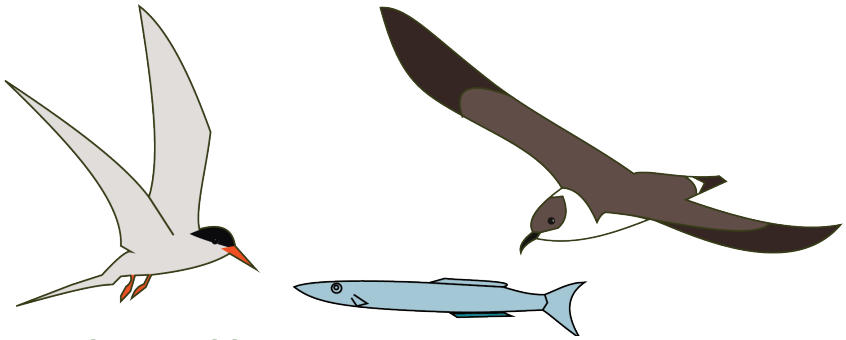
Sand lance in the Northwest Atlantic Ocean

NECASC
Northeast Climate Adaptation Science Center

Climate change and shifting human activities are impacting the ecology of the Northwest Atlantic region. A better understanding of foundational forage species such as sand lance is needed to inform relevant management and conservation efforts.



Why study sand lance?

Sand lance are an ecologically valuable and vulnerable resource. Sand lance form dense schools that fluctuate wildly in abundance and distribution over seasonal, annual, and decadal scales. Unlike most forage fishes, sand lance are strongly associated with clean, sandy, and relatively shallow bottom habitats. This "place-based" aspect of their ecology can attract predators to certain areas where they occur, and also increases their vulnerability to climate change and other human impacts such as over fishing, sand mining, wind energy development, and oil spills.

A number of predators specialize on sand lance as prey

A sand lance burrowing in sand

Food availability for humpback whales is linked to the sand lance

Although sand lance serve as an energy conduit linking upper and lower trophic levels, specific aspects of their ecology and vulnerability are poorly understood. This is in part because their small size, elongate body form, and unique behavior of burrowing into the seabed make them difficult to sample, using typical survey methods.

Michelle Staudinger and Keenan Yakola measuring an Atlantic puffin on Seal Island NWR.

Ongoing field studies on National Wildlife Refuges, Stellwagen Bank National Marine Sanctuary, and state and National Audubon-managed colonies are bringing together federal and academic scientists to improve understanding of the relationship between predator-prey abundance, distribution, fitness and survival.

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Sand lance: Current research, conservation and management implications

About the sand lance:

Sand lance are small fish (<20cm) that play an important role in marine ecosystems throughout the Northwest Atlantic Ocean. Sand lance are considered to be a "quintessential forage fish", serving as a nutritious source of prey for a wide range of marine predators including seabirds, fish, and marine mammals.

A shearwater catching a sand lance

As a small forage fish, sand lance population dynamics may have cascading effects up the food chain

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*Staudinger et al. 2020. The role of sand lances (*Ammodytes* sp.) in the Northwest Atlantic Ecosystem: A synthesis of current knowledge with implications for conservation and management. *Fish and Fisheries*, 00:1–34 https://doi.org/10.1111/faf.12445

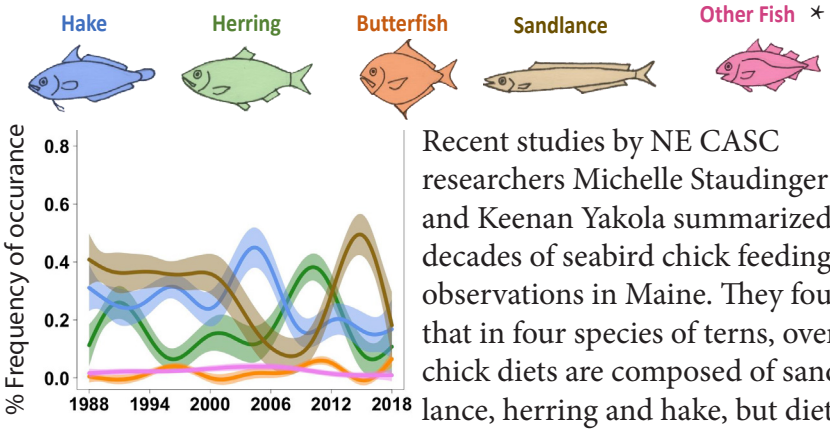
*Top cited paper in 2020-2021 in *Fish and Fisheries*

Layout and design by Elsa Cousins
*Original art by Susan Schubel, National Audubon Seabird Institute

Sand lance are linked to seabirds and other species of high conservation concern

The abundance and distribution of species of high conservation concern like the endangered Roseate Tern, Humpback Whales, and numerous commerical fishes have been associated with sand lance availability. Multiple predator species congregate and benefit from facilitative interactions when foraging on sand lance.

Research on seabird diets



Recent studies by NE CASC researchers Michelle Staudinger and Keenan Yakola summarized 3 decades of seabird chick feeding observations in Maine. They found that in four species of terns, over 70% chick diets are composed of sand lance, herring and hake, but diets vary significantly through time and across nesting colonies. Understanding the variation and general feeding ecology of seabirds can inform broader assessments of system vulnerability to ongoing and future disturbances from fishing and climate change.

Management implications

Working group efforts are building partnerships, informing new research, and helping guide conservation and management efforts for sand lance and their predators in the NWA region. Results are expected to be of particular interest to regional Fishery Management Councils, regulatory agencies, fishing communities, conservation and coastal development groups.

To see sandlance swimming and learn more about them, view this recent video from UNH and Sea Grant researchers:

Collaborating institutions:

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Learn more at: necasc.umass.edu

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