



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 U.S. Geological Survey (USGS) National Water-Quality Assessment 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 set rotation.

The GULN Water Quality Program is 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 Padre Island National Seashore with continuous autonomous sampling in May 2008 and monthly grab sampling in October 2010. Two sites in the Upper Laguna Madre—South Bird Island and Baffin Bay—are located on Texas Coastal Oceanic Observation Network structures and are operated through a task agreement with the Conrad Blucher Institute at Texas A&M University-Corpus Christi. 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 on our website: <https://science.nature.nps.gov/im/units/guln/>. Continuous real-time water quality data are available at: <http://lighthouse.tamucc.edu/qc/170> and <http://lighthouse.tamucc.edu/qc/171>.

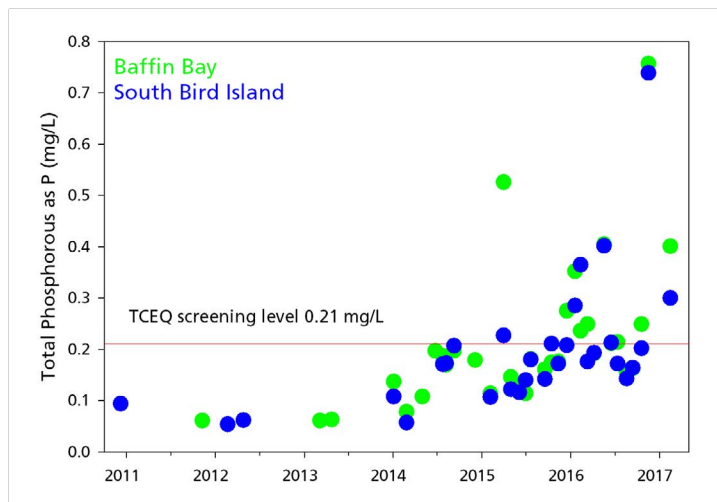


Figure 2. Total phosphorous at two water-quality monitoring sites in the Upper Laguna Madre of Padre Island National Seashore, November 2010 through April 2017.

Significant Findings

Highlights of Calendar Year 2016 Monitoring

The Upper Laguna Madre, while not devoid of human activity, is seemingly removed from direct human influence aside from a maintained channel (Gulf Intracoastal Waterway) and a scattering of fishing camps. While this location may be thought of as relatively pristine, our data show that water-quality parameters typically exceed state water quality standards. For example, chlorophyll *a* regularly exceeds state screening limits at the South Bird Island and Baffin Bay stations. Monitoring in 2016 was no exception. Of the 23 chlorophyll *a* samples analyzed, seven were above state screening levels including five at Baffin Bay and two at South Bird Island. Total phosphorous levels were also higher in 2016. South Bird Island exceeded the Texas screening limit of 0.21 mg/L eight times, and Baffin Bay five times. The screening limit of ammonia was exceeded twice at Baffin Bay and once at South Bird Island. One sample was over the screening limit for nitrate at Baffin Bay.

Total Phosphorous

Phosphorous is an essential nutrient for plants and animals, but an excess can impact an estuary by triggering algal blooms. Since 2014 total phosphorous has increased at both monitoring sites (Figure 2). The source of phosphorous is not known at this time. This long-term monitoring program, combined with the implementation of GULN seagrass monitoring, will give park managers and researchers data needed to assess the condition of the Upper Laguna Madre estuary.

Figure 1. (Left) *Syringodium filiforme* (manatee grass) near the Baffin Bay station. Seagrass and water-quality data can help managers better understand and protect estuaries. Image by Joe Meiman.

Water Quality Standards

The state of Texas designates the Laguna Madre as “Exceptional/Oyster” waters. Although oysters are no longer found in the Upper Laguna Madre, the state gives this estuary the highest possible criteria. Designated uses are used to set water quality standards (below). Details and rationale can be found at Texas Administrative Code Chapter 307: Texas Surface Water Quality Standards §§ 307.1–307.10.

Parameter	Criteria
Ammonia as N*	< 0.10 mg/L
Nitrate as N*	< 0.17 mg/L
Total Phosphorous*	< 0.21 mg/L
Chlorophyll a*	< 11 mg/m ³
Dissolved Oxygen	> 5 mg/L
pH	Between 6.5 and 9.0 SU
Water temperature	< 35 °C

*Texas screening level

Future Monitoring

Monthly water quality sampling will continue throughout calendar year 2017.



Figure 3. Map of Padre Island 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:

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

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>