Transitioning from Single Species to Ecosystem-Based Fishery Management of Blue Crab

A Scoping Paper from the Fisheries Ecosystem Workgroup
Lead Author: Tom Miller, UMCES

Single-species approaches to fisheries management of blue crab in the Bay appear to be fostering stock recovery, which required strong management actions. If this recovery of the blue crab stock is sustained over the next few years, it offers an opportunity to possibly increase production (and relax some fishery regulations) by implementing ecosystem-based fishery management approaches. The following two issues should be considered in the near term (6-18 months).

1) Blue crab couples the benthic and pelagic food webs of Chesapeake Bay – increased abundance of crabs has important consequences for both their predators and prey. These effects are unlikely to be direct or proportional. Further, blue crab may be keystone predators in several communities such that blue crab abundance may have dramatic and cascading effects throughout the ecosystem. We suggest that the CBFEM be used to explore the ecosystem consequences of a recovered blue crab population, and the impact of changes in regulations on crab predator and prey species on blue crab abundance. These analyses should focus on:
   i) The impacts of a recovered blue crab stock on internal population dynamic processes including cannibalism. We note that although this is not an "ecosystem-based" concern, a fuller understanding of the dynamics of a recovered crab stock is necessary in any ecosystem-based approach;
   ii) The impacts of a recovered blue crab stock on its prey base paying particular attention to competition for food;
   iii) The impacts of predators and competitors on a recovered blue crab stock. These analyses should include the impact of blue catfish and cownose ray.

2) Evidence suggests blue crab populations are regulated at the juvenile stage. The quality and distribution of habitats used by newly settled and juvenile blue crabs likely mediates the impact of this density-dependent regulation. Analyses of the relationship between biotic and abiotic characteristics of nursery habitat and site-specific and population-specific recruitment are needed. These analyses should focus on the role of primary and secondary nursery areas, and in the role of *Gracilaria* (non-native macroalgae), *Zostera* (eelgrass) and *Ruppia* (widgeon grass) in particular. Quantification of these relationships will permit management actions that focus on sustaining and restoring crab nursery habitats to maintain and possibly enhance levels of crab production.