

Interactions among horseshoe crabs and intertidal oyster farms in the Delaware Estuary

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Shellfish aquaculture in the Cape Shore region of New Jersey has a long history as a sustainable food production system. Intertidal rack-and-bag oyster farming in the Delaware Bay is concentrated in a small portion of the lower bay, an area also used by red knots (*Calidris canutus rufa*), a bird recently federally listed as 'threatened,' and horseshoe crabs (*Limulus polyphemus*) during spring migrations. The lipid-rich horseshoe crab eggs, deposited on beaches along the birds' migratory route by mating crabs, are an important food source for red knots.

A major data gap currently exists regarding the sustainability of interactions among farms and these wildlife species. Concern has been raised about the ability of horseshoe crabs to traverse intertidal rack-and-bag oyster farms to reach their spawning habitat, and about how farms may alter shorebird foraging patterns and opportunities. The primary goals of this research project are to assess the ability of crabs to move around and among oyster farms to mate and spawn, to survey the spatial distribution of dislodged eggs upon which red knots feed, and to evaluate the

financial burden of seasonal shorebird migration restrictions to farm operations.

Researchers will achieve these goals using a combination of experimental and survey approaches including: (1) controlled experiments to test rack heights for impairment of crab passage, (2) repeated crab census on multiple paired farm/control sites to test if crabs avoid farms, (3) surveys of dislodged crab egg distribution in the upper intertidal to document patterns in shorebird food abundance both baywide and locally within the Cape Shore, and (4) interviews with farmers about the costs of implementing conservation measures. This project focuses on interactions of oyster farms with ecologically and socially important species (horseshoe crabs and red knots) and the need to quantify the economic impacts of management decisions. The data generated will inform ongoing management discussions regarding wildlife management and farm regulations.

