Scope of Work

Analysis Type:	Review, guidance for further development and evaluation of potential tool development associated with Ecosystem Model.
Justification:	EBFM addresses unintended consequences of fishing including the over-exploitation of predators, an increase in abundance of their prey, and a decline of organisms two trophic levels below them, a phenomenon known as a trophic cascade. Alternatively, fishing on lower trophic level species may ultimately lead to predator population declines due to food limitation. Food web linkages connect different components of the larger ecosystem, such as pelagic forage fishes and their piscivorous predators or demersal carnivores. This connectivity between food webs over space, time, and depth creates multiple energy pathways that enhance ecosystem stability and resilience. Food web models are increasingly being utilized by fisheries managers as ecological prediction tools because they provide the capability to simulate the entire ecosystem from primary producers to top predators to fisheries.

Recent activities associated with applying modeling to management were highlighted in a NMFS National Ecosystem Modeling Workshop where all the Science Centers gave brief updates of recent modeling efforts and how they are being used for management. The Alaska Fisheries Science Center indicated food web models are updated frequently and are used regularly in fishery management advice in annual Stock Assessment and Fishery Evaluation reports and management strategy evaluations were conducted for three groundfish species from the Bering Sea. The Northeast Fisheries Science Center created a simple aggregate group production model to explore trade-offs between management objectives related to fisheries and marine mammals. The Pacific Islands Fisheries Science Center built the Guam Atlantis Coral Reef Ecosystem Model which identified management strategies for evaluation as well as metrics for measuring their effectiveness and an Ecopath with Ecosim model to evaluate ecosystem structure and energy flows for two subpopulations of Hawaiian monk seals in the Northwest Hawaiian Islands. The Southeast Fisheries Science Center is collaborating with ASMFC on ecosystem reference points for management use whereby stakeholders have defined goals and objectives. The Northwest Fisheries Science Center is evaluating trade-offs in harvest of forage fish versus predator populations using an Atlantis model, MICE, and Ecopath models.

A new generation South Atlantic Ecosystem Model could therefore serve to inform single species assessment and management and

eventually be capable of generating reference points and ecosystem-level indicators supporting characterization of food web dynamics, development of food web indicators and evaluation of management actions on these systems.

Analyst: Tom Okey, UVic and Roger Pugliese, SAFMC Staff.

Workgroup Members: Proposed -core SSC members and members of the Ecosystem Modeling Workgroup supporting SALCC funded model development.

Tasks and Timeline: Development of the next generation Ecopath with Ecosim Model is nearing completion; therefore, this process will start with a review of data used, methods developed, decisions made, and analyses completed to date. More detailed timeline will be developed after initial meeting of workgroup.