



## Water Quality Monitoring 2017–2018 Data Summary

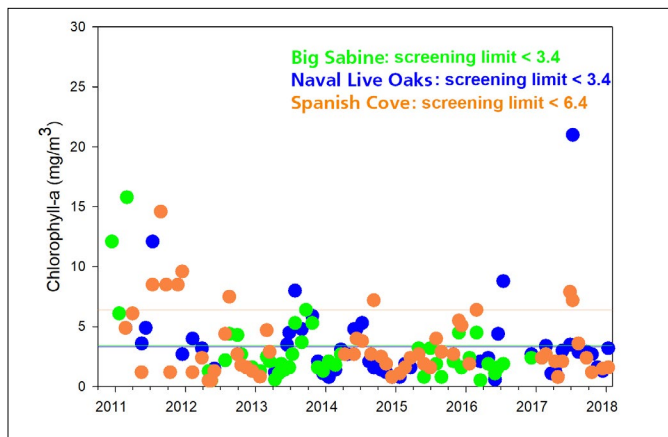
### Overview

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 monitors 54 sites across seven parks sampled on a set rotation.

The GULN Water-Quality Monitoring 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. For site locations, see map on page 2. 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 chlorophyll a and 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 2017 through December 31, 2018. 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:** Chlorophyll-a 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 3.4 mg/m<sup>3</sup>. Spanish Cove (orange) is in Big Lagoon with its limit of 6.4 mg/m<sup>3</sup>.

### Significant Findings

#### Highlights of Calendar Year 2017–2018 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 complex. While there are no nutrient-specific standards in Mississippi, there are location-specific nutrient standards for Florida estuaries. Total nitrogen and phosphorus limits are based on annual geometric means. The state provides no guidance on samples below quantification levels in calculating the annual geometric means. Given these caveats, there were eleven possible violations of water-quality standards in the Florida district. The phosphorous standard was exceeded twice at Big Sabine, and three times at Naval Live Oaks. No data from Mississippi are included in this data summary, although the 2017–2018 data from the USGS monitoring station in Mississippi are available online.

#### Chlorophyll a

Chlorophyll a is a proxy measure of phytoplankton (microscopic plants) in the water column. Increased nutrients into an estuary may result in an increase in phytoplankton, thus an increase in chlorophyll a. Water sampling over the past five years has shown Santa Rosa Sound (Big Sabine and Naval Live Oaks sampling sites) and Big Lagoon (Spanish Cove sampling site) are fairly low in nutrients with occasional elevated total orthophosphate. The graph above shows the generally low chlorophyll a levels at the three monitoring locations from 2017 to 2018, with the exceptions of one value at Naval Live Oaks and two at Spanish Cove that exceeded the screening limit for those areas. Note the different chlorophyll a standards for two estuaries, with a higher level allowed in Big Lagoon.



**Above:** Cooperators from the University of West Florida ready a datasonde for deployment at Naval Live Oaks, June 14, 2018. NPS photo / Joe Meiman.

## 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). Standards for both districts are shown below.

**Below:** Parameters and criteria [SRS—Santa Rosa Sound; BL—Big Lagoon; MS—Mississippi].

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

\* No ambient standard

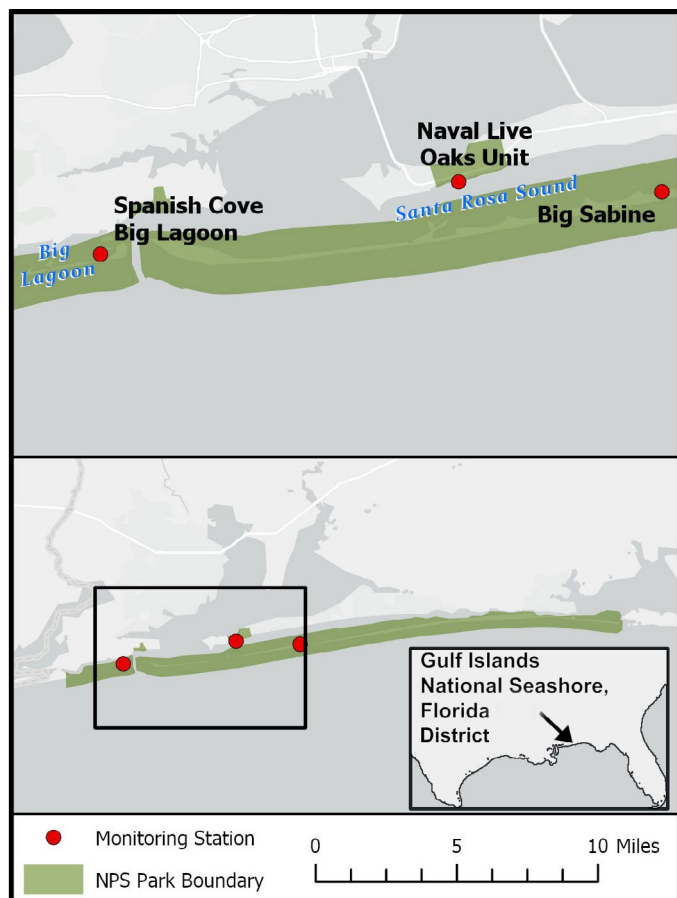
\*\* Based on averages of various sampling periods

\*\*\* No state standard

<sup>†</sup> Annual geometric mean

### Future Monitoring

Monthly water quality and autonomous sampling will continue throughout calendar year 2019.



**Above:** Map of Gulf Islands National Seashore water quality monitoring sites. The map's lower half shows the full extent of the Florida district of the park, and the inset box is expanded above to show the three monitoring sites. The black arrow at bottom right shows the location of the Florida district within the region.

## 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.

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 goal of acquiring baseline information for a variety of resources, from bibliographic information to species occurrence and distribution.

## For More Information

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>