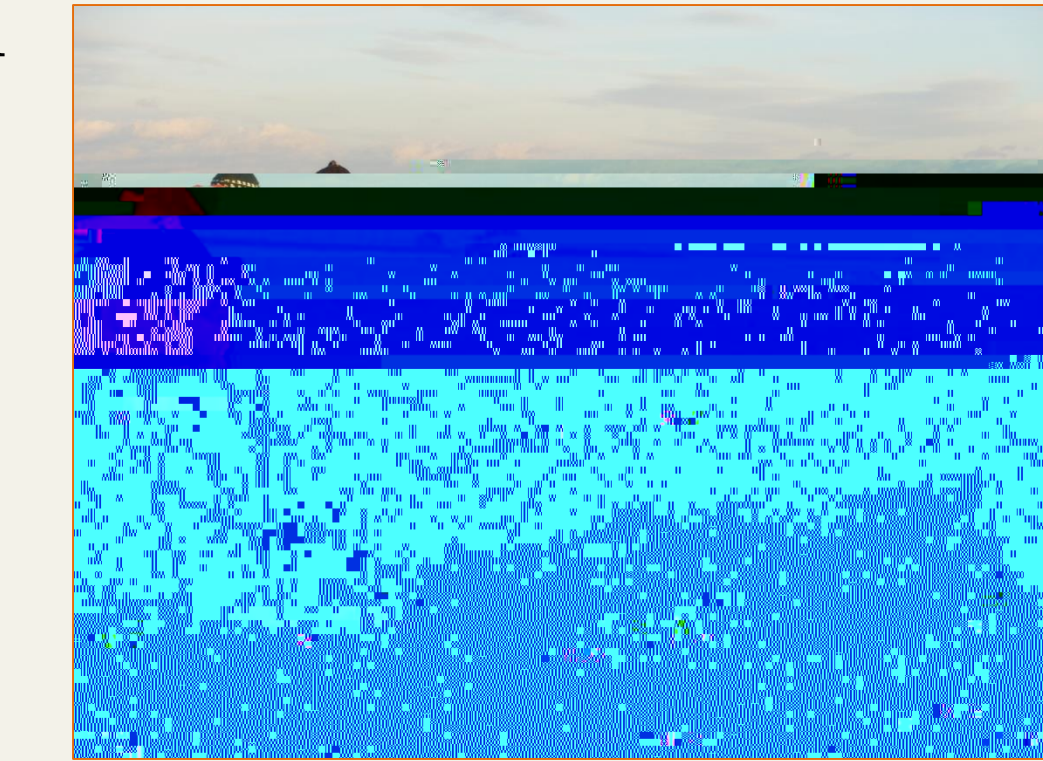


Annual residency patterns and diet of common harbor seals (*Phoca vitulina concolor*) in a southern New Jersey estuary

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Introduction & Objectives

New Jersey is the southern extent of annual *P.v.concolor* seasonal occurrence at haul-out sites along the Atlantic coast, with consistent populations that occur from approximately October-May. We analyzed a 15-year data set (1996-2011) within the southern New Jersey Great Bay/Mullica River estuary in order to 1) document population trends and seasonality of *P.v.concolor*, and 2) determine food sources for the animals using this area. It is valuable to study a species at the extent of its range because changes in population or patterns (due to natural or anthropogenic causes) may first be detected there.

Methods

- Number of hauled out seals was observed opportunistically (1996-2010) and daily (2010-11) using a 40-60x spotting scope. Observations were made from an observation blind or from Rutgers University Marine Field Station (Fig. 1).
- Scat samples were collected opportunistically when seals were not present. Samples were frozen for later processing.
- When analyzed, samples were passed through a elutriator and nested sieves. Fish otoliths were removed, dried, photographed and identified to Order/Family/Genus species (when possible), and assigned an erosion grade.
- Otolith lengths were measured with Image Pro Analysis (Fig. 2) and regression factors applied, where possible, to estimate original fish prey length.

- Water temperature at peak harbor seal abundance in New Jersey is consistent with average temperatures in the Gulf of Maine where seals reside year-round (Waring *et al.* 2013).
- The reason for increase in harbor seal abundance in New Jersey is not known, however this study provides a biological framework for a species whose movements and food habits may be affected by climate change both directly and indirectly.
- Studies show that all fishes consumed by this seasonal seal population are available in either the estuary or near coastal community from Oct-May (Able and Fahay, 2010). It is difficult, however, to determine precise source of prey (estuary/coast) because many are found in *both* habitats at the back-calculated lengths at the given time of year.
- Multiple hake species (Order Gadiformes) represented a substantial portion of identified otoliths. Both spotted hake (*U. regia*) and red hake (*U. chuss*) are abundant in the estuary and the coast year round, with *U. chuss* slightly more limited in the estuary (Able and Fahay 2010).
- Foraging preference varied monthly; most notably, Clupeiformes was non-dominant in early winter but became a major portion of the diet in late winter/early Spring. This timing corresponds to herring fishes moving up river to spawn during these months (Able and Fahay 2010).
- Back-calculated prey length averages ($x = 19.7$ cm) were consistent with other studies that determine original prey length via sagittal otoliths. The length range of prey indicates that adult and larger young-of-year fishes were consumed (Able and Fahay 2010).
- Use of sagittal otoliths for prey identification is widely used in pinniped diet analysis, yet there are known limitations. This study does not attempt to capture the totality of food habits for 0 G(.))TJETQMC /P /MCID8n(s P /Mo1 3042.07 181.13 Tm0 g0 G(.))TJETQMC /P /MC6 EMC /P /MCID 586-B