Final

Total Maximum Daily Load (TMDL) for Sougahatchee Creek

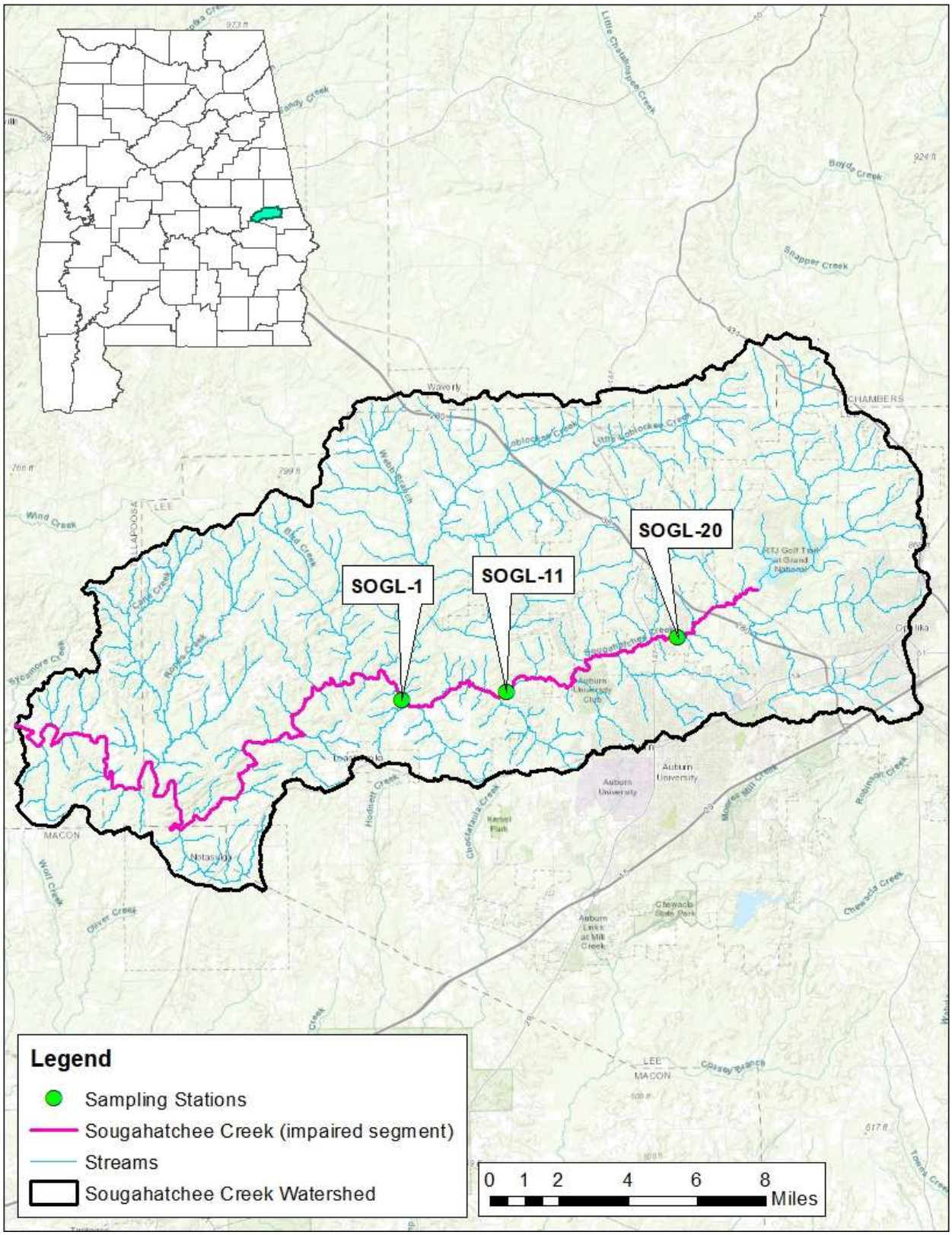
Assessment Unit ID # AL03150110-0104-104

Lee, Macon, and Tallapoosa Counties

Pathogens (*E. coli*)

Alabama Department of Environmental Management
Water Quality Branch
Water Division
June 2025

Figure 1-1 Map of the Sougahatchee Creek Watershed



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1.0 Executive Summary

Section 303(d) of the Clean Water Act and the Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR Part 130) require states to identify waterbodies which are not meeting their designated uses and to determine the total maximum daily load (TMDL) for pollutants causing the use impairment. A TMDL is the sum of individual waste load allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources including natural background levels, and a margin of safety (MOS).

Sougahatchee Creek, part of the Tallapoosa River basin, is currently included on Alabama's §303(d) list for pathogens (*E. coli*) from Sougahatchee Lake Dam to Sycamore Creek. Sougahatchee Creek's headwaters begin northwest of Opelika, Alabama, and it flows southwest to the Tallapoosa River. The total impaired length of Sougahatchee Creek is 33.42 miles, and the total drainage area of the Sougahatchee Creek impaired watershed is 174.98 square miles. Sougahatchee Creek has a use classification of Fish and Wildlife (F&W).

Sougahatchee Creek was first included on the §303(d) list for pathogens in 2018 based on ADEM monitoring data collected in 2011-2016 at station SOGL-1 and in 2012 at station SOGL-11. Sougahatchee Creek has subsequently been listed for pathogens on the 2020, 2022, and 2024 §303(d) lists of impaired waterbodies.

In 2018-2021 and 2023, sampling studies were performed by ADEM to further assess the water quality of the impaired stream. For the purposes of this TMDL, the 2018-2023 data will be used to assess the water quality of Sougahatchee Creek because it provides the best picture of the current water quality of the stream. The 2024 edition of *Alabama's Water Quality Assessment and Listing Methodology*, prepared by ADEM, provides the rationale for the Department to use the most recent data to prepare a TMDL for an impaired waterbody. This TMDL will be developed from *E. coli* data collected at station SOGL-1. This bacterial data is listed in Table 3-5 and in Appendix 7.2, Table 7-3 for reference. ADEM collected 27 *E. coli* samples and conducted two geometric mean studies on Sougahatchee Creek during 2018-2023. According to the data, Sougahatchee Creek was not meeting the pathogen criteria applicable to its use classification of F&W. Therefore, this TMDL has been developed for pathogens (*E. coli*) for the listed reach.

A mass balance approach was used for calculating the pathogen TMDL for Sougahatchee Creek. The mass balance approach utilizes the conservation of mass principle. The TMDL was calculated using the single sample or geometric mean sample exceedance event which resulted in the highest percent reduction. Existing loads were calculated by multiplying the *E. coli* concentrations times the respective instream flows times a conversion factor. In the same manner as existing loads were calculated, allowable loads were calculated for the single sample *E. coli* target of 268.2 colonies/100 ml (298 colonies/100 ml – 10% Margin of Safety) and the geometric mean *E. coli* target of 113.4 colonies/100 ml (126 colonies/100 ml – 10% Margin of Safety). In this case, it was determined that the highest percent reduction was calculated from a single sample maximum *E. coli* exceedance at station SOGL-1 (June 14, 2023) with a value of 24,196 colonies/100 ml. This violation calls for a reduction of 99%.

Table 1-1 is a summary of the estimated existing load, allowable load, and percent reduction for the single sample and geometric mean criteria. Table 1-2 provides the details of the TMDL along with the corresponding reductions for Sougahatchee Creek, which are protective of the *E. coli* water quality criteria year-round.

Table 1-1 *E. coli* Loads and Required Reductions for Sougahatchee Creek

Source	Existing Load (col/day)	Allowable Load (col/day)	Required Reduction (col/day)	% Reduction
Single Sample Load	5.67E+14	6.28E+12	5.60E+14	99%
Geometric Mean Load	1.19E+13	7.93E+11	1.11E+13	93%
Auburn Northside WPCF (AL0050245)*	0	2.49E+10	0	0%
Opelika Westside WWTP (AL0050130)	1.24E+10	6.67E+10	0	0%

*Auburn Northside WPCF ceased discharge to Sougahatchee Creek on January 30, 2013, but still maintains an active NPDES permit.

Table 1-2 *E. coli* TMDL for Sougahatchee Creek

TMDL[a]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[e]			Load Allocation (LA)	
		WWTPs[b]	Stormwater (MS4s and other NPDES sources)[c]	Leaking Collection Systems[d]		
(col/day)	(col/day)	(col/day)	(% reduction)	(col/day)	(col/day)	(% reduction)
6.98E+12	6.98E+11	9.15E+10	99%	0	6.19E+12	99%

a. TMDL was established using the single sample criterion of 298 colonies/100ml.
b. Current and future WWTPs must meet the applicable instream water quality criteria for pathogens at the point of discharge.
c. Current and future MS4s will be required to document within the entity's stormwater management program plan (SWMPP) the method(s) that with be utilized to demonstrate consistency with the assumptions and requirements of this TMDL. Other NPDES stormwater sources will be required to demonstrate consistency with the assumptions and requirements of this TMDL through implementation and maintenance of BMPs on a case-by case basis. The 99% reduction for MS4s and other NPDES sources should not be interpreted strictly as a numeric permit limit, but as an effort to implement BMPs to demonstrate reductions of the impairment to the maximum extent practicable.
d. The objective for leaking collection systems is a wasteload allocation (WLA) of zero. It is recognized, however, that a WLA of 0 colonies/day may not be practical. For these sources, the WLA is interpreted to mean a reduction in *E. coli* loading to the maximum extent practicable, consistent with the requirement that these sources not contribute to a violation of the water quality criteria for *E. coli*.
e. There are no CAFOs in the Sougahatchee Creek watershed. Future CAFOs will be assigned a WLA of zero.

Compliance with the terms and conditions of existing and future National Pollutant Discharge Elimination System (NPDES) permits will effectively implement the WLA and demonstrate consistency with the assumptions and requirements of the TMDL. Required load reductions in the LA portion of this TMDL can be implemented through voluntary measures and may be eligible for CWA §319 grants.

The Department recognizes that adaptive implementation of this TMDL will be needed to achieve applicable water quality criteria and we are committed to targeting the load reductions to improve water quality in the Sougahatchee Creek watershed. As additional data and/or information becomes available, it may become necessary to revise and/or modify the TMDL accordingly.

2.0 Basis for §303(d) Listing

2.1 Introduction

Section 303(d) of the Clean Water Act and EPA's Water Quality Planning and Management Regulations (40 CFR Part 130) require states to identify waterbodies which are not meeting their designated uses and to determine the TMDL for pollutants causing use impairment. The TMDL process establishes the allowable loading of pollutants for a waterbody based on the relationship between pollution sources and instream water quality conditions, so that states can establish water-quality based controls to reduce pollution and restore and maintain the quality of their water resources (USEPA, 1991).

The State of Alabama has identified 33.42 miles of Sougahatchee Creek as impaired for pathogens. The §303(d) listing for pathogens was originally reported on Alabama's 2018 List of Impaired Waters based on ADEM monitoring data collected in 2011-2016 and was subsequently included on the 2020, 2022, and 2024 lists.

2.2 Problem Definition

Waterbody Impaired:	Sougahatchee Creek – from Sycamore Creek to Sougahatchee Lake dam
Impaired Reach Length:	33.42 miles
Impaired Drainage Area:	174.98 square miles
Water Quality Standard Violation:	Pathogens (Single Sample, Geometric Mean)
Pollutant of Concern:	Pathogens (*E. coli*)
Water Use Classification:	Fish and Wildlife

Usage Related to Classification:

The impaired stream segment is classified as Fish and Wildlife (F&W). Usage of waters in the F&W classification is described in ADEM Admin. Code r. 335-6-10-.09(5)(a), (b), (c) and (d).

(a) Best usage of waters: fishing, propagation of fish, aquatic life, and wildlife.

(b) Conditions related to best usage: the waters will be suitable for fish, aquatic life and wildlife propagation. The quality of salt and estuarine waters to which this classification is assigned will also be suitable for the propagation of shrimp and crabs.

(c) Other usage of waters: it is recognized that the waters may be used for incidental water contact year-round and whole body water-contact recreation during the months of May through October, except that water contact is strongly discouraged in the vicinity of discharges or other conditions beyond the control of the Department or the Alabama Department of Public Health.

(d) Conditions related to other usage: the waters, under proper sanitary supervision by the controlling health authorities, will meet accepted standards of water quality for outdoor swimming areas and will be considered satisfactory for swimming and other whole body water-contact sports.

E. coli Criteria:

Criteria for acceptable bacteria levels for the Fish and Wildlife use classification are described in ADEM Admin. Code R. 335-6-10-.09(5)(e)7(i) and (ii) as follows:

7. Bacteria:

(i) In non-coastal waters, bacteria of the E. coli group shall not exceed a geometric mean of 548 colonies/100 ml; nor exceed a maximum of 2,507 colonies/100 ml in any sample. In coastal waters, bacteria of the enterococci group shall not exceed a maximum of 275 colonies/100 ml in any sample. The geometric mean shall be calculated from no less than five samples collected at a given station over a 30-day period at intervals not less than 24 hours.

(ii) For incidental water contact and whole body water-contact recreation during the months of May through October, the bacterial quality of water is acceptable when a sanitary survey by the controlling health authorities reveals no source of dangerous pollution and when the geometric mean E. coli organism density does not exceed 126 colonies/100 ml nor exceed a maximum of 298 colonies/100 ml in any sample in non-coastal waters. In coastal waters, bacteria of the enterococci group shall not exceed a geometric mean of 35 colonies/100 ml nor exceed a maximum of 158 colonies/100 ml in any sample. The geometric mean shall be calculated from no less than five samples collected at a given station over a 30-day period at intervals not less than 24 hours. When the geometric bacterial coliform organism density exceeds these levels, the bacterial water quality shall be considered acceptable only if a second detailed sanitary survey and evaluation discloses no significant public health risk in the use of the waters. Waters in the immediate vicinity of discharges of sewage or other wastes likely to contain bacteria harmful to humans, regardless of the degree of treatment afforded these wastes, are not acceptable for swimming or other whole body water-contact sports.

Criteria Exceeded:

Sougahatchee Creek was first included on the §303(d) list for pathogens in 2018 based on ADEM's *E. coli* data collected in 2011-2016 at station SOGL-1 and in 2012 at station SOGL-11. Of the eighteen *E. coli* samples collected at station SOGL-1 in 2011-2016, nine violated the applicable single sample maximum criterion of 298 colonies/100 ml. Of the eight *E. coli* samples collected at station SOGL-11 in 2012, three violated the applicable single sample maximum criterion of 298 colonies/100 ml. The listing data can be found in Appendix 7.2, Table 7-1.

3.0 Technical Basis for TMDL Development

3.1 Water Quality Target Identification

For the purpose of this TMDL, a single sample *E. coli* target of 268.2 colonies/100 ml will be used. This target was derived by using a 10% explicit margin of safety from the single sample maximum criterion of 298 colonies/100 ml. This target is considered protective of water quality standards and should not allow the single sample maximum criterion to be exceeded. In addition, a geometric mean target of 113.4 colonies/100 ml will be used for a series of at least five samples taken no less than 24 hours apart over the course of 30 days. This geometric mean target was also derived by using a 10% explicit margin of safety from the geometric mean criterion of 126 colonies/100 ml. This target is considered protective of water quality standards and should not allow the geometric mean criterion to be exceeded.

3.2 Source Assessment

3.2.1 Point Sources in the Sougahatchee Creek Watershed

A point source can be defined as a discernable, confined, and discrete conveyance from which pollutants are or may be discharged to surface waters. Point source contributions can typically be attributed to municipal wastewater facilities, illicit discharges, and leaking sewer systems in urban areas. Municipal wastewater treatment facilities are permitted through the National Pollutant Discharge Elimination System (NPDES) process administered by ADEM. In urban settings, sewer lines typically run parallel to streams in the floodplain. If a leaking sewer line is present, high concentrations of bacteria can flow into the stream or leach into the groundwater. Illicit discharges are found at facilities that are discharging bacteria when not permitted, or when the pathogens criterion established in the issued NPDES permit is not being upheld.

Continuous Point Sources

There are two continuous NPDES-permitted facilities in the watershed of the impaired segment of Sougahatchee Creek. These facilities are shown in Table 3-1 and Figure 3-1. These facilities have daily maximum and monthly average *E. coli* limits. The permit limits are the applicable pathogen criteria for the Fish and Wildlife use classification and are as follows:

Monthly average (May-October): 126 colonies/100ml
Monthly average (November-April): 548 colonies/100ml
Daily maximum (May-October): 298 colonies/100ml
Daily maximum (November-April): 2507 colonies/100ml

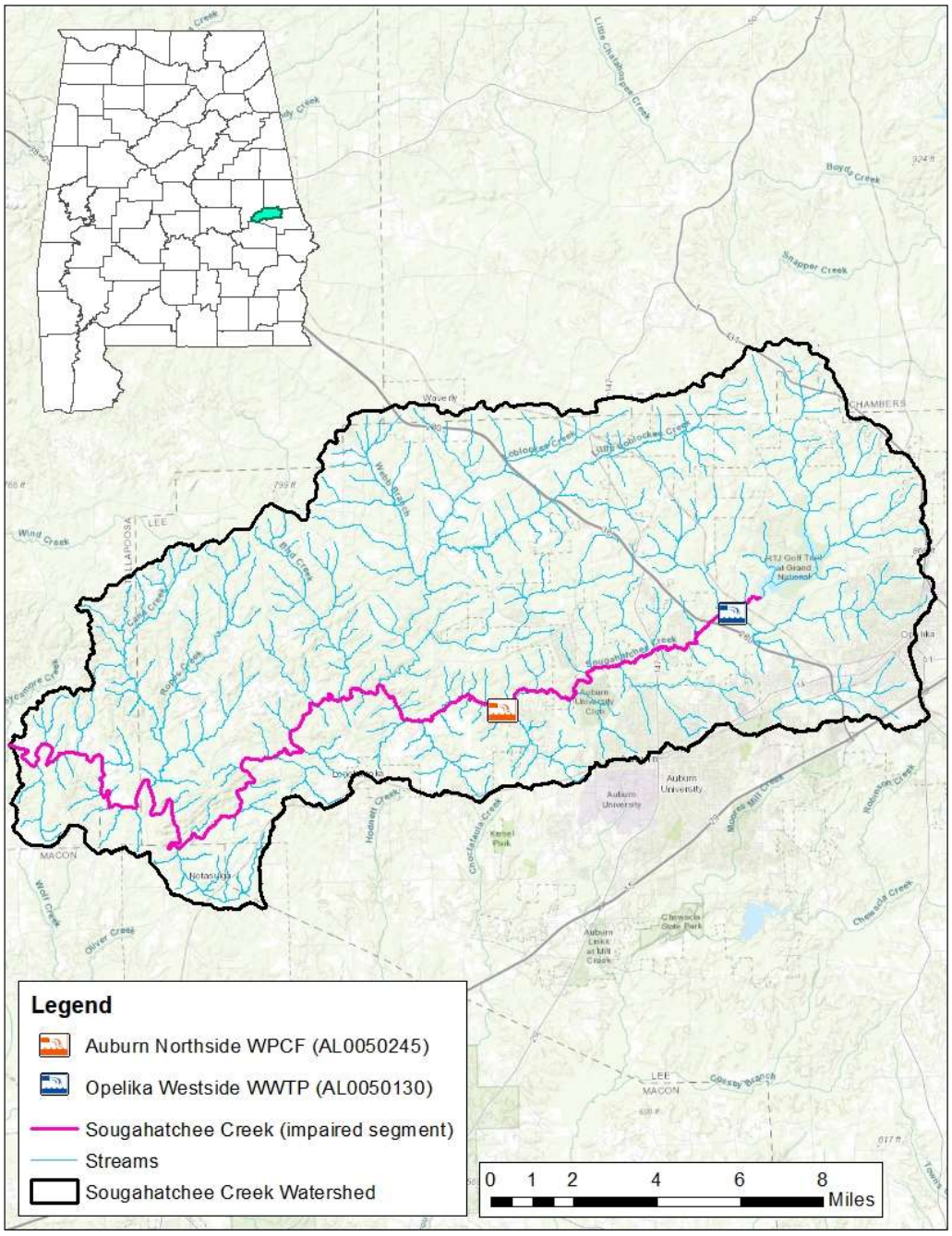
Table 3-1 Continuous Point Sources in the Sougahatchee Creek Watershed

Type	Permit Number	Facility Name	Receiving Stream	Flow (MGD)
Municipal	AL0050245	Auburn Northside WPCF	Sougahatchee Creek	2.2
Municipal	AL0050130	Opelika Westside WWTP	Sougahatchee Creek	5.9

Auburn Northside WPCF (AL0050245) ceased discharge to Sougahatchee Creek on January 30, 2013 but still maintains an active NPDES permit and will receive an allocation in this TMDL. This facility is currently used as a lift station, conveying wastewater to H.C. Morgan WPCF (AL0050237) for treatment.

Any future NPDES-regulated, continuous discharges that are considered by the Department to be a pathogen source will be required to meet the instream water quality criteria for pathogens at the point of discharge.

Figure 3-1 Map of Continuous Point Sources in the Sougahatchee Creek Watershed



Non-Continuous Point Sources

Opelika Westside WWTP is permitted through the NPDES program to discharge stormwater runoff in the Sougahatchee Creek watershed. The facility will be required to comply with the provisions of this TMDL through implementation of Best Management Practices (BMPs) for the permitted stormwater outfalls.

There are currently ten other facilities with NPDES permits for non-continuous/stormwater discharges within the Sougahatchee Creek watershed. Appendix 7.5, Table 7-8 provides a list of these facilities and the type of activity that occurs at each facility (e.g., landfill, salvage and recycling, etc.). These facilities are not required to monitor for *E. coli* and are not considered to be a source of pathogens due to the nature of their processes; therefore, no *E. coli* loading to the watershed will be attributed to these facilities, and they will not receive an allocation in this TMDL.

Urban areas designated as part of the Municipal Separate Storm Sewer System (MS4) program are regulated by NPDES, and as such, are considered to be point sources by EPA and receive waste load allocations (WLAs) in TMDLs. The EPA defines an MS4 as *"a of conveyance or system conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):*

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law);
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a combined sewer; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2."

During rain events in an urbanized watershed, stormwater runoff has the potential to collect pollutants which are transported through MS4 systems before discharging into state waters. Therefore, in 1990 the EPA developed the NPDES stormwater program, which promulgated rules, in two different phases, in order to address the potential negative water quality effects associated with stormwater runoff. In 1990, the EPA issued Phase I regulations under the NPDES stormwater program, which required both medium and large cities and also counties with populations of 100,000 or more to obtain NPDES permit coverage specifically for their stormwater discharges. In 1999, the second phase of the NPDES stormwater program amended existing regulations in addition to requiring NPDES permits for stormwater discharges from certain small MS4 systems.

There are two MS4 permits within the watershed of the impaired segment of Sougahatchee Creek. These permits are listed below in Table 3-2. (Lee County has indicated that it does not own, operate, or maintain an MS4 in the Sougahatchee Creek watershed.) Contributions from these Phase II MS4 areas drain to the pathogen-impaired segment of Sougahatchee Creek and will be allocated as MS4 WLAs in the TMDL. Current and future MS4s will be required to demonstrate consistency with the assumptions and requirements of this TMDL through implementation of BMPs on a case-by-case basis.

Table 3-2 MS4 Permits in the Sougahatchee Creek Watershed

Permit Number	Name	Phase
ALR040003	City of Auburn	II
ALR040018	City of Opelika	II

There are currently no Animal Feeding Operation/Concentrated Animal Feeding Operation (AFO/CAFO) facilities located within the Sougahatchee Creek watershed. The ADEM AFO/CAFO rules prohibit discharges of pollutants from the facilities and their associated waste land application activities. As a result, future AFOs/CAFOs will receive a waste load allocation of zero.

There are currently no registered sites in the Sougahatchee Creek watershed where land application of by-products for beneficial use is present. Beneficial use sites are regulated by ADEM's Land Division and are required to implement appropriate BMPs and agronomic application rates to protect the environment.

Sanitary sewer overflows (SSOs) have the potential to severely impact water quality and can often result in the violation of water quality standards. It is the responsibility of the NPDES wastewater discharger or collection system operator for non-permitted "collection only" systems to ensure that releases do not occur. Unfortunately, releases to surface waters from SSOs are not always preventable or reported. From review of ADEM files, it was found that numerous SSOs have been reported in the Sougahatchee Creek watershed in recent years. Since 2018, 33 SSOs within the watershed have been reported from Auburn Northside WPCF (AL0050245) and Opelika Westside WWTP (AL0050130). The numerous SSOs are considered a source of pathogens to Sougahatchee Creek and are listed in Appendix 7.6, Table 7-9 along with a map of the SSO locations in Appendix 7.6, Figure 7-1.

3.2.2 Nonpoint Sources in the Sougahatchee Creek Watershed

Nonpoint sources of *E. coli* bacteria do not have a defined discharge point, but rather occur over the entire length of a stream or waterbody. On the land surface, *E. coli* bacteria can accumulate over time in the soil and then are washed off during rain events. As the runoff transports the sediment over the land surface, more *E. coli* bacteria are collected and carried to the stream or waterbody. Therefore, there is some net loading of *E. coli* bacteria into the stream as dictated by the watershed hydrology.

Agricultural land can be a source of *E. coli* bacteria. Runoff from pastures, animal feeding areas, improper land application of animal wastes, and animals with direct access to streams are all mechanisms that can contribute *E. coli* bacteria to waterbodies. To account for the potential influence from animals with direct access to stream reaches in the watershed, *E. coli* loads can be calculated as a direct source into the stream.

E. coli bacteria can also originate from forested areas due to the presence of wild animals such as deer, raccoons, turkey, waterfowl, etc. Wildlife deposit feces onto land surfaces where it can be transported during rainfall events to nearby streams. Control of these sources is usually limited to land management BMPs and may be impracticable in most cases. As a result, forested areas are not specifically targeted in this TMDL.

E. coli loading from urban areas is potentially attributable to multiple sources including stormwater runoff, unpermitted discharges of wastewater, runoff from improper disposal of waste materials, failing septic tanks, and domestic animals. Septic systems may be direct or indirect sources of

bacterial pollution via ground and surface waters. Onsite septic systems have the potential to deliver *E. coli* bacteria to surface waters due to system failure and malfunction.

3.3 Land Use Assessment

Land use for the Sougahatchee Creek watershed was determined using ArcMap with land use datasets derived from the 2021 National Land Cover Dataset (NLCD). Figure 3-2 and Table 3-3 display the land use areas for the Sougahatchee Creek watershed.

The majority of the Sougahatchee Creek watershed is forested/natural (76.91%). Other land uses include developed land (14.48%) and agriculture (7.62%). If not managed properly, agriculture can have significant nonpoint source impacts. Also, septic systems can be a main source of bacteria if not properly installed and maintained.

Figure 3-2 Land Use Map for the Sougahatchee Creek Watershed

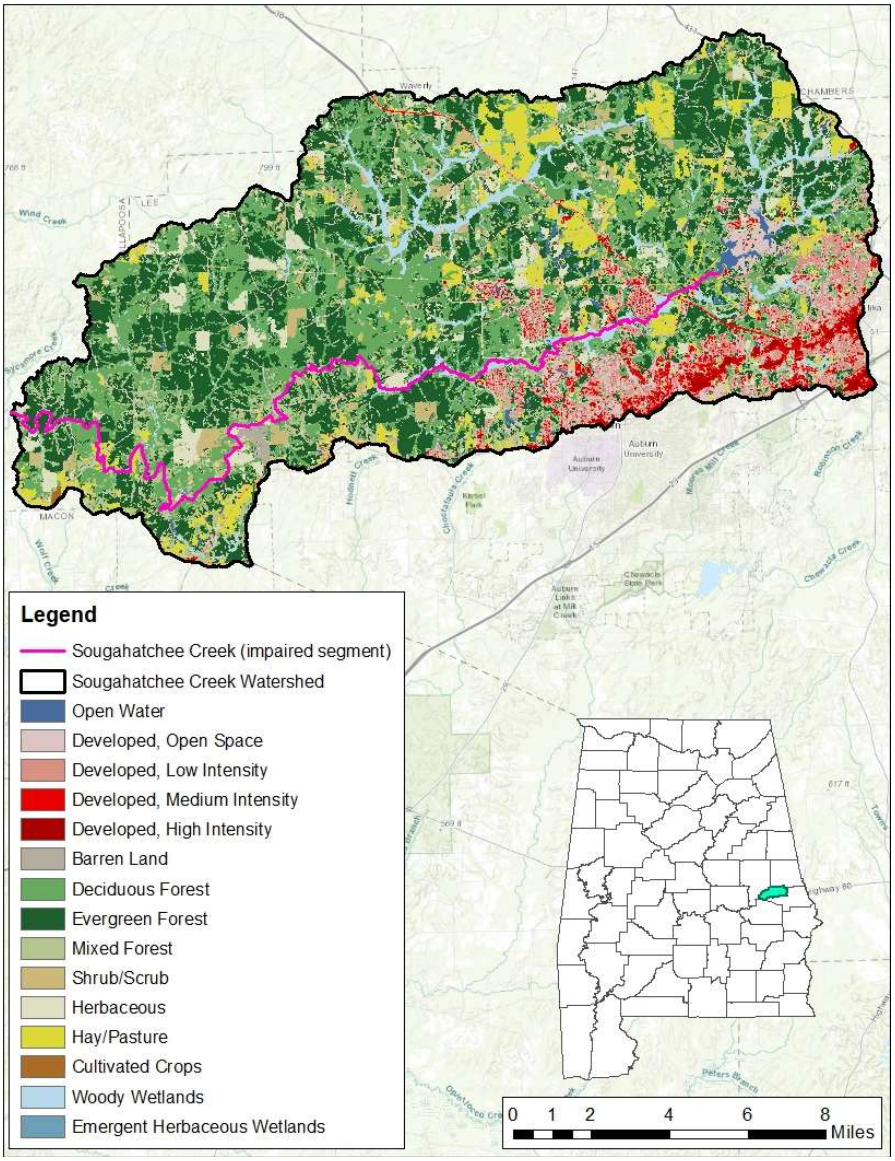
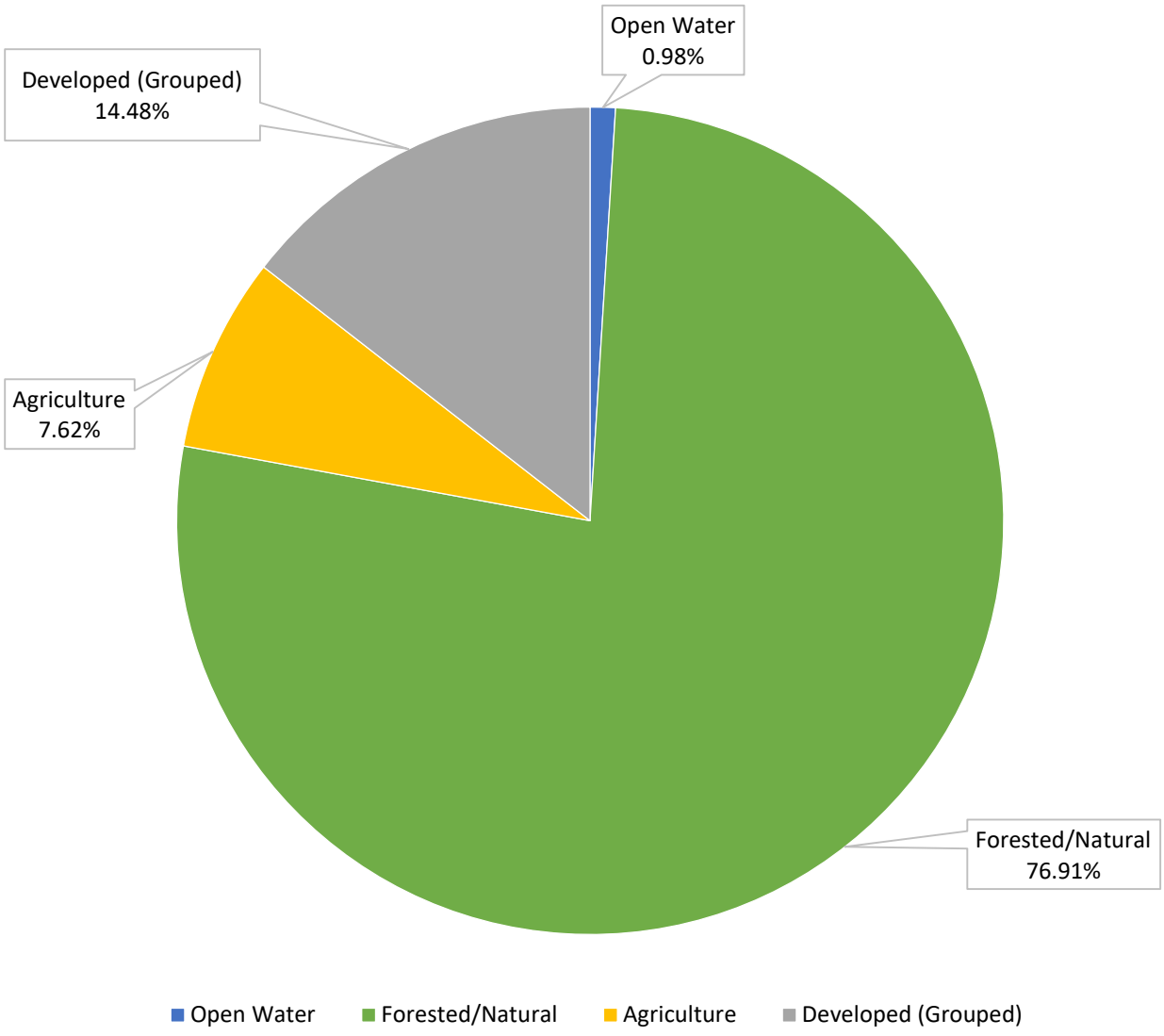


Table 3-3 Land Use Areas for the Sougahatchee Creek Watershed

Cumulative Land Use	Square Miles (mi^2)	Acres	Percent
Open Water	1.71	1,097.18	0.98%
Forested/Natural	134.58	86,132.88	76.91%
Agriculture	13.34	8,537.44	7.62%
Developed (Grouped)	25.34	16,219.70	14.48%
Total	**174.98**	**111,987.20**	**100.00%**

Figure 3-3 Primary Land Uses in the Sougahatchee Creek Watershed



3.4 Linkage Between Numeric Targets and Sources

The Sougahatchee Creek watershed's primary land use is forested/natural, followed by developed land and agriculture. Pollutant loadings from forested areas tend to be low due to their filtering capabilities and will be considered as background conditions. The most likely sources of pathogen loadings in Sougahatchee Creek are from agricultural land uses, unpermitted discharges of wastewater, urban runoff, and possibly failing septic systems. It is not considered a logical approach to calculate individual components for nonpoint source loadings. Hence, there will not be individual loads or reductions calculated for the various nonpoint sources. The loadings and reductions will only be calculated as a single total nonpoint source load and reduction.

3.5 Data Availability and Analysis

To further assess the impaired segment, ADEM collected water quality data on Sougahatchee Creek at station SOGL-1 in 2018-2021 and 2023. Figure 1-1 and Table 3-4 display the location and description, respectively, for the ADEM sampling station. The 2018-2023 data listed in Table 3-5 will be used for this TMDL. The January 2024 edition of *Alabama's Water Quality Assessment and Listing Methodology,* prepared by ADEM, provides the rationale for the Department to use the most recent data to prepare a TMDL for an impaired waterbody.

Table 3-4 Sougahatchee Creek Sampling Station Description

Station ID	Station Location	Latitude	Longitude
SOGL-1	Sougahatchee Creek at Lee Road 188	32.6267	-85.588

18 of the 27 *E. coli* samples collected at station SOGL-1 during 2018-2023 violated the summer single sample maximum criterion of 298 colonies/100 ml for the Fish and Wildlife use classification. Geometric means were calculated based on data collected at station SOGL-1 in June and August 2023; geometric means from both months exceeded the *E. coli* criterion of 126 colonies/100 ml. This data can be viewed in Table 3-5 and Appendix 7.2, Table 7-3.

Table 3-5 2018-2023 *E. coli* Exceedances at Station SOGL-1

Station SOGL-1						
Visit Date	***E. coli* (col/100 ml)**	***E. coli* dc***	***E. coli* Criterion (col/100 ml)**	**Geometric Mean (col/100 ml)**	**Geometric Mean Criterion (col/100 ml)**	**Flow (cfs)**
6/13/2018	1046.2	H	298			64.6
8/8/2018	920.8	H	298			44.5
10/17/2018	2419.6	G	298			37.2
6/6/2019	143.9		298			49.3
8/6/2019	272.3		298			26.6
10/10/2019	435.2		298			4.1
6/9/2020	161.6		298			44.5
8/5/2020	488.4	H	298			19.4
10/28/2020	613.1	H	298			58.9
6/9/2021	2419.6		298			93.7
8/3/2021	648.8		298			76.6
10/13/2021	488.4		298			81.5
3/21/2023	178.5	H	2507			89.9
5/2/2023	193.5	H	298			71.9
6/7/2023	196.8		298			43.9
6/12/2023	1095		298			56.2
6/14/2023	24196	G	298	1705.5	126	957
6/20/2023	2306		298			93.5
6/22/2023	1200		298			278
6/27/2023	100		298			64.5
7/12/2023	209.8	H	298			
8/3/2023	238.2		298			38.4
8/8/2023	325.5		298			52.3
8/10/2023	410.6		298			41.6
8/15/2023	461.1		298	419.9	126	57.5
8/17/2023	365.4		298			51.1
9/6/2023	579.4		298			24.4

*G denotes that the actual number was probably greater than the number reported. H denotes that the analytical holding times for analysis were exceeded.

Alabama Water Watch (AWW), a citizen volunteer water quality monitoring group, and the City of Auburn, as part of their MS4 monitoring program, have both collected pathogen data on Sougahatchee Creek in the last several years. This data provides further information supporting the existing impairment and can be found in Appendix 7.3 (AWW) and Appendix 7.4 (City of Auburn).

3.6 Critical Conditions/Seasonal Variation

Critical conditions typically occur during the summer months (May – October). This can be explained by the nature of storm events in the summer versus the winter. In summer, periods of dry weather interspersed with thunderstorms allow for the accumulation and washing off of bacteria into streams, resulting in spikes of bacteria counts. In winter, frequent low intensity rain events are more typical and do not allow for the build-up of bacteria on the land surface, resulting in a more uniform loading rate.

The impaired portion of Sougahatchee Creek generally follows the trends described above for the summer months of May through October. The critical condition for this pathogen TMDL was taken to be the one with the highest *E. coli* single sample exceedance value. The highest single sample maximum concentration of 24,196 colonies/100 ml was collected on June 14, 2023 at station SOGL-1. A flow of 957 cfs was measured at station SOGL-1 during this sampling event. The use of the highest exceedance to calculate the TMDL is expected to be protective of water quality in Sougahatchee Creek year-round.

3.7 Margin of Safety

There are two methods for incorporating a Margin of Safety (MOS) in the analysis: 1) by implicitly incorporating the MOS using conservative model assumptions to develop allocations, or 2) by explicitly specifying a portion of the TMDL as the MOS and using the remainder for allocations.

The MOS accounts for the uncertainty associated with the limited availability of *E. coli* data used in this analysis. An explicit MOS was applied to the TMDL by reducing the appropriate target criterion concentration by 10% and calculating a mass loading target with measured or estimated flow data. The single sample *E. coli* maximum value of 298 colonies/100 ml was reduced by 10% to 268.2 colonies/100 ml, while the geometric mean criterion of 126 colonies/100 ml was also reduced by 10% to 113.4 colonies/100 ml.

4.0 TMDL Development

4.1 Definition of a TMDL

A total maximum daily load (TMDL) is the sum of individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources including natural background levels, and a margin of safety (MOS). The margin of safety can be included either explicitly or implicitly and accounts for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. As discussed earlier, the MOS is explicit in this TMDL. A TMDL can be denoted by the equation:

$$TMDL = \Sigma\ WLAs + \Sigma\ LAs + MOS$$

The TMDL is the total amount of pollutant that can be assimilated by the receiving waterbody while achieving water quality standards under critical conditions.

For some pollutants, TMDLs are expressed on a mass loading basis (e.g., pounds per day). However, for pathogens, TMDL loads are typically expressed in terms of organism counts per day (colonies/day), in accordance with 40 CFR 130.2(i).

4.2 Load Calculations

A mass balance approach was used to calculate the pathogen TMDL for Sougahatchee Creek. The mass balance approach utilizes the conservation of mass principle. Total mass loads can be calculated by multiplying the *E. coli* concentration times the instream flow times a conversion factor. Existing loads were calculated for the highest single sample exceedance and the highest geometric mean exceedance. In the same manner, allowable loads were calculated for both the single sample maximum criterion of 298 colonies/100 ml and the geometric mean criterion of 126 colonies/100 ml. The TMDL was based on the violation that produced the highest percent reduction of *E. coli* loads necessary to achieve applicable water quality criteria, whether it be the single sample or geometric mean.

Existing Conditions

The **single sample** mass loading was calculated by multiplying the highest single sample exceedance concentration of 24,196 colonies/100 ml times the measured flow at the time the sample was taken. This concentration was measured at station SOGL-1 on June 14, 2023. The stream flow was 957 cfs at the time of the violation. The product of these two values times the conversion factor gives the total mass loading (colonies per day) of *E. coli* to Sougahatchee Creek.

$$\frac{957\ \text{ft}^3}{\text{s}} \times \frac{24{,}196\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{5.67 \times 10^{14}\ \text{colonies}}{\text{day}}$$

The **geometric mean** mass loading was calculated by multiplying the highest geometric mean exceedance concentration of 1705.5 colonies/100 ml times the average of the measured flows over the geometric mean sampling period. This concentration was calculated based on measurements at station SOGL-1 between June 7, 2023 and June 22, 2023, which are shown in Table 3-5. The average stream flow was calculated to be 285.7 cfs. The product of these two values times the conversion factor gives the total mass loading (colonies per day) of *E. coli* to Sougahatchee Creek under the geometric mean exceedance condition.

$$\frac{285.7\ \text{ft}^3}{\text{s}} \times \frac{1{,}705.5\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{1.19 \times 10^{13}\ \text{colonies}}{\text{day}}$$

The **continuous point sources** mass loading was calculated by taking the average discharge flow from the month of June 2023 (since this is when the highest exceedance occurred) and multiplying that value by the reported maximum daily *E. coli* value for the same month for each facility. These numbers were found in the June 2023 Discharge Monitoring Reports (DMRs) submitted by the facilities.

Auburn Northside WPCF (AL0050245):

The facility reported no discharge during June 2023. Therefore, the existing load for this facility is zero.

Opelika Westside WWTP (AL0050130):

$$3.43\ \text{MGD} \times \frac{1.55\ \text{ft}^3}{\text{s} * \text{MGD}} \times \frac{95.0\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{1.24 \times 10^{10}\ \text{colonies}}{\text{day}}$$

Allowable Conditions

The **allowable load** to the watershed was calculated under the same physical conditions as discussed above for the single sample and geometric mean criteria. This was done by taking the product of the measured flow for the violation event, the allowable concentration, and the conversion factor.

For the **single sample** *E. coli* target concentration of 268.2 colonies/100 ml, the allowable *E. coli* loading is:

$$\frac{957\ \text{ft}^3}{\text{s}} \times \frac{268.2\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{6.28 \times 10^{12}\ \text{colonies}}{\text{day}}$$

The explicit margin of safety of 29.8 colonies/100 ml equals a daily loading of:

$$\frac{957\ \text{ft}^3}{\text{s}} \times \frac{29.8\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{6.98 \times 10^{11}\ \text{colonies}}{\text{day}}$$

For the **geometric mean** *E. coli* target concentration of 113.4 colonies/100 ml, the allowable *E. coli* loading is:

$$\frac{285.7\ \text{ft}^3}{\text{s}} \times \frac{113.4\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{7.93 \times 10^{11}\ \text{colonies}}{\text{day}}$$

The explicit margin of safety of 12.6 colonies/100 ml equals a daily loading of:

$$\frac{285.7\ \text{ft}^3}{\text{s}} \times \frac{12.6\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{8.81 \times 10^{10}\ \text{colonies}}{\text{day}}$$

The WLA for the continuous point sources was calculated by multiplying the design flow of each facility times the applicable instream single sample *E. coli* criterion. The product of these two values times the conversion factor gives the appropriate loading.

Auburn Northside WPCF (AL0050245):

$$2.2\ \text{MGD} \times \frac{1.55\ \text{ft}^3}{\text{s} * \text{MGD}} \times \frac{298\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{2.49 \times 10^{10}\ \text{colonies}}{\text{day}}$$

Opelika Westside WWTP (AL0050130):

$$5.9\ \text{MGD} \times \frac{1.55\ \text{ft}^3}{\text{s} * \text{MGD}} \times \frac{298\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{6.67 \times 10^{10}\ \text{colonies}}{\text{day}}$$

The difference in the pathogen loading between the existing condition (violation event) and the allowable condition converted to a percent reduction represents the total load reduction needed to achieve the *E. coli* water quality criteria. The TMDL was calculated as the total daily *E. coli* load to Sougahatchee Creek as evaluated at station SOGL-1. Table 4-1 shows the existing and allowable *E. coli* loads and required reductions for the Sougahatchee Creek watershed.

Table 4-1 *E. coli* Loads and Required Reductions for Sougahatchee Creek

Source	Existing Load (col/day)	Allowable Load (col/day)	Required Reduction (col/day)	% Reduction
Single Sample Load	5.67E+14	6.28E+12	5.60E+14	99%
Geometric Mean Load	1.19E+13	7.93E+11	1.11E+13	93%
Auburn Northside WPCF (AL0050245)*	0	2.49E+10	0	0%
Opelika Westside WWTP (AL0050130)	1.24E+10	6.67E+10	0	0%

*Auburn Northside WPCF ceased discharge to Sougahatchee Creek on January 30, 2013, but still maintains an active NPDES permit.

From Table 4-1, compliance with the single sample criterion of 298 colonies/100 ml requires a reduction in the *E. coli* load of 99%. The TMDL, WLA, LA and MOS values necessary to achieve the applicable *E. coli* criterion are provided in Table 4-2.

Table 4-2 *E. coli* TMDL for Sougahatchee Creek

TMDL[a]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[e]			Load Allocation (LA)	
		WWTPs[b]	Stormwater (MS4s and other NPDES sources)[c]	Leaking Collection Systems[d]		
(col/day)	(col/day)	(col/day)	(% reduction)	(col/day)	(col/day)	(% reduction)
6.98E+12	6.98E+11	9.15E+10	99%	0	6.19E+12	99%

a. TMDL was established using the single sample criterion of 298 colonies/100ml.
b. Current and future WWTPs must meet the applicable instream water quality criteria for pathogens at the point of discharge.
c. Current and future MS4s will be required to document within the entity's stormwater management program plan (SWMPP) the method(s) that with be utilized to demonstrate consistency with the assumptions and requirements of this TMDL. Other NPDES stormwater sources will be required to demonstrate consistency with the assumptions and requirements of this TMDL through implementation and maintenance of BMPs on a case-by case basis. The 99% reduction for MS4s and other NPDES sources should not be interpreted strictly as a numeric permit limit, but as an effort to implement BMPs to demonstrate reductions of the impairment to the maximum extent practicable.
d. The objective for leaking collection systems is a WLA of zero. It is recognized, however, that a WLA of 0 colonies/day may not be practical. For these sources, the WLA is interpreted to mean a reduction in *E. coli* loading to the maximum extent practicable, consistent with the requirement that these sources not contribute to a violation of the water quality criteria for *E. coli*.
e. There are no CAFOs in the Sougahatchee Creek watershed. Future CAFOs will be assigned a wasteload allocation (WLA) of zero.

4.3 TMDL Summary

Sougahatchee Creek was first included on the §303(d) list for pathogens in 2018 based on ADEM's *E. coli* data collected in 2011-2016 at station SOGL-1 and in 2012 at station SOGL-11. In 2018-2021 and 2023, ADEM collected water quality data that confirmed the pathogen impairment and provided the basis for TMDL development.

A mass balance approach was used to calculate the *E. coli* TMDL for Sougahatchee Creek. Based on the TMDL analysis, it was determined that a 99% reduction in *E. coli* loading was necessary to achieve compliance with applicable water quality standards.

Compliance with the terms and conditions of existing and future NPDES sanitary and stormwater permits will effectively implement the WLA and demonstrate consistency with the assumptions and requirements of the TMDL.

Required load reductions in the load allocation portion of this TMDL will be implemented through voluntary measures/best management practices (BMPs). Cooperation and active participation by the public and various other groups are critical to successful implementation of TMDLs. Local, citizen-led, and implemented management measures offer the most efficient and comprehensive avenue for reduction of loading rates from nonpoint sources. Therefore, TMDL implementation activities for nonpoint sources will be coordinated through interaction with local entities and may be eligible for CWA §319 grants through the Department's Nonpoint Source Unit.

The Department recognizes that adaptive implementation of this TMDL will be needed to achieve applicable water quality criteria, and we are committed to targeting the load reductions to improve

water quality in the Sougahatchee Creek watershed. As additional data and/or information becomes available, it may become necessary to revise and/or modify the TMDL accordingly.

5.0 Follow-up Monitoring

ADEM has adopted a basin approach to water quality monitoring, an approach that divides Alabama's sixteen major river basins into three groups. Each year, ADEM's water quality resources are concentrated in one of the three basin groups and are divided among multiple priorities including §303(d) listed waterbodies, waterbodies with active TMDLs, and other waterbodies as determined by the Department. Monitoring will help further characterize water quality conditions resulting from the implementation of best management practices and load reductions in the watershed. This monitoring will occur in each basin according to the schedule shown in Table 5.1.

Table 5-1 Follow-up Monitoring Schedule

River Basin Group	Years to be Monitored
Coosa, Escatawpa, Tennessee (Guntersville), Tombigbee	2025/2028
Alabama, Cahaba, Mobile, Tallapoosa, Tennessee (Pickwick and Wilson)	2026/2029
Black Warrior, Blackwater, Chattahoochee, Chipola, Choctawhatchee, Escambia, Perdido, Tennessee (Wheeler), Yellow	2027/2030

6.0 Public Participation

As part of the public participation process, this TMDL was placed on public notice and made available for review and comment. The public notice was prepared and published in four newspapers in Montgomery, Huntsville, Birmingham, and Mobile, as well as submitted to persons who requested to be on ADEM's postal and electronic mailing distributions. In addition, the public notice and subject TMDL were made available on ADEM's website: www.adem.alabama.gov. The public could also request paper or electronic copies of the TMDL by contacting Ms. Kimberly Minton at 334-271-7826 or kminton@adem.alabama.gov. The public was given an opportunity to review the TMDL and submit comments to the Department in writing. At the end of the public review period, all written comments received during the public notice period became part of the administrative record. ADEM considered all comments received by the public prior to final completion of this TMDL and subsequent submission to EPA Region 4 for final approval.

7.0 Appendix

7.1 References

ADEM Administrative Code, 2021. Water Division - Water Quality Program, Chapter 335-6-10, Water Quality Criteria.

ADEM Administrative Code, 2021. Water Division - Water Quality Program, Chapter 335-6-11, Use Classifications for Interstate and Intrastate Waters.

Alabama's Monitoring Program. 2011-2023. ADEM.

Alabama Department of Environmental Management (ADEM), *Alabama's Water Quality Assessment and Listing Methodology*, January 2024.

Alabama Department of Environmental Management, 2018, 2020, 2022 & 2024 §303(d) Lists and Fact Sheets. ADEM.

Alabama Department of Environmental Management (ADEM), Laboratory Data Qualification SOP #4910 Revision 7.2, 2022.

United States Environmental Protection Agency, 1991. *Guidance for Water Quality-Based Decisions: The TMDL Process*. Office of Water. EPA 440/4-91-001.

United States Environmental Protection Agency, 1986. *Quality Criteria for Water.* Office of Water. EPA 440/4-91-001.

7.2 Water Quality Data

Table 7-1 2011-2016 ADEM Pathogen Data Collected on Sougahatchee Creek (Listing Data)

	Visit Date	*E. coli* (col/100 ml)	*E. coli* Criterion (col/100 ml)	Flow (cfs)
Station SOGL-11	4/24/2012	178.5	2507	29
	5/10/2012	727	298	45
	6/5/2012	107.1	298	17
	7/17/2012	344.8	298	8.2
	8/14/2012	228.2	298	11
	9/11/2012	131.4	298	7.4
	10/2/2012	307.6	298	25
	11/8/2012	248.1	2507	8.2
Station SOGL-1	6/13/2011	48.7	298	11
	8/2/2011	191.8	298	20
	10/13/2011	387.3	298	12
	6/5/2012	48	298	17
	8/14/2012	648.8	298	11
	10/2/2012	209.8	298	25
	5/6/2013	325.5	298	45
	7/11/2013	4839	298	115
	9/11/2013	435.2	298	15
	6/5/2014	365.4	298	46
	8/7/2014	209.8	298	23
	10/9/2014	285.1	298	9.6
	6/10/2015	3972.6	298	54
	7/29/2015	161.6	298	26
	10/29/2015	193.5	298	14
	6/9/2016	75.4	298	29
	8/3/2016	2239.8	298	46
	10/5/2016	551	298	1.1

Table 7-2 2017 ADEM Pathogen Data Collected on Sougahatchee Creek

	Visit Date	*E. coli* (col/100 ml)	*E. coli* Criterion (col/100 ml)	Flow (cfs)
Station SOGL-20	3/14/2017	1553.1	2507	66.6
	4/11/2017	117.8	2507	30.3
	5/9/2017	275.5	298	18.7
	6/6/2017	1841.6	298	119.1
	6/21/2017	546	298	47.4
	6/30/2017	1450	298	
	7/5/2017	203	298	46.4
	7/11/2017	1046	298	30.6
	7/18/2017	341	298	46.3
	8/8/2017	547.5	298	25.3
	8/28/2017	461.1	298	26.2
	8/29/2017	104.6	298	22.1
	8/30/2017	17328.9	298	
	8/31/2017	4798	298	
	9/19/2017	86.9	298	25.7
	10/3/2017	133.4	298	18.7
Station SOGL-1	3/14/2017	1553.1	2507	101
	4/11/2017	214.2	2507	46
	5/9/2017	387.3	298	28.7
	6/6/2017	2239.8	298	228
	7/11/2017	4839.2	298	76
	8/8/2017	344.8	298	38.6
	9/19/2017	517.2	298	37.2
	10/3/2017	325.5	298	27.7

Table 7-3 2018-2023 ADEM Pathogen Data Collected on Sougahatchee Creek

Station SOGL-1				
Visit Date	***E. coli*** **(col/100 ml)**	***E. coli*** **dc***	***E. coli*** **Criterion (col/100 ml)**	**Flow (cfs)**
6/13/2018	1046.2	H	298	64.6
8/8/2018	920.8	H	298	44.5
10/17/2018	2419.6	G	298	37.2
6/6/2019	143.9		298	49.3
8/6/2019	272.3		298	26.6
10/10/2019	435.2		298	4.1
6/9/2020	161.6		298	44.5
8/6/2020	488.4	H	298	19.4
10/28/2020	613.1	H	298	58.9
6/9/2021	2419.6		298	93.7
8/3/2021	648.8		298	76.6
10/13/2021	488.4		298	81.5
3/21/2023	178.5	H	2507	89.9
5/2/2023	193.5	H	298	71.9
6/7/2023	196.8		298	43.9
6/12/2023	1095		298	56.2
6/14/2023	24196	G	298	957
6/20/2023	2306		298	93.5
6/22/2023	1200		298	278
6/27/2023	100		298	64.5
7/12/2023	209.8	H	298	
8/3/2023	238.2		298	38.4
8/8/2023	325.5		298	52.3
8/10/2023	410.6		298	41.6
8/15/2023	461.1		298	57.5
8/17/2023	365.4		298	51.1
9/6/2023	579.4		298	24.4

*G denotes that the actual number was probably greater than the number reported. H denotes that the analytical holding times for analysis were exceeded.

7.3 Alabama Water Watch (AWW) Water Quality Data

Table 7-4 AWW Station Locations on Sougahatchee Creek

Site Number	Latitude	Longitude
07011009	32.65749	-85.45981
07011055	32.634181	-85.52514
07011007	32.6265	-85.58802
07011025	32.648	-85.483
07011002	32.6425	-85.50413
07011028	32.6602	-85.4518

Table 7-5 2018-2023 AWW Pathogen Data Collected on Sougahatchee Creek

Site Number	Visit Date	*E. coli* (col/100 ml)
7011002	6/6/2018	433
7011002	7/25/2018	300
7011002	9/12/2018	733
7011002	6/26/2019	267
7011002	8/7/2019	67
7011002	9/19/2019	133
7011002	7/14/2020	267
7011002	8/18/2020	67
7011002	9/22/2020	167
7011002	7/6/2021	267
7011002	8/8/2021	2100
7011002	8/10/2021	2100
7011002	9/14/2021	567
7011007	6/6/2018	100
7011007	9/12/2018	833
7011007	8/7/2019	100
7011007	9/19/2019	233
7011007	7/15/2020	133
7011007	8/18/2020	0
7011007	9/22/2020	133
7011007	7/6/2021	267
7011007	8/8/2021	5567
7011007	9/14/2021	633
7011009	6/6/2018	67
7011009	7/25/2018	100
7011009	9/12/2018	200

Table 7-5 2018-2023 AWW Pathogen Data Collected on Sougahatchee Creek *(cont.)*

Site Number	Visit Date	*E. coli* (col/100 ml)
7011025	10/26/2020	367
7011025	3/20/2021	67
7011025	7/4/2021	467
7011025	8/10/2021	2967
7011025	9/5/2021	1167
7011025	10/13/2021	500
7011025	12/4/2021	433
7011025	1/1/2022	1800
7011025	2/1/2022	67
7011025	8/1/2022	400
7011025	12/1/2022	800
7011025	1/20/2023	200
7011025	5/1/2023	33
7011025	6/21/2023	2133
7011028	1/23/2018	223
7011028	2/2/2018	67
7011028	2/20/2018	67
7011028	3/20/2018	67
7011028	4/14/2018	67
7011028	4/16/2018	133
7011028	5/14/2018	33
7011028	5/25/2018	400
7011028	6/11/2018	4967
7011028	6/30/2018	133
7011028	7/16/2018	67
7011028	8/13/2018	33
7011028	6/26/2019	333
7011028	8/7/2019	100
7011028	9/19/2019	133
7011028	7/14/2020	100
7011028	8/18/2020	200
7011028	9/22/2020	133
7011028	7/6/2021	200
7011028	8/10/2021	700
7011028	9/14/2021	900

Table 7-5 2018-2023 AWW Pathogen Data Collected on Sougahatchee Creek *(cont.)*

Site Number	Visit Date	*E. coli* (col/100 ml)
7011055	6/6/2018	333
7011055	7/25/2018	67
7011055	9/12/2018	1133
7011055	8/7/2019	167
7011055	9/19/2019	167
7011055	7/15/2020	167
7011055	8/18/2020	100
7011055	7/6/2021	200
7011055	8/8/2021	6400
7011055	9/14/2021	467

7.4 City of Auburn Water Quality Data

Table 7-6 City of Auburn Station Locations on Sougahatchee Creek

Site	Latitude	Longitude
SOGL-1	32.626569	-85.588019
SOGL-11	32.628185	-85.545705
SOGL-20	32.648751	-85.472166
SOGL-22	32.657756	-85.459302

Table 7-7 2019-2024 City of Auburn Pathogen Data Collected on Sougahatchee Creek

Site	Date	*E. coli* (MPN)
SOGL-1	4/24/2019	200
SOGL-1	5/21/2019	150
SOGL-1	6/5/2019	100
SOGL-1	6/13/2019	150
SOGL-1	6/19/2019	150
SOGL-1	6/27/2019	150
SOGL-1	7/2/2019	50
SOGL-1	7/25/2019	50
SOGL-1	8/8/2019	450
SOGL-1	8/14/2019	461.1
SOGL-1	8/22/2019	275.5
SOGL-1	8/30/2019	200
SOGL-1	9/4/2019	150
SOGL-1	9/25/2019	300
SOGL-1	10/25/2019	100
SOGL-1	11/14/2019	400
SOGL-1	4/14/2020	1119.9
SOGL-1	5/13/2020	77.1
SOGL-1	6/4/2020	121.1
SOGL-1	6/8/2020	178.2
SOGL-1	6/18/2020	143.9
SOGL-1	6/22/2020	410.6
SOGL-1	6/29/2020	193.5
SOGL-1	7/29/2020	235.9
SOGL-1	8/6/2020	259.5
SOGL-1	8/13/2020	727
SOGL-1	8/19/2020	579.4

Table 7-7 2019-2024 City of Auburn Pathogen Data Collected on Sougahatchee Creek (*cont.*)

Site	Date	*E. coli* (MPN)
SOGL-1	8/26/2020	613.1
SOGL-1	9/3/2020	260.3
SOGL-1	9/29/2020	866.4
SOGL-1	10/27/2020	816.4
SOGL-1	11/23/2020	120.1
SOGL-1	4/27/2021	275.5
SOGL-1	5/28/2021	131.4
SOGL-1	6/3/2021	115.3
SOGL-1	6/8/2021	980.4
SOGL-1	6/15/2021	238.2
SOGL-1	6/22/2021	547.5
SOGL-1	7/1/2021	816.4
SOGL-1	7/22/2021	325.5
SOGL-1	8/5/2021	172.3
SOGL-1	8/11/2021	272.3
SOGL-1	8/19/2021	488.4
SOGL-1	8/24/2021	410.6
SOGL-1	9/2/2021	648.8
SOGL-1	9/23/2021	547.5
SOGL-1	10/14/2021	344.8
SOGL-1	11/29/2021	104.6
SOGL-1	4/13/2022	209.8
SOGL-1	5/11/2022	62
SOGL-1	6/2/2022	344.8
SOGL-1	6/8/2022	501.2
SOGL-1	6/16/2022	770.1
SOGL-1	6/22/2022	275.5
SOGL-1	6/30/2022	325.5
SOGL-1	7/20/2022	185
SOGL-1	8/3/2022	>2419.6
SOGL-1	8/10/2022	866.4
SOGL-1	8/17/2022	365.4
SOGL-1	8/25/2022	2419.6
SOGL-1	9/1/2022	209.8
SOGL-1	9/15/2022	579.4
SOGL-1	10/18/2022	365.4

Table 7-7 2019-2024 City of Auburn Pathogen Data Collected on Sougahatchee Creek (*cont.*)

Site	Date	*E. coli* (MPN)
SOGL-1	4/25/2023	131.4
SOGL-1	5/30/2023	291
SOGL-1	6/6/2023	387.3
SOGL-1	6/13/2023	228.2
SOGL-1	6/20/2023	1986.3
SOGL-1	6/27/2023	410
SOGL-1	7/6/2023	727
SOGL-1	8/2/2023	387.3
SOGL-1	8/10/2023	770.1
SOGL-1	8/17/2023	307.6
SOGL-1	8/24/2023	365.4
SOGL-1	8/31/2023	290.9
SOGL-1	9/28/2023	387.3
SOGL-1	10/24/2023	228.2
SOGL-1	4/22/2024	1299.7
SOGL-1	5/30/2024	365.4
SOGL-1	6/26/2024	145
SOGL-1	7/2/2024	207.5
SOGL-1	7/8/2024	235.9
SOGL-1	7/16/2024	179.3
SOGL-1	7/24/2024	365.4
SOGL-1	7/31/2024	461.1
SOGL-1	8/26/2024	461.1
SOGL-1	9/24/2024	435.2
SOGL-1	10/9/2024	275.5
SOGL-11	4/24/2019	150
SOGL-11	5/21/2019	50
SOGL-11	6/5/2019	150
SOGL-11	6/13/2019	50
SOGL-11	6/19/2019	50
SOGL-11	6/27/2019	50
SOGL-11	7/2/2019	50
SOGL-11	7/25/2019	50
SOGL-11	8/8/2019	550
SOGL-11	8/14/2019	344.8
SOGL-11	8/22/2019	435.2

Table 7-7 2019-2024 City of Auburn Pathogen Data Collected on Sougahatchee Creek (*cont.*)

Site	Date	*E. coli* (MPN)
SOGL-11	8/30/2019	250
SOGL-11	9/4/2019	0
SOGL-11	9/25/2019	200
SOGL-11	10/25/2019	100
SOGL-11	11/14/2019	50
SOGL-11	4/14/2020	920.8
SOGL-11	5/13/2020	209.8
SOGL-11	6/4/2020	156.5
SOGL-11	6/8/2020	148.3
SOGL-11	6/18/2020	248.1
SOGL-11	6/22/2020	648.8
SOGL-11	6/29/2020	461.1
SOGL-11	7/29/2020	920.8
SOGL-11	8/6/2020	307.6
SOGL-11	8/13/2020	727
SOGL-11	8/19/2020	517.2
SOGL-11	8/26/2020	686.7
SOGL-11	9/3/2020	579.4
SOGL-11	9/29/2020	980.4
SOGL-11	10/27/2020	920.8
SOGL-11	11/23/2020	122.3
SOGL-11	4/27/2021	387.3
SOGL-11	5/28/2021	613.1
SOGL-11	6/3/2021	172.5
SOGL-11	6/8/2021	579.4
SOGL-11	6/15/2021	238.2
SOGL-11	6/22/2021	79.8
SOGL-11	7/1/2021	435.2
SOGL-11	7/22/2021	248.9
SOGL-11	8/5/2021	218.7
SOGL-11	8/11/2021	228.2
SOGL-11	8/19/2021	547.5
SOGL-11	8/24/2021	410.6
SOGL-11	9/2/2021	816.4
SOGL-11	9/23/2021	727
SOGL-11	10/14/2021	727

Table 7-7 2019-2024 City of Auburn Pathogen Data Collected on Sougahatchee Creek (*cont.*)

Site	Date	*E. coli* (MPN)
SOGL-11	11/29/2021	72.3
SOGL-11	4/13/2022	161.6
SOGL-11	5/11/2022	83.6
SOGL-11	6/2/2022	163.8
SOGL-11	6/8/2022	41.6
SOGL-11	6/16/2022	980.4
SOGL-11	6/22/2022	123.6
SOGL-11	6/30/2022	261.3
SOGL-11	7/20/2022	186
SOGL-11	8/3/2022	1986.3
SOGL-11	8/10/2022	866.4
SOGL-11	8/17/2022	727
SOGL-11	8/25/2022	>2419.6
SOGL-11	9/1/2022	410.6
SOGL-11	9/15/2022	816.4
SOGL-11	10/18/2022	260.3
SOGL-11	4/25/2023	191.8
SOGL-11	5/30/2023	365
SOGL-11	6/6/2023	435.2
SOGL-11	6/13/2023	235.9
SOGL-11	6/20/2023	1732.9
SOGL-11	6/27/2023	1732.9
SOGL-11	7/6/2023	980.4
SOGL-11	8/2/2023	261.3
SOGL-11	8/10/2023	325.5
SOGL-11	8/15/2023	218.7
SOGL-11	8/24/2023	325.5
SOGL-11	8/31/2023	648.8
SOGL-11	9/28/2023	613.1
SOGL-11	10/24/2023	920.8
SOGL-11	4/22/2024	816.4
SOGL-11	5/30/2024	206.4
SOGL-11	6/26/2024	111.2
SOGL-11	7/2/2024	193.5
SOGL-11	7/8/2024	218.7
SOGL-11	7/16/2024	218.7

Table 7-7 2019-2024 City of Auburn Pathogen Data Collected on Sougahatchee Creek (*cont.*)

Site	Date	*E. coli* (MPN)
SOGL-11	7/24/2024	579.4
SOGL-11	7/31/2024	488.4
SOGL-11	9/3/2024	387.3
SOGL-11	9/24/2024	727
SOGL-11	10/9/2024	686.7
SOGL-20	4/24/2019	0
SOGL-20	5/21/2019	100
SOGL-20	6/5/2019	50
SOGL-20	6/13/2019	100
SOGL-20	6/19/2019	500
SOGL-20	6/27/2019	50
SOGL-20	7/2/2019	0
SOGL-20	7/25/2019	50
SOGL-20	8/8/2019	950
SOGL-20	8/14/2019	478.6
SOGL-20	8/22/2019	2419.6
SOGL-20	8/30/2019	400
SOGL-20	9/4/2019	150
SOGL-20	9/25/2019	9999
SOGL-20	10/25/2019	150
SOGL-20	11/14/2019	0
SOGL-20	4/14/2020	648.8
SOGL-20	5/13/2020	235.9
SOGL-20	6/4/2020	204.6
SOGL-20	6/8/2020	172.3
SOGL-20	6/18/2020	127.4
SOGL-20	6/22/2020	435.2
SOGL-20	6/29/2020	235.9
SOGL-20	7/29/2020	204.6
SOGL-20	8/6/2020	435.2
SOGL-20	8/13/2020	547.5
SOGL-20	8/19/2020	547.5
SOGL-20	8/26/2020	727
SOGL-20	9/3/2020	365.4
SOGL-20	9/29/2020	410.6
SOGL-20	10/27/2020	461.1

Table 7-7 2019-2024 City of Auburn Pathogen Data Collected on Sougahatchee Creek (*cont.*)

Site	Date	*E. coli* (MPN)
SOGL-20	11/23/2020	161.6
SOGL-22	4/27/2021	98.7
SOGL-22	5/28/2021	193.5
SOGL-22	6/3/2021	65.7
SOGL-22	6/8/2021	435.2
SOGL-22	6/15/2021	60.9
SOGL-22	6/22/2021	95.9
SOGL-22	7/1/2021	488.4
SOGL-22	7/22/2021	152.9
SOGL-22	8/5/2021	156.5
SOGL-22	8/11/2021	201.4
SOGL-22	8/19/2021	435.2
SOGL-22	8/24/2021	193.5
SOGL-22	9/2/2021	547.5
SOGL-22	9/23/2021	396.8
SOGL-22	10/14/2021	387.3
SOGL-22	11/29/2021	78.9
SOGL-22	4/13/2022	111.2
SOGL-22	5/11/2022	41.1
SOGL-22	6/2/2022	73.3
SOGL-22	6/8/2022	54.5
SOGL-22	6/16/2022	1203.3
SOGL-22	6/22/2022	95.9
SOGL-22	6/30/2022	104.6
SOGL-22	7/20/2022	101.2
SOGL-22	8/3/2022	1986.3
SOGL-22	8/10/2022	209.8
SOGL-22	8/17/2022	218.7
SOGL-22	8/25/2022	980.4
SOGL-22	9/1/2022	142.1
SOGL-22	9/15/2022	209.8
SOGL-22	10/18/2022	1119.9
SOGL-22	4/25/2023	275.5
SOGL-22	5/30/2023	179
SOGL-22	6/6/2023	160.7
SOGL-22	6/13/2023	770.1

Table 7-7 2019-2024 City of Auburn Pathogen Data Collected on Sougahatchee Creek (*cont.*)

Site	Date	*E. coli* (MPN)
SOGL-22	6/20/2023	980.4
SOGL-22	6/27/2023	>2419.6
SOGL-22	7/6/2023	579.4
SOGL-22	8/2/2023	116.9
SOGL-22	8/10/2023	228.2
SOGL-22	8/17/2023	186
SOGL-22	8/24/2023	261.3
SOGL-22	8/31/2023	461.1
SOGL-22	9/28/2023	125.9
SOGL-22	10/24/2023	95.8
SOGL-22	4/22/2024	378.4
SOGL-22	5/30/2024	83.9
SOGL-22	6/26/2024	770.1
SOGL-22	7/2/2024	95.9
SOGL-22	7/8/2024	56.5
SOGL-22	7/16/2024	222.4
SOGL-22	7/24/2024	151.5
SOGL-22	7/31/2024	80.9
SOGL-22	8/26/2024	145.5
SOGL-22	9/24/2024	131.4
SOGL-22	10/9/2024	387.3

7.5 NPDES Non-Continuous Dischargers

Table 7-8 Non-Continuous Point Sources in the Sougahatchee Creek Watershed

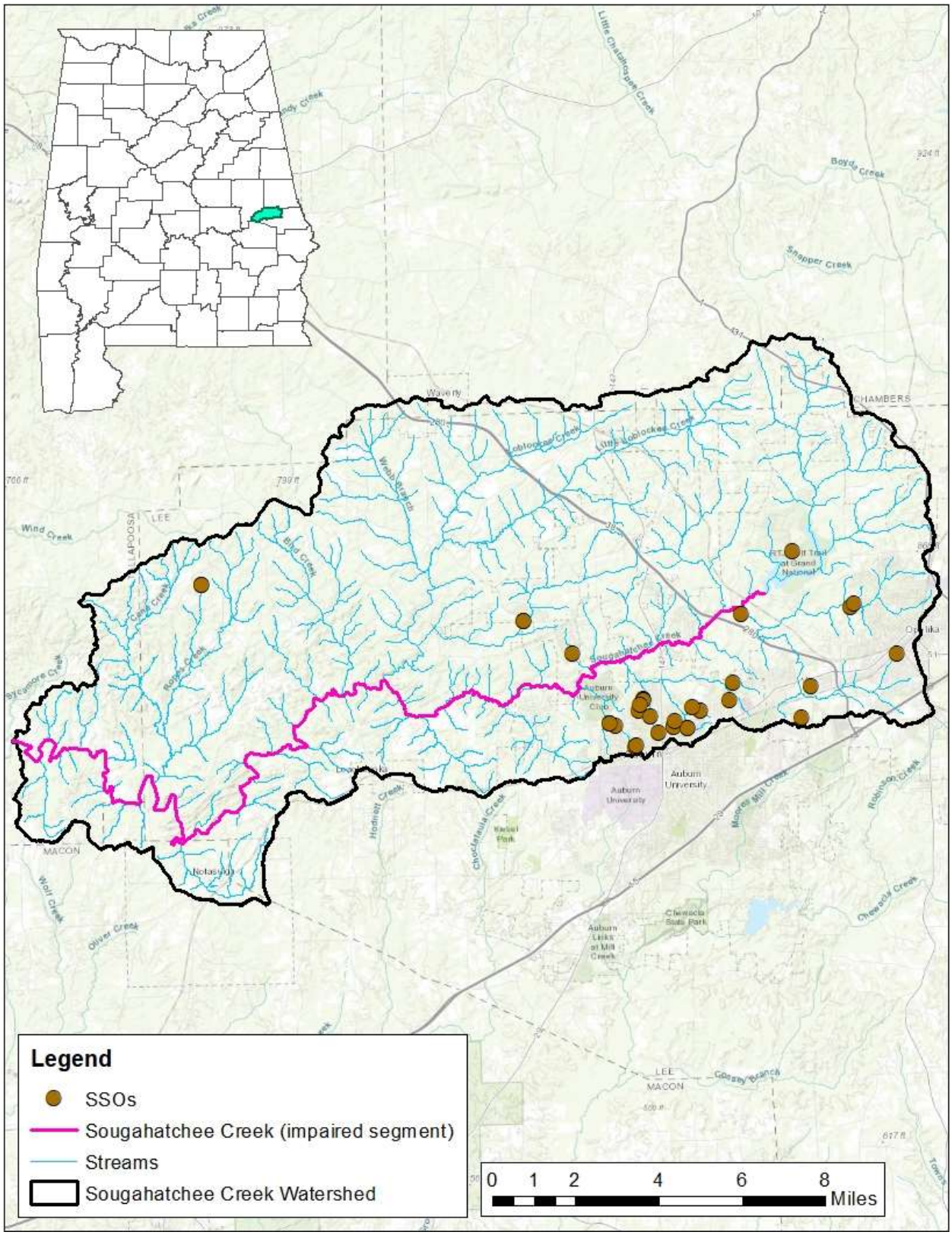
Permit Number	Facility Name	Activity
AL0074357	Notasulga Quarry II	Quarry Operations and Associated Areas
ALG020191	D & J Asphalt Plant at Vulcan Quarry	Asphalt
ALG110362	Ready Mix USA - Opelika Facility	Concrete
ALG110512	Custom Concrete Walls - Waverly	Concrete
ALG140875	Opelika Bin	Transportation
ALG141025	Environmental & Recycling Solutions, Inc.	Transportation
ALG160161	Opelika Transfer Station, LLC	Landfill
ALG180159	Waste Recycling, Inc. - Opelika	Salvage and Recycling
ALG180818	Recycle Alabama, LLC	Salvage and Recycling
ALG180833	Mims Recycling & Salvage, LLC	Salvage and Recycling

7.6 Sanitary Sewer Overflows (SSOs)

Table 7-9 Reported SSOs in the Sougahatchee Creek Watershed

	SSO Began Date	Estimated Release Volume (gallons)	Duration (hours)
Auburn Northside WPCF (AL0050245)	1/23/2019	6,750	1
	6/3/2020	2,700	4
	8/17/2020	1,000	1
	11/30/2020	450	1
	9/27/2021	1,800	1
	12/1/2021	28	0
	12/27/2021	100	0
	7/5/2022	920	1
	7/29/2022	20	3
	8/5/2022	25	0
	10/26/2022	450	1
	12/7/2022	750	3
	1/9/2023	≤ 1,000	0
	3/23/2023	75	0
	5/9/2023	600	1
	7/24/2023	200	1
	11/20/2023	3,000	5
	12/8/2023	5.5	6
	12/18/2023	700	1
	1/18/2024	600	1
	3/25/2024	300	0
	4/12/2024	14,400	4
	4/22/2024	930	1
	5/30/2024	650	1
Opelika Westside WWTP (AL0050130)	10/20/2018	≤ 1,000	42
	11/22/2019	1,000 – 10,000	1
	1/16/2020	25,000 – 50,000	2
	9/14/2021	1,000 – 10,000	3
	10/1/2021	1,000 – 10,000	2
	1/20/2023	1,000 – 10,000	66
	2/27/2023	10,000 – 25,000	5
	6/30/2023	1,000 – 10,000	2
	7/11/2023	1,000 – 10,000	0

Figure 7-1 Map of Reported SSOs in the Sougahatchee Creek Watershed



7.7 Sougahatchee Creek Watershed Photos (May 2, 2023)

Figure 7-2 Sougahatchee Creek at Lee Road 188 (SOGL-1), Looking Upstream

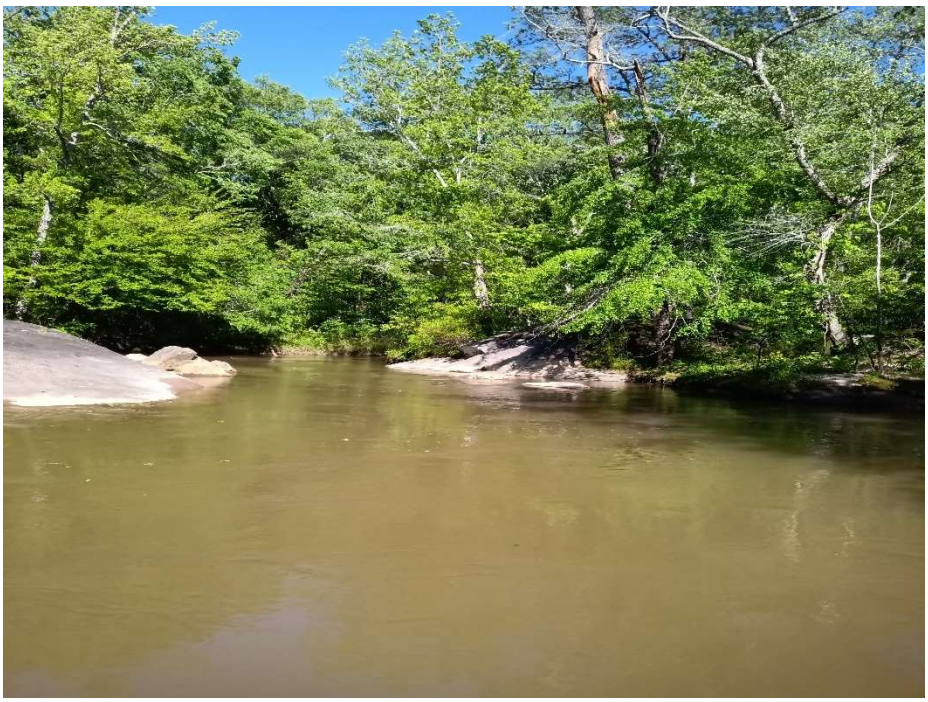


Figure 7-3 Sougahatchee Creek at Lee Road 188 (SOGL-1), Looking Downstream

7.8 Sougahatchee Creek Watershed Photos (July 12, 2023)

Figure 7-4 Sougahatchee Creek at Lee Road 188 (SOGL-1), Looking Upstream

Figure 7-5 Sougahatchee Creek at Lee Road 188 (SOGL-1), Looking Downstream