

This information is distributed solely for the purpose of pre-dissemination peer review. It has not been formally disseminated by NOAA. It does not represent any final agency determination or policy

Summary of Ecosystem Considerations

- Ecosystem approaches to Gulf of Maine/Georges Bank fisheries (TOR 3):
 - a) Determine the production potential of the fishery based on food chain processes and estimate the aggregate yield from the ecosystem;
 - b.) Comment on aggregate single stock yield projections in relation to overall ecosystem production, identifying potential inconsistencies between the two approaches.

This information is distributed solely for the purpose of pre-dissemination peer review. It has not been formally disseminated by NOAA. It does not represent any final agency determination or policy

Summary of Ecosystem Considerations

- TOR 3a (Determine the production potential):
 - Aggregate production models suggest that the estimated MSY level for all GARM species is lower than the sum of individual species MSY estimates and overall fishing mortality should be lower
 - Aggregate pelagic species yield is higher and F_{msy} for pelagic species is lower than for single species assessments
 - Food web considerations indicate a production potential of 4.8-6.2 million tons and a potential catch (landings and discards) of 1.55-1.86 million tons for 'reasonable' ecosystem exploitation levels (*includes invertebrates*).
 - Ecosystem metrics indicate overfished condition

This information is distributed solely for the purpose of pre-dissemination peer review. It has not been formally disseminated by NOAA. It does not represent any final agency determination or policy

Summary of Ecosystem Considerations

- TOR 3b (Comment on aggregate single stock yield projections..... identifying potential inconsistencies between the two approaches):
 - Several methods and approaches identified some inconsistencies:
 - Direct estimates suggest System MSY (fish) is < ~0.6 M (+/- 0.3) mt than summed SS estimates
 - The same is true for Bmsy
 - Fmsy needs to be lower for system

This information is distributed solely for the purpose of pre-dissemination peer review. It has not been formally disseminated by NOAA. It does not represent any final agency determination or policy

Overview

Approach	Can All Species Simultaneously Exist at Bmsy?
Estimate Total Standing Stock Biomass and MSY per Unit Area	Results for Northeast Continental Shelf Biomass within range of estimates for other systems
Rebalanced Network Models at Bmsy	Rebalanced biomass estimates for groundfish converge on initial levels suggesting increased biomass levels are inconsistent with equilibrium state. Other ecosystem metrics do not indicate problems with MSY strategy.
Aggregate Production Models	Aggregate production models for GARM Species indicate lower MSY and Fmsy than single species analysis. Aggregate models for pelagic species indicates similar or higher MSY and lower Fmsy.
Aggregate Production Model Simulator	All species cannot be simultaneously at Bmsy levels given parameterization. Model highlights the importance of competitive interactions and the effects of exploitation on system dynamics
Trophic Transfer Model	Energy flow considerations suggest that total removals (landings and discards) from system at MSY levels will exceed sustainable levels.

This information is distributed solely for the purpose of pre-dissemination peer review. It has not been formally disseminated by NOAA. It does not represent any final agency determination or policy

Summary of Ecosystem Considerations

- Majority of evidence for GARM stocks suggest that the ecosystem may not support all SS yields and Bmsy's concurrently
- Given caveats, areas of uncertainty, etc., we suspect the answer to the two TOR questions will remain robust
 - Several lines of evidence suggest that this constraint is real
- Consistent with prior, NEUS LME and theoretical studies
- Consistent with similar work in other systems
- Results are consistent across GARM spp, pelagic spp, elasmobranch spp, and ALL spp groups for Fmsy
- Highlights importance of interactions among spp

This information is distributed solely for the purpose of pre-dissemination peer review. It has not been formally disseminated by NOAA. It does not represent any final agency determination or policy

Now What?

- Still need to independently do SS assessments and BRPs
- Use these ecosystem results for context
- Potentially discount (lower) GARM SS BRPs (i.e., MSY estimates) by common factor to account for difference in Sum of SS vs. System MSYs
- Or Potentially set up two-tier levels of yield, either for total system or groups thereof
- Or Potentially lower system Fs (by reducing overall MS fishing effort)