

**Addressing the impact of climate change on “choke” species issues in a multispecies fishery**

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**Abstract**

In recent decades, the Gulf of Maine has warmed four times faster than the global average rate, and there are a growing number of examples of fishery resources that have been impacted by this long-term warming. Groundfish have exhibited sensitivity to changing ocean conditions in the region, with some species responding with increased productivity and others with decreased productivity. A critical problem for the multi-species groundfish fishery is that regulations constrain fishermen from targeting abundant stocks because they co-occur with populations that require rebuilding (i.e., “choke” stocks). This constraint can result in significant foregone yield. We are exploring the implications of climate change on management of the groundfish fishery to examine whether warming will exacerbate or mitigate the critical issue of “choke” species in this fishery. We applied management strategy evaluation to quantify and compare the performance of alternative management strategies for the groundfish fishery with a focus on Atlantic cod and haddock. Operating models were developed to emulate the population dynamics of these two stocks and incorporate the influence of projected climate change on stock productivity. Alternative management strategies were tested to evaluate their performance with respect to projected warming and technical interactions within the mixed fishery. We examined the tradeoffs associated with alternative strategies to rebuild stocks at low biomass (Atlantic cod) or utilize stocks at high biomass (haddock). As the effects of climate change on ecosystems become more apparent, we will need management strategies that address the impact of differential responses of co-occurring species in multispecies fisheries.

**Keywords:**

management strategy evaluation, climate change, multispecies fishery

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