



SALT MARSH NEKTON MONITORING

Assateague Island National Seashore



Salt Marsh Panne near Campground-Assateague Island National Seashore

Photo by NPS Staff

Importance

Salt marshes are considered some of the most productive and valuable ecosystems of the world. They serve as nursery grounds for economically important fish and shellfish, feeding and stopover areas for birds, nutrient filters for polluted waters and critical coastline buffers from storm damage. National Park Service managers have expressed concern over the degradation of these valuable habitats within their parks. Assateague Island National Seashore (ASIS) is one of seven parks within the Northeast Coastal and Barrier Network (NCBN) that has valuable salt marsh habitat.

Monitoring Program

The NCBN has developed long term salt marsh monitoring protocols to detect changes in salt marsh condition over time. Information from ongoing monitoring will be used to assist management and protection efforts within these parks. As part of this effort, the NCBN is monitoring nekton community structure and species composition in salt marshes.

Nekton are free swimming fish and crustaceans that are common inhabitants of salt marsh pools and tidal creeks

Nekton community structure incorporates information about species composition and the density of each species into a multivariate measure used to examine the data quantitatively.

Scientists hypothesize that nekton may serve as indicators of ecosystem condition because they are thought to be sensitive to environmental changes. If this is true, climate changes will result in variations in nekton species composition and density and subsequent changes in community structure.

Implementation of the NCBN Salt Marsh Nekton Monitoring Protocol began at ASIS in 2008 and data will continue to be collected on a biennial basis. During the 2008 sampling effort nekton were sampled at nine permanent sites. Throw traps (1m²) were used to capture nekton in creeks, marsh pools, and along marsh shoreline. Nekton sampling occurred twice; once in July and again in September. Density and length were recorded for all nekton species identified at each sampling location. Environmental parameters collected included temperature, salinity, water depth, and vegetation cover. In future years, dissolved oxygen concentration will also be recorded at each sampling location.

What do we want to understand?

1. The current density, species richness, and nekton community structure at ASIS
2. How density, species richness, and nekton community structure changes over time?
3. How are changes over time in nekton community structure associated with changes in sediment elevation, and salt marsh vegetation?



Examples of throw trap (left) and Spotfin killifish (right) captured in a salt marsh. Photos by NPS Staff

This first year of nekton sampling at ASIS established a baseline for monitoring trends. Examination of this first year of data indicates that there was substantial variability in density, and species richness between early and late summer in 2008. These differences resulted in a significantly different nekton community structure at the later visit as opposed to the early one.

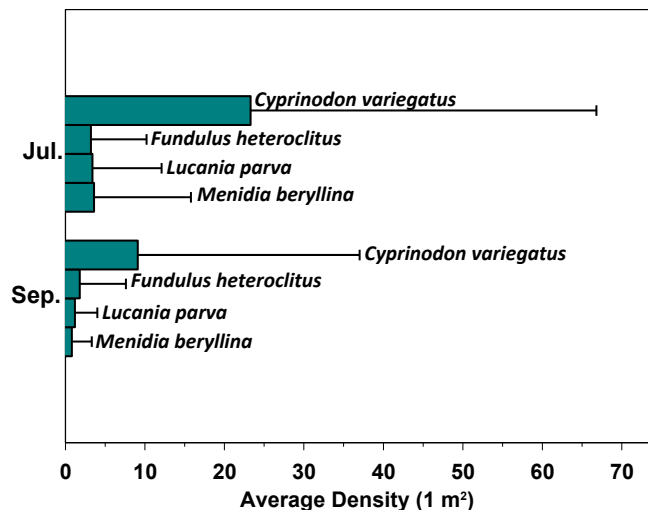
As more data are collected, it will be informative to examine how nekton density, species richness, and community structure change over time. We will also be looking for trends in the comparison of early and late summer samples. Observed trends in the nekton community, as well as trends in the differences between early and late season nekton samples may provide useful information about effects of climate change and sea-level rise on ASIS salt marshes.

In addition to collecting nekton data, the NCBN will be collecting data on salt marsh vegetation community structure at each site and sediment elevation at a subset of these sites. By monitoring salt marsh vegetation, nekton, and sediment elevation in close proximity, we will gain an understanding of how these different aspects of the salt marsh ecosystem correlate over time in their response to climate change.

Status and Trends

In total, seventeen nekton species consisting of 15 fish and 2 decapod species were found at ASIS during the summer of 2008. Four species account for approximately 94% of all nekton recorded during the sampling period. The most prevalent species, sheepshead minnow (*Cyprinodon variegatus*) accounts for approximately 66% of all nekton recorded at ASIS in 2008.

The three other species, common mummichog (*Fundulus heteroclitus*), rainwater killifish (*Lucania parva*), and inland silverside (*Menidia beryllina*), account for approximately 10%, 9% and 9% of all nekton, respectively. The complete species list is included at the end of this brief.



Average density (m2) of four most prevalent species at ASIS during July and September sampling periods in 2008.

Nekton Species found at Assateague Island National Seashore during the Summer of 2008

Species	Common Name
<i>Alosa sapidissima</i>	American Shad
<i>Anguilla rostrata</i>	American Eel
<i>Callinectes sapidus</i>	Blue Crab
<i>Cyprinodon variegatus</i>	Sheepshead Minnow
Fundulidae*	Topminnow Family*
<i>Fundulus confluentus</i>	Marsh Killifish
<i>Fundulus heteroclitus</i>	Common Mummichog
<i>Fundulus luciae</i>	Spotfin Killifish
<i>Fundulus</i> species*	Ray Finned Fish Genus*
<i>Gambusia affinis</i>	Mosquitofish
<i>Gobiosoma bosc</i>	Naked Goby
<i>Leiostomus xanthurus</i>	Spot
<i>Lucania parva</i>	Rainwater Killifish
<i>Menidia beryllina</i>	Inland Silverside
<i>Palaemonetes pugio</i>	Daggerblade Grass Shrimp
<i>Paralichthys dentatus</i>	Summer Flounder
<i>Stongylura marina</i>	Atlantic Needlefish

Entries with a * indicate that the family or genus was confirmed, but that the species could not be identified.

More Information

Erika Patenaude 401-874-4603
Biologist Erika_Patenaude@nps.gov

Sara Stevens 401-874-4548
NCBN Coordinator Sara_Stevens@nps.gov

NCBN Salt Marsh Nekton Monitoring Program:
<http://science.nature.nps.gov/im/units/ncbn/vs/saltnekton.aspx>