

Evaluating the performance of management strategies for Northeast US groundfish fisheries in a changing climate

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Abstract

Fisheries management advice should be based on the best available science. The data sets considered most informative for supporting decisions are typically derived from analyses of historical data. A limitation of such historically-focused analyses is that management decisions are often optimized under assumptions that the historical conditions will prevail. Although this approach can be successful under stationary conditions, a major challenge facing fisheries management is that climate change can cause directional change in population productivity rates. This can result in a mismatch between the assumed conditions under which decisions are made and the actual conditions under which management is implemented. Management strategy evaluation provides a framework for quantitative-based decision-making. Its flexibility allows for examining management procedures under expected future conditions. We examined the performance of biological reference points produced under both assumptions of prevailing conditions and when integrating future expectations about a population. Performance was quantified based on the ability to meet conservation and economic management objectives. We based our operating models on groundfish stocks in the northeast US and a relationship between productivity and projected temperature increase through 2050. Our findings indicate that forward-looking reference points can result in more effective management, though an informed understanding of the relationship between changing conditions and productivity is necessary.

Keywords:

management strategy evaluation, biological reference points, stock assessment

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