

Cape Hatteras National Seashore

National Park Service
U.S. Department of the Interior

Inventory & Monitoring Program
Southeast Coast Network



Fixed-Station Water Quality Monitoring, 2010

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 data station is located at a dock at the Ocracoke Village boat ramp. This station collects pH, dissolved oxygen, temperature, salinity, conductivity, turbidity and water level data every 30 minutes. Additional water quality measurements are made by SECN 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 collects data in the vicinity of nine 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. Summary data are presented in annual data reports published by the SECN.

Significant Findings

Monthly water quality sampling indicated good water clarity, good to fair chlorophyll levels, good dissolved oxygen and fair levels of both nitrogen and phosphorus in the vicinity of Ocracoke Island during 2010 (Table 1, Figure 1).

Dissolved oxygen levels briefly dropped below 2 mg/L several times during a brief three day period between November 4 and November 6. Values ranged from 0.13 mg/L during this period in November to 13.22 mg/L during February. Mean monthly values ranged from 11.4 mg/L in February to 5.6 mg/L during September. Mean daily values were generally higher during the cooler winter months and dipped to their lowest level during late summer and fall.

pH values ranged from 7.58 in January to 9.05 in May. Mean monthly pH levels range from 7.9 to 8.2 and did not exhibit any discernible seasonal variation during 2010.

Turbidity levels ranged from near 0 NTUs across all months to maximum reading readings of 238 NTUs and 346 NTUs in May and June, respectively. Daily mean values were generally higher during late spring and lowest in the summer months.

Lower than normal water levels were observed in the vicinity of the Ocracoke monitoring station during a brief period in late April and resulted from a combination of low tide and a period of sustained strong winds out of the south.

Salinity levels ranged from 12.3 ppt in February to 36.2 ppt in August. Mean daily salinity levels were generally lowest during the period from early to late spring and highest during the late summer months.

Status of Conditions

Table 1. Median measurements and ratings of monthly water-quality data from sampling stations at CAHA. Numbers in brackets indicate the number of months in 2010 when water-quality measurements indicated a poor rating. Green = good; yellow = fair; red = poor.

Water Clarity Index (k)	Chlorophyll <i>a</i> (ug/L)	Dissolved Oxygen (mg/L)	TDN (mg/L)	TDP (mg/L)
0.60[0]	5.62[0]	8.13[0]	0.33[0]	0.02[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 on the 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.

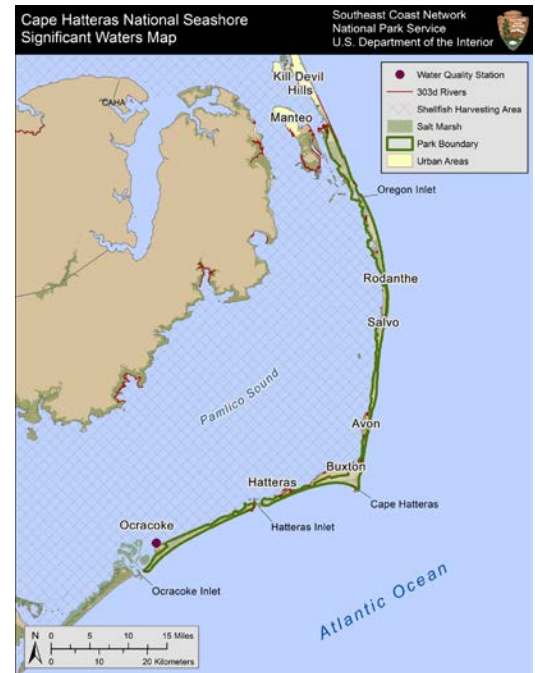


Figure 1. Locations of water quality monitoring stations at Cape Hatteras National Seashore used in this report.

About the Southeast Coast Network

The Southeast Coast Network (SECN) 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 to 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/reports.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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