Final

Total Maximum Daily Load (TMDL)

for

Cane Creek

Assessment Unit ID # AL03160109-0601-102

Town Creek

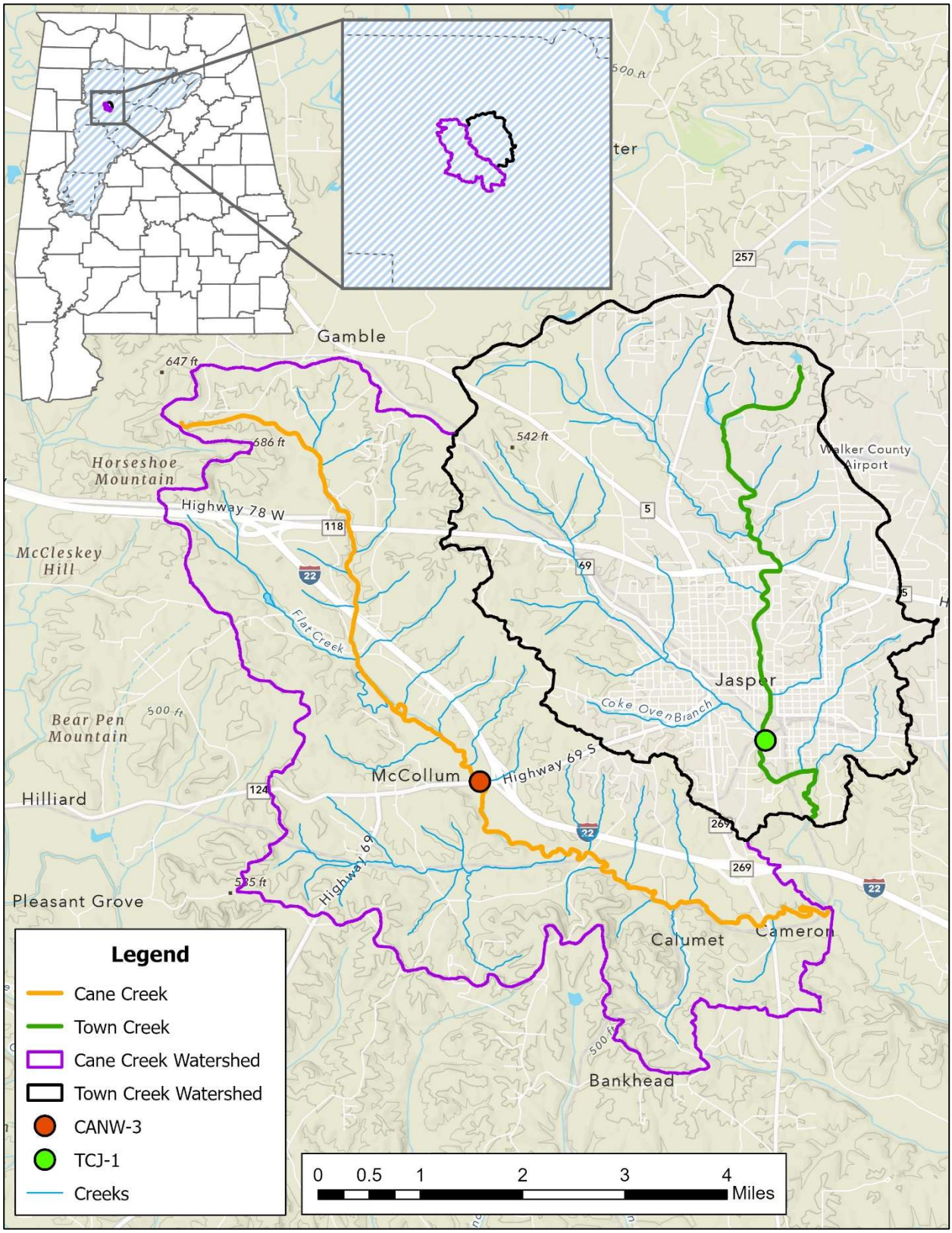
Assessment Unit ID # AL03160109-0601-902

Walker County

Pathogens (*E. coli*)

Alabama Department of Environmental Management
Water Quality Branch
Water Division
April 2026

Figure 1-1 Map of the Cane Creek and Town Creek Watersheds



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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).

Cane Creek, a part of the Black Warrior River basin, is located in Walker County. Cane Creek begins northwest of Jasper, Alabama and flows southeast to its confluence with Mulberry Fork. The total length of Cane Creek is 20.92 miles, and the total drainage area of the Cane Creek watershed is 63.53 square miles. Cane Creek is currently included on Alabama's §303(d) list for pathogens (*E. coli*) from its source to Town Creek. The §303(d)-listed length of Cane Creek is 10.34 miles, and the drainage area of the watershed for the listed segment is 16.87 square miles. This segment of Cane Creek has a use classification of Fish and Wildlife (F&W).

Town Creek, a part of the Black Warrior River basin, is also located in Walker County. Town Creek begins north of Jasper, Alabama and flows south to its confluence with Cane Creek. The total length of Town Creek is 7.37 miles, and the total drainage area of the Town Creek watershed is 14.86 square miles. Town Creek is currently included on Alabama's §303(d) list for pathogens (*E. coli*) from its source to 100 yards upstream of the Southern Railway crossing. The §303(d)-listed length of Town Creek is 6.27 miles, and the drainage area of the watershed for the listed segment is 13.91 square miles. This segment of Town Creek has a use classification of Fish and Wildlife (F&W).

Cane Creek (AL03160109-0601-102) was first included on the §303(d) list for pathogens in 2020 based on ADEM monitoring data collected in 2018 at station CANW-3. Town Creek (AL03160109-0601-902) was first included on the §303(d) list for pathogens in 2020 based on ADEM monitoring data collected in 2018 at station TCJ-1. Cane Creek and Town Creek have subsequently been listed for pathogens on the 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 streams. A review of the general water quality and intensive *E. coli* studies revealed that the listed segments of Cane Creek and Town Creek were not meeting the pathogen criteria applicable to their use classification of F&W. 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. The bacterial data for the impaired waterbodies is listed in Appendix 7.2, Tables 7-3 and 7.4 for reference.

A mass balance approach was used for calculating the pathogen TMDLs for Cane Creek and Town 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).

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

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

Source	Existing Load (col/day)	Allowable Load (col/day)	Required Reduction (col/day)	% Reduction
Single Sample Load	7.34E+10	4.07E+09	6.93E+10	94%
Geometric Mean Load	2.42E+09	4.99E+08	1.92E+09	79%

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

TMDL[a]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[f]			Load Allocation (LA)	
		WWTPs[b]	Stormwater (MS4s[c] and other NPDES sources[d])	Leaking Collection Systems[e]		
(col/day)	(col/day)	(col/day)	(% reduction)	(col/day)	(col/day)	(% reduction)
4.52E+09	4.52E+08	N/A	N/A	0	4.07E+09	94%

N/A = Not applicable
a. TMDL was established using the single sample criterion of 298 colonies/100ml.
b. Future WWTPs must meet the applicable instream water quality criteria for pathogens at the point of discharge.
c. Future MS4 areas 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.
d. Future NPDES-permitted 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.
e. 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*.
f. Future CAFOs will be assigned a WLA of zero.

Table 1-3 is a summary of the estimated existing load, allowable load, and percent reduction for the single sample and geometric mean criteria for Town Creek. Table 1-4 provides the details of the TMDL along with the corresponding reductions for Town Creek, which are protective of the *E. coli* water quality criteria year-round.

Table 1-3 *E. coli* Loads and Required Reductions for Town Creek

Source	Existing Load (col/day)	Allowable Load (col/day)	Required Reduction (col/day)	% Reduction
Single Sample Load	2.61E+12	1.76E+11	2.43E+12	93%
Geometric Mean Load	3.18E+10	1.84E+10	1.34E+10	42%

Table 1-4 *E. coli* TMDL for Town Creek

TMDL[a]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[f]			Load Allocation (LA)	
		WWTPs[b]	Stormwater (MS4s[c] and other NPDES sources[d])	Leaking Collection Systems[e]		
(col/day)	(col/day)	(col/day)	(% reduction)	(col/day)	(col/day)	(% reduction)
1.96E+11	1.96E+10	N/A	93%	0	1.76E+11	93%

N/A = Not applicable
a. TMDL was established using the single sample criterion of 298 colonies/100ml.
b. Future WWTPs must meet the applicable instream water quality criteria for pathogens at the point of discharge.
c. Future MS4 areas 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 percent reduction should not be interpreted as a numeric permit limitation.
d. Other NPDES-permitted 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 percent reduction should not be interpreted as a numeric permit limitation.
e. 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*.
f. 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 Cane Creek and Town Creek watersheds. 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 10.34 miles of Cane Creek as impaired for pathogens. The §303(d) listing for pathogens was originally reported on Alabama's 2020 List of Impaired Waters based on ADEM monitoring data collected in 2018 and was subsequently included on the 2022 and 2024 lists.

The State of Alabama has also identified 6.27 miles of Town Creek as impaired for pathogens. The §303(d) listing for pathogens was originally reported on Alabama's 2020 List of Impaired Waters based on ADEM monitoring data collected in 2018 and was subsequently included on the 2022 and 2024 lists.

2.2 Problem Definition

Waterbody Impaired:	Cane Creek – from its source to Town Creek
Assessment Unit ID:	AL03160109-0601-102
Impaired Reach Length:	10.34 miles
Impaired Drainage Area:	16.87 square miles
Water Quality Standard Violation:	Pathogens (Single Sample, Geometric Mean)
Pollutant of Concern:	Pathogens (*E. coli*)
Water Use Classification:	Fish and Wildlife

Waterbody Impaired:	Town Creek – from its source to 100 yards upstream of Southern Railway Crossing
Assessment Unit ID:	AL03160109-0601-902
Impaired Reach Length:	6.27 miles
Impaired Drainage Area:	13.91 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 segments are 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.

<u>*E. coli* Criteria:</u>

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:

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.

<u>Criteria Exceeded:</u>

Cane Creek (AL03160109-0601-102) was first included on the §303(d) list for pathogens in 2020 based on ADEM's *E. coli* data collected in 2018 at station CANW-3. Of the eight *E. coli* samples

collected at station CANW-3 in 2018, two 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.

Town Creek (AL03160109-0601-902) was first included on the §303(d) list for pathogens in 2020 based on ADEM's *E. coli* data collected in 2018 at station TCJ-1. Of the eight *E. coli* samples collected at station TCJ-1 in 2018, five violated the applicable single sample maximum criterion of 298 colonies/100 ml. The listing data can be found in Appendix 7.2, Table 7-2.

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 Cane Creek and Town Creek Watersheds

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.

Continuous Point Sources

There are currently no continuous NPDES-permitted facilities in the Cane Creek or Town Creek watersheds.

Non-Continuous Point Sources

Mar-Jac Poultry AL, LLC (AL0081825) operates a poultry processing facility in the Town Creek watershed. This facility is permitted through the NPDES program to discharge stormwater runoff to Town Creek. The current permit requires the facility to monitor for *E. coli* in their stormwater runoff. Mar-Jac Poultry AL, LLC 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 21 other facilities with NPDES permits for non-continuous/stormwater discharges (e.g., landfill, salvage and recycling, etc.) within the Cane Creek and Town Creek watersheds. 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.

The Cane Creek and Town Creek watersheds do not presently qualify as municipal separate storm sewer system (MS4) areas.

There are currently no Animal Feeding Operation/Concentrated Animal Feeding Operation (AFO/CAFO) facilities located within the Cane Creek or Town Creek watersheds. The ADEM AFO/CAFO rules prohibit point source discharges of pollutants from these facilities and their associated waste land application activities. As a result, current and future AFOs/CAFOs will receive a wasteload allocation of zero.

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 registered sites in the Cane Creek or Town Creek watersheds 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 Town Creek watershed in recent years. Since 2019, 106 SSOs within the watershed have been reported from Town Creek WWTP (AL0023418). These SSOs are listed in Appendix 7.3, Table 7-5 along with a map of the SSO locations in Appendix 7.3, Figure 7-1.

3.2.2 Nonpoint Sources in the Cane Creek and Town Creek Watersheds

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 Cane Creek and Town Creek watersheds was determined using ArcGIS Pro with land use datasets derived from the 2021 National Land Cover Dataset (NLCD). Figure 3-1 displays the land use map for the Cane Creek and Town Creek watersheds. Tables 3-1 and 3-2 display the land use areas for the Cane Creek and Town Creek watersheds, respectively.

The majority of the Cane Creek watershed is forested/natural (81.22%). Other land uses include developed land (11.18%) and agriculture (7.31%). The majority of the Town Creek watershed is developed land (47.78%) and forested/natural (43.75%). Agriculture makes up 8.32% of the land use in the Town Creek watershed. 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 3-1 Land Use Map for the Cane Creek and Town Creek Watersheds

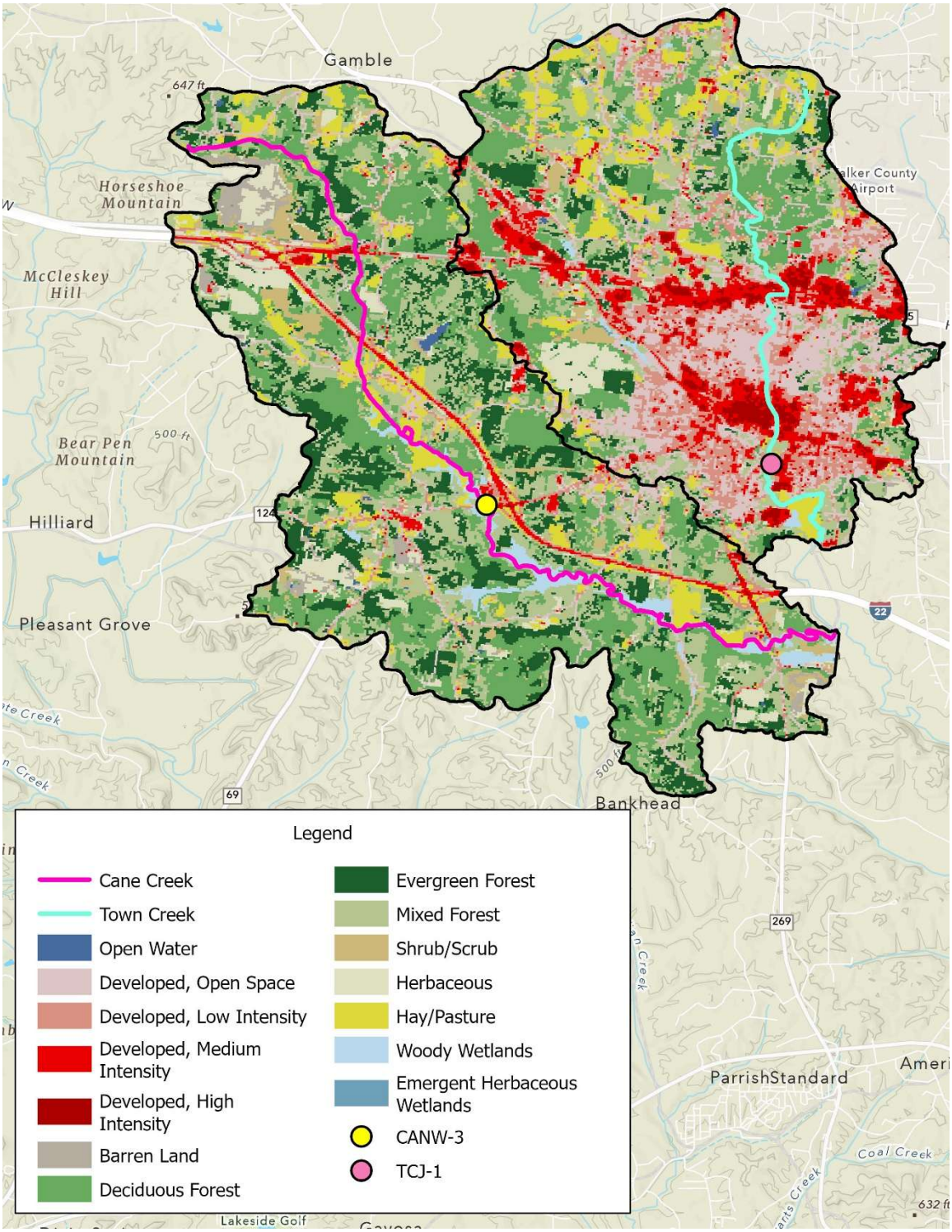


Table 3-1 Land Use Areas for the Cane Creek Watershed

Cumulative Land Use	Square Miles (mi^2)	Acres	Percent
Open Water	0.05	30.92	0.29%
Forested/Natural	13.70	8768.83	81.22%
Agriculture	1.23	789.74	7.31%
Developed (Grouped)	1.89	1207.31	11.18%
Total	**16.87**	**10796.80**	**100.00%**

Figure 3-2 Primary Land Uses in the Cane Creek Watershed

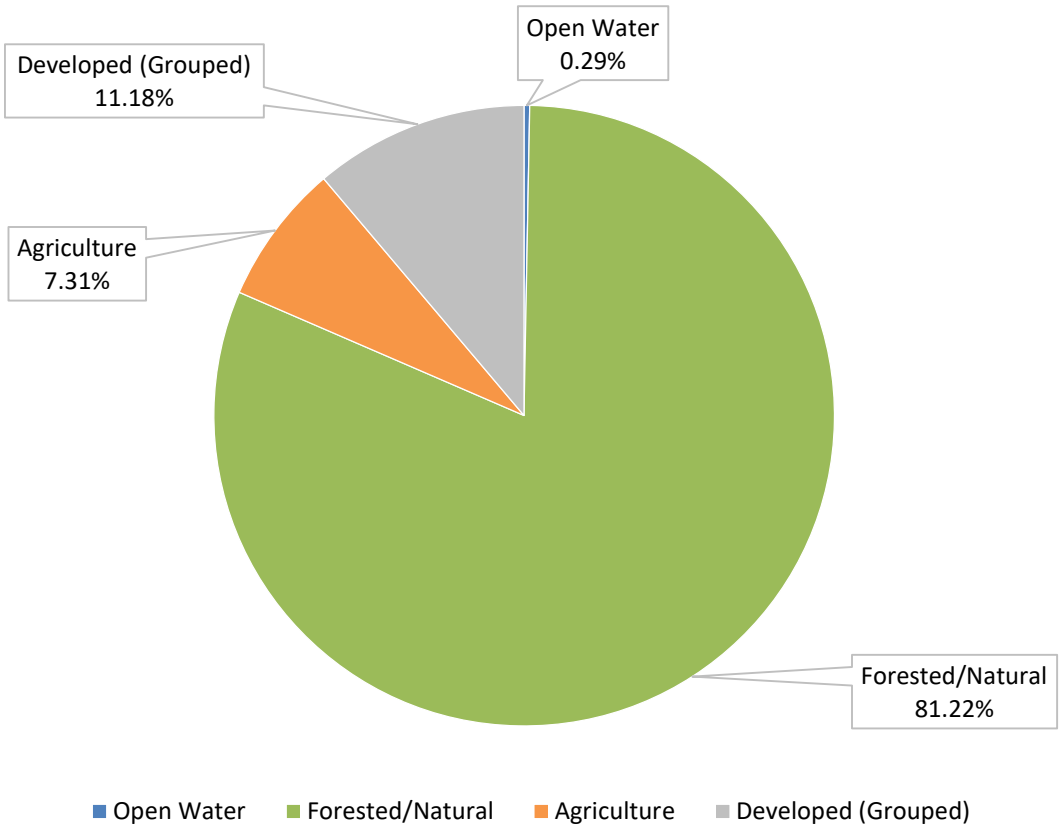
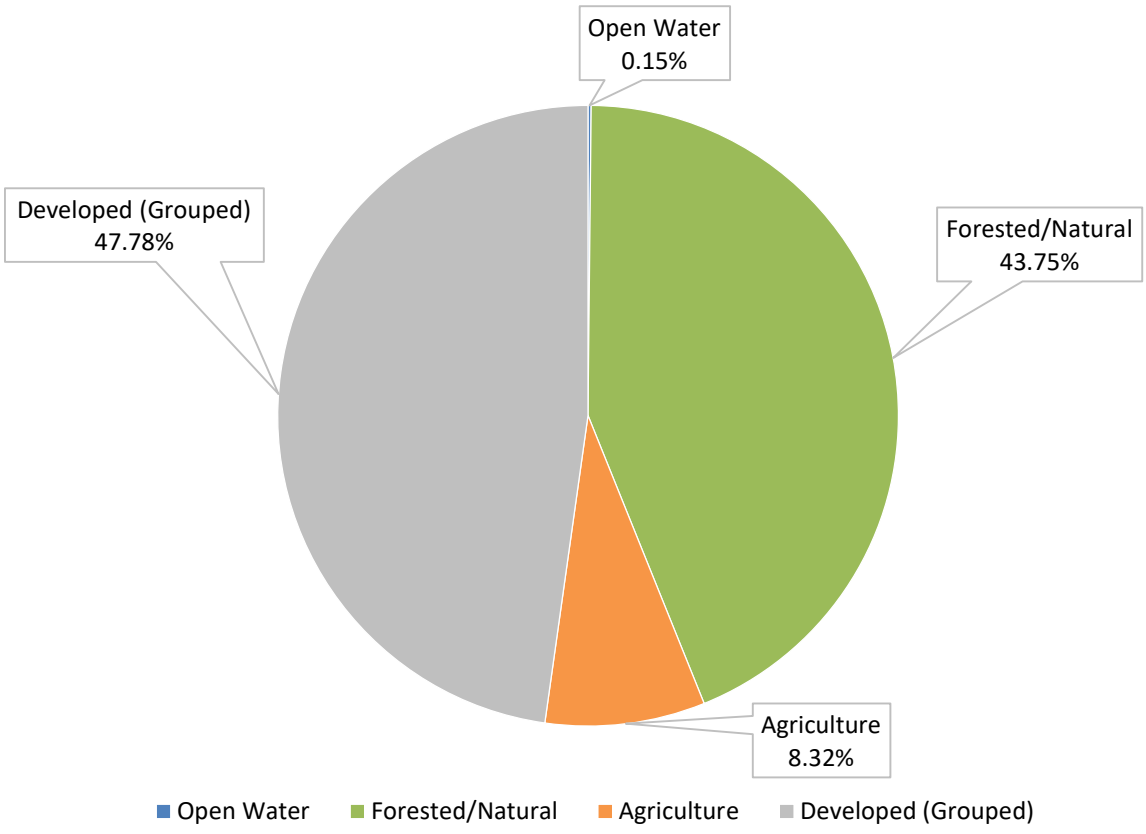


Table 3-2 Land Use Areas for the Town Creek Watershed

Cumulative Land Use	Square Miles (mi^2)	Acres	Percent
Open Water	0.02	13.79	0.15%
Forested/Natural	6.09	3894.67	43.75%
Agriculture	1.16	740.62	8.32%
Developed (Grouped)	6.65	4253.31	47.78%
Total	**13.91**	**8902.40**	**100.00%**

Figure 3-2 Primary Land Uses in the Town Creek Watershed



3.4 Linkage Between Numeric Targets and Sources

The Cane Creek watershed's primary land use is forested/natural, followed by developed land and agriculture. The Town Creek watershed's primary land uses are developed land and forested/natural, followed by 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 the impaired streams are failing septic systems, unpermitted discharges of wastewater, stormwater runoff, and the agricultural land uses. 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 Cane Creek at station CANW-3 and on Town Creek at station TCJ-1 to further assess the impaired streams. Figure 1-1 and Table 3-2 display the locations and descriptions, respectively, for the ADEM sampling stations. The 2024 data listed in Tables 3-3 and 3-4 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 Stations

Station ID	Station Location	Latitude	Longitude
CANW-3	Cane Creek at AL Hwy 69	33.81906	-87.3162
TCJ-1	Town Creek approximately 1 mile upstream of WWTP discharge at 26th St E bridge	33.82488	-87.27584

Five of the 16 *E. coli* samples collected at station CANW-3 in 2024 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 CANW-3 in July and September 2024; the geometric mean from July 2024 exceeded the *E. coli* criterion of 126 colonies/100 ml. This data can be viewed in Table 3-3 and Appendix 7.2, Table 7-3.

Three of the 16 *E. coli* samples collected at station TCJ-1 in 2024 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 TCJ-1 in July and September 2024; both geometric means exceeded the *E. coli* criterion of 126 colonies/100 ml. This data can be viewed in Table 3-4 and Appendix 7.2, Table 7-4.

Table 3-3 2024 *E. coli* Data at Station CANW-3

Station CANW-3					
Visit Date	***E. coli* (col/100 ml)**	***E. coli* Criterion (col/100 ml)**	**Geometric Mean (col/100 ml)**	**Geometric Mean Criterion (col/100 ml)**	**Flow (cfs)**
3/27/2024	137.4	2507			48.36
4/18/2024	261.3	2507			16.72
5/22/2024	344.8	298			0.68
6/12/2024	63.1	298			0.7
7/8/2024	74.9	298			-0.16
7/15/2024	172.3	298			-0.14
7/22/2024	686.7	298	548.6	126	-0.12
7/24/2024	4839.2	298			0.62
7/29/2024	1158.8	298			0.7
8/21/2024	40.4	298			-0.13
9/4/2024	143	298			-0.13
9/9/2024	5.2	298			-0.21
9/19/2024	261.3	298	102.4	126	2.46
9/23/2024	178.2	298			1.54
9/30/2024	325.5	298			0.32
10/29/2024	8.5	298			-0.92

Table 3-4 2024 *E. coli* Data at Station TCJ-1

Station TCJ-1					
Visit Date	***E. coli* (col/100 ml)**	***E. coli* Criterion (col/100 ml)**	**Geometric Mean (col/100 ml)**	**Geometric Mean Criterion (col/100 ml)**	**Flow (cfs)**
3/27/2024	272.3	2507			54.05
4/18/2024	1986.3	2507			14.66
5/22/2024	83.3	298			1.82
6/12/2024	88.4	298			1.72
7/8/2024	65.7	298			0.4
7/15/2024	25.6	298			0.56
7/22/2024	93.3	298	195.8	126	0.41
7/24/2024	3972.6	298			26.82
7/29/2024	461.1	298			4.99
8/21/2024	307.6	298			0.39
9/4/2024	105	298			0.19
9/9/2024	150	298			0.09
9/19/2024	248.1	298	155.4	126	4.8
9/23/2024	275.5	298			1.58
9/30/2024	84.2	298			1.3
10/29/2024	260.3	298			0.87

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.

Cane 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 4839.2 colonies/100 ml was collected on July 24, 2024, at station CANW-3. A flow of 0.62 cfs was measured at station CANW-3 during this sampling event. The use of the highest exceedance to calculate the TMDL is expected to be protective of water quality in Cane Creek year-round.

Town Creek also follows the trends described above. 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 3972.6 colonies/100 ml was collected on July 24, 2024, at station TCJ-1. A flow of 26.82 cfs was measured at station TCJ-1 during this sampling event. The use of the highest exceedance to calculate the TMDL is expected to be protective of water quality in Town 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 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 TMDLs for Cane Creek and Town 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.

4.2.1 Cane Creek – *Existing Conditions*

The **single sample** mass loading was calculated by multiplying the highest single sample exceedance concentration of 4839.2 col/100 ml by the measured flow at the time the sample was taken. This concentration was measured at station CANW-3 on July 24, 2024. The stream flow was 0.62 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 Cane Creek.

$$\frac{0.62\ \text{ft}^3}{\text{s}} \times \frac{4839.2\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{7.34 \times 10^{10}\ \text{colonies}}{\text{day}}$$

The **geometric mean** mass loading was calculated by multiplying the highest geometric mean exceedance concentration of 548.6 colonies/100 ml by the average of the flows over the geometric mean sampling period. This concentration was calculated based on measurements at station CANW-3 between July 8, 2024, and July 29, 2024, which are shown in Table 3-3. The average stream flow was calculated to be 0.18 cfs. The product of these two values times the conversion factor gives the total mass loading (colonies per day) of *E. coli* to Cane Creek under the geometric mean exceedance condition.

$$\frac{0.18\ \text{ft}^3}{\text{s}} \times \frac{548.6\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{2.42 \times 10^{9}\ \text{colonies}}{\text{day}}$$

4.2.2 Cane Creek – *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 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:

$$\frac{0.62\ \text{ft}^3}{\text{s}} \times \frac{268.2\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{4.07 \times 10^9\ \text{colonies}}{\text{day}}$$

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

$$\frac{0.62\ \text{ft}^3}{\text{s}} \times \frac{29.8\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{4.52 \times 10^8\ \text{colonies}}{\text{day}}$$

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

$$\frac{0.18\ \text{ft}^3}{\text{s}} \times \frac{113.4\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{4.99 \times 10^8\ \text{colonies}}{\text{day}}$$

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

$$\frac{0.18\ \text{ft}^3}{\text{s}} \times \frac{12.6\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{5.55 \times 10^7\ \text{colonies}}{\text{day}}$$

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 Cane Creek as evaluated at station CANW-3. Table 4-1 shows the existing and allowable *E. coli* loads and required reductions for the Cane Creek watershed.

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

Source	Existing Load (col/day)	Allowable Load (col/day)	Required Reduction (col/day)	% Reduction
Single Sample Load	7.34E+10	4.07E+09	6.93E+10	94%
Geometric Mean Load	2.42E+09	4.99E+08	1.92E+09	79%

From Table 4-1, compliance with the single sample criterion of 298 colonies/100 ml requires a reduction in the *E. coli* load of 94%. 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 Cane Creek

TMDL[a]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[f]			Load Allocation (LA)	
		WWTPs[b]	Stormwater (MS4s[c] and other NPDES sources[d])	Leaking Collection Systems[e]		
(col/day)	(col/day)	(col/day)	(% reduction)	(col/day)	(col/day)	(% reduction)
4.52E+09	4.52E+08	N/A	N/A	0	4.07E+09	94%

N/A = Not applicable
a. TMDL was established using the single sample criterion of 298 colonies/100ml.
b. Future WWTPs must meet the applicable instream water quality criteria for pathogens at the point of discharge.
c. Future MS4 areas 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.
d. Future NPDES-permitted 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.
e. 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*.
f. Future CAFOs will be assigned a WLA of zero.

4.2.3 Town Creek – *Existing Conditions*

The **single sample** mass loading was calculated by multiplying the highest single sample exceedance concentration of 3972.6 col/100 ml by the measured flow at the time the sample was taken. This concentration was measured at station TCJ-1 on July 24, 2024. The stream flow was 26.82 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 Town Creek.

$$\frac{26.82\ \text{ft}^3}{\text{s}} \times \frac{3972.6\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{2.61 \times 10^{12}\ \text{colonies}}{\text{day}}$$

The **geometric mean** mass loading was calculated by multiplying the highest geometric mean exceedance concentration of 195.8 colonies/100 ml by the average of the flows over the geometric mean sampling period. This concentration was calculated based on measurements at station TCJ-1 between July 8, 2024, and July 29, 2024, which are shown in Table 3-4. The average stream flow was calculated to be 6.64 cfs. The product of these two values times the conversion factor gives the total mass loading (colonies per day) of *E. coli* to Town Creek under the geometric mean exceedance condition.

$$\frac{6.64\ \text{ft}^3}{\text{s}} \times \frac{195.8\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{3.18 \times 10^{10}\ \text{colonies}}{\text{day}}$$

4.2.4 Town Creek – *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 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:

$$\frac{26.82\ \text{ft}^3}{\text{s}} \times \frac{268.2\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{1.76 \times 10^{11}\ \text{colonies}}{\text{day}}$$

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

$$\frac{26.82\ \text{ft}^3}{\text{s}} \times \frac{29.8\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{1.96 \times 10^{10}\ \text{colonies}}{\text{day}}$$

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

$$\frac{6.64\ \text{ft}^3}{\text{s}} \times \frac{113.4\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{1.84 \times 10^{10}\ \text{colonies}}{\text{day}}$$

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

$$\frac{6.64\ \text{ft}^3}{\text{s}} \times \frac{12.6\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755\ 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{2.05 \times 10^{9}\ \text{colonies}}{\text{day}}$$

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 Town Creek as evaluated at station TCJ-1. Table 4-3 shows the existing and allowable *E. coli* loads and required reductions for the Town Creek watershed.

Table 4-3 *E. coli* Loads and Required Reductions for Town Creek

Source	Existing Load (col/day)	Allowable Load (col/day)	Required Reduction (col/day)	% Reduction
Single Sample Load	2.61E+12	1.76E+11	2.43E+12	93%
Geometric Mean Load	3.18E+10	1.84E+10	1.34E+10	42%

From Table 4-3, compliance with the single sample criterion of 298 colonies/100 ml requires a reduction in the *E. coli* load of 93%. The TMDL, WLA, LA and MOS values necessary to achieve the applicable *E. coli* criterion are provided in Table 4-4.

Table 4-4 *E. coli* TMDL for Town 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)
1.96E+11	1.96E+10	N/A	93%	0	1.76E+11	93%

N/A = Not applicable
a. TMDL was established using the single sample criterion of 298 colonies/100ml.
b. Future WWTPs must meet the applicable instream water quality criteria for pathogens at the point of discharge.
c. Future MS4 areas 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 percent reduction should not be interpreted as a numeric permit limitation.
d. Other NPDES-permitted 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 percent reduction should not be interpreted as a numeric permit limitation.
e. 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*.
f. Future CAFOs will be assigned a WLA of zero.

4.3 TMDL Summary

Cane Creek was first included on the §303(d) list for pathogens in 2020 based on ADEM's *E. coli* data collected in 2018 at station CANW-3. In 2024, 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 Cane Creek. Based on the TMDL analysis, it was determined that a 94% reduction in *E. coli* loading was necessary to achieve compliance with applicable water quality standards.

Town Creek was first included on the §303(d) list for pathogens in 2020 based on ADEM's *E. coli* data collected in 2018 at station TCJ-1. In 2024, 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 Town Creek. Based on the TMDL analysis, it was determined that a 93% 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/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 Cane Creek and Town Creek watersheds. 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 was placed on public notice and made available for review and comment. The public notice and subject TMDL were made available on ADEM's website: www.adem.alabama.gov. In addition, the public notice was submitted to persons who requested to be on ADEM's postal and electronic mailing distributions. 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. No written comments were received during the public notice period.

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. 2018-2024. ADEM.

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

Alabama Department of Environmental Management, 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 2018 ADEM Pathogen Data Collected on Cane Creek (Listing Data)

Station CANW-3				
Visit Date	***E. coli* (col/100 ml)**	***E. coli* dc**	***E. coli* Criterion (col/100 ml)**	**Flow (cfs)**
3/15/2018	201.4		2507	14.36
4/10/2018	86		2507	6.4
5/8/2018	148.3		298	3.53
6/14/2018	574.8		298	1.02
7/12/2018	178.5		298	3.01
8/2/2018	238.2		298	1.63
9/11/2018	90.5		298	0.13
10/18/2018	488.4		298	0.7

Table 7-2 2018 ADEM Pathogen Data Collected on Town Creek (Listing Data)

Station TCJ-1				
Visit Date	***E. coli* (col/100 ml)**	***E. coli* dc***	***E. coli* Criterion (col/100 ml)**	**Flow (cfs)**
3/14/2018	461.1	H	2507	17.74
4/9/2018	178.5	H	2507	9.88
5/7/2018	648.8	H	298	5.54
6/13/2018	1986.3	H	298	2.42
7/11/2018	1203.3	H	298	3.77
8/2/2018	579.4	H	298	2.08
9/11/2018	187.2		298	1.35
10/18/2018	1046.2		298	2.68

*H denotes the analytical holding times for analysis were exceeded.

Table 7-3 2024 ADEM Pathogen Data Collected on Cane Creek

Station CANW-3				
Visit Date	***E. coli* (col/100 ml)**	***E. coli* dc**	***E. coli* Criterion (col/100 ml)**	**Flow (cfs)**
3/27/2024	137.4		2507	48.36
4/18/2024	261.3		2507	16.72
5/22/2024	344.8		298	0.68
6/12/2024	63.1		298	0.7
7/8/2024	74.9		298	-0.16
7/15/2024	172.3		298	-0.14
7/22/2024	686.7		298	-0.12
7/24/2024	4839.2		298	0.62
7/29/2024	1158.8		298	0.7
8/21/2024	40.4		298	-0.13
9/4/2024	143		298	-0.13
9/9/2024	5.2		298	-0.21
9/19/2024	261.3		298	2.46
9/23/2024	178.2		298	1.54
9/30/2024	325.5		298	0.32
10/29/2024	8.5		298	-0.92

Table 7-4 2024 ADEM Pathogen Data Collected on Town Creek

Station TCJ-1				
Visit Date	***E. coli* (col/100 ml)**	***E. coli* dc**	***E. coli* Criterion (col/100 ml)**	**Flow (cfs)**
3/27/2024	272.3		2507	54.05
4/18/2024	1986.3		2507	14.66
5/22/2024	83.3		298	1.82
6/12/2024	88.4		298	1.72
7/8/2024	65.7		298	0.4
7/15/2024	25.6		298	0.56
7/22/2024	93.3		298	0.41
7/24/2024	3972.6		298	26.82
7/29/2024	461.1		298	4.99
8/21/2024	307.6		298	0.39
9/4/2024	105		298	0.19
9/9/2024	150		298	0.09
9/19/2024	248.1		298	4.8
9/23/2024	275.5		298	1.58
9/30/2024	84.2		298	1.3
10/29/2024	260.3		298	0.87

7.3 Sanitary Sewer Overflows (SSOs)

Table 7-5 Reported SSOs in the Town Creek Watershed

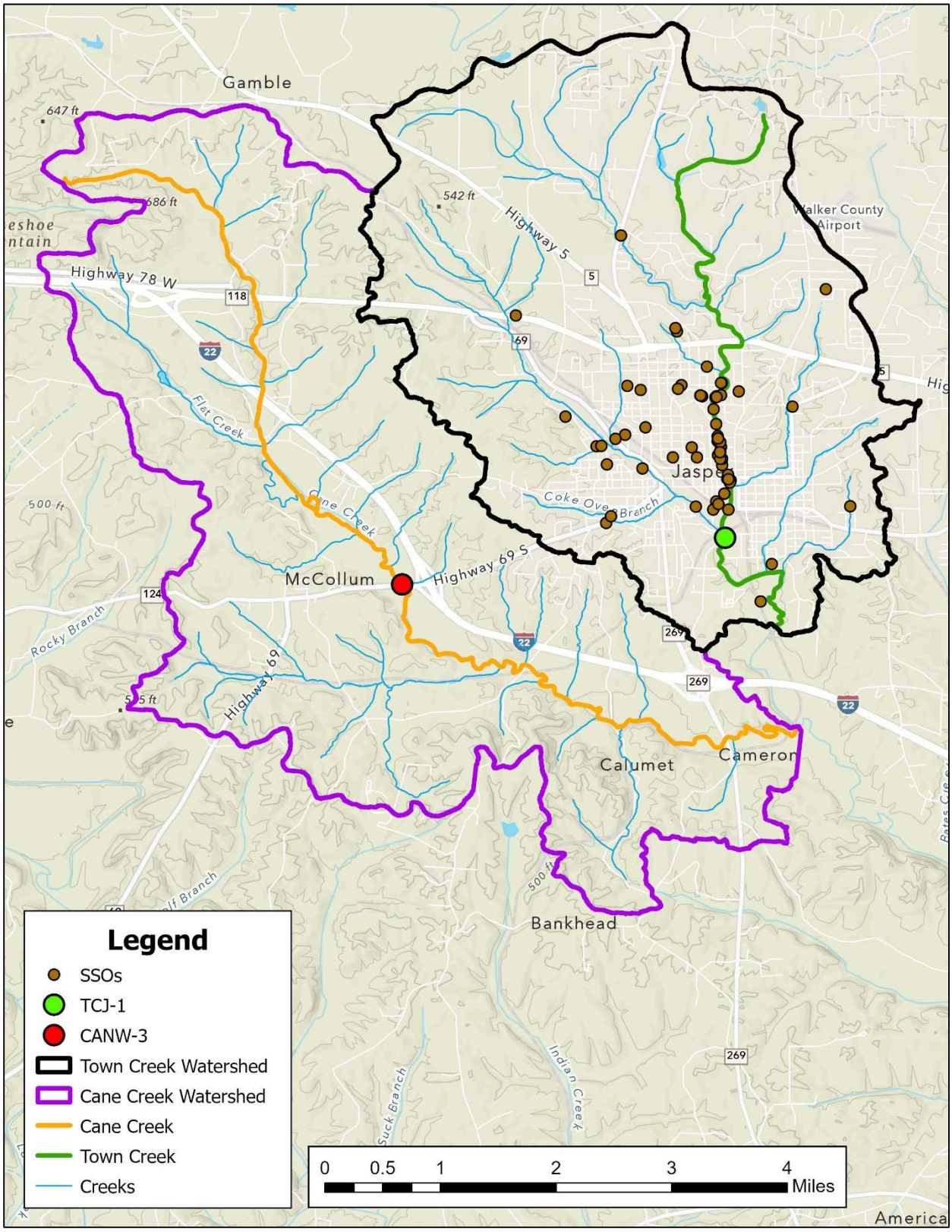
Town Creek WWTP (AL0023418)		
SSO Began Date	**Estimated Release Volume (gallons)**	**Duration (hours)**
2/21/2019	1,000 - 10,000	17
2/22/2019	≤ 1,000	5
3/2/2019	1,000 - 10,000	30
5/22/2019	≤ 1,000	40
6/3/2019	25,000 - 50,000	21
8/19/2019	≤ 1,000	1
10/31/2019	≤ 1,000	2
12/12/2019	50	0
1/3/2020	1,000 - 10,000	15
2/6/2020	50,000 - 75,000	8
2/6/2020	1,000 - 10,000	3
2/6/2020	1,000 - 10,000	3
2/10/2020	25,000 - 50,000	20
2/13/2020	1,000 - 10,000	3
2/20/2020	1,000 - 10,000	10
3/5/2020	1,000 - 10,000	8
3/5/2020	1,000 - 10,000	11
3/5/2020	1,000 - 10,000	8
5/4/2020	≤ 1,000	1
8/3/2020	≤ 1,000	0
9/3/2020	≤ 1,000	2
9/10/2020	≤ 1,000	4
12/10/2020	≤ 1,000	17
12/22/2020	≤ 1,000	1
1/21/2021	≤ 1,000	1
2/4/2021	≤ 1,000	0
7/15/2021	≤ 1,000	2
8/11/2021	≤ 1,000	0
8/31/2021	10,000 - 25,000	23
10/19/2021	1,000 - 10,000	6
3/11/2022	≤ 1,000	5
7/6/2022	≤ 1,000	22
11/16/2022	≤ 1,000	2
11/30/2022	1,000 - 10,000	6
12/14/2022	10,000 - 25,000	17
12/14/2022	1,000 - 10,000	12
12/14/2022	10,000 - 25,000	12

Town Creek WWTP (AL0023418)		
SSO Began Date	**Estimated Release Volume (gallons)**	**Duration (hours)**
12/14/2022	10,000 - 25,000	17
2/2/2023	25,000 - 50,000	14
2/2/2023	1,000 - 10,000	14
2/2/2023	100,000 - 250,000	14
2/2/2023	10,000 - 25,000	14
2/17/2023	10,000 - 25,000	3
2/17/2023	10,000 - 25,000	2
3/3/2023	1200	1
3/3/2023	1,000 - 10,000	24
6/6/2023	2000	0
8/5/2023	1350	2
8/10/2023	≤ 1,000	1
8/22/2023	≤ 1,000	1
9/11/2023	≤ 1,000	1
9/25/2023	≤ 1,000	1
11/2/2023	≤ 1,000	0
1/4/2024	≤ 1,000	1
2/12/2024	50,000 - 75,000	6
2/12/2024	50,000 - 75,000	7
2/12/2024	50,000 - 75,000	8
2/13/2024	≤ 1,000	3
2/27/2024	≤ 1,000	4
3/1/2024	25,000 - 50,000	9
3/1/2024	25,000 - 50,000	9
3/1/2024	25,000 - 50,000	8
3/15/2024	1,000 - 10,000	6
3/15/2024	1,000 - 10,000	6
3/15/2024	1,000 - 10,000	7
3/26/2024	10,000 - 25,000	8
3/26/2024	1,000 - 10,000	8
3/26/2024	1,000 - 10,000	6
3/26/2024	10,000 - 25,000	9
3/26/2024	1,000 - 10,000	8
5/28/2024	≤ 1,000	0
6/7/2024	≤ 1,000	3
6/25/2024	≤ 1,000	0
9/10/2024	≤ 1,000	1

Table 7-5 Reported SSOs in the Town Creek Watershed *(cont.)*

Town Creek WWTP (AL0023418)		
SSO Began Date	**Estimated Release Volume (gallons)**	**Duration (hours)**
9/14/2024	10,000 - 25,000	6
9/14/2024	10,000 - 25,000	6
9/14/2024	10,000 - 25,000	7
9/14/2024	10,000 - 25,000	6
9/14/2024	≤ 1,000	7
9/14/2024	10,000 - 25,000	7
10/8/2024	≤ 1,000	1
11/19/2024	1,000 - 10,000	2
11/19/2024	1,000 - 10,000	4
11/19/2024	≤ 1,000	3
11/19/2024	≤ 1,000	3
11/19/2024	≤ 1,000	2
11/19/2024	1,000 - 10,000	2
1/14/2025	≤ 1,000	0
1/31/2025	≤ 1,000	0
2/12/2025	1,000 - 10,000	14
2/12/2025	1,000 - 10,000	16
2/12/2025	1,000 - 10,000	16
2/12/2025	1,000 - 10,000	16
4/6/2025	100,000 - 250,000	12
4/15/2025	≤ 1,000	0
4/22/2025	1,000 - 10,000	23
4/22/2025	25,000 - 50,000	22
4/22/2025	25,000 - 50,000	20
4/22/2025	50,000 - 75,000	22
4/22/2025	25,000 - 50,000	20
4/22/2025	1,000 - 10,000	4
4/22/2025	1,000 - 10,000	23
4/22/2025	25,000 - 50,000	23
4/22/2025	25,000 - 50,000	22
4/22/2025	10,000 - 25,000	28
4/22/2025	25,000 - 50,000	22

Figure 7-1 Map of Reported SSOs in the Cane Creek and Town Creek Watersheds



7.4 Cane Creek Watershed Photos (July 24, 2024)

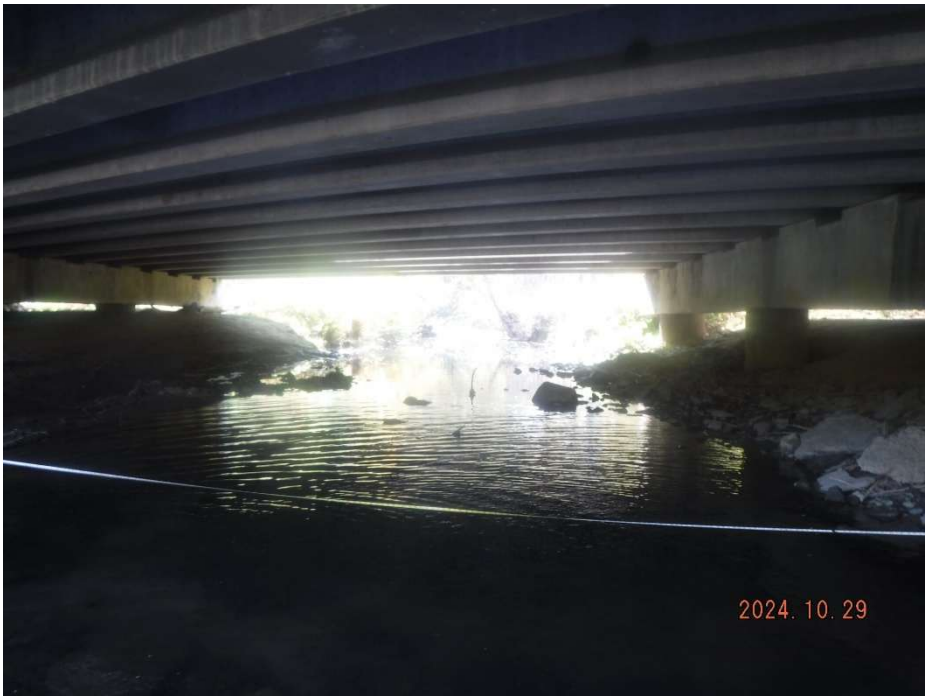
Figure 7-2 Cane Creek at AL Hwy 69 (CANW-3), Looking Upstream

Figure 7-3 Cane Creek at AL Hwy 69 (CANW-3), Looking Downstream

7.5 Cane Creek Watershed Photos (October 29, 2024)

Figure 7-4 Cane Creek at AL Hwy 69 (CANW-3), Looking Upstream

Figure 7-5 Cane Creek at AL Hwy 69 (CANW-3), Looking Downstream



7.6 Town Creek Watershed Photos (July 24, 2024)

Figure 7-6 Town Creek at 26th E Street (TCJ-1), Looking Upstream

Figure 7-7 Town Creek at 26th E Street (TCJ-1), Looking Downstream

7.7 Town Creek Watershed Photos (October 29, 2024)

Figure 7-8 Town Creek at 26th E Street (TCJ-1), Looking Upstream

Figure 7-9 Town Creek at 26th E Street (TCJ-1), Looking Downstream