Trophodynamic fishery-ecosystem model of the South Atlantic Bight

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Over a decade ago, the South Atlantic Fishery Management Council sponsored the development of an *Ecopath with Ecosim* (EwE) fishery-ecosystem modelling exercises as part of their Fishery Ecosystem Planning process resulting in the first iteration of the South Atlantic Bight ecosystem model (Okey and Pugliese 2001). This preliminary model of this ecosystem was refined during an iterative process involving a broad cross-section of stakeholders and scientists to produce a second generation model that was articulated enough to explore various scenarios in the context of changing fishing strategies and other environmental stressors including pollution, and the direct, indirect, and combined effects of these stressors on valued fish stocks. It was used in demonstrations at the advisory committee level, but it was not used further due in part to over-commitment with other projects by TAO.

In 2012, we further modified and updated this model during the present exercise to better articulate forage species in the region, thus allowing exploration of questions specific to forage species and some other valued fish groups. The intention of this modelling exercise was to develop it to also investigate habitat- and area-based management questions and the potential effects of climate change.

The current iteration of this South Atlantic Bight trophodynamic ecosystem model includes 99 functional groups. These groups include both single species groups and aggregated functional groups that together represent all of the important biomasses and flows in the ecosystem, including plankton, algae, plants, invertebrates, fishes, birds, marine mammals, and detritus groups. A broad array of different types of analysis can be conducted with this modelling approach including characterization of community structure, characteristics, and status; whole food web temporal simulations; habitat-based spatial analyses in which the broad ecological and fisheries effects of different spatial management scenarios can be simulated; simulations of the impacts of climate change; formalized policy optimization analyses, and combinations of all of these analyses.