



Water Quality Monitoring 2019 Data Summary

Overview

The Gulf Coast Network (GULN) Water Quality Monitoring Program began collecting samples in September 2007. The program was developed primarily from protocols of the U. S. Geological Survey (USGS) National Water-Quality Assessment Program and the Texas Commission of Environmental Quality's (TCEQ) Surface Water Quality Monitoring Program. The GULN program monitors 54 sites across seven parks which are sampled on a set rotation.

The GULN Water-Quality Program was designed to provide an integrated assessment of the spatial and temporal distribution of general water-quality conditions and the transport of major inorganic constituents of stream and estuary water in relation to hydrologic conditions and major sources.

The network began long-term monitoring of water quality at Gulf Islands National Seashore in February 2011, conducting monthly grab sampling and continuous autonomous sampling. There are three sites in the Florida District (see map on next page) which include sites in two different bodies of water (Big Lagoon and Santa Rosa Sound). Field sites include Spanish Cove (in Big Lagoon), and Naval Live Oaks and Big Sabine (in Santa Rosa Sound). Sampling sites rotate with two of these three sites active each year, and one site in the Mississippi Sound at Ship Island (sampled and monitored by the USGS). Specifically, in 2019 Naval Live Oaks and Spanish Cove were the active sites and Big Sabine was inactive. Grab samples are collected for a common suite of nutrients standard to the Gulf of Mexico Alliance, a state-led network of partners working on priority issues along the Gulf Coast. These data are integrated into our routine seagrass monitoring program to better understand estuary health.

This brief summarizes data collected from January 1, 2019 through December 31, 2019. Water quality data are available upon request to the Gulf Coast Network. Past water-quality reports and briefs are available on the [Gulf Coast Network website](#).



Above: Photograph of water and seagrass along the Gulf Island National Seashore. NPS photo.

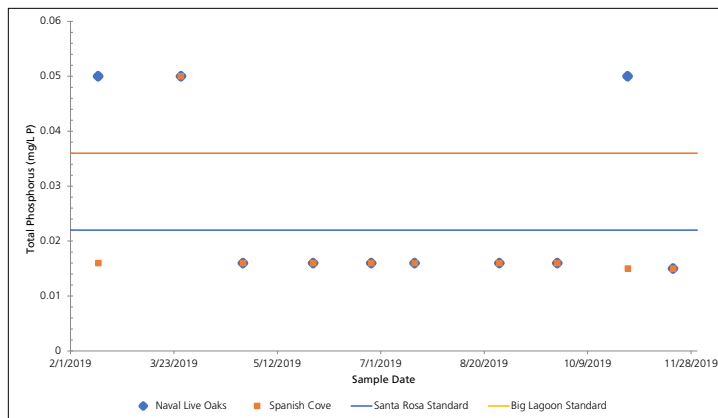


Figure 1. Total phosphorus measurements at Naval Live Oaks, and Spanish Cove. Four violations of total phosphorus occurred between these two sites in 2019.

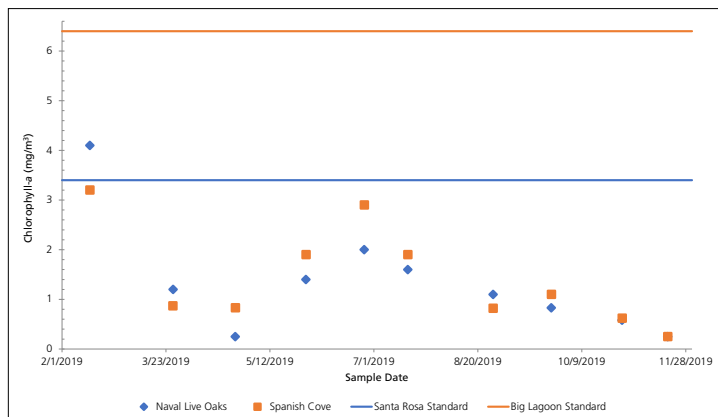


Figure 2. Chlorophyll-a at the two water quality monitoring sites in the Florida district of Gulf Islands National Seashore: Naval Live Oaks (blue data points and horizontal line are in Santa Rosa Sound with a limit of 3.4 mg/m³). Spanish Cove (orange data points and horizontal lines) is in Big Lagoon with its limit of 6.4 mg/m³.

Significant Findings

Highlights of Calendar Year 2019 Monitoring

The estuaries of Gulf Islands National Seashore are part of a much larger ecosystem directly influenced by human activities that can alter the natural physiochemical range of the water. To better define this range, a set of water-quality parameters, focused on nutrients, was chosen for routine analysis.

Water quality standards are a bit complex as the seashore is in two states. While there are no nutrient-specific standards in Mississippi, there are location-specific nutrient standards for Florida estuaries. Furthermore, total nitrogen and phosphorus limits are based on annual geometric means. There were four possible violations of water-quality standards in the Florida district. The chlorophyll-a standard

Significant Findings (continued)

was exceeded once at Naval Live Oaks (in Santa Rosa Sound). The total phosphorus standard was exceeded three times at Naval Live Oaks, and once at Spanish Cove (in Big Lagoon; Figure 1).

Chlorophyll-a

Chlorophyll-*a* is a proxy measure of phytoplankton (microscopic plants, also generally referred to as algae) in the water column. Increased nutrients into a waterbody may result in an increase in phytoplankton and an increase in chlorophyll-*a*. Extensive increases in phytoplankton may become an algal bloom that result in damage to aquatic organisms, and potential health risks for people. Historically sites in Big Lagoon and Santa Rosa Sound are low in nutrients with occasional spikes. Figure 2 shows chlorophyll-*a* levels at GULN sites in Gulf Islands National Seashore for 2019.

Water Quality Standards

The state of Florida designates the estuaries of the seashore as “Outstanding Florida Waters” (Rule 62-302.532 F.A.C.) with site-specific water quality standards (Rule 62-302.700). Mississippi regards seashore waters as “Recreational” (Regulation LW-2).

Below: Parameters and criteria.

Parameter	Santa Rosa Sound	Big Lagoon	Mississippi Sound
Water Temperature	–	–	< 32.2 °C
Dissolved Oxygen	**	**	> 5 mg/L
pH	–	–	6.0–9.0 SU
Chlorophyll- <i>a</i>	< 3.4 mg/m ³	< 6.4 mg/m ³	–
Total Nitrogen	< 0.041 mg/L [†]	< 0.61 mg/L [†]	–
Total Phosphorus	< 0.022 mg/L [†]	< 0.036 mg/L [†]	–

** Based on averages of various sampling periods

[†] Annual geometric mean

Future Monitoring

Monthly water quality and autonomous sampling will continue through 2020.



Map of the sampling sites. Site names and the specific water bodies (Big Lagoon and Santa Rosa Sound) for each site are labeled.

About the Gulf 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 ecosystems,
- 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.

Gulf Coast Network Website:

<https://www.nps.gov/im/guln/index.htm>

Gulf Coast Network Reports and Publications:

<https://www.nps.gov/im/guln/reports-publications.htm>

About the NPS Inventory & Monitoring Program:

<https://www.nps.gov/im/index.htm>

Data Downloads via the Natural Resource Information Portal:

<https://irma.nps.gov>