
- Consider an Illex index standardization for the NEFSC trawl survey.
- Explore the reasons for the decline in average size of Illex caught in the survey since 1985.
- Compare predator consumption estimates to total catch.

8) A certification that the recommendations provided by the SSC represent the best scientific information available.

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.
Surf Clams and Ocean Quahogs

Jessica Coakley presented updated catch data and survey indices, as well as the 2014 fishery performance reports for Surf Clams and Ocean Quahogs. Based on the information presented, the SSC saw no compelling reason to alter their 2015 ABC recommendation for either species.

During the course of discussion, the SSC was informed about the New England Council’s proposed omnibus habitat amendment. The SSC agreed that there might be aspects of the NEFMC’s amendment process where input from the MAFMC SSC might be beneficial, but deferred to the MAFMC for further direction.

Other Topics

MAFMC Research Priorities

The SSC discussed potential ways to prioritize research needs identified in the MAFMC’s Five Year Research Priority Plan. Previous SSC discussion on this topic revealed reluctance on the part of the SSC to invest much time on this task if those in a position to implement the research priority plan remain unresponsive. However, recent discussion on the topic of developing and implementing a research plan for the NE region at the May NRCC meeting indicated that managers do indeed intend to work more aggressively to implement research programs that address needs identified by the Councils. In particular, MAFMC leadership has a keen interest in insuring that agency research programs systematically address research needs identified by the MAFMC.

The SSC noted some redundancy in the general research needs category, warranting some consolidation of these topics. The need for the MAFMC to articulate an overall goal for the research plan is highly desirable – the current research priority plan essentially represents a stock assessment improvement wish list. Research that better integrates social and economic impacts into the Council’s management program needs to be highlighted, as is the need for management strategy evaluations, although approaches in this regard need not be overly complex. Research that addresses scientific uncertainty in biological reference points should also be identified as a high priority.

SSC members agreed to send comments to staff on the research priority plan by 20 May 2014. SSC members Mark Holliday and Brian Rothschild agreed to work with MAFMC staff on prioritization of research needs across species and across fisheries.

Revised National Standard 2 Guidelines

John Boreman briefly reviewed the revised guidelines, published within the last year in the Federal Register, which contain several new provisions related to SSC operations. Most of the revisions are already being practiced by our SSC. Among these provisions are confirmation that SSC members can serve on peer review panels, such as SAW/SARC and SEDAR; all science information passing to the Councils needs to be vetted through the respective SSC (i.e., science information related to setting annual catch limits cannot pass directly from a peer review to a Council); the SSC may provide an ABC recommendation to the Council that is inconsistent with the findings of a peer review, as long as it is
justified; and the SSC should certify that its scientific recommendations are based on the best scientific information available.

cc: SSC Members, Lee Anderson, Chris Moore, Rich Seagraves, Jason Didden, Jessica Coakley, Jose Montañez, Kiersten Curti, Chuck Adams, Fred Serchuk
The SSC will provide a written report that identifies the following for up to three fishing years (2015-2017):

1) The materials considered in reaching its recommendations;
2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the Omnibus Amendment;
3) If possible, the level of catch (in weight) and the probability of overfishing associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy;
4) The level of catch (in weight) and the probability of overfishing associated with the acceptable biological catch (ABC) for the stock, the number of fishing years for which the ABC specification applies and, if possible, interim metrics that can be examined to determine if multi-year specifications need adjustment prior to their expiration;
5) The most significant sources of scientific uncertainty associated with determination of OFL and ABC;
6) Ecosystem considerations accounted for in the stock assessment, and any additional ecosystem considerations that the SSC took into account in selecting the ABC, including the basis for those additional considerations;
7) Prioritized research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level;
8) A certification that the recommendations provided by the SSC represent the best scientific information available.
Mid-Atlantic Fishery Management Council  
Scientific and Statistical Committee  
May 7-8, 2014  
Baltimore, MD  
Draft Agenda

Wednesday   May 7, 2014
0900  Butterfish OFL/ABC Recommendations for 2015-2017 (Adams/Didden)
1200  Lunch
1300  Butterfish (cont.)
1400  Atlantic mackerel multi-year ABC review; Research Track Assessment Development (Curti/Didden)
1530  Multi-year ABC for Illex and Long-finned Squid (Hendrickson/Didden)
1700  Adjourn

Thursday May 8, 2014
0800  Squid multi-year ABC cont. (if necessary)
0900  Fishery Performance Reports for Surf clams and Ocean quahogs (Coakley/Montanez)
1100  Research Plan Development (Seagraves)
1230  Other Business
1300  Meeting adjourns
MAFMC Scientific and Statistical Committee
7-8 May 2014 Meeting
Baltimore, MD

Name
Affiliation

SSC Members in Attendance:
John Boreman (SSC Chairman)  North Carolina State University
Tom Miller (SSC Vice-Chair) (5/7 only)  University of Maryland - CBL
Mike Wilberg  University of Maryland - CBL
Doug Lipton (5/7 only)  NMFS
Ed Houde  University of Maryland - CBL
Doug Vaughan  NMFS (retired)
Olaf Jensen  Rutgers
Yan Jiao  Virginia Tech
Bonnie McCay  Rutgers University
Dave Secor (5/7 only)  University of Maryland – CBL
Sunny Jardine  University of Delaware
Brian Rothschild  University of Massachusetts - Dartmouth
David Tomberlin  NMFS Office of Science and Technology
Mark Holliday  NMFS Office of the Assistant Administrator
Mike Frisk  Stony Brook University
Rob Latour  VIMS
Cynthia Jones (5/7 only)  Old Dominion University

Others in attendance:
Rich Seagraves  MAFMC staff
Jose Montañez  MAFMC staff
Jason Didden  MAFMC Staff
Jessica Coakley (5/8 only)  NMFS Northeast Fisheries Science Center
Chuck Adams (5/7 only)  NMFS Northeast Fisheries Science Center
Kiersten Curti (5/7/only)  MAFMC Vice-chair
Lee Anderson  GSSA
Greg DiDomenico (5/7 only)  Lunds Seafoods, MAFMC Member
Jeff Kaelin  Rutgers University
Laura Palamara (5/7 only)  NMFS Northeast Fisheries Science Center
John Manderson  Wallace and Associates
Pete Jensen (5/8 only)  Sea Watch International
Tom Alspach (5/8 only)  Sea Watch International
Guy Simmons (5/8 only)
The Council's Surfclam and Ocean Quahog Advisory Panel met on April 23, 2014 via webinar and in-person at the Council office to review 2014 data updates to the Surfclam and Ocean Quahog AP information documents and revise the fishery performance report based on advisor perspectives on these fisheries.

**Council Advisors that Attended the Meeting:** Thomas Alspach, Thomas Dameron, Joseph Lacotte, Michael LaVecchia, Samuel Martin, David Wallace  
**Staff and Scientific and Statistical Committee:** John Boreman (SSC), Ed Houde (SSC), Jessica Coakley (Staff), José Montañez (Staff)  
**Public:** Peter Himchak, Tom Hoff, Pete Jensen, Tony Kratowicz

**Surfclam and Ocean Quahog**

**Critical Issues**

- The most critical current challenge to the surfclam and ocean quahog fishery is the New England Council's Omnibus Habitat Amendment which has the potential to ban bottom tending mobile gear (including clam dredges) from high energy sand environments where the surfclam and ocean quahogs fishery is the only fishery being prosecuted. This action has the potential impact on the spatial distribution of the fishery, which will result in biological impacts as well as social and economic impacts. It also impacts the Mid-Atlantic Council's ability to manage its jurisdictional fishery for surfclam and ocean quahogs.

**Market Issues**

- For surfclams and ocean quahogs, there are occasional landings in Ocean City, MD. 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, Hyannis, MA (surfclams only), and New Bedford, MA. Vessels have been moving North and shifting effort (Tables 2 a,b of Information Documents).

- For Maine quahogs, the quahogs have increased to sizes larger than the preferred small size for the market, which explains the decline in the catch rates for Maine quahogs.

- A major reason clam plants have been closed over the last 20 years has been wastewater. Two plants recently had permits coming due and closed because of the wastewater requirement and capital investments needed to meet permit limits.

- Another reason for recent consolidation has been the cost of fuel prices and the distance needed to travel to harvest clams - which cascades through the vessel, processors, ports, etc., and has put greater economy on scale and location. Vessel discharge permits will be additional costs, and
will affect both vessels and docks. Vessels that have ballast tanks are required to have a vessel discard permit for those vessels greater than 79 ft.

- The cost of complying regulatory function has increased. Prior to 1990, there were already great regulatory costs (e.g., Clean Water Act, Clean Air Act, and other fisheries related regulations). Since the individual transferrable quota (ITQ) went into place to the present, the regulatory function has increased substantially (e.g., coast guard, habitat requirements, bycatch species (marine mammals), etc.) and the cost of staying up to date and following the regulatory requirements (complexity and number) is expanding.

- Vessels built after July 2013 will need to be "classed", and then subsequently kept in that class by inspections, which created significant cost considerations.

- The push to comply with global food safety requirements/initiatives and sustainability certification lead to additional costs. The global food safety ratings are being required by buyers, and if not satisfied could lead to buyers choosing not to use specific suppliers. The Marine Fisheries Advisory Committee (MAFAC) has recommended that NOAA Fisheries use their inspection service to develop sustainability certifications for US seafood similar to the Marine Stewardship Council (MSC) and other independent groups.

- The seafood imported into the US needs to be compliant with hazard analysis and critical control points (HACCP) but may not have to meet the third party audits, which makes the domestic seafood more expensive. During a recertification process, it becomes more stringent than the initial certification ("keep raising the bar"); the facility could be found not compliant.

- 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 market place. The limit in demand for clams in the market is driven by many market factors including foreign seafood competition, other products in the marketplace (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.

**Environmental and Ecological Issues**

- Many species (including surfclams and ocean quahogs) are moving toward the poles or into deeper waters. This movement is temperature driven. Historically, about half the quota for quahogs used to be taken in the area off the Southern area. The surfclams are increasing in these Southern areas, possibly because of the faster growth rates for surfclams settling when compared to quahogs. Some of the Southern beds that used to be quahog beds now have surfclam recruitments.

- The natural shift in the stocks distribution northwards has driven the movement of the fishery (Tables 2a,b of Information Documents).
- The issue of bottom tending mobile gear impacts on habitat will continue to be a concern. The environmental community is focused on these issues and there has been a push for increased closures as a tool to reduce habitat impacts. Many of these approaches used are not always based on the best available information to describe impacts and possible approaches. Amendment 17 (Cost Recovery Amendment) will also review and update if needed any essential fish habitat (EFH) and fishery impacts for surfclams and ocean quahogs. The spatial area for the fishery is small and the gear impacts are considered to be minimal and temporary in nature, due to the high energy sand environments.

- Two positive aspects to support the sustainability of the surfclam and ocean quahog resources include, 1) the opening of Georges Bank has mitigated some of the prior concerns by providing access to more, larger clams and alleviating some of the fishing pressure from the Southern areas, 2) there are ongoing discussions and research projects examining how best to protect small clam areas and increase productivity of the surfclam and quahog stocks (Science Center for Marine Fisheries; SCeMFiS).

Management Issues & Management Induced Effort Shifts

- The Mid-Atlantic Council needs to be more involved in habitat issues (and other issues) that are being proposed through the New England Council process. Many gear or fishery closures are being proposed for species such as groundfish, that will impact surfclam, ocean quahog, and other fisheries (e.g., Georges Bank, Great South Channel, and Nantucket Shoals, etc.). The Council now has additional seats on the Habitat Committee to better engage with the New England Council on issues that affect surfclams and ocean quahogs. Advisors urge the Mid-Atlantic Council to appoint members from states that are most engaged and knowledgeable about these fisheries. For industry, keeping up to date and being proactive about what is being proposed is an additional cost. Small fishermen are less able to afford to send people to meetings to stay engaged on the issues.

General Fishing Trends

- Effort is moving northward because the catch rates are higher resulting in a smaller footprint from dredging activity on habitat (Tables 2a,b of Information Documents).

- The larger vessels will be accessing Georges Bank, because of the distances traveled and effects of weather. Nantucket Shoals is a smaller boat fishery.

- The larger surfclam vessels going to Georges Bank has taken pressure off some of the nearshore areas, and Southern areas.

- The landings per unit effort (LPUE) may not be indicative of abundance because it only reflects the fishing occurring in a few ten minute squares. The Stock Assessment Review Committee (SARC) panel recommended a more detailed analysis be undertaken on LPUE, and did not make definitive conclusions about the utility of LPUE as an index of abundance. The advisors noted that the LPUE's in the 1970's and 1980's were lower, then increased, and then decreased again. The Advisors were concerned that some of the figures in the CRD13-04 did not include these
longer time series showing those initial lower levels. These longer time series figures are in the final assessment report.

**Other Issues**

- The group would like to see *status quo* quotas for the upcoming fishing years; the stability in the quota translates into stability in the fishery and market.

- The new SCeFiS is industry and National Science Foundation (NSF) supported and has several ongoing research projects: 1) shell breakage studies for surfclams and ocean quahogs to reduce survey uncertainty in abundance estimates, 2) modified selectivity dredge design work with tighter bar spacing to improve selectivity gear for surveys (and remove need to line with chicken wire), 3) targeted investigations of biological reference point development for black sea bass, surfclams, and ocean quahogs, and, 4) a management strategy evaluation (MSE) which examines spatial management approaches, including rotational and regional closures.

- Some advisors expressed concerns about the conclusions included in the ocean quahog assessment update provided by the Northeast Fisheries Science Center (NEFSC) last year (Chute A., Hennen D, Russell R, Jacobson L. 2013. Stock Assessment Update for Ocean Quahogs (*Arctica islandica*) through 2011. NEFSC Ref Doc 13-17; 156 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at [http://nefsc.noaa.gov/publications/](http://nefsc.noaa.gov/publications/)). Specifically, there were concerns about the statements that, "Based on assessment data, the ocean quahog population is an unproductive stock with infrequent recruitment, and thus vulnerable to overfishing. After three decades of fishing at a low F, the stock as a whole is being fished down.", and that, "Recruitment events appear to be localized and separated by decades, although survey length frequencies show that a low level of recruitment occurs on a continuous basis. The potential contribution of this recruitment to stock biomass and productivity is unknown." Although these statements were made, the stock has declined by about 15% over the last three decades showing little cause for concern from the industry perspective.
MEMORANDUM

Date: April 17, 2014
To: Chris Moore, Executive Director
From: Jessica Coakley and José Montañez, Staff
Subject: Surfclam and Ocean Quahog Specifications Review for 2015 Fishing Year

As part of the 2014-2016 multi-year specification process for Atlantic surfclams and ocean quahogs, the Scientific and Statistical Committee (SSC) and Council will review the most recent information available to determine whether modification of the current 2015 specifications is warranted.

The NMFS Northeast Fisheries Science Center provided a data update for surfclams and ocean quahogs to support this review, which includes updated catch and landings data and landings-per-unit-effort data.

Based on a review of this information, staff recommends no change to the 2015 fishing year specifications.

In 2015, the SSC and Council will again review the most recent information to determine if any changes to the 2016 fishing year are warranted.
Mid-Atlantic Fishery Management Council

Atlantic Surfclam Information Document - April 2014

Management System

The Fishery Management Plan (FMP) for Atlantic surfclam (*Spisula solidissima*) became effective in 1977. The FMP established the management unit as all Atlantic surfclams in the Atlantic EEZ. The FMP is managed by the Mid-Atlantic Fishery Management Council (Council), in conjunction with the National Marine Fisheries Service (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 New York and New Jersey. The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org

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. 1999a). An electronic version is available at the following website: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. Additional information on this species is available at the following website: http://www.nefsc.noaa.gov/sos/. A summary of the basic biology is provided below.

Atlantic surfclams are distributed along the western North Atlantic Ocean from the southern Gulf of St. Lawrence to Cape Hatteras. Surfclams occur in both the state territorial waters (≤ 3 mi from shore) and within the 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, surfclams are found from the intertidal zone to a depth of about 60 meters, but densities are low at depths greater than 40 meters.

The maximum size of surfclams is about 22.5 cm (8.9 inches) shell length, but surfclams larger than 20 cm (7.9 inches) are rare. The maximum age exceeds 30 years and surfclams of 15-20 years of age are common in many areas. Surfclams are capable of reproduction in their first year of life, although full maturity may not be reached until the second year. Eggs and sperm are shed directly into the water column. Recruitment to the bottom occurs after a planktonic larval period of about three weeks.

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

The Atlantic surfclam stock assessment was peer reviewed and approved for use by management at Stock Assessment Workshop 56 (SAW 56). A statistical catch at age and length model called SS3 was used and incorporates age and length structure. Reports on “Stock Status,” including annual assessment and reference point update reports, SAW reports, and Stock Assessment Review Committee (SARC) panelist reports are available online at the NEFSC website: http://www.nefsc.noaa.gov

The Atlantic surfclam resource in the US EEZ is not overfished and overfishing is not occurring in 2011 (NEFSC 2013). Estimated biomass of the entire resource during 2011 (approximate 120+ mm shell length, SL) was 1,060 thousand mt (2,337 million lbs), with a 95% confidence interval of 802 - 1,401 thousand mt meats (NEFSC 2013). The 95% confidence interval overlaps the $B_{\text{Target}} = \frac{1}{2} B_{1999} = 972$ thousand mt meats (2,142 million lbs) but is entirely above $B_{\text{Threshold}} = \frac{1}{2} B_{\text{Target}} = 486$ thousand mt meats (1,071 million lbs; Figure 1). Estimated annual fishing mortality during 2011 for the entire resource was $F = 0.027$ (95% confidence interval 0.016 - 0.045), which is entirely below the overfishing threshold $F_{\text{MSY}}$ proxy $= M = 0.15$ (Figure 2).

Estimated biomass on Georges Bank during 2011 (ages 7+, approximately 120+ mm shell length, SL) was 357 thousand mt of meats (787 million lbs) with a 95% confidence interval 252 - 506 mt. Surfclams on Georges Bank were not fished from 1990 to 2008 due to the risk of paralytic shellfish poisoning (PSP). There was light fishing in years 2009-2011 under an exempted fishing permit. Fishing mortality on Georges Bank was close to zero ($F_{2011} = 0.009$; 95% confidence interval 0.006 - 0.013) during 2011. Estimated biomass of the southern area during 2011 (ages 6+, approximately 120+ mm shell length, SL) was 703 thousand mt (1,549 million lbs), with a 95% confidence interval of 481 - 1,028 thousand mt meats (Figure 3). Estimated fishing mortality during 2011 for the southern area was $F = 0.037$ (95% confidence interval 0.025 - 0.056) (Figure 4). Recruitment (age 0) has been below average for the whole stock since 1999 (Figure 5).
Figure 1. Whole stock biomass status estimates with approximate 95% confidence intervals on the estimates and reference points. Source: Stock Assessment Summary (NEFSC 2013).

Figure 2. Whole stock fishing mortality estimates with approximate 95% confidence intervals, and the overfishing threshold. Source: Stock Assessment Summary (NEFSC 2013).
Figure 3. Southern area biomass estimates, and biomass reference points with approximate 95% confidence intervals. Source: Stock Assessment Summary (NEFSC 2013).

Figure 4. Southern area fishing mortality estimates and with approximate 95% confidence intervals, and the overfishing threshold. Source: Stock Assessment Summary (NEFSC 2013).
Description of the Fishery and Market

The commercial fishery for surfclam in Federal waters is prosecuted with large vessels and hydraulic dredges. Surfclam landings and commercial quotas are given below in Tables 1 and 2. The distribution of the fishery has changed over time, as shown in Figures 6 and 7.

Port and Community Description

When Amendment 13 to the FMP was developed, the Council hired Dr. Bonnie McCay and her associates at Rutgers University to describe the ports and communities that are associated with the surfclam and ocean quahog fisheries. The researchers did an extensive job characterizing the three main fisheries (non-Maine ocean quahog, Maine ocean quahog, and surfclam). The McCay team characterizations of the ports and communities are based on government census and labor statistics and on observations and interviews carried out during the late 1990s and in the fall of 2001. The description of the fishing gear, areas fished, etc. are fully described in Amendment 13.

Communities from Maine to Virginia are involved in the harvesting and processing of surfclams and ocean quahogs. Ports in New Jersey and Massachusetts handle the most volume and value, particularly Atlantic City and Point Pleasant, New Jersey, and New Bedford, Massachusetts. There are also landings in Ocean City, Maryland, and the Jonesport and Beals Island areas of Maine.

Additional information on "Community Profiles for the Northeast US Fisheries" can be found at: http://www.nefsc.noaa.gov/read/socialsci/communityProfiles.html
### Table 1. Federal Surfclam Quotas and Landings: 1998 - 2016.

<table>
<thead>
<tr>
<th>Year</th>
<th>Landings&lt;sup&gt;a&lt;/sup&gt; ('000 bu)</th>
<th>Quota ('000 bu)</th>
<th>% Harvested</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>2,365</td>
<td>2,565</td>
<td>92%</td>
</tr>
<tr>
<td>1999</td>
<td>2,539</td>
<td>2,565</td>
<td>99%</td>
</tr>
<tr>
<td>2000</td>
<td>2,565</td>
<td>2,565</td>
<td>100%</td>
</tr>
<tr>
<td>2001</td>
<td>2,855</td>
<td>2,850</td>
<td>100%</td>
</tr>
<tr>
<td>2002</td>
<td>3,113</td>
<td>3,135</td>
<td>99%</td>
</tr>
<tr>
<td>2003</td>
<td>3,241</td>
<td>3,250</td>
<td>100%</td>
</tr>
<tr>
<td>2004</td>
<td>3,138</td>
<td>3,400</td>
<td>92%</td>
</tr>
<tr>
<td>2005</td>
<td>2,744</td>
<td>3,400</td>
<td>81%</td>
</tr>
<tr>
<td>2006</td>
<td>3,057</td>
<td>3,400</td>
<td>90%</td>
</tr>
<tr>
<td>2007</td>
<td>3,231</td>
<td>3,400</td>
<td>95%</td>
</tr>
<tr>
<td>2008</td>
<td>2,919</td>
<td>3,400</td>
<td>86%</td>
</tr>
<tr>
<td>2009</td>
<td>2,602</td>
<td>3,400</td>
<td>77%</td>
</tr>
<tr>
<td>2010</td>
<td>2,332</td>
<td>3,400</td>
<td>69%</td>
</tr>
<tr>
<td>2011&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2,443</td>
<td>3,400</td>
<td>72%</td>
</tr>
<tr>
<td>2012&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2,341</td>
<td>3,400</td>
<td>69%</td>
</tr>
<tr>
<td>2013&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2,390</td>
<td>3,400</td>
<td>70%</td>
</tr>
<tr>
<td>2014&lt;sup&gt;c&lt;/sup&gt;</td>
<td>359&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3,400</td>
<td>NA</td>
</tr>
<tr>
<td>2015&lt;sup&gt;e&lt;/sup&gt;</td>
<td>NA</td>
<td>3,400</td>
<td>NA</td>
</tr>
<tr>
<td>2016&lt;sup&gt;e&lt;/sup&gt;</td>
<td>NA</td>
<td>3,400</td>
<td>NA</td>
</tr>
</tbody>
</table>

<sup>a</sup> 1 surfclam bushel is approximately 17 lb.  
<sup>b</sup> The Scientific and Statistical Committee (SSC) recommended an overfishing limit (OFL) for 2010, 2011, 2012, and 2013 of 129,300 mt, 114,00 mt, 102,300 mt, and 93,400 mt, respectively, and an acceptable biological catch (ABC) of 96,600 mt (2011-2013).  
<sup>c</sup> For 2014-2016, the SSC recommended an OFL of 81,150 mt, 75,178 mt, 71,512 mt, respectively, and an acceptable biological catch (ABC) of 60,313 mt, 51,804 mt, 48,197 mt, respectively.  
<sup>d</sup> Incomplete landings year.  
NA = Not yet available.  
Source: NMFS Clam Vessel Logbook Reports.

a) mt meats

<table>
<thead>
<tr>
<th>Year</th>
<th>Southern VA</th>
<th>Delmarva</th>
<th>NJ</th>
<th>LI</th>
<th>Southern New England</th>
<th>Georges Bank</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>0</td>
<td>1,977</td>
<td>14,825</td>
<td>1,798</td>
<td>1,444</td>
<td>11</td>
<td>9</td>
<td>20,064</td>
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<tr>
<td>2010</td>
<td>0</td>
<td>1,556</td>
<td>11,064</td>
<td>1,181</td>
<td>2,870</td>
<td>1,311</td>
<td>2</td>
<td>17,984</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>1,445</td>
<td>12,036</td>
<td>409</td>
<td>2,552</td>
<td>2,387</td>
<td>10</td>
<td>18,839</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>3,763</td>
<td>6,171</td>
<td>305</td>
<td>4,119</td>
<td>3,560</td>
<td>94</td>
<td>18,012</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>3,585</td>
<td>5,329</td>
<td>231</td>
<td>4,862</td>
<td>4,369</td>
<td>57</td>
<td>18,433</td>
</tr>
</tbody>
</table>

b) bushels ('000)

<table>
<thead>
<tr>
<th>Year</th>
<th>Southern VA</th>
<th>Delmarva</th>
<th>NJ</th>
<th>LI</th>
<th>Southern New England</th>
<th>Georges Bank</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>0</td>
<td>256</td>
<td>1,923</td>
<td>233</td>
<td>187</td>
<td>1</td>
<td>1</td>
<td>2,602</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>202</td>
<td>1,435</td>
<td>153</td>
<td>372</td>
<td>170</td>
<td>0</td>
<td>2,332</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>187</td>
<td>1,561</td>
<td>53</td>
<td>331</td>
<td>310</td>
<td>1</td>
<td>2,443</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>488</td>
<td>800</td>
<td>40</td>
<td>534</td>
<td>462</td>
<td>12</td>
<td>2,336</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>465</td>
<td>691</td>
<td>30</td>
<td>631</td>
<td>567</td>
<td>7</td>
<td>2,390</td>
</tr>
</tbody>
</table>
Figure 6. Surfclam landings by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, for 1979, 1989, 1999, and 2009 (1 kilobushel = 1000 bu y\(^{-1}\)).
Source: Stock Assessment Summary (NEFSC 2013).
Figure 7. Surfclam landings by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, for 2011-2013, and preliminary 2014 (1 kilobushel = 1000 bushels). Source: Dan Hennan Pers. Comm. (NEFSC 2014).
Federal Fleet Profile

The total number of vessels participating in the surfclam fishery has been relatively stable from 2003 through 2013, ranging from 29 vessels in 2006 to 49 vessels in 2013 (Table 3). The average ex-vessel price of surfclams reported by processors increased about 2% from $12.44 in 2012 to $12.63 per bushel in 2013. The total ex-vessel value of the 2013 federal harvest was approximately $31.0 million or 7% increase from the prior year. A myriad of factors have contributed to the difficulties in the clam industry. Major users of clam meats have reduced their purchases from industry and stopped advertising products like clam chowder in the media. Industry members reported that imported meat from Canada and Vietnam contributed to an oversupply of clam meats in the marketplace. The costs to vessels harvesting clams has increased due to the rising costs of fuel and insurance. Trips harvesting surfclams have increased in length as catch rates have declined. The distribution of LPUE (landings per unit effort) in bushels per hour for 2011-2014 is shown below in Figure 8.

As indicated above, surfclams on Georges Bank were not fished from 1990 to 2008 due to the risk of PSP. There was light fishing on Georges Bank in years 2009-2011 under an exempted fishing permit and LPUE in that area was substantially higher (5-7 times higher) than in other traditional fishing grounds. The Greater Atlantic Regional Fisheries Office reopened a portion of Georges Bank to the harvest of surfclams and ocean quahogs beginning January 1, 2013 (77 FR 75057, December 19, 2012) under its authority in 50 CFR 648.76. Harvesting vessels have to adhere to the recently adopted testing protocol into the National Shellfish Sanitation Program. It is anticipated that allowing clam vessels to fish in the reopened area would significantly reduce the fishing pressure in the southern portion of the surfclam range while providing an economic benefit to the industry because of the higher LPUE from Georges Bank.

Processing Sector

Even though this document describes the surfclam fishery, the information presented in this section regarding the processing sector is for both surfclams and ocean quahogs as some of these facilities purchase/process both species. In 2013, there were 7 companies reporting purchases of surfclams and/or ocean quahogs from the industrial fisheries outside of Maine. They were distributed by state as indicated in Table 4. Employment data for these specific firms are not available. In 2013, these companies bought approximately $21.9 million worth of ocean quahogs and $31.0 million worth of surfclams.
Figure 8. Surfclam landings per unit effort (bushels per hour) by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, for 2011-2013, and preliminary 2014 (1 kilobushel = 1000 bu y-1). Source: Dan Hennan Pers. Comm. (NEFSC 2014).
Table 3. Federal Fleet Profile, 2003 through 2013.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvesting BOTH surfclams &amp;</td>
<td>14</td>
<td>12</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>ocean quahogs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvesting only surfclams</td>
<td>21</td>
<td>24</td>
<td>20</td>
<td>24</td>
<td>24</td>
<td>28</td>
<td>22</td>
<td>24</td>
<td>29</td>
<td>33</td>
</tr>
<tr>
<td>Total Vessels</td>
<td>35</td>
<td>36</td>
<td>29</td>
<td>33</td>
<td>32</td>
<td>36</td>
<td>34</td>
<td>36</td>
<td>42</td>
<td>49</td>
</tr>
</tbody>
</table>

Source: NMFS Clam Vessel Logbooks

Table 4. Companies that reported buying surfclams ocean quahogs and by state (from NMFS dealer/processor surfclam/ocean quahog dealer/processor report database) in 2013.

<table>
<thead>
<tr>
<th>Number of Companies</th>
<th>MA</th>
<th>NJ</th>
<th>DE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

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Management System

The Fishery Management Plan (FMP) for ocean quahog (*Arctica islandica*) became effective in 1977. The FMP established the management unit as all ocean quahog in the Atlantic EEZ. The FMP is managed by the Mid-Atlantic Fishery Management Council (Council), in conjunction with the National Marine Fisheries Service (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, is available on the Council website at: [http://www.mafmc.org](http://www.mafmc.org)

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. 1999b). An electronic version is available at the following website: [http://www.nefsc.noaa.gov/nefsc/habitat/efh/](http://www.nefsc.noaa.gov/nefsc/habitat/efh/). Additional information on this species is available at the following website: [http://www.nefsc.noaa.gov/sos/](http://www.nefsc.noaa.gov/sos/). A summary of the basic biology is provided below.

The ocean quahog is a bivalve mollusk distributed in temperate and boreal waters on both sides of the North Atlantic Ocean. In the Northeast Atlantic, quahogs occur from Newfoundland to Cape Hatteras from depths of about 8 to 400 meters. Ocean quahogs further north occur closer to shore. The US stock resource is almost entirely within the Exclusive Economic Zone (EEZ, 3-200 miles from shore), outside of state waters, and at depths between 20 and 80 meters. However, in the northern range, ocean quahogs inhabit waters closer to shore, such that the State of Maine has a small commercial fishery which includes beds within the state's territorial sea (<3 miles). Ocean quahogs burrow in a variety of substrates and are often associated with fine sand.

Ocean quahogs are one of the longest-living, slowest growing marine bivalves in the world. Under normal circumstances, they live to more than 100 years old. Ocean quahogs have been aged in excess of 200 years. Growth tends to slow after age 20, which corresponds to the size currently harvested by the industry (approximately 3 inches). Size and age at sexual maturity are variable and poorly known. Studies in Icelandic waters indicate that 10, 50, and 90 percent of female ocean quahogs were sexually mature at 40, 64 and 88 mm (1.5, 2.5 and 3.5 inches) shell length or approximately 2, 19 and 61 years of age. Spawning occurs over a protracted interval from summer through autumn. Free-floating larvae may drift far from their spawning location because they develop slowly and are planktonic for more than 30 days before settling. Major recruitment events appear to be separated by periods of decades.
Based on their growth, longevity and recruitment patterns, ocean quahogs are relatively unproductive and able to support only low levels of fishing. The current resource consists of individuals that accumulated over many decades.

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

**Status of the Stock**

A forward projecting stock assessment model, based on the Deriso-Schnute delay-difference equation, was applied in a program called (KLAMZ) and was used in the most recent ocean quahog assessment update (Chute et al. 2013). This update utilized the same peer-reviewed and approved methods developed at Stock Assessment Workshop 48 (SAW 48). Detailed reports on “Stock Status,” including annual assessment and reference point update reports, SAW reports, and Stock Assessment Review Committee (SARC) panelist reports are available online at the NEFSC website: [http://www.nefsc.noaa.gov](http://www.nefsc.noaa.gov)

Based on the June 2013 update, which utilized data through 2011, the stock is not overfished and overfishing is not occurring, relative to the biological reference points (Chute et al. 2013). Whole stock fishable biomass during 2011 was 2.96 million mt meats (Figure 1), which is above the revised $B_{target}$ of 1.73 million mt and the revised $B_{threshold}$ of 1.39 million mt. The fishing mortality rate during 2011 for the stock in the exploited region was $F = 0.010 \, \text{y}^{-1}$ (Figure 2), below the revised $F_{threshold}$ of 0.022 $\text{y}^{-1}$. Fishing mortality for the exploited area of the stock was also below the previous $F_{threshold}$ of 0.08 $\text{y}^{-1}$, and whole stock biomass was above the previous $B_{threshold}$ of 0.89 million mt.

Based on assessment data, the ocean quahog population is an unproductive stock with infrequent recruitment, and thus vulnerable to overfishing (Chute et al. 2013). After three decades of fishing at a low $F$, the stock as a whole is being fished down. In 2011, fishable stock biomass in the southernmost regions of Southern VA, Delmarva, and NJ was less than half of 1978 pre-fishery levels (recommended target biomass for the stock as a whole is 50% of the pre-fishery biomass). Biomass in the more northern regions of LI increased after 1978 due to a recruitment event and growth, but then began to decrease in the early 1990s when recruitment declined and the fishery gradually began to move north into these regions. Recruitment events appear to be localized and separated by decades, although survey length frequencies show that a low level of recruitment occurs on a continuous basis. The potential contribution of this recruitment to stock biomass and productivity is unknown.
Figure 1. KLAMZ model estimates of fishable biomass for the entire stock (top) and the exploited regions (bottom), 1982-2011. Source: Stock Assessment Update (Chute et al. 2013)
Figure 2. KLAMZ estimates of fishing mortality for the entire stock (top) and the exploited regions (bottom), 1982-2011. Source: Stock Assessment Update (Chute at al. 2013).
Description of the Fishery and Market

The commercial fishery for ocean quahog in Federal waters is prosecuted with large vessels and hydraulic dredges, and is very different from the small Maine fishery prosecuted with small vessels (35-45 ft) targeting quahogs for the local fresh, half shell market. Ocean quahog landings and commercial quotas are given below in Tables 1 and 2. The distribution of the fishery has changed over time, with the bulk of the fishery from 1980-1990 being prosecuted off the Delmarva, to more Northern areas (Figures 3 and 4).

Table 1. Federal Ocean Quahog Quotas and Landings: 1998 - 2016.

<table>
<thead>
<tr>
<th>Year</th>
<th>Landingsa (’000 bu)</th>
<th>Quota (’000 bu)</th>
<th>% Harvested</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>3,897</td>
<td>4,000</td>
<td>99%</td>
</tr>
<tr>
<td>1999</td>
<td>3,770</td>
<td>4,500</td>
<td>86%</td>
</tr>
<tr>
<td>2000</td>
<td>3,161</td>
<td>4,500</td>
<td>73%</td>
</tr>
<tr>
<td>2001</td>
<td>3,691</td>
<td>4,500</td>
<td>84%</td>
</tr>
<tr>
<td>2002</td>
<td>3,871</td>
<td>4,500</td>
<td>89%</td>
</tr>
<tr>
<td>2003</td>
<td>4,069</td>
<td>4,500</td>
<td>93%</td>
</tr>
<tr>
<td>2004</td>
<td>3,825</td>
<td>5,000</td>
<td>79%</td>
</tr>
<tr>
<td>2005</td>
<td>2,940</td>
<td>5,333</td>
<td>57%</td>
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<tr>
<td>2006</td>
<td>3,066</td>
<td>5,333</td>
<td>60%</td>
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<tr>
<td>2007</td>
<td>3,366</td>
<td>5,333</td>
<td>65%</td>
</tr>
<tr>
<td>2008</td>
<td>3,426</td>
<td>5,333</td>
<td>65%</td>
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<tr>
<td>2009</td>
<td>3,443</td>
<td>5,333</td>
<td>65%</td>
</tr>
<tr>
<td>2010</td>
<td>3,554</td>
<td>5,333</td>
<td>68%</td>
</tr>
<tr>
<td>2011b</td>
<td>3,116</td>
<td>5,333</td>
<td>60%</td>
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<tr>
<td>2012b</td>
<td>3,454</td>
<td>5,333</td>
<td>66%</td>
</tr>
<tr>
<td>2013b</td>
<td>3,201</td>
<td>5,333</td>
<td>61%</td>
</tr>
<tr>
<td>2014c</td>
<td>845d</td>
<td>5,333</td>
<td>NA</td>
</tr>
<tr>
<td>2015c</td>
<td>NA</td>
<td>5,333</td>
<td>NA</td>
</tr>
<tr>
<td>2016c</td>
<td>NA</td>
<td>5,333</td>
<td>NA</td>
</tr>
</tbody>
</table>

a 1 ocean quahog bushel is approximately 10 lb. b For 2011-2013, the Scientific and Statistical Committee recommended an overfishing limit (OFL) for 2011-2013 = 34,800 mt, and an acceptable biological catch (ABC) = 26,100 mt. c For 2014-2016, the SSC did not recommend an OFL. They recommended a constant ABC of 26,100 mt, for 2014-2016. d Incomplete landings year. NA = Not yet available. Source: NMFS Clam Vessel Logbook Reports.

a) mt meats

<table>
<thead>
<tr>
<th>Year</th>
<th>Southern VA</th>
<th>Delmarva</th>
<th>NJ</th>
<th>LI</th>
<th>Southern New England</th>
<th>Georges Bank</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>0</td>
<td>211</td>
<td>2,416</td>
<td>8,617</td>
<td>4,280</td>
<td>17</td>
<td>1</td>
<td>15,542</td>
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<tr>
<td>2010</td>
<td>0</td>
<td>428</td>
<td>2,315</td>
<td>9,892</td>
<td>3,472</td>
<td>13</td>
<td>0</td>
<td>16,120</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>290</td>
<td>1,868</td>
<td>10,238</td>
<td>1,740</td>
<td>0</td>
<td>0</td>
<td>14,136</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>0</td>
<td>1,400</td>
<td>11,622</td>
<td>2,271</td>
<td>104</td>
<td>77</td>
<td>15,474</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>0</td>
<td>358</td>
<td>9,878</td>
<td>4,094</td>
<td>164</td>
<td>0</td>
<td>14,494</td>
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</table>

b) bushels ('000)

<table>
<thead>
<tr>
<th>Year</th>
<th>Southern VA</th>
<th>Delmarva</th>
<th>NJ</th>
<th>LI</th>
<th>Southern New England</th>
<th>Georges Bank</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>0</td>
<td>47</td>
<td>533</td>
<td>1,900</td>
<td>944</td>
<td>4</td>
<td>0</td>
<td>3,426</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>94</td>
<td>510</td>
<td>2,181</td>
<td>765</td>
<td>3</td>
<td>0</td>
<td>3,554</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>64</td>
<td>412</td>
<td>2,257</td>
<td>384</td>
<td>0</td>
<td>0</td>
<td>3,116</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>0</td>
<td>309</td>
<td>2,562</td>
<td>501</td>
<td>23</td>
<td>17</td>
<td>3,411</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>0</td>
<td>79</td>
<td>2,178</td>
<td>903</td>
<td>36</td>
<td>0</td>
<td>3,195</td>
</tr>
</tbody>
</table>
Figure 3. Ocean quahog landings by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, for 1980-2011. TMSQ in light blue had reported landings, but from fewer than three vessels (1 kilobushel = 1000 bu y-1). Source: Stock Assessment Update (Chute et al. 2013).
Figure 4. Ocean quahog landings by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, for 2011-2014. TMSQ in light blue had reported landings, but from fewer than three vessels (1 kilobushel = 1000 bu y-1). Source: Dan Hennen Pers. Comm. (NEFSC 2014).
Port and Community Description

When Amendment 13 to the FMP was developed, the Council hired Dr. Bonnie McCay and her associates at Rutgers University to describe the ports and communities that are associated with the surfclam and ocean quahog fisheries. The researchers did an extensive job characterizing the three main fisheries (non-Maine ocean quahog, Maine ocean quahog, and surfclam). The McCay team characterizations of the ports and communities are based on government census and labor statistics and on observations and interviews carried out during the late 1990s and in the fall of 2001. The description of the fishing gear, areas fished, etc. are fully described in Amendment 13.

Communities from Maine to Virginia are involved in the harvesting and processing of surfclams and ocean quahogs. Ports in New Jersey and Massachusetts handle the most volume and value, particularly Atlantic City and Point Pleasant, New Jersey, and New Bedford, Massachusetts. There are also landings in Ocean City, Maryland, and the Jonesport and Beals Island areas of Maine. The Maine fishery is entirely for ocean quahogs, which are sold as shellstock for the half-shell market. The other fisheries are industrialized ones for surfclams and ocean quahogs, which are hand shucked or steam-shucked and processed into fried, canned, and frozen products.

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

Federal Fleet Profile

The total number of vessels participating in the ocean quahog fisheries outside the state of Maine has experienced a downward trend as the fisheries moved beyond a market crisis in 2005 where major users of clam meats reduced their purchases from industry and stopped advertising products like clam chowder in the media. Industry members reported that imported meat from Canada and Vietnam contributed to an oversupply of clam meats in the marketplace. The costs to vessels harvesting clams have increased significantly, with the greatest component being the cost of diesel fuel. Trips harvesting quahogs have also increased in length as catch rates have declined steadily. The 30 or so vessels that reported landings during 2004 and 2005 was reduced and coast-wide harvests consolidated on to approximately 20 vessels in the subsequent years. The Maine ocean quahog fleet numbers started to decline with fuel prices soaring in mid-2008 and totaled 11 in 2013 (Table 3).
Table 3. Federal Fleet Profile, 2003 through 2013.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Maine Vessels</td>
<td>14</td>
<td>12</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Harvesting BOTH surfclams &amp; ocean quahogs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Non-Maine Vessels</td>
<td>15</td>
<td>12</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Harvesting only ocean quahogs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Non-Maine Vessels</td>
<td>29</td>
<td>24</td>
<td>18</td>
<td>17</td>
<td>18</td>
<td>15</td>
<td>21</td>
<td>19</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>Maine Ocean Quahog Vessels</td>
<td>34</td>
<td>32</td>
<td>25</td>
<td>24</td>
<td>22</td>
<td>19</td>
<td>15</td>
<td>13</td>
<td>12</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: NMFS Clam Vessel Logbooks

The average ex-vessel price of non-Maine ocean quahogs reported by processors in 2013 was $6.87 per bushel, representing no change from the 2012 price ($6.88 per bushel). In 2013, 3.2 million bushels of non-Maine ocean quahog were landed compared to 3.3 million bushels landed in 2012. The total ex-vessel value of the 2013 federal harvest outside of Maine was approximately $22.9 million, a 10% increase from the prior year.

In 2013, the Maine ocean quahog fleet harvested a total of 60,302 Maine bushels, a 15% decrease from the 70,655 bushels harvested in 2012. Average prices for Maine ocean quahogs have declined substantially over the past 10 years. In 2003, there were very few trips that sold for less than $37.00 per Maine bushel, and the mean price was $40.66. Aggressive price cutting by one company has driven prices down such that many trips in 2008 and 2009 sold for $28.00, with the mean price for all trips equaling $33.31 per bushel in 2008. In 2013, the mean price was $24.60 per Maine bushel. The value of the 2013 harvest reported by the purchasing dealers totaled $1.48 million, a decrease of 15% from the prior year.

The distribution of LPUE (landings per unit effort) in bushels per hour for 2011-2014 is shown below in Figure 8.
Figure 8. Ocean quahog landings per unit effort (bushels per hour) by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, for 2011-2013, and preliminary 2014 (1 kilobushel = 1000 bu y⁻¹). Source: Dan Hennan Pers. Comm. (NEFSC 2014).
Processing Sector

Even though this document describes the ocean quahog fisheries, the information presented for the processing sector is for both ocean quahogs and surfclams as some of these facilities purchase/process both species. In 2013, there were 7 companies reporting purchases of surfclams and/or ocean quahogs from the industrial fisheries outside of Maine. They were distributed by state as indicated in Table 4. Employment data for these specific firms are not available. In 2013, these companies bought approximately $21.9 million worth of ocean quahogs and $31.0 million worth of surfclams.

Table 4. Companies that reported buying ocean quahogs and surfclams by state (from NMFS dealer/processor surfclam/ocean quahog dealer/processor report database) in 2013.

<table>
<thead>
<tr>
<th>Number of Companies</th>
<th>MA</th>
<th>NJ</th>
<th>DE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>1</td>
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</table>

References


Action Plan (as of 4/15/14) to Develop an Amendment to the Atlantic Surfclam and Ocean Quahog FMP to Address:
Cost Recovery, Updating Biological Reference Points, Optimum Yield Range, and Essential Fish Habitat Updates

Council: Mid-Atlantic

Additional Expertise Sought:

<table>
<thead>
<tr>
<th>Agency</th>
<th>Role</th>
<th>Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAFMC</td>
<td>FMAT Chair</td>
<td>Jessica Coakley</td>
</tr>
<tr>
<td>MAFMC</td>
<td>Other Staff Technical Support</td>
<td>José Montañez</td>
</tr>
<tr>
<td>NMFS NERO</td>
<td>Sustainable Fisheries – NERO liazon</td>
<td>Douglas Potts</td>
</tr>
<tr>
<td>NMFS NERO</td>
<td>Habitat</td>
<td>David Stevenson</td>
</tr>
<tr>
<td>NMFS NERO</td>
<td>Fisheries Statistics Office</td>
<td>Anna Macan</td>
</tr>
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<td>NEPA</td>
<td>Tim Cardiasmenos</td>
</tr>
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<td>Dan Hennen</td>
</tr>
<tr>
<td>NMFS NEFSC</td>
<td>Socioeconomics</td>
<td>John Walden</td>
</tr>
</tbody>
</table>

Title of Action: "Amendment 17 to the Atlantic Surfclam and Ocean Quahog FMP (Cost Recovery Amendment)"

Objective of Action/Purpose and Need:

The purpose of this action is to implement measures for collecting fees and recovering costs associated with the management of the Atlantic surfclam and ocean quahog individual transferrable quota (ITQ) fisheries and to ensure the FMP is in compliance with the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The MSA requires fees be recovered for incremental costs directly related to management, data collection and analysis, and enforcement of ITQ programs. The need for this action is to ensure that fishermen that hold individual transferrable quotas are bearing at least part of the costs related to the management of their ITQ fishery.

In addition, a purpose of this action is to implement measures that facilitate incorporation of revised stock status determination criteria (i.e., biological reference points) for surfclams and ocean quahog into the Fishery Management Plan (FMP). This action is needed to ensure that the Council is applying the most updated information to management through the FMP to ensure that quota levels are set properly and that stocks are managed to prevent overfishing.

Another purpose of this action is to implement measures that would modify or eliminate the optimum yield (OY) ranges for surfclam and ocean quahog. This action is needed to ensure the Council has the flexibility to set catch and landings limits, and commercial quotas consistent with the MSA without a potential conflict between the OY ranges that currently exist in the FMP and the SSC recommendations. This is further needed to ensure that stocks continue to be managed to prevent overfishing.
The last purpose of this action is to implement revisions to the essential fish habitat (EFH) components of the FMP. The two most critical EFH components that will be revised, as necessary, are the EFH designations (maps and text descriptions) and an evaluation of the adverse impacts of the fishery on EFH for any federally managed species in the region. The Council is required to review EFH periodically so that the designations are adequately identifying the proper EFH for better protection of these habitats from fishing and non-fishing activities.

**Fisheries that Apply**: Atlantic surfclam and ocean quahog.

**Types of Measures to be Considered**: At this time, the Council is considering a wide range of management options. These could include, but are not limited to the following:

- *Fees and Cost Recovery* - The Council is considering methods to collect fees to recover costs in the surfclam and ocean quahog fishery. One method is to collect a percentage fee based on the landed value of harvest. This fee could be paid directly by the fishermen, or it could be collected by the dealer. There may be other methods included as appropriate.

- *BRP Updates* - The Council is considering an administrative mechanism that ensures that if revised stock status criteria/biological reference points meet specific criteria they are immediately incorporated into the FMP. The reference points can then be used immediately without the need to update them through an Amendment process. This process is being considered for all Council FMPs, and is already used in the Summer Flounder, Scup, and Black Sea Bass and Spiny Dogfish FMPs.

- *OY Range* - The Council could consider modifying the process for specifying OY to better align with the current system of catch limits, consider eliminating the ranges within the FMP, or other options.

- *EFH Updates* - MSA requires EFH definitions be periodically reviewed, and revised if needed through Council action.

**Type of NEPA Analysis Expected**: Document expected to be EA.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>NEPA Analysis</th>
<th>Requirements</th>
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</thead>
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<tr>
<td>EA</td>
<td>Environmental Assessment</td>
<td>NEPA applies, no scoping required, public hearings required under MSA</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
<td>NEPA applies, scoping required, public hearings required</td>
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**Applicable Laws/Issues:**

<table>
<thead>
<tr>
<th>Law/Issue</th>
<th>Applies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnuson-Stevens Act</td>
<td>Yes</td>
</tr>
<tr>
<td>Administrative Procedures Act</td>
<td>Yes</td>
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<tr>
<td>Regulatory Flexibility Act</td>
<td>Yes</td>
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<tr>
<td>Paperwork Reduction Act</td>
<td>Possibly; depends on data collection needs</td>
</tr>
<tr>
<td>Coastal Zone Management Act</td>
<td>Possibly; depends upon effects of the action on the resources of coastal states in the</td>
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</tbody>
</table>
management unit

<table>
<thead>
<tr>
<th>Act</th>
<th>Level of consultation if necessary, depends upon the actions taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endangered Species Act</td>
<td>Possibly; level of consultation, if necessary, depends upon the actions taken</td>
</tr>
<tr>
<td>Marine Mammal Protection Act</td>
<td>Possibly; level of consultation, if necessary, depends upon the actions taken</td>
</tr>
<tr>
<td>E.O. 1286 (Regulatory Planning and Review)</td>
<td>Yes</td>
</tr>
<tr>
<td>E.O. 12630 (Takings)</td>
<td>Possibly; legal review will confirm</td>
</tr>
<tr>
<td>E.O. 13132 (Federalism)</td>
<td>Possibly; legal review will confirm</td>
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<tr>
<td>Essential Fish Habitat</td>
<td>Possibly; level of consultation, if necessary, depends upon the actions taken</td>
</tr>
<tr>
<td>Information Quality Act</td>
<td>Yes</td>
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</tbody>
</table>

Other Issues: At this time, no additional Amendment development issues have been identified.

Timing Issues: NMFS-NERO staff indicated a new cost recovery program would require more time to implement than typical actions; this is reflected in the timeline.

Timeline for Development/Review/Implementation:

<table>
<thead>
<tr>
<th>2014-2015 Development Track</th>
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<tbody>
<tr>
<td>Action</td>
</tr>
<tr>
<td>First FMAT Meeting</td>
</tr>
<tr>
<td>Develop Description of the Alternatives (may include additional meetings of the Committee and/or FMAT as needed)</td>
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<tr>
<td>MAFMC Meeting (Council Review Alternatives)</td>
</tr>
<tr>
<td>Document Development: EA (may include additional meetings of the Committee and/or FMAT as needed)</td>
</tr>
<tr>
<td>MAFMC Meeting (Adopt public hearing draft)</td>
</tr>
<tr>
<td>Public Hearings and Summarization of Comments (need at least 23 days of FR notice and 30 days comment period with hearings)</td>
</tr>
<tr>
<td>MAFMC Meeting (Review comment summary)</td>
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<tr>
<td>MAFMC Meeting (Approve/adopt amendment)</td>
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<tr>
<td>Final Rule Effective</td>
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AMENDMENT 17

TO THE

ATLANTIC SURFCLAM AND OCEAN QUAHOG

FISHERY MANAGEMENT PLAN

(Includes Environmental Assessment, Regulatory Impact Review, and Initial Regulatory Flexibility Analysis)

May 2014

Mid-Atlantic Fishery Management Council

in cooperation with

the National Marine Fisheries Service

Draft adopted by MAFMC: XXXXXXX
Final adopted by MAFMC: XXXXXXX
Draft submitted to NOAA: XXXXXXX
Final approved by NOAA: XXXXXXX

A Publication of the Mid-Atlantic Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award No. NA10NMF4410009
4.0 INTRODUCTION AND BACKGROUND

4.1 PURPOSE AND NEED OF THE ACTION

The purpose of this action is to implement measures for collecting fees and recovering costs associated with the management of the Atlantic surfclam and ocean quahog individual transferrable quota (ITQ) fisheries and to ensure the fishery management plan (FMP) is in compliance with the Magnuson-Stevens Fishery Conservation and Management Act (MSA\(^1\)). The MSA requires fees be recovered for incremental costs directly related to management, data collection and analysis, and enforcement of ITQ programs. The need for this action is to ensure that fishermen that hold individual transferrable quotas are bearing at least part of the costs related to the management of their ITQ fishery.

In addition, a purpose of this action is to implement measures that facilitate incorporation of revised stock status determination criteria (i.e., biological reference points) for surfclams and ocean quahog into the Fishery Management Plan (FMP). This action is needed to ensure that the Council is applying the most updated information to management through the FMP to ensure that quota levels are set properly and that stocks are managed to prevent overfishing.

\(^1\) Magnuson-Stevens Fishery Conservation and Management Act (MSA), portions retained plus revisions made by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA).
Another purpose of this action is to implement measures that would modify or eliminate the optimum yield (OY) ranges for surfclam and ocean quahog. This action is needed to ensure the Council has the flexibility to set catch and landings limits, and commercial quotas consistent with the MSA without a potential conflict between the OY ranges that currently exist in the FMP and the SSC recommendations. This is further needed to ensure that stocks continue to be managed to prevent overfishing.

The last purpose of this action is to implement revisions to the essential fish habitat (EFH) components of the FMP. The two most critical EFH components that will be revised, as necessary, are the EFH designations (maps and text descriptions) and an evaluation of the adverse impacts of the fishery on EFH for any federally managed species in the region. The Council is required to review EFH periodically so that the designations are adequately identifying the proper EFH for better protection of these habitats from fishing and non-fishing activities.

5.0 MANAGEMENT ALTERNATIVES

Comprehensive descriptions of the current regulations for surfclams and ocean quahogs as detailed in the Code of Federal Regulations (CFR) are available through the website for the Greater Atlantic Regional Fisheries Office (GARFO) of NOAA Fisheries: http://www.nero.noaa.gov/nero/regs/.

5.1 Cost Recovery Alternatives

NOAA Fisheries is required under the MSA to collect fees to recover the costs directly related to management, data collection and analysis, and enforcement of ITQ\(^2\) programs. Under section 304(d)(2)(A) of the Act, the Secretary is authorized to collect a fee to recover these costs. Throughout the description of alternatives, it should be noted that the term shareholder refers to the actual allocation holder. ITQ cage tags are issued to the shareholder and these tags may or may not be fished during the fishing year. The tags may also be leased to other entities. The shareholder may harvest surfclam and ocean quahogs on his or her own vessel, or pay someone else to provide a harvesting service. Therefore, the term tag holder is used to describe an entity that actually holds the tags, but may or may not be the actual shareholder.

The following provisions of the ITQ cost recovery program would apply to all the proposed alternatives:

- Under this alternative the greatest ITQ fee that could be collected is 3 percent of the ex-vessel value of shellfish harvested, which is the maximum fee amount allowed by section 304(d)(2)(B) of the MSA.
- ITQ fees collected would be deposited in the Limited Access System Administrative Fund (LASAF) established in the U.S. Treasury.

\(^2\) A limited access privilege is a permit, issued as part of a limited access system, to harvest a quantity of fish expressed by a unit or units representing a portion of the total allowable catch of the fishery that may be received or held for exclusive use by a person. This includes individual fishing quotas. An ITQ is an individual fishing quota (IFQ) program where privileges can be transferred subsequent to initial allocations.
Separate accounts would be created within the LASAF to ensure that the funds from the ITQ cost recovery are used only to pay for the actual costs directly related to management, data collection, analysis, and enforcement costs of the NOAA Fisheries Northeast Region Atlantic Surfclam and Ocean Quahog ITQ Programs, as described in the MSA.³

An annual ITQ report would be generated⁴. This report will be available online and on request from NOAA Fisheries. A copy of the report will be provided to the Council.

The ex-vessel value⁵ of an ITQ landing would equal the sum of all payments⁶ of monetary worth made to fishermen for the sale of the shellfish under the tags provided, during the fishing year.

NOAA Fisheries will mail a bill for the fees to be collected for the fishing year to those required to pay (i.e., dealers, shareholders, or tag holders depending on the alternative considered). Bills may also be made available electronically via the internet. Payment of the ITQ fee must be made at the end of the fishing season. Payments of the ITQ fee must be made electronically via the Federal web portal, www.pay.gov, or other internet sites as designated by the Regional Administrator.⁷ The RA has discretion to authorize payment by check, if necessary. NOAA Fisheries will address any payment liabilities, as needed.

NOAA Fisheries will estimate the ITQ percentage fee to be applied for the first year of implementation of cost recovery, based on prior year actual costs and the anticipated ex-vessel value of the fishery.

The RA would review the cost recovery fee annually to determine if adjustment is warranted. Those to be issued bills (i.e., dealers, shareholders, or tag holders depending on the alternative considered) will need to know what ITQ fee percentage will be applied, the RA would publish a notification of the ITQ fee percentage (or

³ Up to 25-percent of the fees collected can be used for purchasing quota for small-vessel fisherman or quota for new entrants into the fishery, if such a program is submitted by the Council and approved by NOAA Fisheries (as described by paragraph 303A(g) of the MSA).
⁴ The report would include annual information regarding the amount and value of Atlantic surfclam and ocean quahog landed during the fishing year, the associated cost recovery fees, and the status of those fees. This report would also detail the costs incurred by NOAA Fisheries, including the calculation of the recoverable costs for the management, enforcement, and data collection, incurred by NOAA Fisheries during the fishing year.
⁵ “Value” refers to the worth, in U.S. dollars, of any amount of landed ITQ surfclam and ocean quahog as determined by the sale, or potential economic return for the sale, of those shellfish. Actual ex-vessel value would be the amount of money received as payment for the tag holder's ITQ shellfish sold, as reported by a federally permitted dealer. In other words, this ex-vessel value amount will not be averaged with the other dealer prices for the purposes of calculating cost recovery fees.
⁶ This would include any retro-payments (e.g., bonuses, delayed partial payments, post-season payments) made to the tag holder (or shareholder if not one in the same) for previously landed surfclams and/or ocean quahogs. Retro-payments would be part of the ex-vessel value and as such have a fee liability. If they were received after the initial payment, but during the same fishing year, the cost recovery fee for those retro-payments also would be due at the end of the fishing season. It is the responsibility of the dealer to update any previously reported landing report to reflect these “retro-payments”.
⁷ The reason for the 100-percent electronic fee collection system is to minimize paper transactions, and reduce the administrative burden that would be charged to the industry. Presently, the NOAA Fisheries Greater Atlantic Regional Fishery Office is not equipped to process paper collections. Instructions for electronic payment will be made available on both the payment website and the paper bill. Payment options will include payment via a plastic card (e.g. Visa, MasterCard, Discover, etc.), or direct automated clearing house (ACH) withdrawal from a designated checking account.
ITQ per tag fee if applicable) in the Federal Register each year, prior to the start of the upcoming fishing year. This will be based on prior year estimates of costs. At the end of the fishing year, the Regional Administrator would determine if a fee adjustment is warranted. Factors considered in the review include the catch subject to the ITQ cost recovery, projected ex-vessel value of the catch, costs directly related to the management, enforcement, and data collection of the ITQ program, and expected nonpayment of fee liabilities. If a fee adjustment is warranted, the RA would adjust the ITQ fee percentage in the next fishing year.

- Each year the RA would publish a notification of the ITQ fee percentage for the next fishing year in the Federal Register.
- Those issued bills will provide payment to NOAA Fisheries at the end of the fishing season. Early payment may be allowed\(^8\), but it would not relieve a federally permitted dealer, tag, or shareholder holder of any associated fee collection or reporting requirement.

5.1.1 Alternative 1 (No action - No Cost Recovery)

Under this alternative, cost recovery would not be implemented for the Atlantic surfclam and ocean quahog ITQ fisheries. This means no fees would be collected to cover the costs directly related to management, data collection and analysis, and enforcement of ITQ programs. This alternative would be contrary to the Congressional mandate to collect fees for ITQ programs as specified in the MSA.

5.1.2 Alternative 2 (ITQ tag holder pays via a federally permitted dealer)

Alternative 2 would implement a cost recovery system where federally permitted dealers would collect the fee to be recovered at the point of purchase when the tag holder uses the cage tags to land surfclams and/or ocean quahogs. The person that submits the tags at the point of landing (i.e., tag holder) would be responsible for paying the fee to the dealer.

The dealer would be responsible for collecting the fees at the point of purchase and submitting the payment to NOAA Fisheries at the end of the fishing season. The dollar amount of the fee due would be determined by multiplying the ITQ fee percentage by the actual ex-vessel value of each ITQ landing made using tags.

5.1.3 Alternative 3 (Shareholder pays directly; equal fee per tag)

Alternative 3 would implement a cost recovery system where the ITQ shareholder would pay the fee directly to NMFS, and the fee will be shared by all shareholders regardless of whether the ITQ was fished or not.

The dollar amount of the fee due would be determined by multiplying the ITQ fee percentage by the total ex-vessel value of ITQ landings for the surfclam or ocean quahog fisheries, and then dividing it

\(^8\) Currently there is not a mechanism at GARFO to allow early payments. Payment is allowed once the bills are sent out and the payment system for cost recovery is not accessible all year. This could increase administrative costs.
by the number of ITQ shares (i.e., tags). The shareholder would pay the fee for all of the held shares directly to NMFS.

5.1.4 Alternative 4 (Tagholder; two-tiered approach)

Alternative 4 would implement a cost recovery system where tag holders would have a percentage of the fee assessed to tag holders to keep their permit and tags. The remaining half of the fee would be paid via federally permitted dealers that would collect the fee to be recovered at the point of purchase when the tag holder uses the cage tags to land surfclams or ocean quahogs. Whomever, hold the tags at the point of landing (i.e., tag holder) would be responsible for paying the fee to the dealer. This would include tag holders that are, or are not, the actual shareholder.

The dealer would be responsible for collecting fees at the point of purchase and submitting the payment to NOAA Fisheries at the end of the fishing season. The dollar amount of the fee due would be determined by multiplying the ITQ fee percentage by the actual ex-vessel value of each ITQ landing made using tags.

5.1.5 Alternative 5 (Shareholder pays; tilefish model)

Alternative 3 would implement a cost recovery system where the ITQ shareholder would pay the fee directly to NMFS, and the fee will based on the landed value of surfclams and ocean quahogs associated with the shares owned.

The dollar amount of the fee due would be determined by multiplying the ITQ fee percentage by the total ex-vessel value of ITQ landings. The shareholder would pay the fee for all of the held shares directly to NMFS.

5.1.6 Considered but rejected from further analysis

The FMAT considered an alternative, where the ITQ permit holder will pay the fee associated with the cost recovery program in order to obtain the cage tags at the beginning of the fishing based on assumed landings for the upcoming fishing year. This was rejected because the MSA stipulates that the recovered fee must be based on the landings, and this implies that those landings must have already occurred. Alternatives above do recover fees at the beginning of the fishing year, but those fees are based off landings estimates from the prior year. The FMAT discussed the new entrant promotion program, where up to 25-percent of the fees collected can be used for purchasing quota for small-vessel fisherman or quota for new entrants into the fishery, if such a program is submitted by the Council and approved by NOAA Fisheries. However, the Council has not indicated interest in implementing this program therefore it is not included in the alternatives presented by the FMAT. A lien registry could be used to identify shareholders more accurately given the numbers of transactions with tags that occur in this fishery; however, a formal catch share lien registry has never been implemented by NOAA Fisheries.
5.2 Administrative Mechanism to Update Biological Reference Points Alternatives

Under National Standard 1, the MSA requires that each Council FMP define overfishing as a rate or level of fishing mortality that jeopardizes a fishery’s capacity to produce MSY on a continuing basis and defines an overfished stock as a stock size that is less than a minimum biomass threshold. The SFA also requires that each FMP specify objective and measurable status determination criteria for identifying when stocks or stock complexes covered by the FMP are overfished. To fulfill the requirements of the SFA, status determination criteria are comprised of two components: 1) a maximum fishing mortality threshold (section 600.310 (d)(2)(i)) and 2) a minimum stock size threshold (section 600.310 (d)(2)(ii)).

5.2.1 Alternative 1 (No Action)

Under this no action alternative, the status determination criteria, which include a maximum fishing mortality threshold (MFMT; $F_{\text{MSY}}$; or reasonable proxy thereof) and the minimum stock size threshold (MSST; or reasonable proxy thereof) for each species managed under this FMP would remain unchanged and as defined for ocean quahogs and surfclams under Amendment 12 to the FMP (1998) and Amendment 13 to the FMP (2003). These definitions of status determination criteria have remained unchanged for these species since they were described in the FMP in 1998 and 2003, and may only be modified by a framework or Amendment to the FMP (Table 1).

Overfishing for these species is currently defined to occur when the fishing mortality rate exceeds the threshold fishing mortality rate of $F_{\text{MSY}}$. Since $F_{\text{MSY}}$ cannot be reliably estimated for surfclams and ocean quahog stocks, proxies are used.

Table 1. Definitions for the MFMT and MSST for surfclams and ocean quahogs.

<table>
<thead>
<tr>
<th>Stock Status Determination Criteria</th>
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<tbody>
<tr>
<td>Species</td>
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<tr>
<td>surfclams - MSST</td>
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<tr>
<td>ocean quahogs - MSST</td>
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For the surfclam and ocean quahog stocks $B_{\text{MSY}}$ cannot be reliably estimated; therefore, the maximum biomass based on yield per recruit analysis and average recruitment is used as a proxy. Updates to the values associated with those definitions may occur when new information becomes available. The Council is not required to undertake any specific action when this occurs, as using the updated values is consistent with National Standard 2.
However, under this no action alternative, incorporation of changes to the status determination criteria would continue to occur through the framework adjustment or amendment process as necessary.

5.2.2 Alternative 2 (Redefine the Status Determination Criteria)

Under this alternative, the status determination criteria for each of the species managed under the FMP would be defined as follows.

The maximum fishing mortality threshold for each of the species under the FMP is defined as $F_{MSY}$ (or a reasonable proxy thereof) as a function of productive capacity, and based upon the best scientific information consistent with National Standards 1 and 2. Specifically, $F_{MSY}$ is the fishing mortality rate associated with MSY. The maximum fishing mortality threshold ($F_{MSY}$) or a reasonable proxy may be defined as a function of (but not limited to): total stock biomass, spawning stock biomass, total egg production, and may include males, females, both, or combinations and ratios thereof which provide the best measure of productive capacity for each of the species managed under the FMP. Exceeding the established fishing mortality threshold constitutes overfishing as defined by the Magnuson-Stevens Act.

The minimum stock size threshold for each of the species under the FMP is defined as $\frac{1}{2} B_{MSY}$ (or a reasonable proxy thereof) as a function of productive capacity, and based upon the best scientific information consistent with National Standards 1 and 2. The minimum stock size threshold ($\frac{1}{2} B_{MSY}$) or a reasonable proxy may be defined as a function of (but not limited to): total stock biomass, spawning stock biomass, total egg production, and may include males, females, both, or combinations and ratios thereof which provide the best measure of productive capacity for each of the species managed under the FMP. The minimum stock size threshold is the level of productive capacity associated with the relevant $\frac{1}{2}$ MSY level. Should the measure of productive capacity for the stock or stock complex fall below this minimum threshold, the stock or stock complex is considered overfished. The target for rebuilding is specified as $B_{MSY}$ (or reasonable proxy thereof) at the level of productive capacity associated with the relevant MSY level, under the same definition of productive capacity as specified for the minimum stock size threshold.

The definitions for status determination criteria for these species are broadened under this alternative to allow for greater flexibility in incorporating changes to the definitions of the maximum fishing mortality threshold and/or minimum stock size threshold as the best scientific information consistent with National Standards 1 and 2 becomes available. As such, the following describes the potential sources of peer-reviewed scientific advice on status determination criteria and the current process of how that scientific advice will move forward in the development of management advice through the Council’s annual specification process.

Specific definitions or modifications to the status determinations criteria, and their associated values, would result from the most recent peer-reviewed stock assessments and their panelist recommendations. The Northeast Regional Stock Assessment Workshop/ Stock Assessment Review Committee (SAW/SARC) process is the primary mechanism utilized in the Northeast Region at present to review scientific stock assessment advice, including status determination criteria, for federally-managed species. There are also periodic reviews, which occur outside the SARC process.
that are subject to rigorous peer-review and may also result in scientific advice to modify or change the existing stock status determination criteria. These periodic reviews outside the SARC process could be conducted by any of the following listed below, as deemed appropriate by the managing authorities.

- MAFMC Science and Statistical Committee (SSC) Review
- MAFMC Externally Contracted Reviews with Independent Experts (e.g., Center for Independent Experts - CIE)
- NMFS Internally Conducted Review (e.g., Comprised of NMFS Scientific and Technical Experts from NMFS Science Centers or Regions)
- NMFS Externally Contracted Review with Independent Experts (e.g., Center for Independent Experts - CIE)

The scientific advice provided with respect to status determination criteria could follow three scenarios. First, it is possible that the panelists participating in the peer-review reach consensus with respect to maintaining the current definitions of status determination criteria for surfclams or ocean quahogs. There may be updates to the values associated with those same definitions based on the input of more recent information as well (i.e., additional year’s data); however, the Council is not required to undertake any specific action when this occurs, as using the updated values is consistent with National Standard 2. In this case the scientific advice can then move forward to the SSC and then on to the Council to develop management recommendations. Under the second potential scenario for scientific advice, the peer-review recommends changes or different definitions of the status determination criteria, and the panelists reach consensus as to how these status determination criteria should be modified or changed. This scientific advice can move forward to the SSC and then on to the Council to develop management recommendations. Under these first two potential scenarios, consensus has been reached and therefore the scientific advice moving forward to the Council’s advisory groups should be clear.

The third potential scenario is the peer review scientific advice with respect to the incorporation to status determination criteria is split (consensus is not reached) or uncertain recommendations are provided (weak consensus). The scientific advice provided by the reviewers may be particularly controversial. In addition, the scientific advice may not be specific enough to provide adequate guidance as to how the maximum fishing mortality threshold and/or minimum stock size threshold should be defined or what resulting management advice should be developed from these changes. Under these circumstances, unclear scientific advice can move forward to the SSC to review the information and recommendations provided by the peer-review group. The SSC, would clarify the scientific advice for the Council as to what the status determination criteria should be (e.g., modify, change, or maintain the same definitions). At that point the scientific advice on how the status determination criteria should be defined will be clear, and can move forward to the Council such that management advice can be developed.

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9 For example, in 2006 scientific advice on summer flounder status determination criteria was provided through a NMFS internally conducted review at the “Summer Flounder Assessment and Biological Reference Point Update for 2006”. The review panel was composed of experts from NMFS and academia.
The Council’s Industry Advisory groups are often engaged to provide additional management recommendations to the Council. The Council can then utilize the management advice from their advisory groups in developing their own recommendations put forward through the annual regulatory process of setting the annual specifications for the upcoming fishing year, which is the primary mechanism for adjusting management measures to meet the goals of the FMP. The recommendations from the Council can move forward in the annual specification package to NMFS for implementation under their regulatory process. The EA/RIR/FRFA in the annual or multi-year specification document currently provides a thorough analysis of this information and the extent to which the information is applied.

5.3 Optimum Yield Range Alternatives

5.3.1 Alternative 1 (No Action)

Under this alternative, the FMP specified optimum yield (OY) ranges would remain as described in the FMP. Specifically, the FMP specifies a surfclam OY range from 1.85 - 3.40 million bushels or 14,265 - 26,218 mt to be used to set the surfclam commercial quota. For ocean quahog the OY range is 4.00 - 6.00 million bushels or 18,144 - 27,216 mt. The Council must select a commercial quota within this range, and modification to the range would require a Framework adjustment.

5.3.2 Alternative 2 (Eliminate the OY Range)

Under this alternative, the OY ranges would be removed from the FMP and commercial quotas would continue to be set under the existing system of catch limits. This is consistent with the other FMPs the Council manages; surfclams and ocean quahogs are the only stocks with OY ranges specified in the plan. As prescribed under this system, the Council may not exceed the acceptable biological catch recommendations of the SSC, and would continue to specify annual catch limits, targets, and commercial quotas as otherwise described in the FMP.

5.3.3 Alternative 3 (Link Upper OY Range to ABC Recommendations)

Under this alternative, the upper bound of the OY range for both surfclams and ocean quahog would be equal ABC, as specified by the SSC for each of those stocks. The FMP prescribes that ACL=ABC. As noted in the CFR§648.72, specifications for surfclams and ocean quahogs may be specified below the OY ranges in the FMP, if the ABC recommendation of the SSC limits the ACL to a value less than the minimum of the range indicated. This alternative addresses the potential disconnect at the upper end of the OY range.

5.3.4 Considered but rejected from Further Analysis

The FMAT considered modifying the values in the surfclam and ocean quahog OY ranges; however a more complete biological and economic analysis would be required to do so. The OY ranges in the plan were based on scientific information (stock assessments) and industry input in the 1980's and these data would need to be reevaluated. Even with an updated range, there is still the possibility that the SSC might recommend something above the current OY range and the Council would not be able to develop viable commercial quota recommendation without going through a Framework
adjustment process. Therefore, this alternative was considered but rejected from further analysis as it does not address the issue of potential disconnect with the newly implemented catch limit system.

5.4 Essential Fish Habitat (EFH) Alternatives

5.4.1 Alternative 1 (No action - EFH)

Under this alternative, the no action text definitions and maps (Figures 1 and 2) for EFH are as follows:

*Atlantic surfclam juveniles and adults*: EFH habitat is defined as throughout the substrate, to a depth of three feet below the water/sediment interface, within federal waters from the eastern edge of Georges Bank and the Gulf of Maine throughout the Atlantic EEZ, in areas that encompass the top 90 percent of all the ranked ten-minute squares for the area where surfclams were caught in the NEFSC surfclam and ocean quahog dredge surveys. Surfclams generally occur from the beach zone to a [water] depth of about 200 feet, but beyond about 125 feet abundance is low.

*Ocean quahog juveniles and adults*: EFH habitat is defined as throughout the substrate, to a depth of three feet below the water/sediment interface, within federal waters from the eastern edge of Georges Bank and the Gulf of Maine throughout the Atlantic EEZ, in areas that encompass the top 90 percent of all the ranked ten-minute squares for the area where ocean quahogs were caught in the NEFSC surfclam and ocean quahog dredge surveys. Distribution in the western Atlantic ranges in [water] depths from 30 feet to about 800 feet. Ocean quahogs are rarely found where bottom water temperatures exceed 60oF, and occur progressively further offshore between Cape Cod and Cape Hatteras.

Figure 1. Surfclam juvenile and adult essential fish habitat (Amendment 12; 1998).
Figure 1. Ocean quahog juvenile and adult essential fish habitat (Amendment 12; 1998).

5.4.2 Alternative 2 (Placeholder)

This alternative is presently a placeholder pending further analysis this summer. The FMAT is working with the NEFSC to update survey data time series (1980-2013), maps of survey catch by percentile, and on any other relevant information to refine the text and mapped EFH definitions for surfclams and ocean quahogs.

Back in 2009, the Council identified the following as a preferred option based on analyses provided by a previous FMAT. These are provided below. The current FMAT will revisit this information and present the Committee with alternatives to consider in August or October, so the Council is basing its EFH definitions on the most up to date information.

Atlantic Surfclams

Eggs and larvae: In the water column, in state and federal waters designated as EFH for juvenile and adult Atlantic surfclams. Atlantic surfclam larvae occur primarily at temperatures between 14 and 20°C, and their inshore and offshore movements across the continental shelf are associated with upwelling and downwelling processes. Larval settlement coincides with the relaxation of upwelling events. Settling larvae select coarse sand over muddy sand.

Juveniles and adults: Benthic habitats in nearshore and continental shelf waters in sandy sediments between 8 and 40 meters. Juveniles and adult surfclams occur in fairly evenly-distributed aggregations and in patchy, dense beds in well-sorted medium sand, but may also be found in fine sand and silty fine sand. [Insert sentence re depth of sediment occupied]. They can inhabit waters to
a depth of 128 meters, but are more commonly found from beyond the breaker zone to 40 meters. Other conditions that generally exist where EFH is found are bottom temperatures below 25°C, salinities above 28 ppt, and dissolved oxygen concentrations above 3 ppm. Atlantic surfclams are planktivorous siphon feeders. Adults spawn in inshore and offshore areas, primarily between May and August, usually when bottom temperatures exceed 15°C. In some years, there may be a second minor spawning event in October.

Ocean Quahogs

Eggs and larvae: In the water column, in state and federal waters designated as EFH for juvenile and adult ocean quahogs. Larval settlement is believed to occur throughout the adult distribution range. Larvae can survive temperatures as high as 20°C in the laboratory, but grow optimally between 13 and 15°C.

Juveniles and adults: Benthic habitats on the continental shelf in a variety of bottom sediments at depths between 40 and 100 meters. Ocean quahogs are usually found in dense beds just below the sediment surface in sand and mud, but are also present in rocky/muddy areas, areas with cobble, and in shell hash bottoms. [Insert sentence re depth of sediment occupied] Juvenile and adult ocean quahogs are most common between 40 and 100 meters, although they have been found as deep as 256 meters. Other EFH conditions that generally exist are bottom water temperatures between 6 and 16°C and salinities of 32-34 ppt. Ocean quahogs are suspension feeders on phytoplankton. Spawning is protracted, lasting from May to November (sometimes persisting into January), but is most intense August to November.

Mid-Atlantic and Georges Bank Maps

NEFSC survey data from 1980-2008 was mapped according to percentiles of average catch rates (numbers per tow) from high (75%) to progressively lower (100%) densities per ten minute square of latitude and longitude. The 95th cumulative percentile was selected as the preferred alternative in 2009. In the maps, the squares that make up the 95th percentile include the 75% and 90% squares. A second, non-preferred alternative was based on a shorter (1997-2008) time series of survey data and was intended to show the effects of warmer bottom water temperatures on surfclam abundance in the southern end of their range (Weinberg 2005).

Because the juveniles and adults occupy the same locations and have the same habitat requirements, all the EFH maps that follow are for both life stages combined. In addition, because there are no survey data for the pelagic egg and larvae, all the EFH maps are meant to apply to all life history stages (eggs, larvae, juveniles, and adults).
Mid-Atlantic Inshore Maps

Survey data collected by the states of New York (2002-2006) and New Jersey (1988-2007) were analyzed using the same methods that were applied to the NEFSC survey data. The preferred alternative that was selected in 2009 was the 95th percentile distribution. There are no inshore data for ocean quahogs in the Mid-Atlantic.
Gulf of Maine Maps

Very limited survey data are available for surfclams and ocean quahogs in the Gulf of Maine. Several alternatives were developed based on their depth and substrate preferences. The 2009 preferred alternative for surfclams was mapped as depths of 0-70 meters in the southwestern Gulf of Maine where sandy substrates are found (the non-referred alternative was 0-70 meters all the way to the Canadian border). For ocean quahogs, the preferred alternative was 60-100 meters along the entire coast (non-preferred was 0-130 meters).