

Cape Hatteras National Seashore

National Park Service
U.S. Department of the Interior

Inventory & Monitoring Program
Southeast Coast Network



Fixed-Station Water-Quality Monitoring, 2012

Vital Sign Overview

In 2005 the National Park Service (NPS) Southeast Coast Network (SECN) Inventory and Monitoring Program began collecting water-quality data in the estuarine waters near Cape Hatteras National Seashore (CAHA) as part the NPS Vital Signs monitoring program. The continuous-monitoring station is on the Ocracoke boat ramp dock. This station collects pH, dissolved oxygen, water temperature, salinity, turbidity and water-level data every 30 minutes. Additional water-quality measurements are made by SECN, or CAHA staff and include monthly measurements of water-clarity conditions, nutrients, and chlorophyll *a* levels. Methods used are adapted from, or compatible with, the water-quality monitoring program established by the National Estuarine Research Reserve Program (NERR). The Cape Hatteras National Seashore fixed-station water quality monitoring site is part of the SECN estuarine water-quality monitoring program, which routinely collects data in the vicinity of seven coastal parks located along the southeastern U.S. coast. Information collected by this monitoring program will be used to help managers make better-informed decisions by understanding trends and variability related to water-quality conditions in park waters.

Significant Findings

Monthly water-quality data collected at the Southeast Coast Network site near Cape Hatteras National Seashore during 2012 reflected *good* to *fair* conditions throughout the year (Table 1), with water-clarity rating *good* in the spring and early summer and *fair* in the late summer.

Dissolved inorganic nitrogen and phosphorus were *good* when available. Chlorophyll *a* levels rated *fair* during the late summer months, and *good* in June and October. Discrete data was not available for the first five months, and last two months of the year, due to lab contract issues and site access.

Mean monthly dissolved oxygen levels were *good* throughout the entire year, ranging from a high of 9.6 mg/L in February to a low of 6.4 mg/L in July and August. No daily average dissolved oxygen levels dipped below 5 mg/L.

Mean monthly pH values ranged from a low of 7.9 in January to a high of 8.3 in June with very little variability throughout the year.

Monthly mean turbidity values were highest during April at 18.9 NTUs. The lowest individual turbidity reading for any given month was ≤ 2.2 NTUs and a maximum reading of 175.4 NTUs was recorded in September.

Water Temperatures in 2012 were similar to those in 2011 with the monthly mean high in July of 28.5°C (83.3°F) and 28.1°C (82.6°F) for 2012 and 2011 respectively. The lowest monthly average for both years was in January with 2012 readings approximately 5°C (9°F) higher, 10.1°C (50.2°F) to 5.2°C (41.4°F).

Status of Conditions

Table 1. Median measurements and ratings of monthly water-quality data from the sampling station at CAHA. Numbers in brackets indicate the number of months in 2012 when water-quality measurements indicated a *poor* rating. Green (■) = *good*; yellow (■) = *fair*; red (■) = *poor*. The light attenuation coefficient (*k*) was used as a relative measure of water clarity.

Water Clarity (<i>k</i>)	Chlorophyll <i>a</i> (µg/L)	Dissolved Oxygen (mg/L)	Dissolved Inorganic Nitrogen (mg/L)	Dissolved Inorganic Phosphorus (mg/L)
1.56 [0]	5.47 [0]	8.57 [0]	0.0178 [0]	0.008 [0]

Sampling Area

Cape Hatteras National Seashore is the northern most park unit in the Southeast Coast Network (Figure 1). Located along the northern section of the Outer Banks, Cape Hatteras contains 35,400 acres of land and 74 miles of virtually unspoiled beaches. The U.S. Fish and Wildlife Service administers the Pea Island National Wildlife Refuge within the boundary of the Seashore. Seashore marshes contribute heavily to primary estuarine productivity and provide habitat for numerous wildlife and aquatic species.

Visitor and recreational uses represent the major categories of threat to the integrity of natural resources at CAHA. Replacement of natural areas with impervious surfaces increases storm water runoff with its associated contaminants, so it may be of potential concern to offshore water quality. Many areas in the vicinity of the park have water bodies that have recently been 303(d) listed. Shell fishing has been prohibited in areas to the south of Kill Devil Hills and Manteo due to elevated pathogen levels and several smaller areas along the Seashore have been 303(d) listed. Recent sampling by the SECN in the vicinity of Cape Hatteras have indicated mostly *good* and *fair* water quality conditions on the sound side of the park with some areas of elevated nitrogen and phosphorus.



Figure 1. Location of water quality-monitoring station at Cape Hatteras National Seashore used in this report.

About the Southeast Coast Network

The Southeast Coast Network includes 20 parks, 17 of which contain significant and diverse natural resources. In total, SECN parks encompass more than 184,000 acres of federally-managed land across North Carolina, South Carolina, Georgia, Alabama, and Florida. The parks span a wide diversity of cultural missions also, including four national seashores, two national historic sites, two national memorials, seven

national monuments, two national military parks, as well as a national recreation area, national battlefield and an ecological and historic preserve. The parks range in size from slightly more than 20 to nearly 60,000 acres, and when considered with non-federal lands jointly managed with NPS, the Network encompasses more than 253,000 acres.

About the Inventory & Monitoring Program

In 1999, the National Park Service initiated a long-term ecological monitoring program, known as “Vital Signs Monitoring,” to provide the minimum infrastructure to allow more than 270 national park system units identify and implement long-term monitoring of their highest-priority measurements of resource condition. The overarching purpose of natural resource monitoring in parks is to develop scientifically sound information on the current status and long-term trends in the composition, structure, and function of park ecosystems, and to determine how well current management practices are sustaining those ecosystems.

The NPS Vital Signs Monitoring Program addresses five goals for all parks with significant natural resources:

- Determine the status and trends in selected indicators of the condition of park ecosystem,
- Provide early warning of abnormal conditions,
- Provide data to better understand the dynamic nature and condition of park ecosystems,
- Provide data to meet certain legal and Congressional mandates, and
- Provide a means of measuring progress towards performance goals.

For More Information

SECN Home Page: <http://science.nature.nps.gov/im/units/secn/index.cfm>

SECN Reports & Publications: <http://science.nature.nps.gov/im/units/secn/publications.cfm>

Inventory & Monitoring Program: <http://science.nature.nps.gov/im/index.cfm>

Data Downloads via the Natural Resource Information Portal: <http://nrinfo.nps.gov/Home.mvc>

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