



## Assessment of Estuarine Water Quality, 2013

### Overview

The Southeast Coast Network conducted an assessment of water quality at Timucuan Ecological and Historic Preserve as a part of the Network's Vital Signs Monitoring program in August 2013. The assessment was conducted at 30 randomly-selected sites in the vicinity of the Park 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

Timucuan Ecological and Historic Preserve (TIMU) encompasses 18,600 hectares (46,000 acres) of salt marsh and coastal hammock habitat in addition to estuarine, marine, and brackish open waters (Figure 1). TIMU contains the seaward confluence of the Nassau and St. Johns Rivers (SJR) and is along the northeastern coast of Florida in Duval County and entirely within the city limits of Jacksonville. TIMU includes several rare and vulnerable natural communities including coastal strand, maritime hammock, scrub, and shell mound habitat.

National Park Service (NPS) facilities within TIMU include Fort Caroline visitor center and maintenance area,

the Theodore Roosevelt area with park headquarters, the Kingsley Plantation, the Ribault Column, and the historic Broward house. Other state and city parks in the area include Big and Little Talbot Island State Parks, Fort

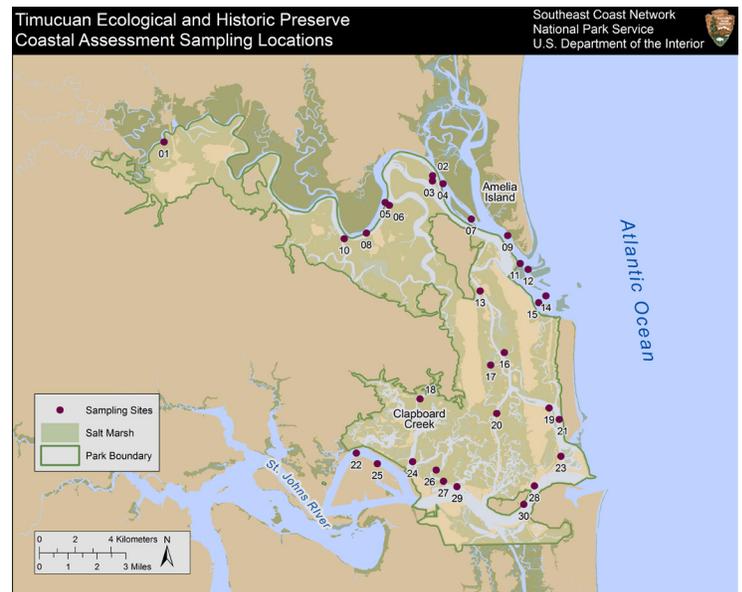


Figure 1. Estuarine Water Quality Assessment sampling locations at Timucuan Ecological and Historic Preserve, August 2013.

### Significant Findings

- Water clarity was rated as good at 80% of sites in the assessed area with 3% rated as poor. Five sites (17%) lacked water clarity ratings due to missing Secchi depth measurements.
- Dissolved Oxygen levels ranked good at 24 sites and fair at six sites.
- Chlorophyll *a* levels were rated as good at 30% of sites in the assessed area with 60% rated as fair. Ten percent were rated as poor.
- Dissolved inorganic nitrogen (DIN) levels were good at 57% of the sites, and fair at 43%. Dissolved inorganic phosphorus (DIP) levels were rated as good at 30% of the sites, fair at 37%, and poor at 33%.
- A water-quality condition summary index was calculated for all sites at Timucuan Ecological and Historic Preserve using the categorical assessments of water clarity, chlorophyll *a*,

DIN and DIP concentrations and dissolved oxygen. This index indicated *fair* water-quality conditions at 67% of the sites sampled with water-quality conditions at 30% of sites rated as *good* and one site (3%) evaluated as *poor*. Individual site ratings indicated better water quality conditions in the waters closest to the coast, with six of the good sites being located in an inlet or sound, and the other three good sites close to open water.

- The only site rated as poor for overall water quality was the easternmost Nassau River site, located further inland than all other sites. Sites rated as *fair* or *poor* were generally located in salt marsh areas.
- Overall, the park water quality index rating for the area in and around Timucuan National Ecological and Historic Preserve was *fair*, with 70% of the sites in combined *fair* and *poor* condition.

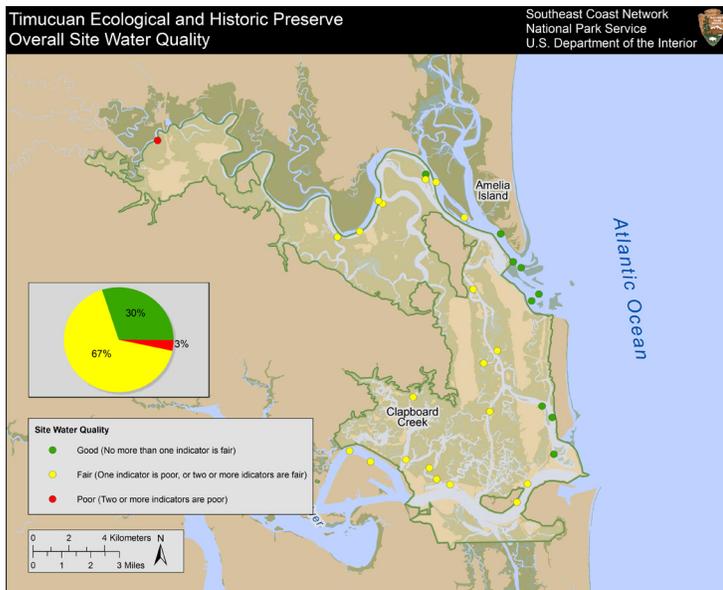
## Status of Conditions

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 Timucuan Ecological and Historic Preserve August, 2013**

Parameter	% Sites Rated		
	Good	Fair	Poor
Water Clarity ( <i>k</i> )	80	3	0
Chlorophyll <i>a</i>	30	60	10
Dissolved Inorganic Nitrogen	57	43	0
Dissolved Inorganic Phosphorus	30	37	33
Dissolved Oxygen	80	20	0



**Figure 2. Overall water quality index rating for sites sampled in Timucuan Ecological and Historic Preserve, August 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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