

2021 Atlantic Cod Stock Structure Science/Assessment Workshop Series

Workshop #3: Exploring Stock Assessment Prospects & Data Needs

June 25, 2021

WORKSHOP BACKGROUND AND OVERVIEW

In 2020, a report by the Atlantic Cod Stock Structure Working Group (ACSSWG) concluded that the population structure of Atlantic Cod in New England waters consists of **five distinct biological stocks, instead of the two that are currently managed**. This conclusion requires a re-thinking of the current science and management approaches to the fishery. In this effort, the New England Fishery Management Council (NEFMC), NOAA's Northeast Fisheries Science Center (NEFSC), and NH Sea Grant, hosted a series of Atlantic Cod Stock Structure Workshops to focus on **(a) Science/Assessment Prospects** and **(b) Management**. Each workshop featured presentations by technical experts followed by discussions open to the public to ensure complete information is available to best inform the cod stock assessment process.

The third workshop brought together the information from the previous two workshops and focused on evaluating which stock assessment approach can be supported by the data for each of the five stocks. The workshop had the following **objectives**:

- Establish a common understanding of the goals and objectives of this Atlantic Cod Stock Structure Workshop series
- Learn how management strategy evaluation (MSE) could be applied to Atlantic cod decision-making and the data needed to support this effort.
- Provide an overview of typical assessment approaches available and their corresponding data needs.
- Explore what assessment methods are feasible for each of the five stocks based on the available data and evaluate other data sources and metrics that can be used to provide qualitative descriptions of stock status.

This summary report focuses on the presentations and resulting discussions among workshop participants. The agenda is found in Appendix A and presentation slides are available online:

<https://seagrant.unh.edu/2021-atlantic-cod-stock-workshops>

ATTENDANCE

The virtual (Zoom) workshop was attended by 32 people (Appendix B). Participant backgrounds included a broad range of expertise in fisheries science and management including representatives from state and federal agencies, non-profit environmental organizations, academic researchers, and members of the commercial and recreational fishing industries. An initial poll indicated that 76% of respondents attended both previous Cod Structure Workshops on June 1 and 7, 18% attended only on June 7, and one participant attended neither of the previous workshops.

Introductory Presentations

Presentation – Workshop Introduction, Erik Chapman, New Hampshire Sea Grant (NHSG)

- This workshop series is a continuation of the Atlantic Cod Stock Structure Working Group’s (ACSSWG) findings that were presented in two NH Sea Grant facilitated workshops in 2018 and 2019
- The current 2021 workshop series will include two separate components:
 - Science/Assessment
 - Management Implications and Options
- Today we will focus on stock assessment approaches to better understand the feasibility of management for each proposed stock area

Presentation – Goals and Objectives of the Workshops, Russell Brown (NMFS, NEFSC)

- The schedule for the 2021 workshop series was reviewed. Two Science/Data Workshops have now occurred on June 1 and June 7. Today and on July 1 (if required), we will discuss assessment prospects, data limitations, and gaps to inform the Research Track.
- Recent science (ACSSWG report) suggests a finer scale stock structure than the current management units. Assessment of the available data is needed to determine if management is practical at this scale.
- The purpose of this workshop series is to assess the available and emerging data by stock area to inform the upcoming Research Track Working Group stock assessment process, and to identify data gaps and needs that would limit assessment. E.g., are there sufficient data to conduct age-specific modeling by stock area?
- This workshop series will not be performing stock assessments for the proposed stock units, nor other detailed analyses. This workshop series will also not focus on management implications, as that will be the focus of the next workshop series that will occur in August and September.

Presentation – Understanding Data Needs to Support Management Strategy Evaluation (MSE) as a Tool for Decision Making, Lisa Kerr, (Gulf of Maine Research Institute)

Why do we care about misalignment between biological stock structure and management units?

- There is a current understanding that population diversity (genetic, demographic, ecological, functional) has a value for a species success. If different populations respond differently to external pressures (e.g. environmental conditions) this asynchrony of responses provides stability to the overall species and is critical in fisheries to provide stability in the resource.
- This is termed the “portfolio effect” because a more diverse portfolio buffers the system, as some populations will fare better than others during changing conditions, thereby preventing the volatility of a single, synchronous response.
- These concepts are especially relevant to cod in the warming Gulf of Maine because some stocks may be more resilient to temperature change through adaptations (e.g., heat shock proteins) making them especially valuable to conserve.

- A mismatch between biological stocks and management units can lead to a misinterpretation of data trends and poorly targeted catch limits can cause overexploitation (e.g., Canadian cod).

How do we address misalignment between biological and management units?

There are currently a range of options to consider:

- Status quo management - There is insufficient information to change current practices
- “Weakest link” management - The assumed weakest spawning component is protected through management measures (e.g., herring)
- Spatial and temporal closures - Used to protect specific spawning populations (e.g. cod)
- Stock composition analysis - Data (catches or samples) are parsed to the appropriate stock of origin, allowing for separate assessment of multiple components (e.g., ICES Baltic cod)
- Alteration of stock boundaries – redrawing stock boundaries to improve the alignment of biological populations and management units (e.g., Irminger Sea redfish)

Best practices in integration of biological population structure into assessment and management.

- Holistic review of available stock identity information by a group of experts (e.g., ACSSWG)
- Identification of alternative assessment and management options that consider biological structure (current cod workshops; NEFMC, NEFSC, NHSG)
- Consideration of the practical limitations of alternative approaches (current cod workshops; NEFMC, NEFSC, NHSG)
- Evaluation of outcomes to alternative assessment and management options relative to biological, economic and social objectives (Management Strategy Evaluation)

Management Strategy Evaluation of alternative assessment and management options

- MSE is a tool used to evaluate alternative management approaches. This framework can be used to test the performance of different potential strategies to align management units with populations and identify impacts of mis-specified stock structure.
- The MSE framework for Atlantic cod would require an operating model to simulate 5 biological stocks and a fishery model; it would then be run to simulate the dynamics of the populations under fishing. Simulated survey and fishery data is aligned with actual data availability and used to produce stock assessment (i.e., analytical [ASAP] or index based), and evaluate management strategies over time, including catch advice.
- Most importantly, simulated data must be representative of actual data availability, to ensure we are emulating reality to the best of our ability.
- The performance of a range of possible alternatives will be evaluated, including approaches that lump (i.e. multiple populations grouped together) or split (i.e. focus is on individual population scale) populations at the level of assessment or management or both:
 - 1) lumped assessment and management
 - 2) lumped assessment and management with spatial/temporal management
 - 3) lumped assessment with split management
 - 4) split assessment and split management – best aligns biological & management units

- In conclusion, sustainable management is difficult when management units do not match the scale of fish biology but there are a range of approaches to improve assessment and management in situations where a mismatch in scale occurs.
- Moving forward, the ACSSWG report will be used to inform development of operating models that emulate the best available science on Atlantic cod stock structure and integrated into a MSE framework to evaluate the performance of alternative assessment and management options.

Please see the following reference for additional details on the importance of aligning biological and management units in the cod fishery:

Kerr et al. 2014, *Consequences of a mismatch between biological and management units on our perception of Atlantic cod off New England*
<https://academic.oup.com/icesjms/article/71/6/1366/2835585>

Presentation – Data Requirements for Stock Assessment and Fisheries Management (co-authored by Chris Legault and Jonathan DeBora), Russel Brown (NMFS, NEFSC)

Purpose of Stock Assessment: What is the state of the stock? What has happened to the stock? What will happen to the stock?

- Stock assessment is mandated within the Magnuson Stevens act to prevent overfishing while achieving the optimal yield.
- Stock assessment is defined as collecting, analyzing and reporting demographic info for the purpose of determining the effects of fishing on fish pops. A stock assessment seeks to determine stock status, describe uncertainties, project population status under different scenarios, and subject assessment to external peer review.
- The basis of accurate assessments includes biological data (growth, reproduction, movement) fishery independent (federal, state or academic standardized surveys) and dependent data (commercial and recreational catch, vessel reports, etc.), mathematical and statistical models, reference points, and harvest control rules.
- During the assessment process, data sources are summarized to produce size and/or age composition of stocks and then combined with additional information sources/assumptions like maturity, fishing mortality, discards, migrations etc. to best inform assessment. There is a continuum of approaches to choose from for the assessment model, from data-rich to data-poor methods, according to the data availability for a stock area.
 - Index methods are preferred for data poor assessments and have potential application for cod because catch is low and therefore so is the data availability for many of the newly proposed stocks.
 - Aggregate production dynamics evaluate stock size, reproductive rate, and mortality rate over time with increased information availability compared to index methods. These models estimate key values for the stock, including: maximum population size achievable, population growth rate, biomass trends, and catch rates.

- Surplus production models require catch data (landings and discards for all fisheries) as key input. No size or age distribution information is included, so they require less data but also provide less detailed output.
- Statistical catch at age (age-based assessments) are the most detailed forms of assessment, but are complicated to establish. They require managers to disaggregate fishery dependent and independent data by fleet, season, age, length etc. The age information is used to generate a structure of the population and estimate annual cohort sizes. These models offer the advantages of a precise stock status and detailed information about the population with biological reference points, but they require detailed catch at age sampling across a uniform time series (e.g. ASAP).
- Key biological reference points for age based assessment are fishing mortality (threshold and target) and biomass (threshold and target). The threshold is a level that should be avoided, because it implies inefficient use of the resource and endangers the long-term productivity of the stock. The target is the optimal level that extracts the maximum sustainable yield.

Data Review and Open Discussion of Assessment Approach by Stock

During this section of the workshop each biological stock area was reviewed, the available data was summarized, and an initial suggestion/recommendation of which assessment approach can be supported by the data was presented. The discussion focused on evaluating tradeoffs to determine the most probable and realistic expectation of what is possible or likely possible given the available data for each stock area.

Presentation – Eastern and Western Gulf of Maine, Charles Perretti (NMFS, NEFSC)

- Survey trends are broadly similar across the wGoM and eGoM. The majority of the cod biomass is currently in wGoM. The Maine/New Hampshire survey and sentinel survey catch some cod in eGoM but data are limited in numbers and age distributions.
- Both the commercial and recreational catch data sets are similar in that the eGoM is data poor and wGoM is overall data rich.
- In summary, eGoM would likely require an index-based assessment due to limited data availability. If wGoM is treated as a single stock (winter and spring spawners), there should be enough data for an age-based assessment.

Participant Q&A, Western Gulf of Maine

- Could the spring and winter wGoM stocks be assessed separately?
 - Russel Brown expanded on the methods currently used for stock partitioning that include analyzing otoliths via Micah Dean’s methods. Managers don’t have a plan or program for doing this moving forward or have the data/means to do this going back in time, although we do have the archived otoliths.

- How can we differentiate the winter and spring spawners without the age/length studies?
 - Rich McBride explained that we can look at the size of the first otolith annulus to differentiate between winter and spring spawners. There are also otolith microchemistry analyses and genetics methods that are validated but none of these methods are operational yet in management.

- Given this, what is the most realistic expectation and what would need to happen to differentiate these stocks?
 - Charles Perretti explained that we would need to use archived otoliths and historical data sources to retrospectively split up the fish caught in those statistical areas since 2011, but this is complicated prior to 2011 due to different otolith processing techniques (break and burn). This requires significant resources and would likely not be achieved by the Research Track assessment.
 - In disagreement with some of the above comments, Steve Cadrin (SMAST) noted, that stock discrimination using otoliths is right on the edge of being operational between Micah Dean and Lisa Kerr's methods. The potential for more routinely operational monitoring is there and it may not be necessary to process all archived otoliths. We would only need a representative subsample to characterize the stock composition. The real question is, how much CAN be done ahead of the 2023 track assessment?
 - Lisa Kerr (GMRI) added that there are multiple ways to use this information. Ideally, we would have composition analysis of both survey and fishery-based data for assessment (e.g., Eastern Baltic cod). If we cannot achieve this in the short term, it may be useful to at least monitor the current mixed stock composition to allow for reactive management measures.
 - Perretti acknowledged that monitoring is an interesting alternative but may not address all sources of catch (recreational, discards, etc.) and that otolith processing resources are limited.
 - If the expectations for aging are not feasible, it should be well communicated and we should adapt expectations based on aging abilities.
 - Lisa Kerr suggested assembling people with expertise on otoliths (Micah Dean and others) to look more closely into what is feasible i.e. **a subgroup discussion is warranted on feasibility of using otoliths for composition analysis of different data sources, past and future.**
 - Rich McBride spoke about a pilot study with archived otoliths and some limitations they encountered. There are considerations and decisions that need to be made on how to apply this moving forward like personnel being overextended and then having less bandwidth for other species. The feasibility of getting more data into the 2023 assessment is not clear as things stand, but the new approaches proposed by Lisa and Steve are worth discussing.
 - Jamie Cournane explained some recent improvements in the recreational data collection like electronic reporting that can offer fine scale spatiotemporal fishing data. Obtaining data from private anglers is more challenging, but smart phone applications may be a useful tool. The groundfish sector system will be moving

toward 100% coverage and offers a significant data source which may be important for differentiating stocks.

- How can we incorporate these additional sources of information in time for the 2023 Research Track Assessment?
 - Russel Brown stated that this will require additional resources but supports that we follow Lisa's suggestion to develop a subgroup and parse out/characterize the necessary resources. Additional research will have to be prioritized at higher levels of decision making.
 - Industry-University Cooperative Research Centers Program (IUCRC) program funds could provide resources here:
https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505789
 - Charles Perretti emphasized the importance of port sampling efforts for commercial age/lengths. Both have declined in recent years due to funding cuts meaning cod has fewer samples and then splitting those further into 5 stocks may be limiting.
 - Lisa Kerr expanded on the funding comment with a comparison to her bluefin tuna work which also has significant stock mixing. The Kerr lab and other institutions submit all their work to a cohesive, central database which offers methods to distribute work outside of NOAA. This could be a model for workload distribution around cod as well.

Participant Q&A, Eastern Gulf of Maine

- A UMaine graduate student added that there are approximately 200-300 cod otolith samples from the sentinel survey. Is there interest to age them?
 - Rich McBride responded these samples may be useful to analyze in the future; this may be worth returning to in future discussions.
- If there are additional data that aren't being used yet, it may be useful to evaluate "what if" scenarios about how useful these additional data sources might be/could be to improve assessment. i.e. the MSE could explore "What is the value added by these additional data sources?"
 - Lisa Kerr commented about trawl surveys in the context of a longer time series of the Center's survey. i.e. ME/NH only has past 20 years vs. longer-term period from the NEFSC survey that would be worth investigating and comparing.
- Charles Perretti asked does anyone agree we should group eGoM with wGoM or should they be assessed separately?
 - The crux of it is that we need to explore the process further to answer that question but the MSE will explore various options. It is not time yet to answer this question yet.
 - Even if the assessment is currently limited, there are still things that managers can do to address a specific stock short term (area specific rules) that could be beneficial to protect these populations.

- It is important to realize that when we assess the GoM as a whole, it only informs us about the wGoM, as that is where all the data come from, so it is not actually useful in providing any information about the status of the eGoM. Yet, there are habitat and environmental differences between the eGoM and wGoM that may be important to acknowledge and consider for meaningful management.
- When in the process does the decision of managing wGoM vs eGoM get made?
 - Russel Brown explained that these fine scale decision would ideally happen sooner rather than later so that the Research Track assessment can focus more clearly, while acknowledging there may be tension between scientists and managers on this point. Defining the goals for the model output is useful to do before the Research Track begins its work.
- Could we consider an approach similar to Pacific Ocean perch in Alaska where a portion of catch is spatially allocated and can this be looked at in the MSE?
 - Lisa Kerr clarified that a lumped assessment with a spatial allocation of catch will definitely be considered. It should also be explored further in the upcoming management sessions.

Presentation – Channel/ Western Georges Bank + GoM Winter Spawners, Russel Brown (NMFS, NEFSC)

- This presentation focused on the possibility of assessing the stock that comprises the Great South Channel/western Georges Bank cod, along with the Winter Spawners in the wGoM.
- For fishery dependent data, the recreational catch will be difficult to estimate accurately but commercial catch, landings, and discards are well documented.
- For fishery independent surveys, the NEFSC multispecies bottom trawl survey (spring and fall) and the MDMF survey are available and are generally well represented.
- Stock assessment prospects for assessment of the Channel area in isolation and statistical catch at age model may be possible but is highly dependent on getting better representative catch at age estimates.
- If statistical catch at age is not possible, we will need to drop back to aggregate production or index based methods.

Participant Q&A, Channel/ Western Georges Bank

- A participant commented that Scott Steinback has been doing work for the Council around recreational catches data.
 - Russel Brown acknowledged this may be useful data and that they did reach out to him about how easy/difficult it would be to segregate catches. His response was that it would be difficult and require making assumptions that he currently wasn't comfortable with. Currently we split GoM from the South by a port in Massachusetts and it would be harder to split at a finer scale.

Presentation – Eastern Georges Bank, Russel Brown (NMFS, NEFSC)

- Currently the Northeast Peak is assessed along with Canada so this is one region where we would actually be adding data (areas 522 and 525) by increasing the size of a proposed stock area. The newly proposed stock is also larger than the current stock area managed by the Canadians. It will continue to include binational catch and surveys.
- US landings and discards are reasonably well documented and sampled, but some augmentation of length and age samples are required to estimate catch at age – adding areas 522 and 525 will likely address this.
- Canadian landings are very well documented and sampled. Canadian discards are minimal due to regulatory structure.
- Recreational catch is insignificant and largely doesn't occur anymore, since this area is so far from shore.
- There are two US Surveys (Spring and Fall) with consistent coverage and well represented size/age composition.
- There is one Canadian survey (Spring only) with consistent coverage and the size/age composition is also well represented.
- In Summary, if assessed in isolation, a statistical catch at age model is possible for the eastern Georges Bank stock area. The current statistical catch at age model has been rejected and data limited approaches are currently being used to provide the management advice. If Statistical catch at age approach is not possible, it will be necessary to drop back to aggregate production or index based methods.

Participant Q&A, Eastern Georges Bank

- Would the Canadians be open to changing their management units? The Western boundary is unknown and it would be important information to decide what is feasible. Should we consider a revised definition of Georges Bank?
 - Russel Brown emphasized that the ACSSWG had Canadian participation and together, they concluded that the appropriate stock area would be larger. This suggests that they WOULD be amenable to expanding the management unit, but may not participate in the Research Track process.
 - Jamie Cournane also highlighted the unknowns about the Canadian participation but was hopeful. Eastern Georges Bank is a very complicated area for bilateral management and a transboundary research committee would need to support changing the management units. Everything is done through negotiations and would require a lot of support from both countries.
- The Georges Bank cod assessment is highly data rich and yet we still apply an index based approach due to retrospective, historical age based errors. We will need to consider the current issues as well and acknowledge that data availability is important but not the only factor as we approach the MSE process.

- Charles Perretti emphasized that these decisions about additional sources of information and analysis should be made ASAP to ensure that this work is actually completed in time for the Research Track work. The Research Track will also be a long process and so the sooner we can decide on how we will be addressing the newly proposed stocks, the better chance that managers are able to properly incorporate them into analyses.

Presentation – Southern New England, Russel Brown (NMFS, NEFSC)

- Overall, Southern New England (SNE) is a data poor region where landings and discards are low from commercial catch, especially in recent years. Data (length/age) are likely insufficient to support any type of age-based assessment.
- Recreational catch will be difficult to estimate due to Massachusetts ports landing cod from multiple proposed stock areas (SNE and wGoM). There is potential to conduct further exploration of head and charter boat data to better represent the area, but this would need to occur prior to the Research Track.
- The NEFSC and Mass DMR surveys (Spring and Fall), show consistent coverage but the size and age composition are not well represented.
- The NEAMAP bottom trawl surveys have insufficient cod catch to index the population, especially in the Fall when there have been no cod catches.
- The RI DEM and URI/GSO surveys (Spring and Fall) have consistent coverage but size and age data are limited to younger fish only.
- In summary, a statistical catch at age model is not possible if SNE is considered in isolation and while aggregate production models can be attempted, an index or data limited assessment approach would likely be employed.

Participant Q&A, Southern New England

- Steve Cadrin highlighted the recreational fishery on Cox Ledge as a potential data source that could complement current survey data with older fish. Can we use MRIP data for SNE cod removals and catch at age estimates?
 - Jamie Cournane explained that dock intercept, mail surveys and ride along programs capture additional information but it has never been applied to a formal stock assessment. There are seasonal limitations when the recreational fleet is not fishing consistently in the Winter due to weather but there is a national initiative to improve these recreational data and it has potential.
 - Waves of recreational boats that fish Cox Ledge are from Montauk (NY) as well so it would be a good idea to look at their VTRs as well.
- Russel Brown addressed the concerns about the additional workload exploring new data sources by noting that he would leverage help from a program within NOAA called the *Rotational Assignment Opportunity* which facilitates people to provide additional help with these sorts of analyses.

- A participant from The Nature Conservancy mentioned some ongoing work with NOAA they are doing internationally to help with other data limited fisheries. Their process may be of interest to consider in some of these cod specific analyses.
- Steve Cadrin highlighted that SNE has more info than eGoM and proposed potential options for SNE to be lumped with other stocks into an “inshore complex” which has been proposed in previous research by Doug Zemeckis.
 - What is the definition of inshore vs offshore?
 - wGoM and the Great South Channel with SNE would be inshore (Zemeckis et al. 2014)
- Lisa Kerr posed some final, lingering concerns that would be appropriate for the Research Track working group and others to consider before they convene. It’s not currently clear how some questions will be dealt with in time prior to the Research Track meeting but it would be useful to the MSE process to get some feedback about what potential scenarios might look like. **A clear timeline of new data compiling and analyses should be a priority before and during the management workshops.**

Next Steps/Follow Up:

The following is a short list of items that were identified during the workshop as needing revisiting with further discussion, potentially by subgroups, prior to the Research Track work.

- Whether and how the eastern and western GoM should be lumped together in assessment or management, and when this decision will be made.
- The feasibility of using otoliths, or other methods, to assess the composition of the historical and modern fishery and survey data. A subgroup discussion was suggested for this.
- Will additional data from the eGoM (e.g., otoliths or other Sentinel Survey data) provide any new, information useful for assessments moving forward.
- Exploration of additional recreational fishery data (headboat/charter boat) from Southern New England.
- A decision about what scenarios will be explored by the MSE process.

Additional Feedback

The following poll question was presented to participants to close out the workshop and collect feedback on productivity of these discussions as we approach the management series in August-September:

Do you feel better informed about the data availability and limitations of a 5 cod stock structure and prepared to engage in the future discussions about management implications?

The closing poll indicated that 72% of participants learned a lot and are ready for the next conversations while 22% acknowledged there was still some information they needed to digest. One individual did not plan on attending the future management discussions.

Appendix A

2021 Atlantic Cod Stock Structure

Science/Assessment Workshop

Exploring Stock Assessment Prospects & Data Needs

June 25, 2021

8:30 AM – 12:30 PM

Workshop Objectives:

- Establish a common understanding of the goals and objectives of this Atlantic Cod Stock Structure Workshop series
- Learn how management strategy evaluation (MSE) could be applied to Atlantic cod decision-making and the data needed to support this effort.
- Provide an overview of typical assessment approaches available and their corresponding data needs.
- Explore what assessment methods are feasible for each of the five stocks based on the available data and evaluate other data sources and metrics that can be used to provide qualitative descriptions of stock status.

8:30 Welcome and Introductions – Erik Chapman, NH Sea Grant and Laura Taylor Singer, Facilitator

8:40 Goals and Objectives of the Science/Assessment Workshops – Russel Brown, NEFSC

8:50 Understanding Data Needs to Support Management Strategy Evaluation (MSE) as a Tool for Decision Making – Lisa Kerr, GMRI

9:20 Overview of Routinely used Stock Assessment Approaches and What Corresponding Data is Need to Inform – NEFSC Staff

9:50 Data Review and Discussion of Relevant Assessment Approaches

- a. Western Gulf of Maine (spring spawning population)
- b. Western Gulf of Maine/South Channel (winter spawning population)
- c. Georges Bank East
- d. Southern New England
- e. Eastern Gulf of Maine

We will be reviewing each biological stock area to summarize the available data and present an initial suggestion/recommendation of which assessment approach can be supported by the data. Our discussion will focus on evaluating tradeoffs to determine the most probable and realistic expectation on what is possible or likely possible given the available data for each stock area.

11:00 BREAK

11:15 Data Review and Discussion of Assessment Approach (Continued)

12:15 Overview of Next Steps

12:30 Adjourn

Appendix B

Michelle Lemos (NH Sea Grant)	Russell Brown (NMFS, NEFSC)
Laura Singer (SAMBAS Consulting LLC)	Jocelyn Runnebaum (TNC)
Erik Chapman (NH Sea Grant)	Kyle Molton (NMFS, GARFO)
Adrienne Kovach (UNH)	Jon Deroba (NMFS, Woods Hole)
Michael C. Plaia (Recreational Advisory Panel)	Jeff Vieser (NMFS)
Dan Salerno (NE Sectors V & XI)	Robin Frede (NEFMC)
Rich McBride (NMFS, NEFSC)	Lisa Kerr (GMRI)
Jamie Cournane (NEFMC)	Rebecca Van Hoeck (UNC Chapel Hill)
Steve Cadrin (UMass SMAST)	Alexander Dunn (NMFS, NEFSC)
Robyn Linner (UMaine)	Mark Grant (NMFS)
Nathan Hermann (UNH)	Megan Ware (DMR)
Jackie Odell (Northeast Seafood Coalition)	Kathy Sosebee (NMFS, NEFSC)
Alison Frey (UMass SMAST)	Kate Draa (NOAA)
Cole Carrano (UMass SMAST)	Jon Deroba (NMFS, Woods Hole)
Liz Sullivan (NMFS, GARFO)	Wesley Brown (Lighthouse)
Charles Perretti (NMFS, NEFSC)	Kyle Molton (NMFS, GARFO)