2021 Atlantic Cod Stock Management Workshop Series
Workshop #1: Setting the Groundwork

August 12, 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; Council), 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 Management workshop series will continue to build off the previous Science/Assessment workshops and serve as a bridge from the past to current understanding of cod population structure. The results of this workshop series will be presented to the NEFMC, providing information that will help in the future development of Atlantic cod management measures.

The first workshop had the following **objectives**:

- Review outcomes of the Science/Assessment June workshops
- Provide an overview of the current cod fisheries management system
- Examine different management tools and approaches available

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 49 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 49% of respondents attended all previous Cod Structure Science Workshops in June, 34% attended none, and 3-14% attended one or two 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 Management workshop series will occur throughout August-September and build on the previous Science/Assessment workshops that took place in June. Together, these discussions will be summarized and reported to the NEFMC and the Research Track (full timeline provided in presentation).
- Today, we will review the current management system for cod and discuss stock assessment approaches/available tools to better understand the feasibility of management for each proposed stock area.

Presentation – Goals and Objectives of the Management Workshops, Jamie Cournane (NEFMC)

- The peer reviewed results of the 2020 Atlantic Cod Stock Structure Working Group (ACSSWG), have led to an understanding that there are five distinct biological stocks instead of the two that are currently managed. Given that, we are engaged in this workshop series to discuss management options.
- These current workshops will bridge the two pronged approach between the science and management. The objective is to gather input from participants on potential management changes along with their socioeconomic consequences.
- These discussions will be shared with the Research Track that is currently forming and they will review these reports over the next year or so.
- The workshops will <u>not</u> be scoping specific management actions or making formal recommendations. They are a platform for discussions and gathering different perspectives.

Presentation – Brief Overview of the Cod Stock Structure Science/Assessment Workshop Discussions, Russell Brown (NMFS, NEFSC)

A quick review on progress so far:

- The ACSSWG used an interdisciplinary approach (fishermen ecological knowledge, life history, markers, etc.) to characterize the biological stock structure of cod and concluded there are five stocks that could be considered instead of the two that are currently managed.
- Three workshops took place in June focused on the data availability for each stock, preliminary assessment prospects, and identifying additional information and/or upcoming projects that may prove useful for the Research Track.

Key conclusions:

- The currently low population levels and deficient historical data (e.g., surveys, poor age distributions, lack of ongoing biological sampling) would lead to problems with data deficiency if

further split to assess five management areas. Data limited options, rather than age-based assessments, may offer the most feasible approach.

- SNE and eGoM stock areas are particularly data deficient, and the wGoM area would be relatively stable in terms of the stock assessment.
- wGoM, however, also presents a problem with respect to discriminating the contributions of the distinct winter and spring-spawning stocks. Despite available techniques (otoliths, genetics), currently there are no ongoing stock composition analyses.

Some examples of promising additional information that were identified:

- The University Rhode Island Graduate School of Oceanography (GSO) bottom trawl surveys, Rhode Island Department of Environmental Management (DEM) fixed station and offshore bottom trawl surveys represent considerable sources of information in SNE.
- The eGoM sentinel survey and age samples should be considered.
- Historical survey and commercial otolith collections should be investigated in the GoM to better understand Winter and Spring spawning stock composition (more resources required).

Next steps:

- There will be a total of five Management workshops, including this one, taking place in August and September.
- The Research Track working group is currently being formed and will continue working for the next two years.

Participant Q&A

- How will the Research Track be incorporating these workshop findings?
    - Russell Brown explained that detailed, final reports are currently underway with UNH, and will be provided to the Research Track. Also, we are recruiting new talent and resources to analyze some of the potential data sources brought to light during the Science/Assessment workshops. I will be presenting all this to the Research Track during their early meetings, such that the information from these workshops should inform the work of the Research Track working group.

Presentation – Understanding the Existing Atlantic Cod Management, Jamie Cournane (NEFMC)

- Cod is currently managed within the Northeast Multispecies (13 species of Groundfish) Fishery Management Plan with assessments for the stocks occurring every two years. The 2019 assessment has indicated that both stocks are currently overfished and in rebuilding status. Both stocks are also experiencing overfishing.

<u>Commercial Fishery</u>

- The majority of the commercial groundfish fishery is sector and quota based. Additional regulations include accountability measures, spawning closures, and gear/mesh restrictions.
- The common pool represents a smaller portion of the commercial groundfish fishery with a system of trimester quotas, trip limits, area-based closures, spawning closures, and restrictions on gear/mesh.

  (See presentation posted online for examples of closure maps and commercial reports).

<u>Recreational Fishery</u>

- The recreational groundfish fishery (e.g., angler and for-hire party and charter boats) is subjected to the minimum size limit of 21 inches, bag limits, seasons, and spawning closures. Regulations vary between stock on bags limits and duration of season.
  (See presentation posted online for current regulations and examples of recreational spawning closure maps).

Participant Q&A

- A commercial fisherman commented that days-at-sea and rolling closures in his fishing areas have been substantial. He suggests that we need to be more cognizant of how management has worked thus far over time and not only since 2010, especially regarding the effects of rolling closures.
  - Jamie Cournane emphasized that it is very important to remember from the history of management actions when considering the new biological stock structure. The Council could consider what worked well or not in previous management actions. A history of relevant management actions is also prepared for the stock assessments and can be provided to theResearch Track.

Presentation – Considering Example Management Approaches, Jamie Cournane (NEFMC)

- Considering management, there is a full gradient of approaches available that could be applied to address the newly proposed biological stock structure for cod. The reference to Kerr et al. 2017 *("Lessons learned from practical approaches to reconcile mismatches between biological pop structure and stock units of marine fish"*) was provided, in which authors described these approaches and discussed the impact of mismatches between biological stocks and management areas using historic case studies (https://doi.org/10.1093/icesjms/fsw188).

  Management approaches to understand and consider for application to cod (from Kerr et al.):
  1) Status quo management
  2) "Weakest link" management
  3) Spatial and temporal closures
  4) Stock composition analysis
  5) Alteration of stock boundaries

Participant Q&A

- A participant asked for clarification on the difference between weakest link and spatial and temporal closures when it comes to application.
  - Jamie Cournane and Lisa Kerr (GMRI) explained that weakest link is a highly precautionary approach taken to protect a known minority component. Spatial and temporal closures can be more targeted when additional information is available that allows for more fine scale, informed decisions like spawning closures.

- A participant suggested that they struggle to see a one-size-fits-all for any/all regions. The "weakest link" approach is very intimidating if it were to be considered across all areas. Maybe different approaches should be considered for different areas.
    - Jamie Cournane emphasized that all management options are on the table and there will be areas where some tools are better than others. This is an important point to make clear as the workshops progress.
    - The listed approaches represent a continuum of stock assessment complexity. There could be ways to alter the stock boundaries without using the most complex 5-stock model. In other words, there could be alternative boundaries that focus on two, three or four stocks, not the full five. As long as, these changes better fit the biological populations, they would be preferable to the current two management areas.

- A participant asked whether the "status quo" (i.e. no change) is really an option.
    - Jamie Cournane responded that yes, it is an option that can be considered. However, the goal of these workshops is to discuss how to adjust management in response to the new biological stock structure.
    - Lisa Kerr added that a status quo approach will be considered in the Management Strategy Evaluation (MSE) simulations and associated tradeoffs will be presented. Stock boundaries will also be considered flexible for anything between two and five stocks.
    - Steve Cadrin (SMAST) commented that in principle, it would be difficult to move forward with status quo considering the overall objectives of fisheries is to rebuild stocks. Changes must represent a balance between National Standards and practical applications with all associated tradeoffs considered. We don't actually know if redrawing areas is going to improve the fishery so this is what we need to explore (e.g., MSE process).

- A participant observed that the objective of management is to improve and rebuild cod stocks and asked about the role of re- allocation and what will it do to improve stock status.
    - Jamie Cournane explained that this depends on several factors including results of the Research Track assessment and then the Council's response, which may involve some form of re-allocating based on historical catches. This could mean exploring re-allocation between fishers and areas, or larger scale like between recreational and commercial fisheries.

- A participant asked if climate change is able to be incorporated into the model frameworks?
    - Lisa Kerr responded that factors like climate change are complicated and will involve some assumptions, but yes, it is within the capacity of MSE models.
    - A fishermen added that there are warming waters in regions where he has been fishing for 40 years due to a freshwater discharge pipe and are likely affecting recruitment. These external factors are also important to consider and include since they similarly alter habitat.
    - Lisa Kerr confirmed that although these types of factors will not be at the core of simulations, many will be incorporated into models since temperature is known to impact cod.

- A follow-up question was asked on the topic of re-allocation and the influence of temporal differences in spawning on re-allocation.
    - Jamie Cournane highlighted that these need to be further explored (e.g., winter and spring spawners in wGoM) and we will need to know when and where the industry is fishing each component. Generally, the monitoring of catches by component has mirrored the data used in the assessment.

- Erik Chapman (NHSG) asked a clarifying question about what the stock composition analysis approach would look like in practice.
    - Jamie Cournane provided an example of a sampling area with a set catch limit. The catch is sampled throughout a season and then proportioned between the populations that mix in this area; doing so requires using consistent monitoring tools.
    - Lisa Kerr confirmed the explanation and explained the example of ICES Baltic cod where eastern, western and mixed areas exist. Tools allow for managers to sort proportions of catches and track biomass. We also have many similar tools currently available for cod (e.g. otoliths or genetics).

- A participant raised a question about the available science or ongoing research on spawning populations to inform/modify management in the GOM.
    - Jamie Cournane responded that although there are some ongoing spawning studies focused in SNE, she is not aware of anything current in the GoM.
    - A number of researchers confirmed there are no ongoing projects to delineate cod spawning in the GOM, but there are in SNE on Cox Ledge. The studies are working with commercial and recreational fishermen to best characterize specifics where cod are spawning. An additional effort is working to develop a recreational catch rate series for SNE that should contribute significant data to the Research Track.
    - Rich McBride (NOAA) noted a successful outcome of the Science/Assessment workshops in June in that we were able to connect with researchers at UMaine and identify some archived otolith data/collections from the GoM. The collection has some limitations statistically but still has potential to improve our understanding of the region.

- Specific to Cox Ledge, a participant wondered if we are considering the effects of offshore wind development on the stocks. It would appear we are introducing new science while simultaneously altering the area in other external ways.
    - Steve Cadrin clarified that the current research for Cox ledge is different than previous efforts from 2007-2011 when the goal was to establish stock identification. The current tagging project is being funded by pre-construction monitoring and energy companies to specifically address the impacts of these wind farms.
    - A fisherman noted his concern about excessive monitoring but lack of action. Efforts are reactionary that will be too late if results are negative.

- A comment was made by a sector manager who conducts “in season” monitoring of groundfish with regard to the GoM Spring and Winter spawning specifically. The manager expressed skepticism about the possibility of doing what is needed within a season because available techniques (otolith and genetics) are slow. From the manager’s perspective, it is not possible and too costly.
    - Steve Cadrin agreed that cost can be high but many other fisheries have routine, in season monitoring that have proven effective for assessment. Otoliths are being used in season to age while at the same time they can be used to delineate stocks. Adrienne Kovach (UNH) has genetic markers that are also effective if implemented and the monetary costs for these technologies are continuing to improve.
    - A follow-up question focused on the timeline, even though the cost might become more practical.
    - Steve Cadrin compared modern genetic analyses to the timeline of how age data is collected in season. If samples can be collected in an efficient manner, then it is possible to do the rest in season.
    - Lisa Kerr explained the current process of mixed stock composition analysis of tuna using otolith data as an example of operational, full scale fishery monitoring within season to demonstrate potential for cod.

Appendix A

2021 Atlantic Cod Stock Structure Management Workshop Series
Setting the Groundwork

August 12, 2021
1:00 PM – 3:00 PM

Workshop Objectives:

- Review outcomes of the science/assessment June workshops
- Provide an overview of the current cod fisheries management system
- Examine different management tools and approaches available

1:00 Welcome and Introductions
Erik Chapman, NH Sea Grant and Laura Taylor Singer, Facilitator

1:15 Goals and Objectives of the Management Workshop Series
Jamie Cournane, New England Fishery Management Council (NEFMC)

1:30 Brief Overview of the Cod Stock Structure Science/Assessment Workshop Discussions
Russell Brown, Northeast Fisheries Science Center

1:50 Understanding the Existing Atlantic Cod Management
NEFMC Staff

2:30 Considering Example Management Approaches
NEFMC Staff

2:50 Overview of Next Steps

3:00 Adjourn

Appendix B

Michelle Lemos (NH Sea Grant)
Erik Chapman (NH Sea Grant)
Jamie Cournane (NEFMC)
Adrienne Kovach (UNH)
Laura Singer (Sambas Consulting LLC)
Linas Kenter (UNH)
Alison Frey (Umass SMAST)
Rich McBride (NMFS, NEFSC)
Jackie Odell (Northeast Seafood Coalition)
Hank Soule (Sustainable Harvest Sector)
Daniel McKiernan (Mass DMF)
Steven Cadrin (Umass, SMAST)
Edward Barrett
Cole Carrano (Umass SMAST)
Megan Ware (DMR)
Amanda Hart (Umass, SMAST)
Hal Weeks
Nathan Hermann (UNH)
Michael C. Plaia (Rec Advisory Panel)
Rebecca Peters (Maine DMR)
Micah Dean (Mass DMF)
Ryan Morse (NMFS)
Janice Plante (NEFMC)
Lisa Kerr (GMRI)
Dan Salerno
Robin Frede (NEFMC)
Matt Gates (CT DEEP)
C Foley (NMFS, NEFSC)
Charles Perretti (NMFS, NEFSC)
Lucy McGinnis (Umass Dartmouth)
Allison Lorenc (Conservation Law Foundation)
Kyle Molton (NMFS, GARFO)
Greg Ardini (NEFSC)
Mark Grant (NMFS)
Kaitlyn Shaw (NOAA, NMFS)
Kate Draa (NOAA)
Tom Nies (NEFMC)
Stephanie Sykes (Cape Cod Fishermens Alliance)
Melanie Griffin (Mass DMF)
Alexander Dunn (NMFS, NEFSC)
Maggie Raymond (Associated Fisheries of Maine)
Jocelyn Runnebaum (TNC)
Jason Didden (MAFMC)
Mariana Steen (BOEM)
Kyle Autin
Russell Brown (NOAA, NEFSC)
Irene Andrushchenko (Fisheries and Oceans Canada)
Liz Sullivan (NOAA)
Paul Nitschke (NEFSC)