

## ASSESSMENT OF HORSESHOE CRAB MANAGEMENT REGIMES

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Human use of ecosystem resources is the most tangible aspect to regulate, however management is often based on insufficient data. This management approach, though well intended, may be detrimental to a resource and to the functionality of the ecosystem. Here the implications of this approach are examined as it is employed to the management of the horseshoe crab resource.

The American horseshoe crab, *Limulus polyphemus*, plays a vital ecological role in estuarine and coastal ecosystems and is also a highly valuable resource for a variety of human uses. Several coastal organisms prey on horseshoe crabs, including many species of migratory shorebirds which are highly dependent on horseshoe crab eggs as a food source. Horseshoe crabs are harvested for use as bait in the eel and conch fisheries, for use in education and research, and for use in the biomedical industry.

Until the late 1990s, only a few states had regulations in place to manage the harvest of horseshoe crabs. In 1998, the Atlantic State Marine Fisheries Commission developed an Interstate Fisheries Management Plan for the horseshoe crab. Since the implementation of the Plan, coast-wide horseshoe crab bait harvest has declined. However, harvest bans and reductions in the Delaware Bay region left open a demand for bait which has since been met mostly through increased harvest in the northern states. This has led to a concern that small, localized populations may be less resilient to this shift in harvest pressure. Researchers and resource managers have suggested that assessing populations at an embayment level in order to manage the resource on an estuary by estuary basis may mitigate possible negative impacts resulting from shifts in harvest pressure and may curb overexploitation. Lack of comprehensive data within the region, with the exception of a few focused studies of specific sites, is hindering that type of management effort.

This research addresses these concerns over lack of sufficient data necessary for management as well as concerns over lack of built-in regulatory mechanisms that will address managing horseshoe crabs on an embayment level. First, in order to gather needed data, several groups are involved in coordinating horseshoe crab spawning surveys across the New England region. These surveys allow examination of trends over time, with the assumption that spawning trends will parallel population trends, for particular locations. Second, by conducting a resource policy analysis, state and federal policies that govern the management of the horseshoe crab resource are assessed. This analysis provides alternative and additional regulatory mechanisms that may be employed to address management concerns. This paper also examines how different management regimes correspond with the spawning indices derived from the surveys in order to assess whether or not horseshoe crab populations are considerably sensitive to different management regimes.

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