



**Adapting Fisheries Management to a Changing Ecosystem**  
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**Case Study 9**

**Development of harvest control rules for Atlantic herring: an application of MSE to account for herring's role in the ecosystem**

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ABSTRACT

Atlantic sea herring have supported a primary New England fishery for centuries and have long been recognized as an important prey species for several of the region's key commercial and recreational predators and protected species. Recognizing the importance of managing forage fish within an ecosystem context, the New England Fishery Management Council (NEFMC) initiated development of an Acceptable Biological Catch (ABC) control rule for herring to explicitly account for herring's role in the ecosystem and address the biological and ecological requirements for the herring resource. In 2016, the NEFMC began developing alternatives for the control rule using Management Strategy Evaluation (MSE) to identify fishery objectives and corresponding quantitative performance metrics through a stakeholder-driven process. The approach included integration of herring-specific operating models with a range of "general predator" models, including groundfish, highly migratory species, seabirds, and marine mammals. Results indicated that predator metrics had different levels of sensitivity to herring population changes resulting from different ABC control rules. The NEFMC ultimately selected a biomass-based control rule that limits fishing mortality dependent on stock biomass to account for the role of herring as forage. This case study will describe how the MSE was blended with the Council process to develop an ABC control rule to support ecosystem-based fishery management for Atlantic herring.