

Oceanography Seminar

Kevin Weng

ASSOCIATE PROFESSOR

DEPARTMENT OF FISHERIES SCIENCE

VIRGINIA INSTITUTE OF MARINE SCIENCE

CISRO

“Plasticity and adaptation: migratory coastal fishes under climate change”

Plasticity refers to the variety of conditions that a species can successfully occupy in contemporary time (acclimation), while adaptation refers to evolution through natural selection under changing environmental conditions. Both are important as climate change alters the physical and biotic environments of key species.

Migratory coastal fishes are strongly linked to coastal environments for key life history functions such as spawning and nursery. Coastal habitats may include estuaries, rivers, reefs, sea grass fields, kelp forests, soft sediments, etc. As coastal habitats change, migratory fishes can either select new locations (e.g., a more poleward estuary for spawning and nursery) or adapt to different conditions in their present location. Recent findings for cobia (*Rachycentron canadum*) migration include both "staying" and "straying", suggesting migratory plasticity that may allow founder events to establish spawning in new estuaries. The cobia also has multiple spawning strategies (estuarine and offshore), and a diverse diet with an opportunistic predation style (demersal, pelagic, piscivore, invertivore), sources of ecological plasticity that may be beneficial as food webs are reorganized under climate change. Remaining in place can occur only if acclimation and adaptation can adjust physiological limits to the new conditions. Future conditions in the Chesapeake Bay are likely to be more hypoxic and warmer, presenting physiological challenges for gill-ventilated organisms. Experiments to determine the breadth of environmental limits after short term acclimation suggest that cobia are eurythermal and hypoxia-tolerant. This physiological plasticity may enable cobia to utilize the Bay even as it becomes more hypoxic. Adaptation potential is influenced by generation time, mutation rate, and allelic diversity. The cobia has a short generation time and recent studies indicate high allelic diversity, suggesting that the species may have high adaptation potential. The outlook for other key species may be anticipated by investigating their potential for acclimation and adaptation in a similar manner.

Thursday October 17th, 2019 3:00p.m. MSB 114