



Water Quality Summary, 2016

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 United States Geological Survey (USGS) National Water Quality Assessment and the Texas Commission of Environmental Quality's Surface Water Quality Monitoring Program. The program monitors 54 sites across seven parks which are sampled on 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—Spanish Cove (Big Lagoon), Naval Live Oaks, and Big Sabine (Santa Rosa Sound)—which rotate with two sites active each year. There is also one site in the Mississippi Sound at East Ship Island, operated by United States Geologic Survey (USGS). Autonomous measures, collected every 15 minutes, include water temperature, specific conductance (SpC), pH, dissolved oxygen (DO) and turbidity. 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 (Figure 1) to better understand estuary health.

This brief summarizes data collected from January 1, 2016 through December 31, 2016. Water quality data are available upon request to the Gulf Coast Network or our website: <http://science.nature.nps.gov/im/units/guln/index.cfm>.



Figure 1. Cooperators from the Dauphin Island Sea lab conduct routine seagrass monitoring in the Santa Rosa Sound portion of the Gulf Islands National Seashore. Seagrass and water-quality data can help managers better understand and protect the estuaries. Image by Joe Meiman.

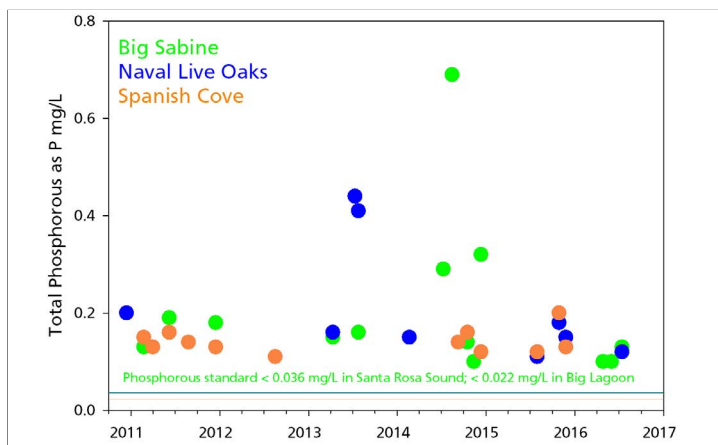


Figure 2. Total phosphorous at the three water-quality monitoring sites in the Florida district of Gulf Islands National Seashore: Big Sabine (green) and Naval Live Oaks (blue) are in Santa Rosa Sound with a limit of 0.036 mg/L. Spanish Cove is in Big Lagoon with its limit of 0.022 mg/L.

Significant Findings

Highlights of Calendar Year 2016 Monitoring

The estuaries of Gulf Islands National Seashore are part of a much larger ecosystem that is 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, and, 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. The state provides no guidance on samples that were below quantification levels in calculating the annual geometric means. There were fifteen possible violations of water-quality standards in the Florida district. The chlorophyll *a* standard was exceeded twice at Big Sabine and once at Naval Live Oaks, while nitrogen was above the limit at Naval Live Oaks and Spanish Cove once each. The phosphorus standard was exceeded three times at Big Sabine, five times at Naval Live Oaks and once at Spanish Cove.

Elevated Total Phosphorous

Phosphorous is an essential nutrient for plants and animals, but an excess can impact an estuary by triggering algal blooms. While most times phosphorous levels are below quantification limits (the smallest concentration that can be considered a valid result), about 30% of the time they are well above the estuary-specific standards (Figure 2). The source of phosphorous is not known at this time. We will continue monitoring water quality as well as seagrass meadows of Gulf Islands National Seashore.

Water Quality Standards

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

	SRS	BL	MS
Temperature	*	*	32.2°C
Dissolved Oxygen	**	**	>5 mg/L
pH	----	----	6–9 SU
Chlorophyll <i>a</i>	<3.4 mg/m ³	<6.4 mg/m ³	----
Total Nitrogen	<0.41 mg/L†	<0.61 mg/L†	----
Total Phosphorous	<0.022 mg/L†	<0.036 mg/L †	----

SRS—Santa Rosa Sound, BL—Big Lagoon, MS—Mississippi

*No ambient standard

**Based on averages of various sampling periods

---- No state standard

† Annual geometric mean

Future Monitoring

Monthly water quality sampling will continue throughout calendar year 2017.



Figure 3. Map of Gulf Islands National Seashore water quality monitoring sites.

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 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.

Effective long-term management and stewardship of natural resources in the Gulf Coast Network begins with baseline knowledge of these resources. To acquire this knowledge, an inventory program was established by the National Park Service with the goals of acquiring baseline information for a variety of resources, from bibliographic information to species occurrence and distribution.

For More Information

GULN Home Page:

<http://science.nature.nps.gov/im/units/guln/index.cfm>

GULN Reports & Publications:

<http://science.nature.nps.gov/im/units/guln/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://irma.nps.gov>