



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 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.

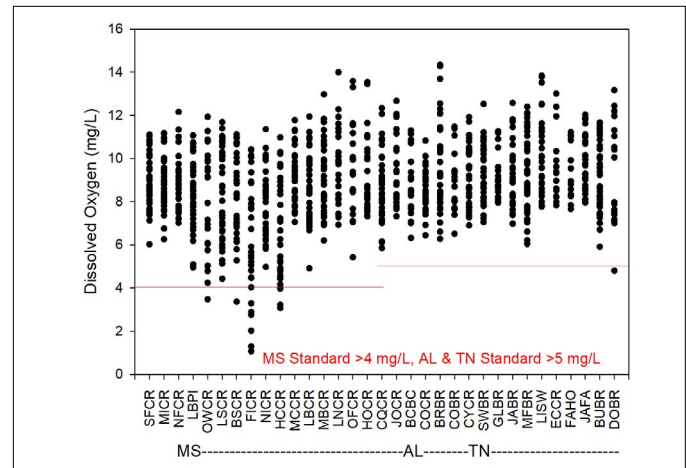
Spanning 710 kilometers (441 miles), the Natchez Trace Parkway (NATR) traverses scores of streams. Some provide the traveler with a quiet recreational moment while others remain unnamed and unvisited by the motorist. Streams of the parkway are transient—commonly bisecting the park for only a few hundred meters—flowing across one boundary and out the other. Some are nearly pristine as they cascade over the bedrock streambeds of Tennessee, while others fail to meet state designated use standards.

The network began long-term monitoring of water quality at Natchez Trace Parkway in March 2010 with quarterly sampling of 27 core sites. Six additional sites were included in this quarterly sampling on a rotation of every other year. For locations of sampling sites, see map on page 2. Field measures include water temperature, specific conductance (SpC), pH, dissolved oxygen (DO), and turbidity. Samples are collected for *Escherichia coli* (*E. coli*) and nitrate.

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: English Camp Creek is one of six rotational water quality stations and is sampled quarterly every other year. Photo by Beth Meiman.



Above: Dissolved oxygen along the Natchez Trace Parkway. Note samples below the Mississippi standard of 4 mg/L.

Significant Findings

Highlights of Calendar Year 2017–2018 Monitoring

There were 51 violations of state water quality standards in 2017 and 2018. Thirty-six were exceedances of *E. coli*, all associated with high flows due to surface runoff, except for McCurtain Creek (milepost 86 in Mississippi) which was above the standard of 298 MPN/100 mL during low flow as well as high. High flow events also produced high turbidities. Ten samples exceeded the 50 NTU above background standard. Low dissolved oxygen was found once at Five Mile Creek (milepost 65) where low flow and warm summer conditions naturally compromise dissolved oxygen. The lower pH limit was crossed, once at Big Sand Creek and once at Five Mile Creek. Low pH occurs in these streams and is a natural condition. The water temperature limit was exceeded once at South Fork of Coles Creek.

Dissolved Oxygen Along the Parkway

Water temperature and dissolved oxygen concentrations are inversely proportional. In the summer streams are warmer and less aerated as flows diminish. Traversing the parkway south to north a pattern emerges. Low dissolved oxygen is common to small streams in southern Mississippi. In this section, Owens, Big Sand, and Five Mile and Hurricane Creeks are reduced to a trickle during the summer. Low dissolved oxygen, sometimes below the state standard of 4 mg/L is common. In central and northern Mississippi the monitored streams along the parkway are larger, and the high-gradient streams of Alabama and Tennessee are well aerated so low dissolved oxygen is uncommon. Only once was dissolved oxygen below the Tennessee and Alabama standard of 5 mg/L, at Dobbins Branch (4.8 mg/L).

Water Quality Standards

Each stream is assigned a designated use by the state that reflects how the water is used; contact recreation or fish and wildlife for example. These designated uses are the basis of water-quality standards below. Note, not all states have developed standards for all parameters.

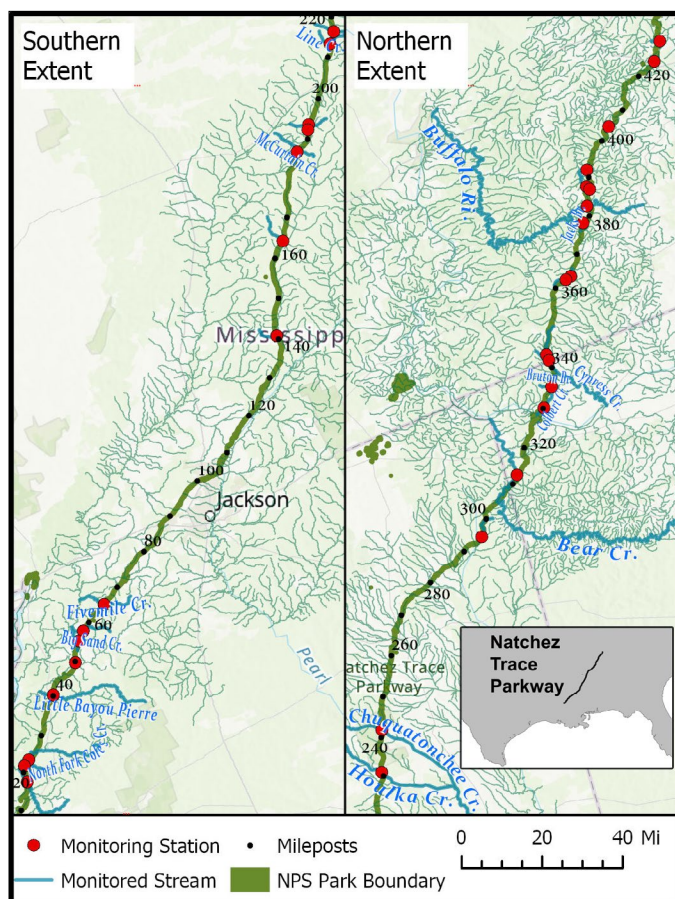
Below: Parameters and criteria [AL—Alabama; MS—Mississippi. TN—Tennessee].

Parameter	AL	MS	TN
Water Temperature (°C)	< 32.0	< 32.2	< 30.5
Dissolved Oxygen (mg/L)	> 5.0	> 5.0	> 5.0
pH (SU; range)	6.0–8.5	6.0–9.0	6.0–9.0
SpC (µS/cm)	NA	< 1000	NA
ANC (mg/L CaCO ₃)	NA	NA	NA
<i>E. coli</i> (MPN/100 mL)	< 298*	< 298*	< 487
Nitrate (mg/L as N)	NA	NA	NA
Turbidity	< 50	< 50	NA

* USEPA full contact recreation, single sample (no state standard)

Future Monitoring

Quarterly water quality sampling will continue throughout 2019.



Above: Map of water quality monitoring sites at Natchez Trace Parkway. On the regional inset map, the solid black line shows the full length of the parkway.

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>