



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 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. Field measures include

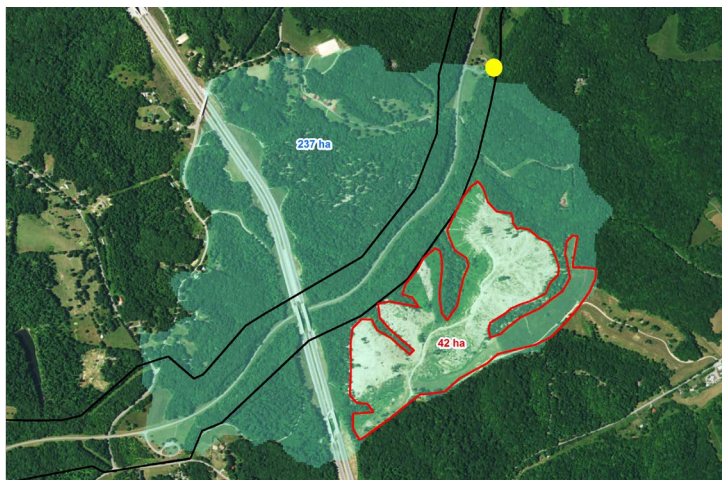


Figure 1. A 2016 aerial image of the 237 ha (586 acres) watershed (shaded area) above the Burns Branch monitoring station (yellow dot). The area outlined in red is the 42 hectares (104 acres) clear cut on adjoining private property. The parkway boundary is depicted with black lines. This image displays approximately 9 square kilometers (3.5 square miles).



Figure 2. Burns Branch on December 28, 2016. Turbidity was 445 NTU, about 200 times above normal background levels. The source of the fine sediment causing the turbid water is runoff from the 42 hectares (104 acres) that were clear. Image by Beth Meiman.

water temperature, specific conductance (SpC), pH, dissolved oxygen (DO), acid-neutralizing capacity (ANC), and turbidity. Samples are collected for *Escherichia coli* (*E. coli*) and nitrate.

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>

Significant Findings

Highlights of Calendar Year 2016 Monitoring

There were 24 violations of state water quality standards in 2016. Sixteen were exceedances of *E. coli*, all associated with high flows caused by surface runoff, with the exception of McCurtain Creek (MM186 in Mississippi) which was above the standard of 298 MPN (most probable number)/100 mL during low flow as well as high. These high flow events also produced high turbidities. Six samples exceeded the 50 NTU above background standard. Isolated low dissolved oxygen at two locations, Five Mile Creek (MM 65) and Hurricane Cree (MM 165) were also reported.

Sedimentation Event at Burns Branch

A logging operation began on private lands adjacent to the Parkway within the Burns Branch watershed in 2011. By 2014, most of the trees had been removed and by 2016, the steep slopes of the 42 hectares (104 acres) cut were cleared of all woody vegetation (Figure 1). Rainfalls during this time brought large amounts of sediment, from silt to cobble, into Burns Branch (Figure 2), covering the bedrock that was formerly found in the stream.

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 wild life for example. These designated uses are the basis of water quality standards below. Note, not all states have developed standards for all parameters.

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) between:	6.0–8.5	6.0–9.0	6.0–9.0
SpC (µS/cm)	--	< 1000	--
ANC (mg/L CaCO ₃)	--	--	--
E. coli (MPN/100 mL)	< 298*	< 298*	< 487
Nitrate (mg/L as N)	--	--	--
Turbidity (NTU)	> 50	> 50	--

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

Future Monitoring

Quarterly water quality sampling will continue throughout calendar year 2017.

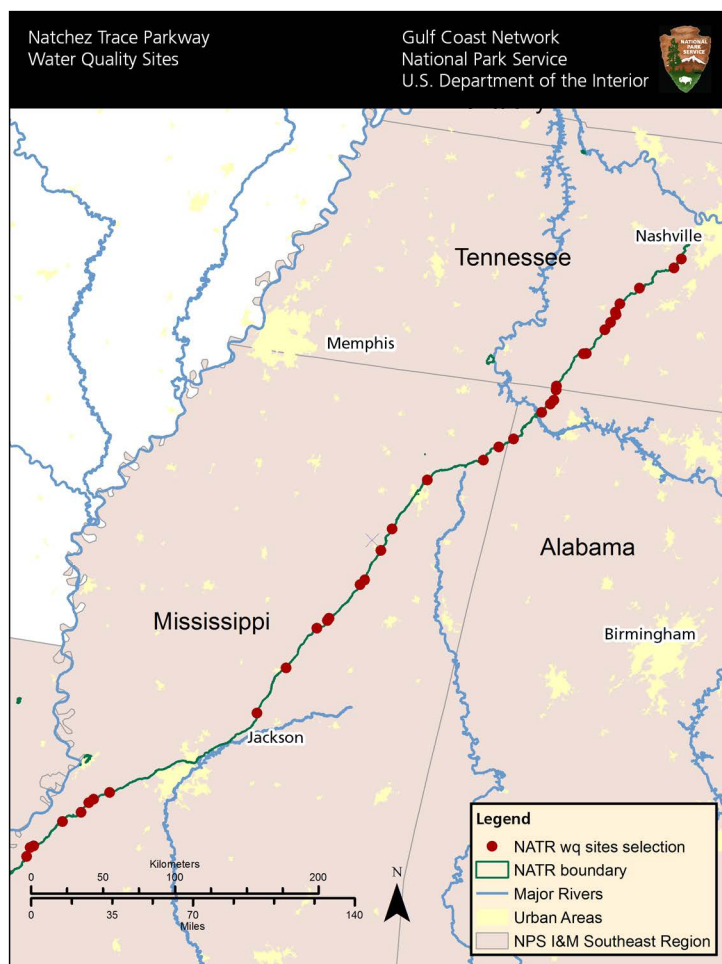


Figure 3. Water-quality monitoring sites at Natchez Trace Parkway in FY 2015.

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>