



Assessment of Estuarine Water Quality, 2013

Overview

The Southeast Coast Network conducted an assessment of water quality at Canaveral National Seashore as a part of the Network's Vital Signs Monitoring program in July 2013. The assessment was conducted at 31 randomly-selected sites in Mosquito Lagoon 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, and dissolved oxygen.

Study Area

Natural resources at Canaveral National Seashore include a diverse assemblage of wildlife, plant communities, geophysical features and natural processes reflecting the complexity of the land/lagoon/sea interface of east central Florida. Throughout the park, the relationship between land and water is paramount. Unlike many barrier islands, Canaveral National Seashore has only a single dune ridge, averaging 12 feet in height. For the vast majority of its length the dune is quite stable, backed by a dense growth of saw palmetto (*Serenoa repens*) and several other species of hardy shrubs and grasses. Mosquito Lagoon, extending along the backside of Canaveral National Seashore's barrier island, is the northernmost part of the Indian River Lagoon. Containing the most diverse assemblage of aquatic species on the entire eastern seaboard, this 155-mile long lagoon has been designated as an Estuary of National Significance by the Environmental Protection Agency and an Outstanding Florida Water by the State of Florida.



Figure 1. Estuarine Water Quality Assessment sampling locations at Canaveral National Seashore, July 2013.

Significant Findings

- During the assessment Mosquito Lagoon was undergoing a brown tide event.
- Water clarity was rated as poor at 68% of sites. Approximately 32 % of the sites sampled in 2013 did not have Secchi data due to shallow depths. No sites rated fair or good.
- Chlorophyll a levels were rated as poor at 90% of sites in the assessed area with 7% of sites rated as fair. Only a single site sampled in 2013 rated as good with low level of chlorophyll a.
- Dissolved nutrient levels were low across the assessed area with dissolved inorganic nitrogen (DIN) levels good (<0.1 mg/L) at all sites (100%) and dissolved inorganic phosphorus (DIP) levels also good (<0.01) at all sites (100%).
- Dissolved oxygen levels rated good at 87% of sites assessed and fair at 10% of the sites. A single site sampled on the western side of Mosquito Lagoon and near large amounts of dead seagrass rated as poor with dissolved oxygen levels measured below 2.0 mg/L.
- A water-quality condition summary index was calculated for each site sampled in Mosquito Lagoon National using the categorical assessments of water clarity, chlorophyll a, DIN and DIP concentrations and dissolved oxygen. This index indicated poor water-quality conditions at 68% of the sites sampled with *good* water quality noted at two sites.
- Based on USEPA site condition summaries overall water quality in Mosquito Lagoon during July, 2013 was poor (more than 20% sites rated as poor).

Status of Conditions

The water quality assessment conducted during this sampling period included hydrographic profiles at 0.5–1.0 m intervals at each site for temperature, pH, dissolved oxygen, and salinity. Concurrent measurements of chlorophyll *a* levels were made, and total and dissolved nutrient samples were taken at 0.5 m below the surface. Estimates of water clarity were made at each site using a Secchi disk at sites with sufficient depth.

Categorical assessments (*good*, *fair*, or *poor*) were assigned to each parameter, and summary conditions were assessed at the site and park-wide level following standard EPA criteria. Percentages of sites rated as *good*, *fair*, or *poor* were calculated for all parameters (Table 1). A water quality index was calculated for each site that took into account the rating of each parameter at each location for all points sampled (Figure 2).

Table 1. Percentage of sites rated as good, fair, or poor at Canaveral National Seashore, July 2013.

Parameter	% Sites Rated		
	Good	Fair	Poor
Water Clarity (<i>k</i>)	0	0	68
Chlorophyll <i>a</i>	3	7	90
Dissolved Inorganic Nitrogen	100	0	0
Dissolved Inorganic Phosphorus	100	0	0
Dissolved Oxygen	87	10	3

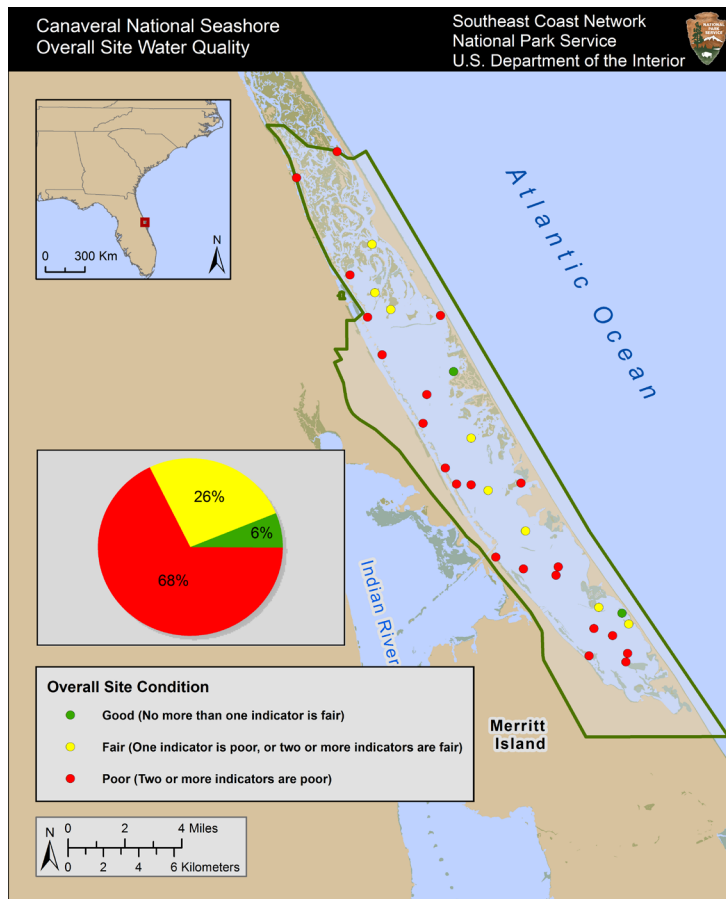


Figure 2. Overall water quality index rating for sites sampled in Mosquito Lagoon near site at Canaveral National Seashore, July 2013. Inset figure shows the percentage of sites in each condition category.

About the Southeast Coast Network

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.

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.

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>

About the NPS 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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