

Comparative study of food webs from two different time periods of Gulf of Maine ecosystem through network analysis

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Abstract

This study investigated the energy flow and trophic structure of the Gulf of Maine (GOM) ecosystem in 2000s and 2010s, respectively. The objectives of this study is to evaluate the changes in GOM ecosystem during the last decade and test the effect of fishing activities on the GOM ecosystem. Two mass balance ecosystem models were developed separately for the two time periods (2000s and 2010s) using Ecopath. The models includes 25 functional groups according to their ecological roles. Fishing activities were used as forcing drivers to simulate the variation of GOM ecosystem from 2000s to 2010s. Result showed that, similar with variations of the GOM ecosystem from the 1980s to 1990s, dominant species in both ecosystem and harvest are still transferred from top predators to crustacean in the last decade. However, food web structure of the GOM ecosystem has become more complex and stable, and more flexibility to the future perturbations, indicating the GOM ecosystem toward a mature stage. Simulation results indicated that fishing activities were considered to be the main driver to the variations of most species in GOM ecosystem, while variations of some species like Atlantic herring (*Clupea harengus*) might also suffering from other conditions like climate change.

Keywords:

Gulf of Maine, Network analysis, Food web, Ecopath, American lobster

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