

Atlantic Cod Stock Structure Workshops

Final Report



Photo credit: NOAA Fisheries

For Today

- Present the main findings of the workshops.
- Answer questions about the workshops and final report.

Atlantic Cod Stock Structure Workshops

Goals & Objectives

PHASE 1: Atlantic Cod Stock Structure Working Group

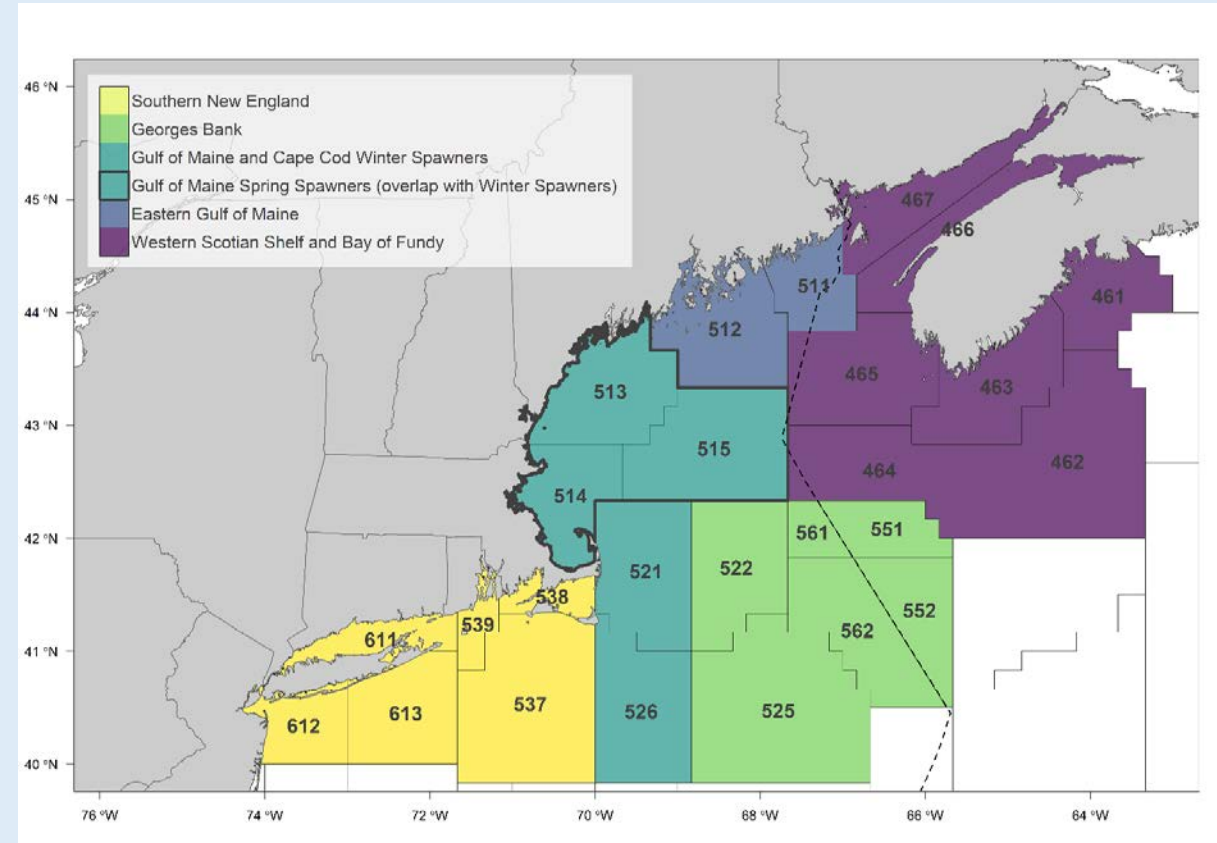
Five distinct biological stocks, instead of the two that are currently managed

Re-thinking of the current science and management approaches to the fishery.

Two-pronged approach developed to incorporate new stock definitions into existing science and management structures.

PHASE 2: Workshops

- (a) Science/Assessment Prospects
- (b) Management



Overview and Attendance of Workshops

The 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**.

Due to public safety considerations related to COVID-19, the workshops were conducted by webinar.

A. Science/Assessment Prospects Workshop Series

Objective: Summarize historical and current data for each of the five proposed stock areas and identify critical data gaps that must be addressed to improve assessment

- 67 participants with the majority coming from academic institutions and the NEFSC (54% combined). The remainder were equally divided among fishing industry representatives, state government members, federal fisheries managers, council staff and non-governmental organizations

B. Management Workshop Series

Objective: Gathering input on potential management changes and possible economic and social impacts. The workshop series is **not making any formal recommendations or scoping specific management actions**

- 105 participants with primarily (24%) self-selected “scientific researchers” while “NOAA/NEFMC staff” and “other” each comprised roughly 14%. Relatively few active commercial fishermen participated, but a variety of fishermen’s organizations were able to attend.

Workshop summaries and presentations can be found on the [UNH Cod Stock Structure Website](#).

Overview of the Report – 2 Parts

Science/Assessment Prospects Workshop Series

- A. BACKGROUND AND PROCESS**
- B. DATA AVAILABILITY AND ASSESSMENT PROSPECTS**
- C. OTHER POTENTIAL DATA SOURCES**
- D. DATA GAPS AND INFORMATION NEEDS**
- E. KEY CONCLUSIONS AND NEXT STEPS**

Management Workshop Series

- A. OVERVIEW AND PROCESS**
- B. BACKGROUND INFORMATION**
- C. MANAGEMENT TOOLS AND THEMES**
- D. EXPLORING SCENARIOS & EVALUATING TRADEOFFS**

Workshop summaries and presentations can be found on the [UNH Cod Stock Structure Website](#).

Initial Steps (Phase 1 and 2A): Atlantic Cod Stock Structure Working Group and Science/Assessment Workshops



Atlantic Cod Stock Structure & Stock Assessment Timeline

	Stock Structure Working Group (ACSSWG)	Science/Assessment and Management Workshops	Research Track Stock Assessment
2018	ACSSWG Formed		
2019	ACSSWG Report Completed		
2020	ACSSWG Peer Review (May)		
2021		Science/Assessment Workshops (June)	Research Track Working Group Formed (October)
		Management Workshops (Aug-Sept)	
2022			Research Track Working Group conducts the Stock Assessment
2023			Research Track Peer Review (March)

Phase 1: Atlantic Cod Stock Structure Working Group

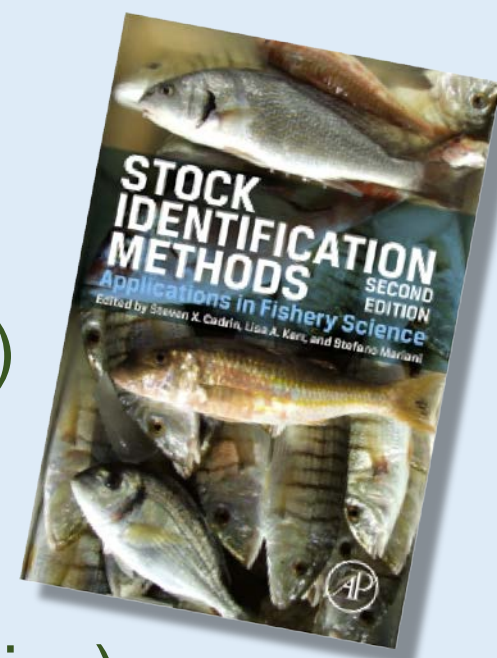


Atlantic cod stock structure working group

- Experts (members & partners) working collaboratively
- using an interdisciplinary approach
- to characterize the biological stock structure of cod
- for eventual consideration in monitoring, assessment and management of US Atlantic cod

Methods: an interdisciplinary approach

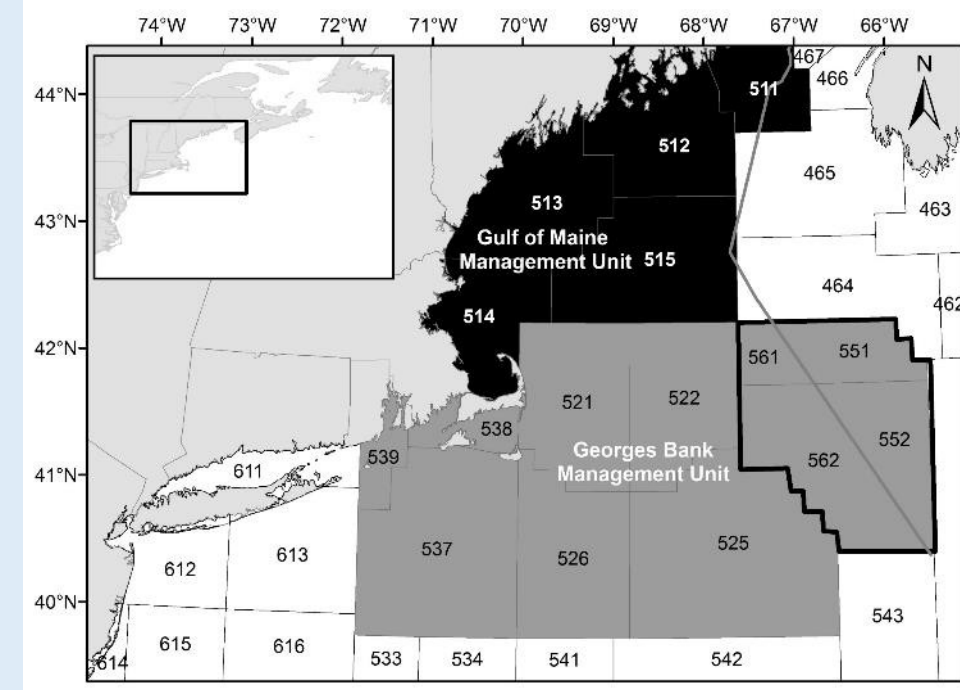
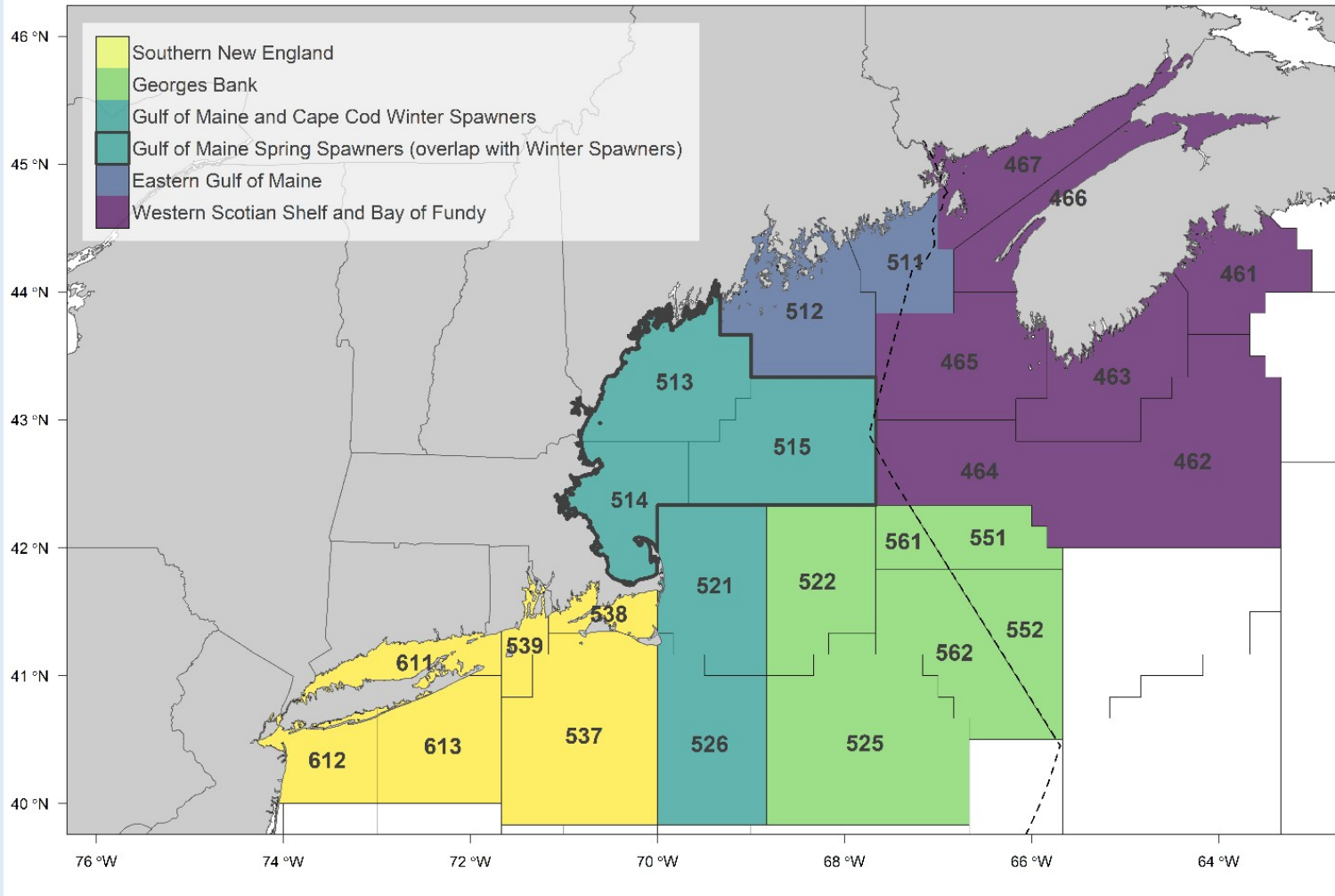
1. Fishermen's ecological knowledge (structured interviews)
2. Early life history (spawning–settlement)
3. Genetic markers (including adaptive markers and genomics)
4. Life history (48 years of the NEFSC bottom trawl survey)
5. Natural markers (otoliths, parasites, color morphs, etc.)
6. Applied markers (200,000 tagged cod; 12,000 recaptures [1923-2013])



Results: Interdisciplinary Highlights

- 1) Notable phenotypic and genetic variability among statistical areas
 - Cod not well mixed in either US management unit
- 2) Extensive movements by adults
 - exchange between US-US management units
 - as well as between US-Canada management units
- 3) Larval dispersal around Cape Cod
 - one-way connectivity between US-US management units
- 4) Two sympatric, genetically differentiated stocks in SW Gulf of Maine
 - adaptive differences between winter- and spring-spawning cod

5 US cod stocks proposed



This proposal accounts for:

- Within unit variation
- Between unit connectivity
- Winter/spring sympatry

Phase 2: Science/Assessment and Management Workshops

Science/Assessment Workshops

- Three workshops held in June 2021

Management Workshops

- Five workshops held in August/September 2021

Atlantic Cod Science & Assessment Workshop Objectives

- Summarize the historical and current data availability for each of the five proposed stocks/management areas
- Provide a summary of stock assessment prospects based on data availability
- Identify additional data that is available or upcoming research that could be used to inform the assessments for each of the proposed stock/management areas
- Generate initial data gaps and ideas for research to improve the assessment prospects
- Learn how management strategy evaluation (MSE) could be applied to Atlantic cod decision making and the data needed to support this effort

Science/Assessment Key Conclusions

- Splitting the historical data collected under the two management area design and then partitioning it for use to assess five management areas results in inadequate assessment data for some areas
- The proposed Southern New England and Eastern Gulf of Maine proposed stock areas were particularly data deficient in terms of the representativeness of fishery independent surveys and biological sampling of the catch required to characterize commercial and recreational landings and discards.
- The proposed Western Gulf of Maine area would be relatively stable in terms of the input data and resulting stock assessment.

Science/Assessment Key Conclusions (cont)

- **The revised Georges Bank stock area would gain data and information as a result of including Statistical Areas 522 and 525 (central Georges Bank)**
 - There is no guarantee that the binational TRAC/TMGC process will adopt the new stock area definition.
- **The Gulf of Maine spring spawning stock (which include cod in the Great South Channel area) are problematic to assess due to:**
 - Limited fishery independent survey data (NEFSC and MADMF surveys)
 - Spatial overlap with Western Gulf of Maine stock area
 - Need to identify Winter vs. Spring spawners in both current/future data collections and historical data

Examples of Additional Information to Consider

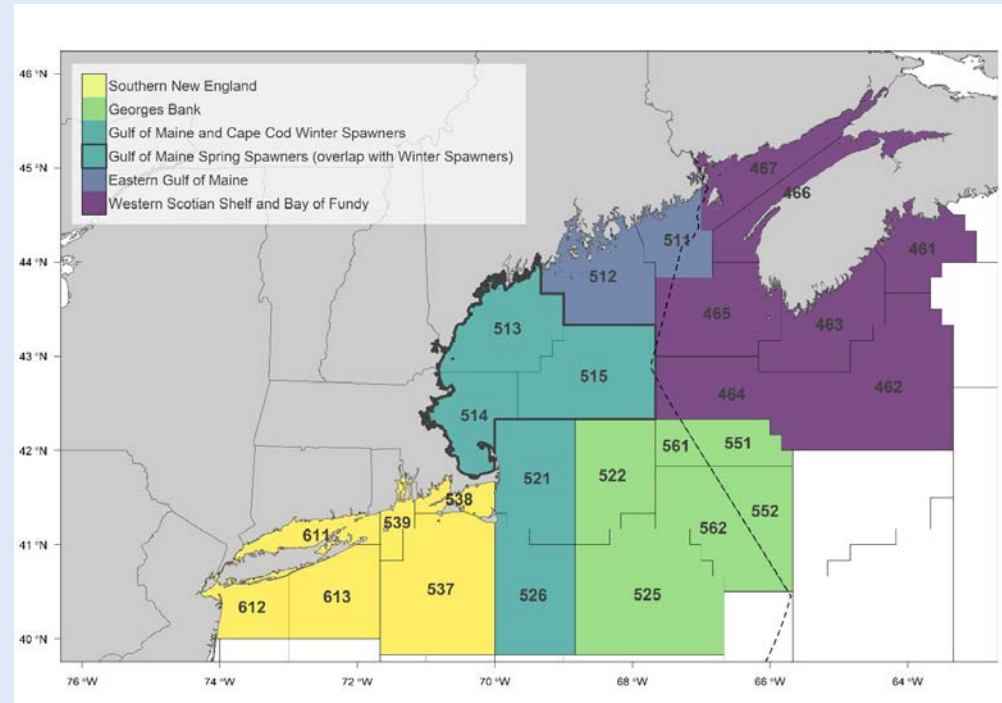
- **Southern New England stock area**
 - University of Rhode Island GSO bottom trawl surveys
 - Rhode Island DEM Fixed Station and Offshore bottom trawl surveys
- **Eastern Gulf of Maine**
 - Sentinel Hook Survey age samples
- **Gulf of Maine Winter vs. Spring Spawners**
 - Examination of historical survey and commercial otoliths

Phase 2: Management Workshop Series

Focus: Gathering input on potential management changes and possible economic and social impacts

What we were not doing during the Management Workshops

- Scoping a management action – *that's a Council/NMFS process*
- Making formal recommendations – *was a forum for gathering perspectives*



	Stock Structure Working Group (ACSSWG)	Science/Assessment and Management Workshops	Research Track Stock Assessment
2018	ACSSWG Formed		
2019	ACSSWG Report Completed		
2020	ACSSWG Peer Review (May)		
2021		Science/Assessment Workshops (June) Management Workshops (Aug-Sept)	Research Track Working Group Formed (October)
2022			Research Track Working Group conducts the Stock Assessment
2023			Research Track Peer Review (March)

Management Workshop Series

Thursday, August 12

- **Setting the Groundwork: 1pm-3pm**

Tuesday, August 17

- **Gathering Regional Perspectives from Southern New England and Georges Bank East & West: 1pm-3pm**

Thursday, August 19

- **Gathering Regional Perspectives from Gulf of Maine East & West: 1pm-3pm**

Thursday, September 9

- **Focusing on Recreational Fishing Perspectives: 2pm-4pm**

Monday, September 20

- **Evaluating Tradeoffs to Adjusting Management Measures: 1pm-4pm**

Setting the Groundwork

August 12

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

Gathering Regional Perspectives from Southern New England and Georges Bank East & West

August 17

Objectives:

- Discuss and define available and potential management tools that could be used to manage Southern New England and Georges Bank East & West stocks differently to account for new understanding of biological stock structure.
- Share advantages and disadvantages of options.

Gathering Regional Perspectives from Gulf of Maine East & West

August 19

Objectives:

- Discuss and define available and potential management tools that could be used to manage Gulf of Maine East & West stocks differently to account for new understanding of biological stock structure.
- Share advantages and disadvantages of options.

Gathering Recreational Perspectives

September 9

Objectives:

- Examine recreational data needs to inform management under the new Atlantic cod stock structure.
- Discuss and define both available and potential management tools that could be used to manage Atlantic cod differently under a new biological stock structure.
- Share advantages and disadvantages of management options.

Major Themes Discussed

- Additional Spawning Closures
- Gear Modification Options
- Options for Improving or Additional Reporting Requirements
- Improving Recreational Data Collection
- Using Mixed Stock Composition Analysis in the Winter/Spring Spawning in the Western Gulf of Maine
- Changes in Management in Fishing Areas 464 and 465
- Discussion of Additional Factors to Consider

Evaluating Tradeoffs to Adjusting Management Measures

September 20

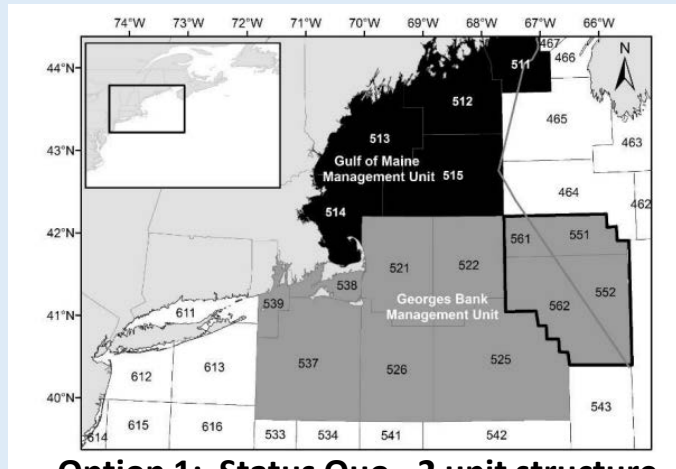
Objectives:

- Integrate the discussions from the previous management workshops and explore specific management options that could be used to manage Atlantic cod differently under a new biological stock structure.
- Evaluate tradeoffs of management options, highlighting socioeconomic considerations.

Discussion Topics:

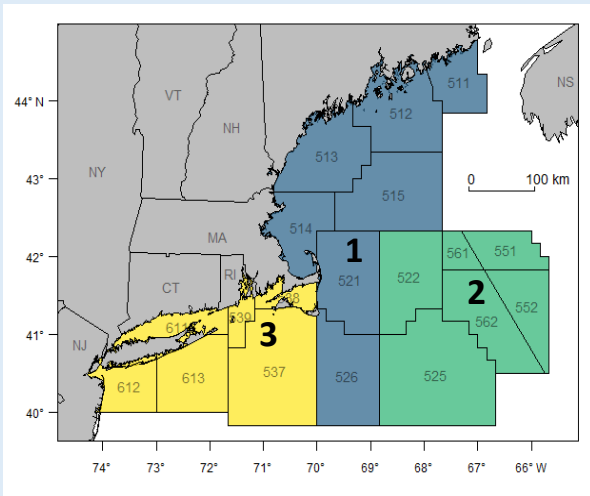
1. Recap of science/assessment workshops and management workshops to date
2. Learn about a project underway using Management Strategy Evaluation
3. Explore the implications and tradeoffs for a range of options to better align the management boundaries with our new understanding of the biological stock structure for Atlantic cod

Scenario Options



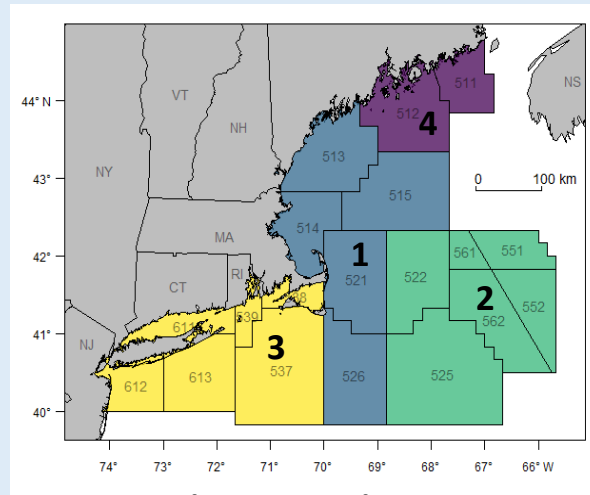
Option 1: Status Quo - 2 unit structure

1. GOM
2. GB



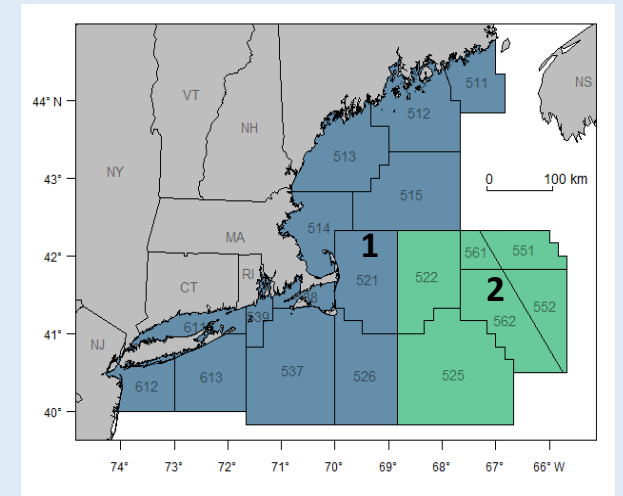
Option 2: 3 unit structure

1. GOM winter/spring
2. GB
3. SNE



Option 3: 4 unit structure

1. GoM winter/spring
2. GB
3. SNE
4. EGoM



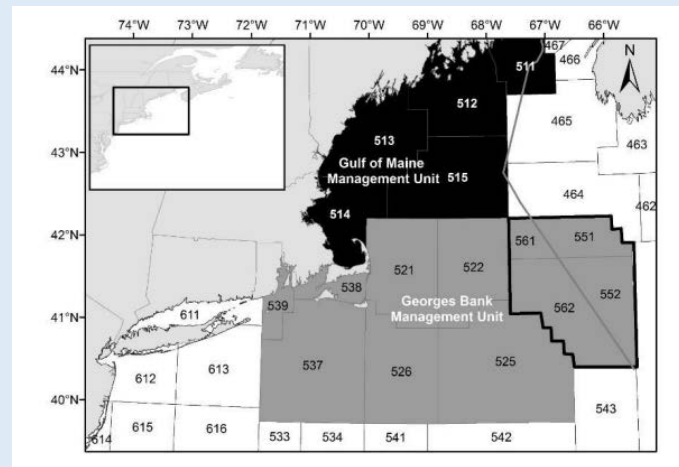
Option 4: 2 unit structure

1. Inshore
2. Offshore

Evaluating Tradeoffs of Options

○ Status Quo:

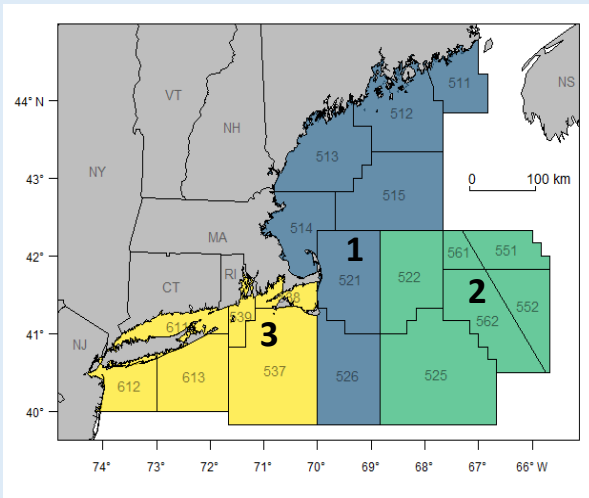
- Data is available for assessments and limits complexity
- Does not consider biology of cod and risks mis-specifying stock assessment (i.e., GB retrospective)



Option 1: Status Quo - 2 unit structure

1. GOM
2. GB

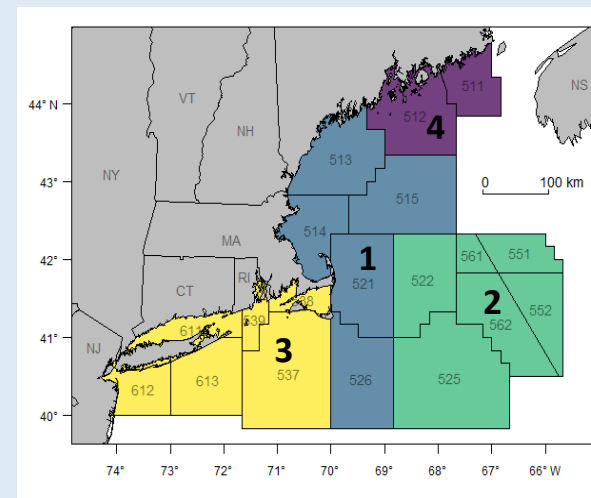
Evaluating Tradeoffs of Options



Option 2: 3 unit structure

1. GOM winter/spring
2. GB
3. SNE

- **Options 2 & 3 (3 unit or 4 unit stock structure):**
 - Better reflects the conclusions of the ACSSWG
 - Considers the new biological units
 - Some areas may be data poor (SNE and EGoM), but unique units allow for better tracking of depleted population (Option 3 v. Option 2)
 - Reallocation for the fishery would be major component to resolve
 - Revisions to US/CA transboundary management require significant time/resources
 - Additional staff capacity for rebuilding plans for all the different stocks; more time consuming
 - Discussion of a 5 unit structure was like 4 unit structure



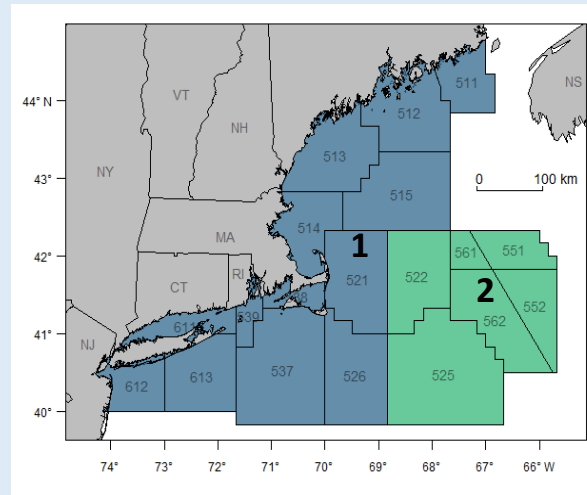
Option 3: 4 unit structure

1. GoM winter/spring
2. GB
3. SNE
4. EGoM

Evaluating Tradeoffs of Options

- Option 4 (inshore-offshore):

- Acknowledges the connectivity between GoM to SNE, around the back of Cape Cod.
- Stock assessment could be simpler because you have two stock areas.
- Issues to resolve of reallocation and US/CA Transboundary management



Option 4: 2 unit structure

1. Inshore
2. Offshore

Thank You – Management Series

Russell Brown - NEFSC

Richard McBride - NEFSC

Erik Chapman – UNH NH Sea Grant

Adrienne Kovach - UNH

Laura Singer - SAMBAS Consulting LLC

Linas Kenter - UNH

Michelle Lemos - UNH

Alexander Dunn - NEFSC

Lisa Kerr - GMRI

Steve Cadrin – UMass/SMASST

Scott Steinback - NEFSC

Charles Perretti - NEFSC

Jessica Joyce – Tidal Bay Consulting LLC

Janice Plante - NEFMC

Micah Dean – MA DMF

Nathan Hermann- UNH

Diane DeVries - UNH

Alison Frey – UMass/SMASST

Cole Carrano – UMass/SMASST

Lucy McGinnis – UMass/SMASST



New England
Fishery Management
Council



NOAA
FISHERIES



Sea Grant
New Hampshire

Atlantic Cod Stock Structure Workshop

For More Information

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

Management Questions or Input

Jamie Cournane

jcournane@nefmc.org

Science/Assessment Questions or Input

Russell Brown

russell.brown@noaa.gov

Richard McBride

richard.mcbride@noaa.gov

For Today

- Present the main findings of the workshops.
- Answer questions about the workshops and final report.

