A quick review of Atlantic cod stock structure working group results

- The Atlantic Cod Stock Structure Working Group (ACSSWG)
- Presenter: Richard McBride, NOAA Fisheries

Atlantic Cod Stock Structure Workshop

ACSSWS, June 1 – July 1, 2021
Introduction: existing management units

Since ~ 1970s (North-South)
- 2 US stock units
- Transboundary
- Subunits (areas)

The question: How do these geographic management units relate to biological stock structure of 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
# Acknowledgements

The working group

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New England Fishery Management Council
NOAA’s Northeast Fisheries Science Center
New Hampshire Sea Grant
Maine Fishermen’s Forum

Existing 2 US stock model

Proposed 5 US stock model + adjacent Canada stock

Black polygons = Gulf of Maine
Gray polygons = Georges Bank
Gray chevron = Hague line

Outlined polygons = TRAC assessed area
Div. 6 (600s), catches included with GB
Div. 4 (400s), Canada management unit
What is a biological stock?

Consider a group of individuals where...

Source of new recruits comes from within

• reproductive isolation

Demographics – growth, mortality, maturity, fecundity –
are similar by age, size, or sex (i.e., dynamic pool)

Abundance estimates are representative of the stock well mixed

The Atlantic cod uses many habitats throughout its life. Open water, eelgrass beds, sandy and gravel areas, kelp, boulder fields and steep rocky ledges are important for growth and survival during different life stages of this fish.

Art by Molly Thomson
What is the ACSSWG?

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
The broader timeline

2018
• ACSSWG formed

2019
• ACSSWG report written

2020
• ACSSWG report peer review

2021
• Science/Assessment Workshops
• Management Workshops
• Stock assessment working group formed

2023
• Cod benchmark (research-track) assessment