Title

Spatial Ecology of American Horseshoe Crab (Limulus polyphemus) in Chatham, Cape Cod, Ma: Implications for Conservation and Management

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Abstract

Information regarding spawning site fidelity and movement patterns of the American horseshoe crab (*Limulus polyphemus*) is crucial for developing effective conservation and management strategies on the correct spatial scale. To investigate the spatial ecology of American horseshoe crabs, 75 adult animals were tracked off the coast of Chatham, Cape Cod, MA from June 2010 to November 2011 using acoustic telemetry. Two groups of horseshoe crabs were tagged in spawning habitats (separated by ~2.0 km) with differing commercial harvesting pressure: one group inside Stage Harbor, where harvesting is permitted and the other within a Marine Protected Area (MPA) where harvesting is prohibited. Network analysis revealed that horseshoe crabs exhibited fidelity to spawning habitat, but not necessarily to the habitat where they were initially tagged. Fifty-nine percent of horseshoe crabs tagged inside Stage Harbor were detected in the MPA and 13% of horseshoe crabs tagged in the MPA were detected inside Stage Harbor. Although horseshoe crabs were utilizing both spawning habitats, predictive modeling revealed little temporal overlap, suggesting that horseshoe crabs from the two spawning habitats represent local populations. Isolated and local populations are more susceptible to overexploitation than are larger populations with many migrants. To protect against overharvest and extinction of isolated and local populations, the correct identification of management units (MUs) must be a priority of fisheries managers. Horseshoe crab populations around Cape Cod, Massachusetts and New England behave differently, requiring the collection of more information so that conservation tools such as MUs or MPAs can be used most effectively.

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