

Timucuan Ecological and Historic Preserve

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 2003 the Northeast Florida Water-Quality Preservation Group—composed of the Florida Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas, the National Park Service, and the Nature Conservancy—was formed by an official Memorandum of Understanding to “collaborate to preserve, protect, and enhance water quality” of Timucuan Ecological and Historic Preserve (TIMU) in northern Florida. In 2006 the National Park Service Southeast Coastal Network (SECN), in cooperation with the City of Jacksonville, Florida, established a jointly operated water-quality monitoring network. This monitoring program was designed to collect data so managers are able to make better-informed decisions by understanding trends and variability of water-quality conditions in park waters.

Significant Findings

Water temperature throughout the year was similar to previous years. The lowest monthly average was 16.5°C (61.7°F) in February, and the highest monthly average was 29.1°C (84.4°F) in July.

Salinity levels dipped to their lowest values of 12.6 ppt in late June in response to the nearly 16 inches of rain that fell during Tropical Storm Debby. The average monthly high was 36.3 ppt in May, and the average monthly low was 30.2 ppt in July.

pH values were consistent throughout the year with monthly averages ranging from 7.9 to 8.1. The lowest pH readings also coincided with Tropical Storm Debby in late June.

Turbidity values were generally low throughout the year with the highest monthly average on 9.3 NTUs in June, and the highest individual reading of 104.9 NTUs in November.

Elevated levels of orthophosphate (DIP) were the most common cause of *poor* water-quality ratings during 2012. Discrete bimonthly water-quality sampling indicated elevated DIP levels at all sites sampled in TIMU in March, and all but three sites in October. High levels of orthophosphate were recorded for every sample taken at TIM1 and TIM2, the most upstream sites on the Nassau River (Table 1).

Chlorophyll *a* and dissolved inorganic nitrogen levels rated as either *good* or *fair* throughout the year (Table 1).

Water clarity rated *good* for all but three samples during 2012. TIM1 in June was *fair* along with TIM2 in October. The only *poor* water-clarity reading was at TIM6 in January (Table 1).

Status of Conditions

Table 1. Median measurements of water-quality data collected by City of Jacksonville at Timucuan Ecological and Historic Preserve 2012. Numbers in brackets indicate the number of sampling occasions 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.

Station Name	Water Clarity (<i>k</i>)	Chlorophyll <i>a</i> (µg/L)	Dissolved Inorganic Nitrogen, (mg/L)	Dissolved Inorganic Phosphorus (mg/L)	Dissolved Oxygen (mg/L)
TIM1	1.87 [0]	3.9 [0]	0.17 [0]	0.13 [6]	5.75 [0]
TIM2	1.73 [0]	6.5 [0]	0.14 [0]	0.12 [6]	5.71 [0]
TIM3	1.43 [0]	9 [0]	0.10 [0]	0.05 [3]	6.18 [0]
TIM4	1.29 [0]	9.2 [0]	0.09 [0]	0.05 [3]	5.96 [0]
TIM5	1.61 [0]	10.2 [0]	0.11 [0]	0.04 [2]	5.67 [0]
TIM6	1.79 [1]	12.45 [0]	0.11 [0]	0.04 [2]	5.84 [0]
TIM7	1.39 [0]	10.8 [0]	0.09 [0]	0.03 [1]	6.5 [0]
TIM8	1.32 [0]	9.2 [0]	0.09 [0]	0.04 [1]	6.98 [0]
TIM9A	1.10 [0]	7.6 [0]	0.07 [0]	0.04 [1]	6.62 [0]
TIM10	1.03 [0]	4.9 [0]	0.08 [0]	0.04 [2]	6.5 [0]
TIM11	0.85 [0]	6.8 [0]	0.06 [0]	0.04 [1]	7.03 [0]
TIM12	1.01 [0]	9.6 [0]	0.07 [0]	0.04 [1]	7.25 [0]

Sampling Area

Timucuan Ecological and Historic Preserve 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 and is located along the northeastern coast of Florida in Duval County and entirely within the city limits of Jacksonville. Water-quality data were collected at 13 sites (Figure 1) — 12 of which were monitored every other month for nutrients and chlorophyll *a* and one site which is monitored continuously for dissolved oxygen, pH, salinity, water temperature, depth and turbidity.

Water resources are an integral part of TIMU with approximately 75% of the protected area composed of wetlands and open water. These resources include numerous tidal creeks, portions of the Nassau and St. Johns Rivers, Sisters Creek/Intracoastal Waterway and the Fort George River. TIMU's estuarine setting serves as a vital ecological link between freshwater habitats and the ocean.



Figure 1. Locations of water-quality monitoring stations at Timucuan Ecological and Historic Preserve used in this report. Other monitoring programs also have locations in this area and are not shown.

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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