

# North Carolina National Estuarine Research Reserve

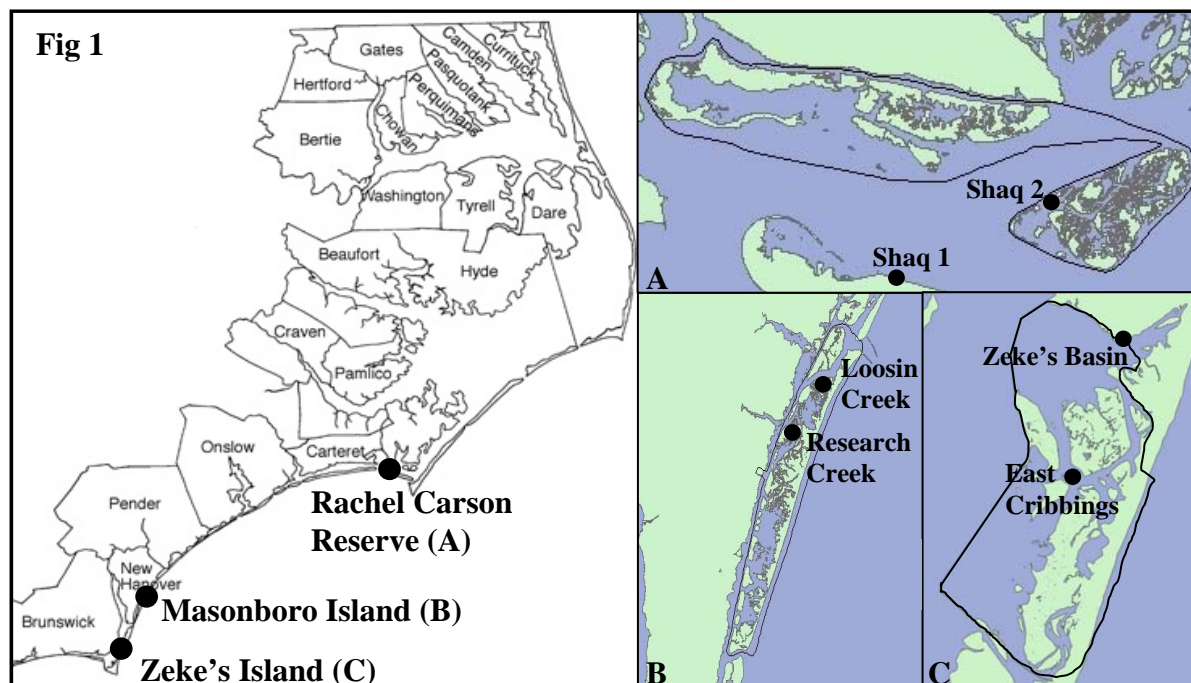
SWMP Paper Series • Number 1



## System-Wide Monitoring Program (SWMP) [www.nccoastalreserve.net](http://www.nccoastalreserve.net)

NOAA's National Estuarine Research Reserve System (NERRS) has established a long-term System-Wide Monitoring Program (SWMP) to identify and track short-term variability and long-term changes in the integrity and biodiversity of representative estuarine ecosystems and coastal watersheds. The purpose of this monitoring is to contribute to effective national, regional and site-specific coastal zone management. SWMP contains three elements - abiotic monitoring, biological monitoring and mapping - that are conducted nationwide at all 28 NERRS. This paper describes the abiotic monitoring portion of SWMP. Abiotic factors include atmospheric, water quality and physical parameters such as temperature, tidal range and bathymetry. Subsequent papers will describe the biological and mapping portions of SWMP.

The North Carolina National Estuarine Research Reserve (NCNERR) implements SWMP water quality monitoring at six sites. Two sites are located at the Rachel Carson Reserve (Fig 1A), two at Masonboro Island (Fig 1B), and two at Zeke's Island (Fig 1C). The two water quality stations at Rachel Carson (Fig 1A) are implemented through a partnership with the National Parks Service Inventory and Monitoring Program. A weather station at Masonboro Island (Fig 4) continuously monitors atmospheric parameters. NCNERR SWMP datasets are an extremely valuable source of continuous long-term monitoring, dating back to 1994.





**Fig 2**

Water quality stations are equipped with a multiparameter YSI™ data logger (Fig 2) sampling every 15 minutes for the following parameters: dissolved oxygen, salinity, turbidity, specific conductivity, temperature, and pH. Nutrients (ammonium, nitrate, nitrite, and ortho-phosphate) and extracted chlorophyll *a* concentrations are obtained from surface grab samples at each water quality station monthly.



**Fig 3**

SWMP data from across the nation is housed at the NOAA Centralized Data Management Office (CDMO). CDMO was established to support SWMP with data management and technical support. The office also provides a web based interface for users to download and visualize SWMP data. The water

quality stations (Fig 3) at Research Creek (Fig 1B) and Zeke's Basin (Fig 1C), as well as the weather station at Masonboro Island (Fig 4), are equipped with a satellite telemetry system that transfers data to the CDMO website in near real time. The near-real-time and archived data may be viewed and downloaded from the CDMO website: <http://cdmo.baruch.sc.edu/>.



**Fig 4**

SWMP data collected by the NCNERR are used by many organizations for a variety of purposes. The U.S. Coast Guard uses the data to assist with search and rescue operations. The National Weather Service uses the data to assist with forecast predictions.

Commercial and recreational fishermen plan fishing trips based on local air and water temperature data. Scientists can track long-term changes in water quality including acidification and other physical changes. Teachers use the data to help students understand water quality issues. Long-term environmental monitoring is imperative for effective coastal resource research, management, and education.



The North Carolina National Estuarine Research Reserve is a cooperative program between the North Carolina Department of Environment and Natural Resources, Division of Coastal Management and the National Oceanic and Atmospheric Administration.