

Cumberland Island National Seashore

National Park Service
U.S. Department of the Interior

Inventory & Monitoring Program
Southeast Coast Network



Fixed-Station Water-Quality Monitoring Data Summary, 2012

Vital Sign Overview

In 2006, the National Park Service (NPS) Southeast Coast Network (SECN) Inventory and Monitoring Program began collecting water-quality data in the estuarine waters near Cumberland Island National Seashore (CUI) as part the NPS Vital Signs Monitoring Program. The station collects pH, dissolved oxygen, water temperature, salinity, turbidity and water-level data at 15-minute intervals. Additional water-quality measurements included monthly measurements of water-clarity conditions, nutrients, and chlorophyll *a* levels. Methods used are adapted from the water-quality monitoring program established by the National Estuarine Research Reserve Program. The CUI 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 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

Dissolved inorganic nitrogen and dissolved inorganic phosphorus were *fair* in August and November. Chlorophyll *a* results were *good* in the second half of the year with June and August reported as *fair*. Water clarity conditions were *poor* in August, *fair* in July and *good* for the rest of 2012 (Table 1).

Water temperatures were similar to 2011 with slightly warmer low water temperatures of 11.2 °C (52.1°F) observed in the winter and a monthly average of 14.6°C (58.28°F) in January. The highest monthly average of 29.0°C (84.2°F) as well as the highest individual reading of 31.4 °C (88.6 °F), was recorded during July.

Dissolved oxygen readings ranged from 2.5 in July to 9.1 mg/L in January. Mean monthly dissolved oxygen concentrations ranged from 3.7 in July to 8.0 mg/L in January. Mean daily dissolved oxygen levels commonly fell below 5.0 mg/L from late June to early October. A total of 84 days had daily averages below 5.0 mg/L.

Turbidity readings ranged from 1.40 NTUs in January to 914 NTUs during July. Mean monthly turbidity levels ranged from 12.9 NTUs in January to 90.3 NTUs in August, with high variability throughout the month. The highest daily mean turbidity levels occurred after Tropical Storm Debby.

Salinity readings ranged from 14.8 parts per thousand (ppt) in July to 37.6 ppt in August. Mean monthly readings ranged from 24.5 ppt for the month of July to 35.4 ppt during May. The 11.64 inches of rain associated with Tropical Storm Debby caused the annual salinity lows for 2012 to occur in July.

pH values ranged between 7.17 and 8.43 throughout the year with the lowest pH conditions occurring episodically throughout the summer months. Mean monthly pH values ranged from a low of 7.6 during March, July, and September to a high of 8.2 in December.

Status of Conditions

Table 1. Median measurements and ratings of monthly water-quality data from sampling stations at CUI. 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)
1.67 [1]	4.12 [0]	6.13 [0]	0.1094 [0]	0.0192 [0]

Sampling Area

As Georgia's southernmost barrier island, Cumberland Island is bound on the east by the Atlantic Ocean and the west by the extensive salt marshes and estuaries of the Cumberland River and Cumberland Sound. The east coast of the island is an almost continuous strip of beaches that face the ocean, whereas the remaining shore is a network of tidal creeks that flow through salt marshes and eventually open into coastal water (Figure 1). Aquatic habitats associated with the island include marine areas, tidal creeks, saltwater ponds, intertidal areas, and inland ponds. Although Cumberland Island is considered relatively pristine in comparison to more highly developed barrier islands, both point and nonpoint sources of pollutants can be found nearby. Many of these pollution sources have the potential to affect water quality on the island. In addition to the numerous industrial and municipal waste facilities in the area, the submarine base at Kings Bay is of potential concern due to the effects of channel dredging as well as other activity on the base. There are also a significant number of USEPA listed Superfund sites nearby, most of which are located in the vicinity of Brunswick, Georgia.



Figure 1. Location of continuous water-quality monitoring station at Cumberland Island National Seashore.

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 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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