



Coastal Water And Sediment Quality, July 2007

Vital Sign Overview

In July 2007, the Southeast Coast Network in cooperation with the University of Georgia, Marine Extension Service conducted a water-quality assessment at 30 sites at Cumberland Island National Seashore as a part of the National Park Service Vital Signs Monitoring Program. Monitoring was conducted following methods developed by the U.S. Environmental Protection Agency as a part of the National Coastal Assessment Program and included laboratory analysis for chlorophyll a, total dissolved nitrogen and phosphorous concentrations and field measurements of water temperature, pH, dissolved oxygen, and salinity. Estimates of water clarity were made using a secchi disk to estimate light extinction.

Significant Findings

Water-quality conditions with respect nutrients, chlorophyll a, dissolved oxygen, and water clarity were rated *fair* at all sites.

63% of sites were rated as *poor* for concentrations total dissolved phosphorus. All sites were rated as either *good* or *fair* for concentrations of total dissolved nitrogen and chlorophyll a.

Sites were generally rated as *good* for concentrations of sediment metals and organic compounds.

Metals were detected in sediments at all sites. Arsenic was the only metal found at concentrations high enough to warrant a *fair* rating, and only at 24 percent of sites.

Organic compounds were detected at only 10 sites and at levels below any known effects thresholds. All sites were rated as *good*.

Even though overall sediment contamination levels were rated *good* at all sites, elevated levels of total organic carbon at 10 sites resulted in those sites being rated *fair* for the Sediment Quality Index.

The general pattern of elevated phosphorus levels around Cumberland Island is consistent with nonpoint source loadings in the Satilla and St. Marys watersheds as detailed in the park's 2005 Coastal Watershed Condition Assessment. Based on the overall suite of water quality indicators measured no immediate management actions are suggested at this time.

Status of Conditions

Overall Condition

	% Sites Rated		
	Good	Fair	Poor
Water Quality Index	0	100	0
Sediment Contamination	100	0	0
Total Organic Compounds	63	37	0
Sediment Quality Index	63	37	0

Water Chemistry

	% Sites Rated		
	Good	Fair	Poor
Water Clarity	100	0	0
Chlorophyll a	37	63	0
Total Dissolved Nitrogen	0	100	0
Total Dissolved Phosphorus	0	37	63
Dissolved Oxygen	20	80	0

Sediment Chemistry

		% Sites Rated		
		Good	Fair	Poor
metals	Arsenic	77	23	0
	Cadmium	100	0	0
	Chromium	100	0	0
	Copper	100	0	0
	Lead	100	0	0
	Mercury	100	0	0
	Nickel	100	0	0
	Silver	100	0	0
	Zinc	100	0	0
organics	Total DDT	100	0	0
	High molecular weight PAH	100	0	0
	Low molecular weight PAH	100	0	0
	Total PAHs	100	0	0
	Total PCBs	100	0	0

Sampling Area & Study Design

Cumberland Island National Seashore is the southernmost barrier island on the Georgia coast. At 17.5 miles long it is one of the larger and more diverse barrier islands on the Atlantic Coast encompassing more than 36,000 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. Thirty sites were selected for sampling within these areas using a spatially balanced method which allows for valid estimates of park-wide conditions to be made from monitoring data.

Estuarine water-quality assessments are planned to be repeated at five-year intervals with the next sampling at Cumberland Island National Seashore scheduled for Summer 2012.



About the Southeast Coast Network

The Southeast Coast Network (SECN) includes twenty parks, seventeen 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://nrim.nps.gov/Home.mvc>

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