

Cumberland Island National Seashore

National Park Service
U. S. Department of the Interior

Inventory & Monitoring Program
Southeast Coast Network



Assessment of Estuarine Water and Sediment Quality, 2012

Vital Sign Overview

In July and August 2012, the Southeast Coast Network Inventory and Monitoring Program conducted an assessment of water quality in the estuarine waters surrounding Cumberland Island National Seashore as a part of the Network's Vital Signs Monitoring program. Monitoring was conducted following methods and standards developed by the U.S. Environmental Protection Agency as a part of the National Coastal Assessment Program and included parameter estimates of water clarity, chlorophyll *a*, total dissolved nitrogen, phosphorous, dissolved oxygen, and field measurements of water temperature, pH, dissolved oxygen, and salinity.

Significant Findings

The overall water quality index rating for the area in the vicinity of Cumberland Island National Seashore during 2012 was *fair*, with 25 sites rated as *fair* and five rated as *good* (Figure 1).

Individual site ratings indicated better water quality conditions in the waters on the southern end of the park, with all five sites rating as *good* being located on the south end.

Water clarity was rated as *good* at 67% of sites in the assessed area with 17% rated as *fair* and 3% rated as *poor*. Three sites (13%), lacked water clarity ratings due to missing Secchi depth measurements.

Chlorophyll *a* levels were rated as *good* at 50% of sites in the assessed area with 50% rated as *fair*. All of the sites rated as *good* were located in estuarine

areas near the southern half of Cumberland Island.

Dissolved inorganic nitrogen (DIN) levels were evenly split with 50% rating *fair* and 50% rating *good*. Dissolved inorganic phosphorus (DIP) levels were rated as *good* at 10% of the sites and *fair* at 90%. The three sites that rated *good* for DIP were located near the southern end of the park.

Dissolved oxygen levels rated *good* at 33% of the sites and *fair* at 67% of the sites. No sites were rated *poor* due to low dissolved oxygen levels.

In general, all parameters indicate an improvement in water quality conditions since last assessed 2007. However, the overall park-wide condition rating of *fair* remained the same between sampling events.

Status of Conditions

Percentages of sites rated as *good*, *fair*, or *poor* were calculated for water clarity, chlorophyll *a*, dissolved inorganic nitrogen, dissolved inorganic phosphorus, and dissolved oxygen (Table 1). A water quality index was calculated for each site and took into account the rating of each parameter at each location for all points sampled (Figure 1).

Table 1. Percentage of sites rated as *good*, *fair*, or *poor* near Cumberland Island National Seashore, 2012.

*May not add to 100% due to missing data.

Parameter	% Sites Rated		
	Good	Fair	Poor
Water Clarity (<i>k</i>)*	67%	17%	3%
Chlorophyll <i>a</i>	50%	50%	0%
Dissolved Inorganic Nitrogen	50%	50%	0%
Dissolved Inorganic Phosphorus	10%	90%	0%
Dissolved Oxygen	33%	67%	0%

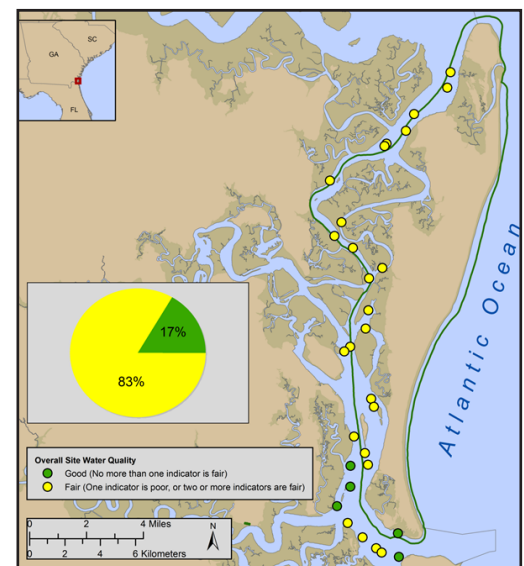


Figure 1. Water-quality index rating by site near Cumberland Island National Seashore, 2012. Graph shows percentage of sites in each condition category.

Sampling Area

Cumberland Island National Seashore (CUIIS) is the southern-most barrier island on the Georgia coast (Figure 2). It is 17.5 miles long and is one of the larger and more diverse barrier islands on the Atlantic Coast encompassing 36,415 acres, of which 16,850 are estuarine. A *Spartina* grass dominated salt-marsh, oyster mud flats, and six tidal creeks provide the habitat for a diverse marine-based fauna. The remaining terrestrial habitats are dominated by a live oak-palmetto dominated forest backed by an extensive dune system. As the elevation of the island rises on the northwest, the habitat transitions into a mixed pine-deciduous forest. The island is known for nesting loggerhead sea turtles, abundant shorebirds, undeveloped dune fields, maritime forest ecosystems, and historic structures in five districts on the National Register of Historic Places. Cumberland Island and its surrounding waters provide habitat for at least 13 federally listed threatened or endangered species.

Many of the threats to natural resources at CUIIS stem from either external development pressures or past human uses of the island. The Georgia coast is experiencing profound growth and recreational pressure will in turn increase on the island and on surrounding waters. Monitoring

the natural processes that are essential to the island's stability and ecology is critical. Long-term water-quality monitoring is designed to provide managers with data in the context of applicable federal standards developed by the U.S. EPA.



Figure 2. Sampling locations near Cumberland Island National Seashore, 2012.

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.

About the Inventory & Monitoring Program

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:

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