Alabama Department of Environmental Management

Draft
Total Maximum Daily Load (TMDL) for Spring Creek

Assessment Unit ID Number
AL03140202-0202-110

Bullock County

Pathogens (*E. coli*)

Alabama Department of Environmental Management
Water Quality Branch
Water Division
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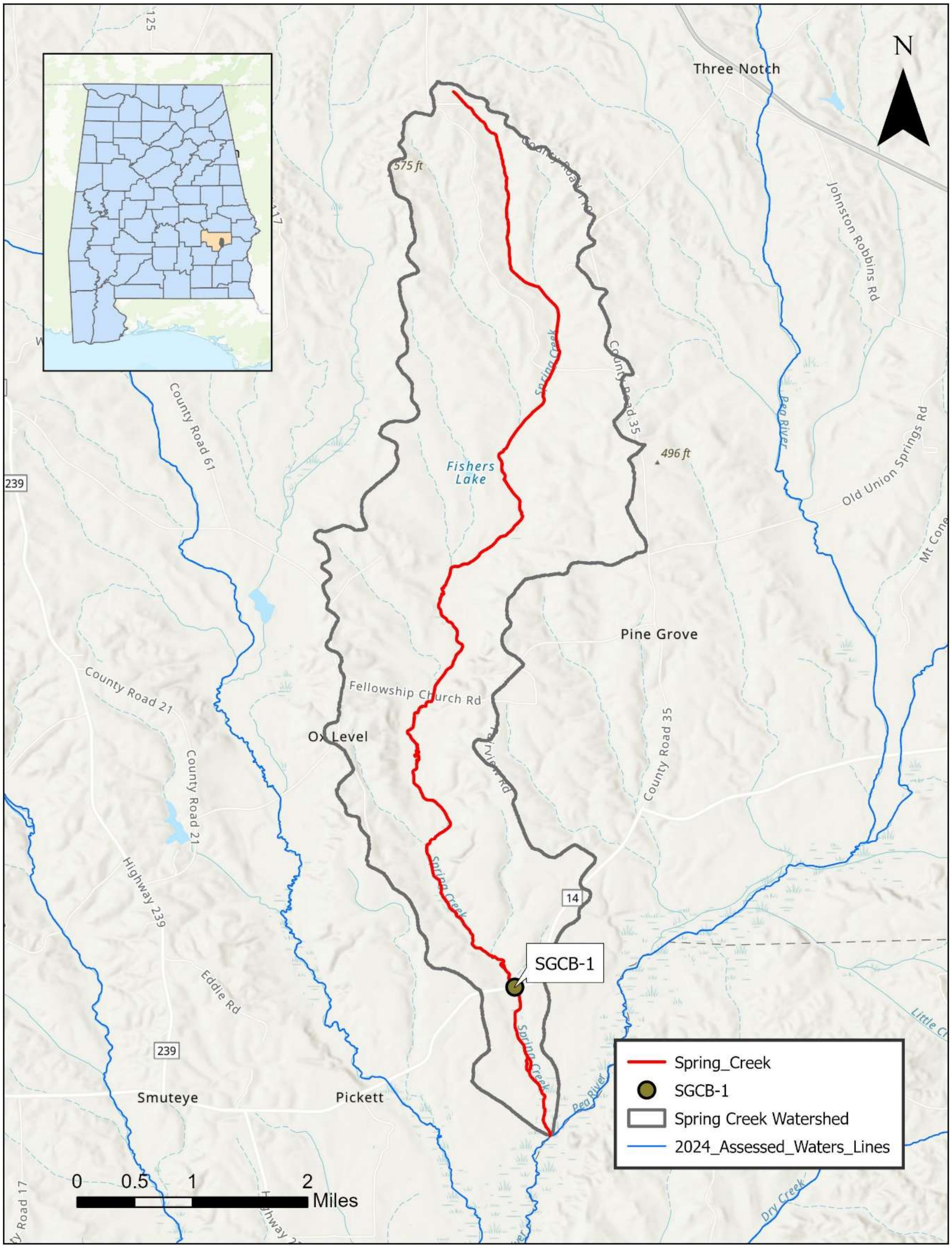
Figure 1.1 Map of Spring Creek Watershed and ADEM Sampling Station



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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 wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources including natural background levels, and a margin of safety (MOS).

Spring Creek, a part of the Choctawhatchee River basin, is currently included on Alabama's §303(d) list for pathogens (*E. coli*) from its source in Bullock County (southeast of Union Springs, Alabama) to its confluence with the Pea River. The total length for the impaired segment of Spring Creek is 11.13 miles, and the total drainage area of the Spring Creek watershed is 11.1 square miles. The impaired segment has a use classification of Fish & Wildlife (F&W).

Spring Creek was first included on the §303(d) list for pathogens in 2018 based on ADEM monitoring data collected in 2015 at station SGCB-1. Spring Creek has subsequently been listed for pathogens on the 2020, 2022 and 2024 §303(d) lists of impaired waterbodies.

In 2024, sampling studies were performed by ADEM to further assess the water quality of the impaired stream. For the purposes of this TMDL, the 2024 data will be used to assess the water quality of Spring 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 SGCB-1. The collective bacterial data is listed in Appendix 7.2, Tables 7.1 and 7.2 for reference.

ADEM collected 16 *E. coli* samples at station SGCB-1 in 2024. Two geometric mean studies were also conducted at this station on Spring Creek in 2024. According to the data, Spring 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 Spring 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 in-stream flows and 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 geometric mean *E. coli* target of 113.4 colonies/100 ml (126 colonies/100 ml – 10% Margin of Safety).

Table 1.1 is a summary of the TMDL, defined as the maximum allowable *E. coli* loading under critical conditions for Spring Creek.

Table 1.1 *E. coli* TMDL for Spring Creek

TMDL[a]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[b]			Load Allocation (LA)	
		WWTPs[c]	Stormwater (MS4s and other NPDES sources)[d]	Leaking Collection Systems[e]		
(col/day)	(col/day)	(col/day)	(% reduction)	(col/day)	(col/day)	(% reduction)
6.85E+10	6.85E+9	NA	NA	0	6.16E+10	86%

Note: NA = not applicable
a. TMDL was established using the single sample criterion of 298 colonies/100ml.
b. Future CAFOs will be assigned a wasteload allocation (WLA) of zero.
c. Future WWTPs must meet the applicable instream water quality criteria for pathogens at the point of discharge.
d. Future MS4 areas and other NPDES-permitted stormwater sources will demonstrate consistency with the requirements of this TMDL through implementation and maintenance of BMPs on a case-by-case basis.
e. 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*.

Compliance with the terms and conditions of 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 load allocation (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 Spring 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 11.13 miles of Spring Creek as impaired for pathogens. The §303(d) listing for pathogens was originally reported on Alabama's 2018 List of Impaired Waters based on 2015 ADEM monitoring data from station SGCB-1. Spring Creek has subsequently been listed for pathogens on the 2020, 2022 and 2024 §303(d) lists of impaired waterbodies.

2.2 Problem Definition

Waterbody Impaired:	Spring Creek – from the Pea River to its source
Impaired Reach Length:	11.13 miles
Impaired Drainage Area:	11.1 square miles
Water Quality Standard Violation:	Pathogens (single sample, geometric mean)
Pollutant of Concern:	Pathogens (*E. coli*)
Water Use Classification:	Fish & Wildlife (F&W)

Usage Related to Classification:
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 F&W use classification are described in ADEM Admin. Code R. 335-6-10-.09(5)(e)7(i) and (ii) as follows:

(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.

<u>Criteria Exceeded:</u>
Spring Creek was first included on the §303(d) list for pathogens in 2018 based on ADEM's 2015 *E. coli* data collected at station SGCB-1. Of the eight *E. coli* samples collected at station SGCB-1, two exceeded the applicable single sample 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 for Spring Creek. 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 Spring 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 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.

There are currently no NPDES-regulated point sources in the Spring Creek watershed. In addition, the Spring Creek watershed does not presently qualify as a municipal separate storm sewer system (MS4) area. Any future NPDES-regulated discharger that is considered by the Department to be a pathogen source will be required to demonstrate consistency with the assumptions and requirements of this TMDL.

There are currently no Concentrated Animal Feeding Operations (CAFOs) or Voluntary Animal Feeding Operations (AFOs) in the Spring Creek watershed. AFOs/CAFOs are required to implement and maintain effective best management practices (BMPs) that meet or exceed Natural Resources Conservation Service (NRCS) technical standards and guidelines, and the ADEM AFO/CAFO rules currently prohibit point source discharges of pollutants from these facilities and their associated land application activities. As a result, future AFOs/CAFOs will receive a wasteload allocation of zero.

There are currently no registered sites in the Spring 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, there have been no recent SSOs reported in the Spring Creek watershed.

3.2.2 Nonpoint Sources in the Spring 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. There are several livestock pastures and horse stables in the watershed. 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 storm water 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 Spring Creek watershed was determined using ArcMap with land use datasets derived from the 2021 National Land Cover Dataset (NLCD). Table 3.1, Figure 3.1, and Figure 3.2 display the land use areas for the Spring Creek watershed.

The majority of the Spring Creek watershed is forested/natural (89.22%). Other land uses include agriculture (8.55%), developed land (1.88%) and open water (0.35%). If not managed properly, agriculture can have significant nonpoint source impacts. Septic systems can also be a main source of bacteria if not properly installed and maintained.

Table 3.1 Land Use Areas for the Spring Creek Watershed

Cumulative Land Use	Mi^2	Acres	Percent
Open Water	0.04	24.86	0.35%
Forested/Natural	9.90	6338.19	89.22%
Agriculture	0.95	607.39	8.55%
Developed (cumulative)	0.21	133.56	1.88%
Total	**11.10**	**7104.00**	**100.0%**

Figure 3.1 Land Use Graph for the Spring Creek Watershed

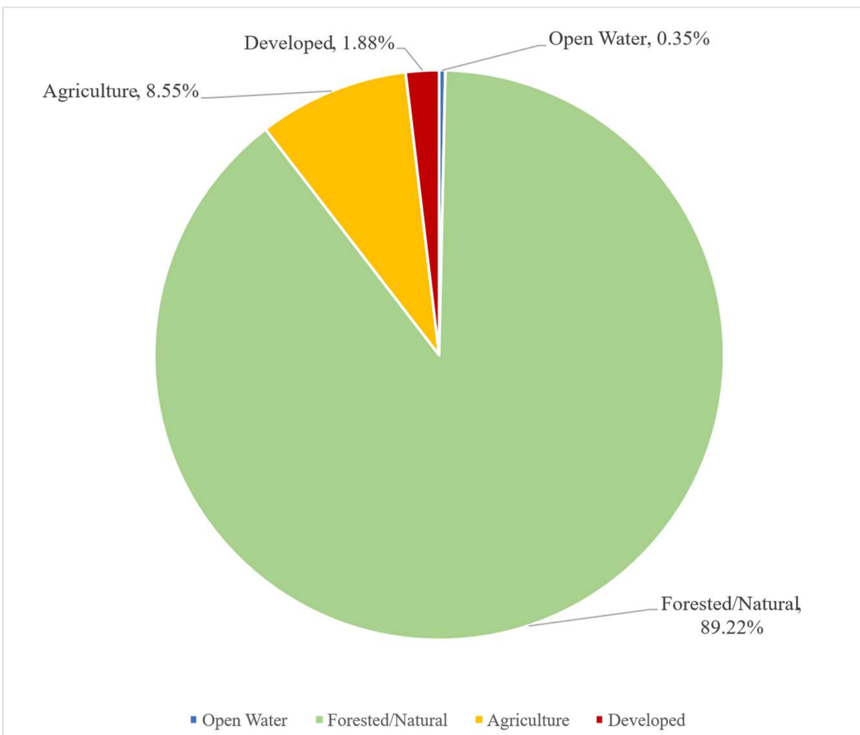
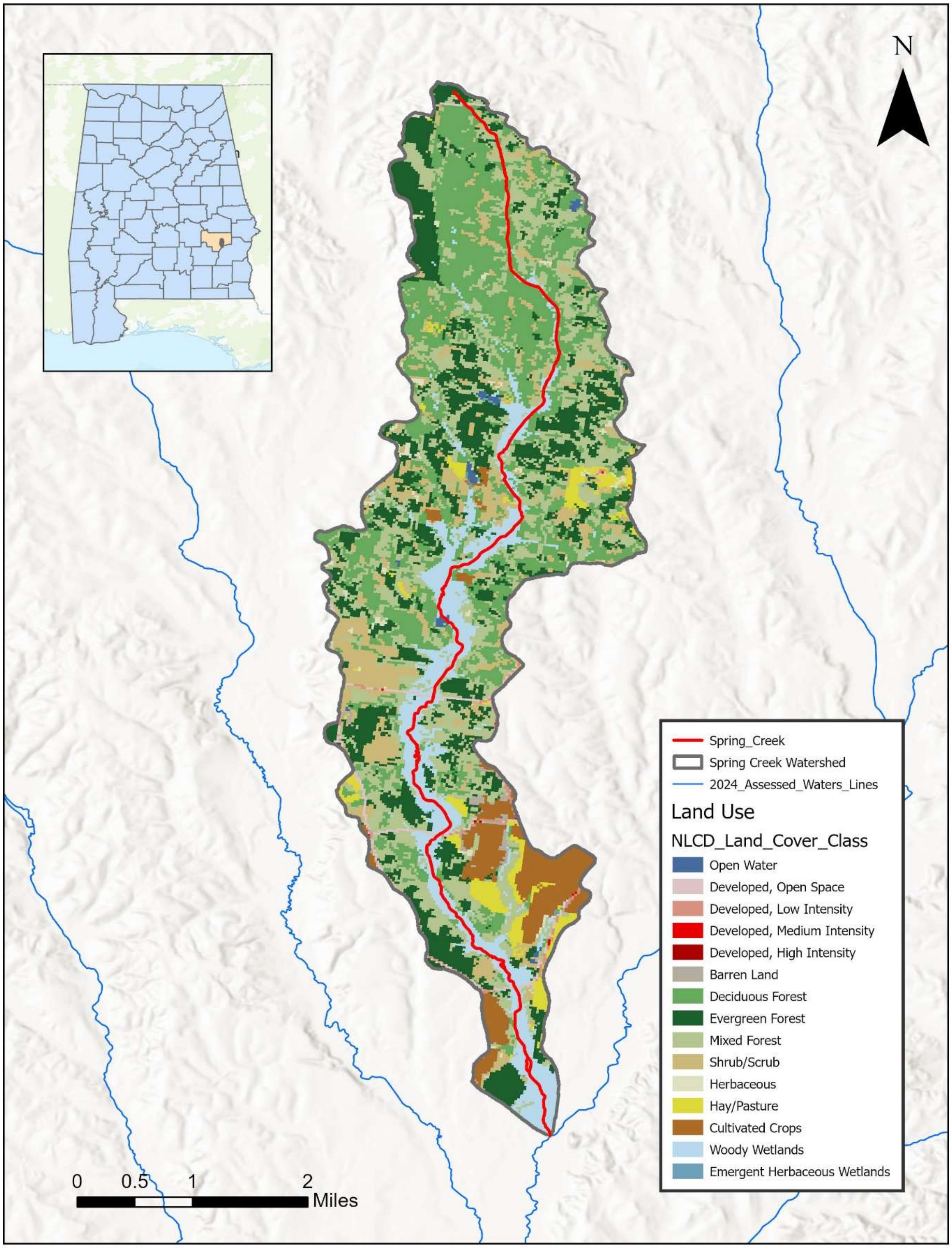


Figure 3.2 Land Use Map for the Spring Creek Watershed



3.4 Linkage Between Numeric Targets and Sources

The majority of the Spring Creek watershed's land use is forested/natural. Pollutant loadings from forested areas tend to be low due to their filtering capabilities and will be considered as background conditions. Approximately nine percent of the watershed is agriculture. The most likely sources of pathogen loadings in Spring Creek are from agricultural land uses and leaking/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

In 2024, ADEM collected water quality data on Spring Creek at station SGCB-1. Figure 1.1 and Table 3.2 display the station location and description, respectively. The 2024 data, shown in Table 3.3, 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 3.2 ADEM Sampling Station in the Spring Creek Watershed

Station ID	Station Location	Latitude	Longitude
SGCB-1	Spring Creek at Bullock County Road 14	31.991717	-85.60669

Of the 16 *E. coli* samples collected in 2024, six violated the applicable single sample maximum criterion for the Fish and Wildlife use classification. In addition, the May and August 2024 geometric mean values exceeded the applicable summer geometric mean criterion (126 colonies/100 mL). The 2024 data for SGCB-1 is shown below in Table 3.3.

Table 3.3 2024 *E. coli* data at SGCB-1

Station SGCB-1						
Visit Date	Single Sample (col/100 ml)	*E. coli* Criterion (col/100 ml)	*E. coli* dc*	Geometric Mean (col/100 ml)	Geometric Mean Criterion (col/100 ml)	Flow (cfs)[t]
3/27/2024	1413.6	2507	H			19.49
4/9/2024	648.8	2507	H			5.84
5/6/2024	176.8	298				1.37
5/7/2024	143.4	298				1.15
5/8/2024	132.6	298				1.27
5/9/2024	176.4	298		352.1	126	1.15
5/16/2024	813	298				5.76
6/6/2024	1986.3**	298				9.39
7/11/2024	69.1	298				1.94
8/14/2024	95.9	298				0.59
8/19/2024	151.5	298				0.48
8/20/2024	1299.7	298				0.44
8/21/2024	613.1	298		411.7	126	0.41
8/22/2024	253	298				0.46
9/5/2024	387.3	298				0.40
10/30/2024	613.1	298				1.22

*H = The analytical holding times for analysis are exceeded.

** Highest single sample exceedance

[t] Flows highlighted in yellow were estimated by taking the average daily flow from USGS Gage 02363000 for the sampling date and multiplying by the ratio of the sampling station/gage drainage area.

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 dispensing of *E. coli* bacteria into streams, resulting in spikes of *E. coli* bacteria counts. In winter, frequent low intensity rain events are more typical and do not allow for the build-up of *E. coli* bacteria on the land surface, resulting in a more uniform loading rate.

The Spring Creek watershed 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. That value was 1986.3 colonies/100 ml, which occurred at station SGCB-1 on June 6, 2024. The flow at the time the sample was collected was 9.39 cfs. The use of the highest exceedance to calculate the TMDL is expected to be protective of water quality in Spring 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 ten percent and calculating a mass loading target with measured flow data. For the F&W classification, the single sample *E. coli* maximum value of 298 colonies/100 ml was reduced by 10% to 268.2 colonies/100 ml. The geometric mean criterion of 126 colonies/ml was also reduced ten percent to 113.4 colonies/100 ml.

4.0 TMDL Development

4.1 Definition of a TMDL

A TMDL is the sum of individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources including natural background levels, and a 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:

$$\text{TMDL} = \Sigma \text{ WLAs} + \Sigma \text{ LAs} + \text{MOS}$$

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 Spring Creek. The mass balance approach utilizes the conservation of mass principle. Total mass loads can be calculated by multiplying the *E. coli* concentration, the instream flow, and a conversion factor. Existing loads were calculated for the highest single sample exceedance and the highest geometric mean sample exceedance. In the same manner, allowable loads were calculated for both the single sample criterion and the geometric mean criterion. There were both single sample and geometric mean violations; the TMDL was based on the violation that produced the highest calculated percent reduction 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 by the flow on the day of the exceedance. The highest exceedance occurred on June 6, 2024, at station SGCB-1. The product of the concentration, flow, and the conversion factor gives the total mass loading (colonies per day) of *E. coli* to Spring Creek.

$$\frac{9.39\ \text{ft}^3}{s} \times \frac{1986.3\ \text{colonies}}{100\text{ml}} \times \frac{24{,}465{,}755\ 100\text{ml} * s}{\text{ft}^3 * \text{day}} = \frac{4.56 \times 10^{11}\text{colonies}}{\text{day}}$$

The **geometric mean** mass loading was calculated by multiplying the highest geometric mean exceedance concentration times the average of the estimated stream flows over the geometric mean sampling period. This concentration was calculated based on measurements between August 19, 2024, and September 5, 2024, at station SGCB-1. The average streamflow for this time was 0.44 cfs. The product of the average streamflow, the geometric mean value, and the conversion factor gives the total mass loading (colonies per day) of *E. coli* to Spring Creek under the geometric mean exceedance condition.

$$\frac{0.44\ \text{ft}^3}{s} \times \frac{411.7\ \text{colonies}}{100\text{ml}} \times \frac{24{,}465{,}755\ 100\text{ml} * s}{\text{ft}^3 * \text{day}} = \frac{4.40 \times 10^{9}\text{colonies}}{\text{day}}$$

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 flow and the allowable concentration. This value was then multiplied by the conversion factor to calculate the allowable load. These calculations can be seen below.

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

$$\frac{9.39\ \text{ft}^3}{s} \times \frac{268.2\ \text{colonies}}{100\text{ml}} \times \frac{24{,}465{,}755\ 100\text{ml} * s}{\text{ft}^3 * \text{day}} = \frac{6.16 \times 10^{10}\text{colonies}}{\text{day}}$$

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

$$\frac{9.39\ \text{ft}^3}{s} \times \frac{29.8\ \text{colonies}}{100\text{ml}} \times \frac{24{,}465{,}755\ 100\text{ml} * s}{\text{ft}^3 * \text{day}} = \frac{6.85 \times 10^{9}\text{colonies}}{\text{day}}$$

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

$$\frac{0.44\ \text{ft}^3}{s} \times \frac{113.4\ \text{colonies}}{100\text{ml}} \times \frac{24{,}465{,}755\ 100\text{ml} * s}{\text{ft}^3 * \text{day}} = \frac{1.22 \times 10^9 \text{colonies}}{\text{day}}$$

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

$$\frac{0.44\ \text{ft}^3}{s} \times \frac{12.6\ \text{colonies}}{100\text{ml}} \times \frac{24{,}465{,}755\ 100\text{ml} * s}{\text{ft}^3 * \text{day}} = \frac{1.36 \times 10^8 \text{colonies}}{\text{day}}$$

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 Spring Creek as evaluated at station SGCB-1. Table 4.1 shows the existing and allowable *E. coli* loads and required reductions for the Spring Creek watershed.

Table 4.1 *E. coli* Loads and Required Reductions for Spring Creek

Source	Existing Load (col/day)	Allowable Load (col/day)	Required Reduction (col/day)	% Reduction
Single Sample Load	4.56E+11	6.16E+10	3.95E+11	86%
Geometric Mean Load	4.40E+09	1.22E+09	3.18E+09	72%

From Table 4.1, compliance with the single sample criterion of 298 colonies/100 ml requires a reduction in the *E. coli* load of 86%. The TMDL, WLA, LA and MOS values necessary to achieve the applicable *E. coli* criterion are provided in Table 4.2 below.

Table 4.2 *E. coli* TMDL for Spring Creek

TMDL[a]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[b]			Load Allocation (LA)	
		WWTPs[c]	Stormwater (MS4s and other NPDES sources)[d]	Leaking Collection Systems[e]		
(col/day)	(col/day)	(col/day)	(% reduction)	(col/day)	(col/day)	(% reduction)
6.85E+10	6.85E+9	NA	NA	0	6.16E+10	86%

Note: NA = not applicable
a. TMDL was established using the single sample criterion of 298 colonies/100ml.
b. Future CAFOs will be assigned a wasteload allocation (WLA) of zero.
c. Future WWTPs must meet the applicable instream water quality criteria for pathogens at the point of discharge.
d. Future MS4 areas and other NPDES-permitted stormwater sources will demonstrate consistency with the requirements of this TMDL through implementation and maintenance of BMPs on a case-by-case basis.
e. 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*.

4.3 TMDL Summary

Spring Creek was first included on the §303(d) list for pathogens in 2018 based on ADEM's *E. coli* data collected at station SGCB-1 in 2015. In 2024, ADEM collected water quality data at station SGCB-1 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 Spring Creek. Based on the TMDL analysis, it was determined that an 86% reduction in the *E. coli* loading was necessary to achieve compliance with applicable water quality standards.

Compliance with the terms and conditions of 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 necessary to achieve applicable water quality criteria, and we are committed to targeting the load reductions to improve water quality in the Spring 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
Alabama, Cahaba, Mobile, Tallapoosa, Tennessee (Pickwick and Wilson)	2026/2029
Black Warrior, Blackwater, Chattahoochee, Chipola, Choctawhatchee, Escambia, Perdido, Tennessee (Wheeler), Yellow	2027/2030
Coosa, Escatawpa, Tennessee (Guntersville), Tombigbee	2028/2031

6.0 Public Participation

As part of the public participation process, this TMDL will be placed on public notice and made available for review and comment. The public notice and subject TMDL will be made available on ADEM's website: www.adem.alabama.gov. In addition, the public notice will be submitted to persons who have requested to be on ADEM's postal and electronic mailing distributions. The public may 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 will be 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 will become part of the administrative record. ADEM will consider 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, 2025. Water Division - Water Quality Program, Chapter 335-6-10, Water Quality Criteria.

ADEM Administrative Code, 2025. Water Division - Water Quality Program, Chapter 335-6-11, Use Classifications for Interstate and Intrastate Waters.

Alabama's Monitoring Program. 2015 and 2024. 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 and 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 2015 *E. coli* Data Collected on Spring Creek

2015 Listing Data				
Station	**Visit Date**	**Flow (cfs)**	***E. coli* (col/100 ml)**	***E. coli* dc***
SGCB-1	3/18/2015	6.2	193.5	H
SGCB-1	4/8/2015	4.69	114.5	H
SGCB-1	5/5/2015	2.4	55.6	JH
SGCB-1	6/10/2015	9.54	648.8	H
SGCB-1	6/30/2015	0.62	190.4	H
SGCB-1	8/5/2015		25.6	H
SGCB-1	9/8/2015		209.8	H
SGCB-1	10/6/2015		325.5	H

*H = The analytical holding times for analysis are exceeded. JH = The identification of the analyte is acceptable; the reported value is an estimate. The analytical holding times for analysis are exceeded.

Table 7.2 2024 *E. coli* Data Collected on Spring Creek

2024 Data				
Station	**Visit Date**	**Flow (cfs)[t]**	***E. coli* (col/100 ml)**	***E. coli* dc***
SGCB-1	3/27/2024	19.49	1413.6	H
SGCB-1	4/9/2024	5.84	648.8	H
SGCB-1	5/6/2024	1.37	176.8	
SGCB-1	5/7/2024	1.15	143.4	
SGCB-1	5/8/2024	1.27	132.6	
SGCB-1	5/9/2024	1.15	176.4	
SGCB-1	5/16/2024	5.76	813	
SGCB-1	6/6/2024	9.39	1986.3	
SGCB-1	7/11/2024	1.94	69.1	
SGCB-1	8/14/2024	0.59	95.9	
SGCB-1	8/19/2024	0.48	151.5	
SGCB-1	8/20/2024	0.44	1299.7	
SGCB-1	8/21/2024	0.41	613.1	
SGCB-1	8/22/2024	0.46	253	
SGCB-1	9/5/2024	0.40	387.3	
SGCB-1	10/30/2024	1.22	613.1	

[t] Flows highlighted in yellow were estimated by taking the average daily flow from USGS Gage 02363000 for the sampling date and multiplying by the ratio of the sampling station/gage drainage area.
*H = The analytical holding times for analysis are exceeded.

7.3 Spring Creek Watershed Photos (September 25, 2023)

Photo 7.1 Station SGCB-1 on Spring Creek at C.R. 14, upstream view.

Photo 7.2 Station SGCB-1 on Spring Creek at C.R. 14, downstream view.