



Water Quality Monitoring 2020 Data Summary

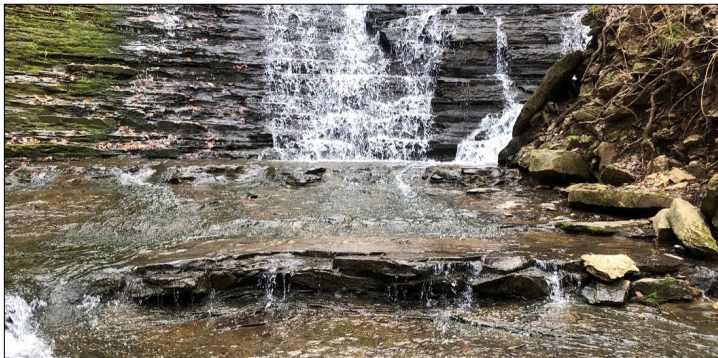
Overview

The Gulf Coast Network (GULN) Water Quality Monitoring Program began in September 2007. The program monitors 54 sites across seven parks. The GULN Water Quality Monitoring Program was designed to provide an integrated assessment of the spatial and temporal distribution of general water quality conditions of stream and estuary water in relation to hydrologic conditions and major sources.

Spanning 710 kilometers (441 miles), the Natchez Trace Parkway (NATR) is crossed by a multitude of streams. Some provide travelers with a quiet recreational moment while others remain unnamed and unvisited by many visitors. Streams of the parkway are transient and commonly bisect the park for only a few hundred meters. Some streams that cross into the park boundaries are nearly pristine, while others fail to meet state designated use standards.

The network began long-term monitoring of water quality at the parkway in March 2010 with quarterly sampling of 27 core sites. Six additional sites were included in this quarterly sampling on a rotation where three of the six additional sites rotated on an every other year basis. Physical measurements taken at each site include water temperature, specific conductance (SpC), pH, dissolved oxygen (DO), and turbidity. In addition to the physical parameters collected, water samples are collected for *Escherichia coli* (*E. coli*) and nitrate measurements.

This brief summarizes data collected from January 1, 2020, through December 31, 2020. Calendar year 2020 was limited in sampling frequency and opportunities due to the COVID pandemic outbreak. GULN staff sampled as frequently as possible while taking into consideration public health decisions, but the total number of samples collected in this particular year for many monitoring programs are reduced compared to other years. Our sampling schedule at the parkway was severely impacted by the pandemic. As a result of the COVID pandemic we were only able to perform a single sampling event (January) in 2020. 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](https://www.nps.gov/im/guln/monitoring-reports.htm) (<https://www.nps.gov/im/guln/monitoring-reports.htm>).



Above: Jackson Falls on the northern stretch of the Natchez Trace Parkway in Tennessee. Photo taken by GULN staff.

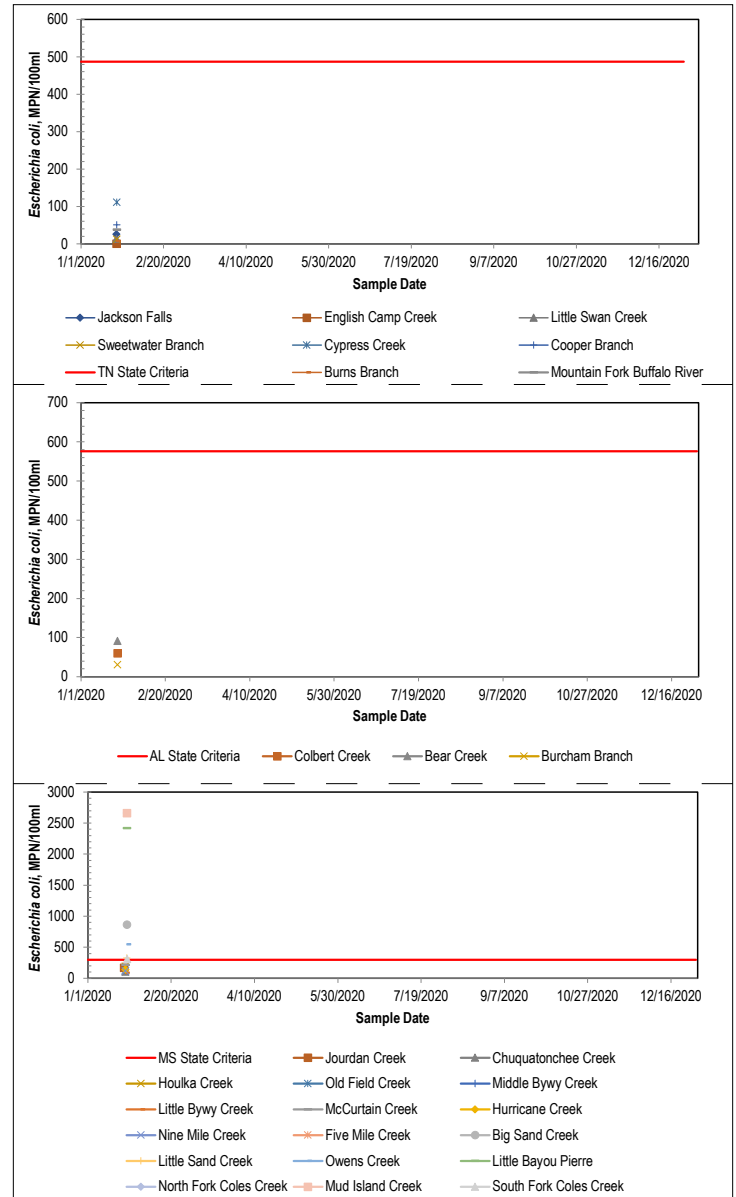


Figure 1. *E. coli* measurements separated by state due to differences in *E. coli* concern thresholds. Violations occurred at only the Mississippi sites for our singular sampling event of 2020.

Significant Findings

Highlights of Calendar Year 2020 Monitoring

Multiple violations of state specific *E. coli* standards occurred in only Mississippi (Figure 1) while historically all three states the Natchez Trace Parkway crosses have had issues. Coinciding with the *E. coli* violations there were multiple violations of turbidity that also occurred in the Mississippi sites. While the violations seen in 2020 were in Mississippi

Significant Findings (Continued)

there may have been violations within the other state sites during the latter part of the year, but with only a single sampling event were not detected.

E. coli and Turbidity

E. coli and turbidity increases are generally associated with increased precipitation events resulting in runoff from nearby terrestrial sources. Agricultural practices, and soil types near freshwater systems along the parkway do play a role in influencing inputs during precipitation events. Large increases in E. coli are found during precipitation events primarily from runoff of animal waste from either livestock or natural populations. Precipitation also results in increased overland flow and loss of exposed soils from agricultural fields and drives erosional processes of loess soils common in the central and southern reaches of the parkway, which all contribute to increases in turbidity during rain events.

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.

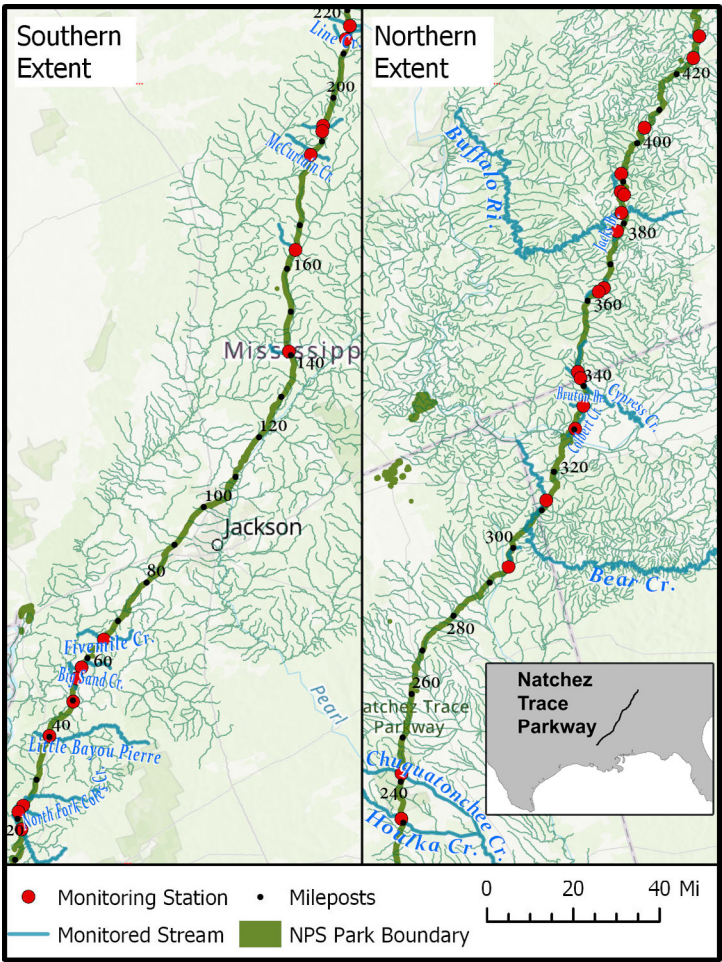
Below: Parameters and criteria.

Parameter	Alabama	Mississippi	Tennessee
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	NA	< 1000
E. coli (MPN/100 mL)	< 298*	< 298*	< 487
Turbidity	> 50	> 50	NA

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

Future Monitoring

Quarterly water quality sampling will continue through 2021.



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.

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>