Final
Total Maximum Daily Load (TMDL)
for

Tallaseehatchee Creek
Assessment Unit ID # AL03150107-0106-100

Shirtee Creek
Assessment Unit ID # AL03150107-0104-100

Weewoka Creek
Assessment Unit ID # AL03150107-0203-100

Talladega County

Pathogens (*E. coli*)

Alabama Department of Environmental Management
Water Quality Branch
Water Division
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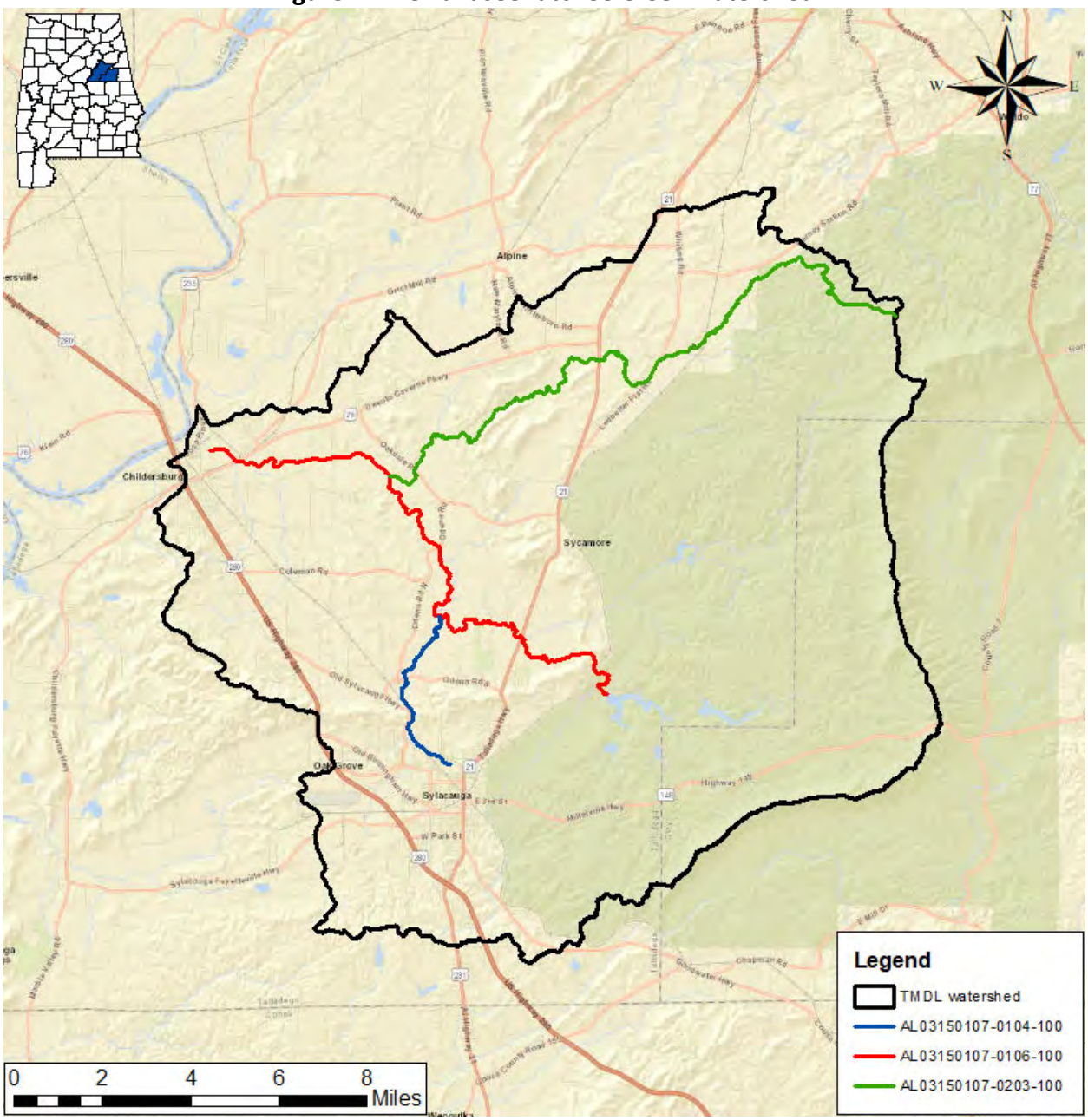
Figure 1: The Tallaseehatchee Creek watershed



1.0 Executive Summary

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 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).

Tallaseehatchee Creek, located in Talladega and Clay Counties, is a tributary to the Coosa River (Lay Lake). Tallaseehatchee Creek is currently included on Alabama's §303(d) list as impaired for pathogens (*E. coli*) and total dissolved solids from Lay Lake to Howard Dam. The listed portion of Tallaseehatchee Creek has a designated use classification of Fish and Wildlife (F&W). Tallaseehatchee Creek flows northwest for a total length of 16.74 miles, ending at the confluence with the Coosa River (Lay Lake). The total drainage area for the Tallaseehatchee Creek watershed is approximately 198.4 square miles.

Shirtee Creek, located in Talladega County, is a tributary to Tallaseehatchee Creek. Shirtee Creek is currently included on Alabama's §303(d) list as impaired for pathogens (*E. coli*) and total dissolved solids from Tallaseehatchee Creek to its source. The listed portion of Shirtee Creek has a designated use classification of F&W. Shirtee Creek flows north for a total length of 4.67 miles, ending at the confluence with Tallaseehatchee Creek. The total drainage area for the Shirtee Creek watershed is approximately 21 square miles.

Weewoka Creek, located in Talladega County, is also a tributary to Tallaseehatchee Creek. Weewoka Creek is currently included on Alabama's §303(d) list as impaired for pathogens (*E. coli*) from Tallaseehatchee Creek to its source. The listed portion of Weewoka Creek has a designated use classification of F&W. Weewoka Creek flows southwest for a total length of 18.32 miles, ending at the confluence with Tallaseehatchee Creek. The total drainage area for the Weewoka Creek watershed is approximately 44.1 square miles.

This TMDL only addresses the pathogens (*E. coli*) impairments. The total dissolved solids impairments for Shirtee Creek and Tallaseehatchee Creek will be addressed in a separate TMDL.

Tallaseehatchee Creek (AL03150107-0106-100) was placed on the 2018 §303(d) list as impaired for pathogens based on data collected by the Alabama Department of Environmental Management (ADEM) at station TH-1 during 2011 to 2016. Shirtee Creek (AL03150107-0104-100) was placed on the 2018 §303(d) list as impaired for pathogens based on data collected at station SHRT-1 during 2011 to 2016. Weewoka Creek (AL03150107-0203-100) was placed on the 2018 §303(d) list as impaired for pathogens based upon data collected from stations WEET-2 and WWOT-37 during 2015 and 2016.

Between 2018 and 2022, additional 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 Tallaseehatchee Creek, Shirtee Creek, and Weewoka Creek were still not meeting the pathogen criteria applicable to their use classifications (F&W).

A mass balance approach was used for calculating the pathogen TMDLs for Tallaseehatchee Creek, Shirtee Creek, and Weewoka Creek. The mass balance approach utilizes the conservation of mass principle. 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/100mL-10% Margin of Safety) and geometric mean *E. coli* target of 113.4 colonies/100 ml (126 colonies/100 ml – 10% Margin of Safety). The TMDL was calculated using the single sample or geometric mean sample exceedance event which resulted in the highest percent reduction.

Table 1.1 is a summary of the estimated existing load, allowable load, and percent reduction for the single sample criterion and the geometric mean criterion for Tallaseehatchee Creek. Table 1.2 lists the TMDL, defined as the maximum allowable *E. coli* loading under critical conditions for Tallaseehatchee Creek.

Table 1.1: Tallaseehatchee Creek - *E. coli* loads and required reductions

Source	Existing Load (colonies/day)	Allowable Load (colonies/day)	Required Reduction (colonies/day)	% Reduction
Single Sample Load	7.14E+12	7.91E+11	6.35E+12	89%
Geometric Mean Load	3.48E+11	1.26E+11	2.22E+11	64%
Fairmont WWTP (AL0020010)	7.96E+7	2.49E+9	0	0%
Sycamore WWTP (AL0061573)	2.06E+7	4.86E+8	0	0%
J. Earl Ham WWTP (AL0020001)	2.19E+9	5.42E+10	0	0%

Table 1.2: *E. coli* TMDL for Tallaseehatchee Creek (AL03150107-0106-100)

TMDL[e]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[a]			Load Allocation (LA)	
		WWTPs[b]	MS4s[c]	Leaking Collection Systems[d]		
(col/day)	(col/day)	(col/day)	% reduction	(col/day)	(col/day)	% reduction
8.79E+11	8.79E+10	5.72E+10	N/A	0	7.34E+11	89%

N/A – Not applicable
a. There are no CAFOs in the Tallaseehatchee Creek watershed. Future CAFOs will be assigned a waste load allocation (WLA) of zero.
b. Current and future WWTPs must meet the applicable in-stream water quality criteria for pathogens at the point of discharge.
c. Future MS4 areas would be required to demonstrate consistency with the assumptions and requirements of this TMDL.
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. TMDL was established using the single sample maximum criterion of 298 colonies/100 ml.

Table 1.3 is a summary of the estimated existing load, allowable load, and percent reduction for the single sample criterion and the geometric mean criterion for Shirtee Creek. Table 1.4 lists the TMDL, defined as the maximum allowable *E. coli* loading under critical conditions for Shirtee Creek.

Table 1.3: Shirtee Creek - *E. coli* loads and required reductions

Source	Existing Load (colonies/day)	Allowable Load (colonies/day)	Required Reduction (colonies/day)	% Reduction
Single Sample Load	9.00E+12	9.97E+11	8.00E+12	89%
Geometric Mean Load	5.39E+10	6.10E+10	0	0%
J. Earl Ham WWTP (AL0020001)	1.11E+10	5.42E+10	0	0%

Table 1.4: *E. coli* TMDL for Shirtee Creek (AL03150107-0104-100)

TMDL[e]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[a]			Load Allocation (LA)	
		WWTPs[b]	MS4s[c]	Leaking Collection Systems[d]		
(col/day)	(col/day)	(col/day)	% reduction	(col/day)	(col/day)	% reduction
1.11E+12	1.11E+11	5.42E+10	N/A	0	9.43E+11	89%

N/A – Not applicable
a. There are no CAFOs in the Shirtee Creek watershed. Future CAFOs will be assigned a waste load allocation (WLA) of zero.
b. Current and future WWTPs must meet the applicable in-stream water quality criteria for pathogens at the point of discharge.
c. Future MS4 areas would be required to demonstrate consistency with the assumptions and requirements of this TMDL.
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. TMDL was established using the single sample maximum criterion of 298 colonies/100 ml.

Table 1.5 is a summary of the estimated existing load, allowable load, and percent reduction for the single sample criterion and the geometric mean criterion for Weewoka Creek. Table 1.6 lists the TMDL, defined as the maximum allowable *E. coli* loading under critical conditions for Weewoka Creek.

Table 1.5: Weewoka Creek - *E. coli* loads and required reductions

Source	Existing Load (colonies/day)	Allowable Load (colonies/day)	Required Reduction (colonies/day)	% Reduction
Single Sample Load	4.59E+12	5.09E+11	4.09E+12	89%
Geometric Mean Load	1.37E+11	5.54E+10	8.17E+10	60%
Winterboro School Lagoon (AL0058823)	0	1.58E+8	0	0%

Table 1.6: *E. coli* TMDL for Weewoka Creek (AL03150107-0203-100)

TMDL[e]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[a]			Load Allocation (LA)	
		WWTPs[b]	MS4s[c]	Leaking Collection Systems[d]		
(col/day)	(col/day)	(col/day)	% reduction	(col/day)	(col/day)	% reduction
5.66E+11	5.66E+10	1.58E+8	N/A	0	5.09E+11	89%

N/A – Not applicable
a. There are no CAFOs in the Weewoka Creek watershed. Future CAFOs will be assigned a waste load allocation (WLA) of zero.
b. Current and future WWTPs must meet the applicable in-stream water quality criteria for pathogens at the point of discharge.
c. Future MS4 areas would be required to demonstrate consistency with the assumptions and requirements of this TMDL.
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. TMDL was established using the single sample maximum criterion of 298 colonies/100 ml.

Compliance with the terms and conditions of existing and future 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 Tallaseehatchee Creek, Shirtee Creek and Weewoka Creek watersheds. As additional data and/or information become 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 total maximum daily load (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 in-stream 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).

2.2 Problem Definition

Waterbody Impaired:	Tallaseehatchee Creek – from Lay Lake to Howard Dam
Assessment Unit ID:	AL03150107-0106-100
Impaired Reach Length:	16.74 miles
Impaired Drainage Area:	198.4 mi^2
Water Quality Standard Violation:	Pathogens (Single Sample Maximum, Geometric Mean)
Pollutant of Concern:	Pathogens (*E. coli*)
Water Use Classification:	Fish and Wildlife

Waterbody Impaired:	Shirtee Creek – from Tallaseehatchee Creek to its source
Assessment Unit ID:	AL03150107-0104-100
Impaired Reach Length:	4.67 miles
Impaired Drainage Area:	21 mi^2
Water Quality Standard Violation:	Pathogens (Single Sample Maximum)
Pollutant of Concern:	Pathogens (*E. coli*)
Water Use Classification:	Fish and Wildlife

Waterbody Impaired:	Weewoka Creek – from Tallaseehatchee Creek to its source
Assessment Unit ID:	AL03150107-0203-100
Impaired Reach Length:	18.32 miles
Impaired Drainage Area:	44.1 mi^2
Water Quality Standard Violation:	Pathogens (Single Sample Maximum, 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 this 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:

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.

Tallaseehatchee Creek - Criteria Exceeded

Tallaseehatchee Creek (AL03150107-0106-100) was placed on Alabama's 2018 §303(d) list for pathogens based on data collected during 2011 to 2016 at station TH-1. *S*ampling at station TH-1 from 2011 to 2016 showed that the *E. coli* criterion was exceeded in 6 out of 17 samples. The table below illustrates the *E.coli* data that was the basis for the listing.

Table 2.2.1: Tallaseehatchee Creek - Data for §303(d) listing at TH-1

TH-1			
Activity Date	**Flow (cfs)**	***E. coli* (col/100 mL)**	**Qualifier Code**
6/1/2011	-	51.2	-
8/11/2011	14.3	90.3	-
10/11/2011	11.0	167	-
6/12/2012	44.5	686.7	-
8/8/2012	13.2	115.3	-
10/10/2012	14.9	124.6	-
6/6/2013	107.5	387.3	-
8/13/2013	93.9	172.3	-
10/8/2013	78.2	517.2	-
6/26/2014	-	387.3	-
8/19/2014	69.3	365.4	-
6/9/2015	50.3	193.5	-
8/11/2015	63.5	2419.6	H
10/6/2015	13.2	209.8	H
6/13/2016	42.7	185	H
8/16/2016	-	248.1	H
11/1/2016	5	155.3	H

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

Shirtee Creek - Criteria Exceeded:

Shirtee Creek (AL03150107-0104-100) was placed on Alabama's 2018 §303(d) list for pathogens based on data collected during 2011 to 2016 at station SHRT-1. *S*ampling at station SHRT-1 from 2011 to 2016 showed that the *E. coli* criterion was exceeded in 6 out of 17 samples. The table below illustrates the *E.coli* data that was the basis for the listing.

Table 2.2.2: Shirtee Creek - Data for §303(d) listing at SHRT-1

SHRT-1			
Activity Date	**Flow (cfs)**	***E. coli* (col/100 mL)**	**Qualifier Code**
6/1/2011	13	48	-
8/11/2011	8.9	51.2	-
10/11/2011	14	81.6	-
6/12/2012	16	365.4	-
8/8/2012	13	93.3	-
10/10/2012	10	95.9	-
6/6/2013	27	365.4	-
8/13/2013	3.2	127.4	-
10/8/2013	26	148.3	-
6/26/2014	30	261.3	-
8/19/2014	24	2419.6	G
6/9/2015	24	980.4	H
8/11/2015	24	2419.6	GH
10/6/2015	12	307.6	H
6/13/2016	13	150	H
8/16/2016	15	90.6	H
11/1/2016	9.6	101.9	H

*H = The analytical holding times for analysis are exceeded.
*G = The amount of analyte is above an acceptable level for quantitation and is likely higher than the reported value.
*GH = The analytical holding times for analysis are exceeded. The actual number was probably greater than the number reported.

Weewoka Creek - Criteria Exceeded:

Weewoka Creek (AL03150107-0203-100) was placed on Alabama's 2018 §303(d) list for pathogens based on data collected during 2015 and 2016 at stations WEET-2 and WWOT-37. Sampling showed that the *E. coli* criterion was exceeded in 2 out of 8 samples at station WEET-2 and in 2 out of 8 samples at station WWOT-37. The tables below illustrates the *E.coli* data that was the basis for the listing.

Table 2.2.3: Weewoka Creek - Data for §303(d) listing at WEET-2

WEET-2			
Activity Date	**Flow (cfs)**	***E. coli* (col/100 mL)**	**Qualifier Code**
3/9/2016	38.6	72.3	H
4/5/2016	45.4	111.9	H
5/2/2016	24.4	150	H
6/9/2016	9.8	107.6	-
7/6/2016	7.3	387.3	H
8/3/2016	6.4	172.3	H
9/7/2016	5	387.3	H
10/4/2016	5.1	275.5	H

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

Table 2.2.4: Weewoka Creek - Data for §303(d) listing at WWOT-37

WWOT-37			
Activity Date	**Flow (cfs)**	***E. coli* (col/100 mL)**	**Qualifier Code**
3/12/2015	86.5	191.8	-
4/15/2015	35.3	191.8	-
5/12/2015	24.1	686.7	-
6/11/2015	14.9	186	-
7/28/2015	7.7	85.7	-
8/18/2015	7.6	290.9	-
9/2/2015	7.6	131.7	-
10/13/2015	8.1	344.8	-

3.0 Technical Basis for TMDL Development

3.1 Water Quality Target Identification

For the purpose of this TMDL, a single sample maximum *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 at least 24 hours apart over the course of 30 days. This 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

A point source can be defined as a discernible, 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.

3.2.1 Continuous Point Sources

Currently, there are four NPDES regulated continuous point source discharges located within the TMDL watershed. Specifically, there are two point sources that discharge in the Tallaseehatchee Creek watershed, one point source in the Shirtee Creek watershed, and one point source in the Weewoka Creek watershed. These continuous point sources can be seen in the table and map below.

All of the permitted 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:

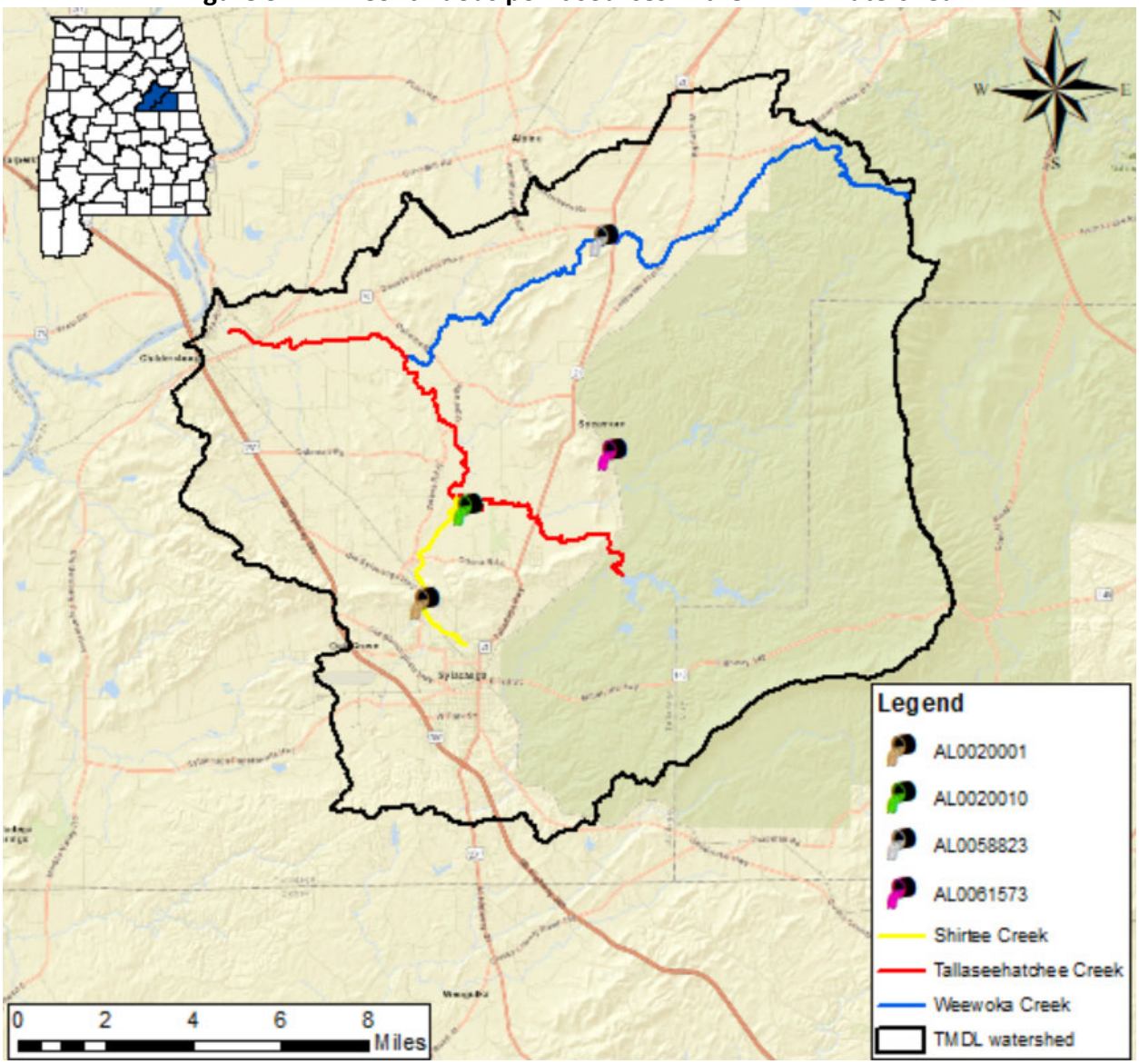
Monthly average (May-October): 126 colonies/100ml
Monthly average (November-April): 548 colonies/100ml
Daily maximum (May-October): 298 colonies/100ml
Daily maximum (November-April): 2507 colonies/100ml

Table 3.2.1.1: NPDES regulated continuous point sources within the TMDL watershed

Type	Permit Number	Facility Name	Receiving Stream	Design Flow (MGD)
Municipal	AL0020001	Sylacauga J Earl Ham WWTP	Shirtee Creek	4.8
Municipal	AL0020010	Fairmont WWTP	Tallaseehatchee Creek	0.22
Municipal	AL0058823	Winterboro School Lagoon	Weewoka Creek	0.014
Municipal	AL0061573	Sycamore WWTP	Foreman Branch*	0.043

*Foreman Branch is a tributary to Emauhee Creek, which is a tributary to Tallaseehatchee Creek.

Figure 3.2.1.1: Continuous point sources in the TMDL watershed



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

3.2.2 Non-Continuous Point Sources

There are numerous facilities with mining, construction, and industrial (individual and general) NPDES permits located within the TMDL watershed. These facilities are not considered to be a source of pathogens due to the nature of their operations. As such, no *E. coli* loading will be attributed to these facilities, nor will they receive an allocation in this TMDL. Any future NPDES regulated discharges that are considered by the Department to be a pathogen source will be required to demonstrate consistency with the assumptions and requirements of this TMDL.

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 three facilities reported SSOs from 2018 to 2023 within the TMDL watershed. The numerous SSOs are considered a source of pathogens to the impaired watershed. The reported SSOs are listed in Appendix 7.3.

3.2.3 Municipal Separate Storm Sewer Systems (MS4s)

Currently, there are no urban areas designated as part of the Municipal Separate Storm Sewer System (MS4) program located within the TMDL watershed. Any future MS4 stormwater discharges will be required to demonstrate consistency with the assumptions and requirements of this TMDL.

3.2.4 Animal Feeding Operation/Concentrated Animal Feeding Operation (AFO/CAFO)

Currently, there are no Animal Feeding Operations/Concentrated Animal Feeding Operations (AFOs/CAFOs) located within the TMDL 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 waste load allocation of zero.

3.2.5 Nonpoint Sources

Nonpoint sources of bacteria do not have a defined discharge point, but rather occur over the entire length of a stream or waterbody. On the land surface, bacteria can accumulate over time and be washed into streams or waterbodies during rain events. Therefore, there is some net loading of bacteria into streams 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 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 will 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 developed 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. On-site septic systems may be direct or indirect sources of bacterial pollution via ground and surface waters due to system failures and malfunctions.

The nature and extent of bacteria sources in the watershed will be identified more specifically during the implementation phase of the TMDL.

3.3 Land Use Assessment

Land use percentages for the Tallaseehatchee Creek watershed were determined from the 2019 National Land Cover Dataset (NLCD). The total drainage area of the Tallaseehatchee Creek watershed is approximately 198.4 square miles. Table 3.3.1 lists the various land uses and their associated percentages for the Tallaseehatchee Creek watershed. A pie chart illustrating the major cumulative land use types for the Tallaseehatchee Creek watershed is shown in Figure 3.3.1.

Table 3.3.1: Tallaseehatchee Creek watershed land use (2019 NLCD)

Land Use	Miles^2	Acres	Percent
Open Water	0.85	544.64	0.43%
Developed, Open Space	12.26	7848.98	6.18%
Developed, Low Intensity	5.29	3387.74	2.67%
Developed, Medium Intensity	2.35	1503.39	1.18%
Developed, High Intensity	1.14	732.12	0.58%
Barren Land	1.32	843.77	0.66%
Deciduous Forest	74.05	47393.00	37.32%
Evergreen Forest	40.82	26125.16	20.57%
Mixed Forest	12.23	7825.41	6.16%
Shrub/Scrub	6.06	3880.12	3.06%
Herbaceous	5.65	3612.80	2.84%
Hay/Pasture	23.27	14890.89	11.73%
Cultivated Crops	8.80	5632.82	4.44%
Woody Wetlands	4.12	2634.49	2.07%
Emergent Herbaceous Wetlands	0.21	136.55	0.11%
Totals→	**198.42**	**126991.89**	**100.00%**
Class Description	**Miles^2**	**Acres**	**Percent**
Open Water	0.85	544.64	0.43%
Agricultural Lands	32.07	20523.71	16.16%
Forested/Natural	143.14	91607.54	72.14%
Developed Land (Grouped)	22.37	14316.00	11.27%
Totals→	**198.42**	**126991.89**	**100.00%**

Figure 3.3.1: Tallaseehatchee Creek watershed cumulative land use distribution

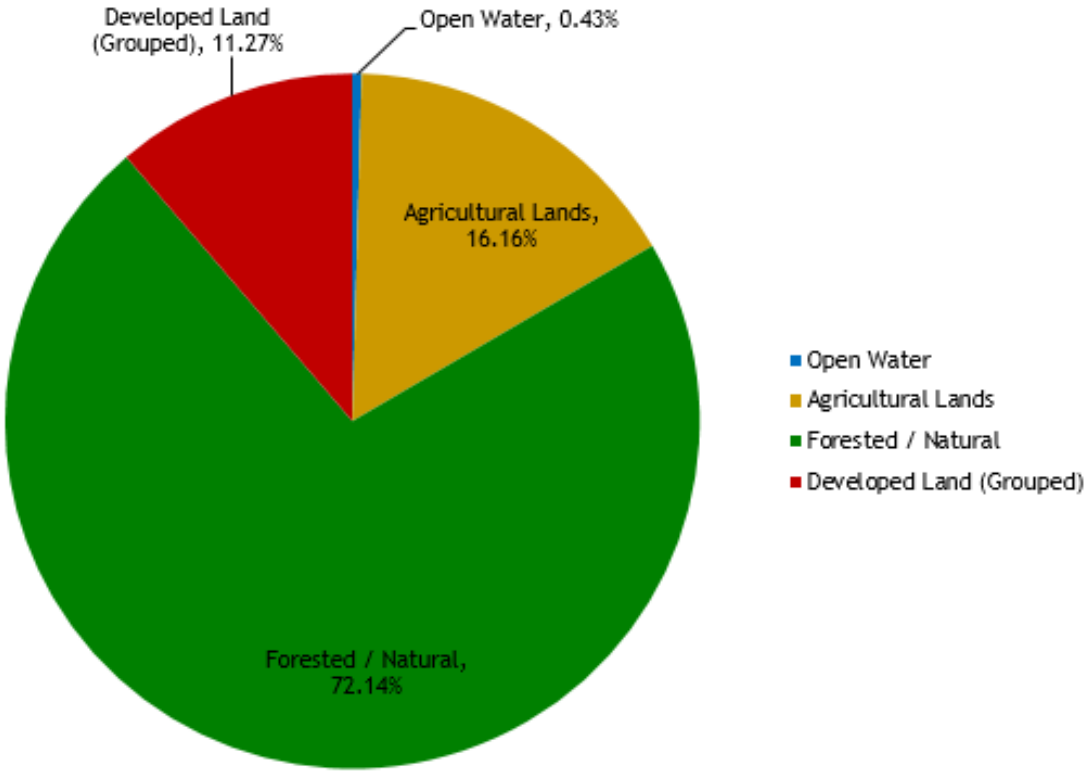
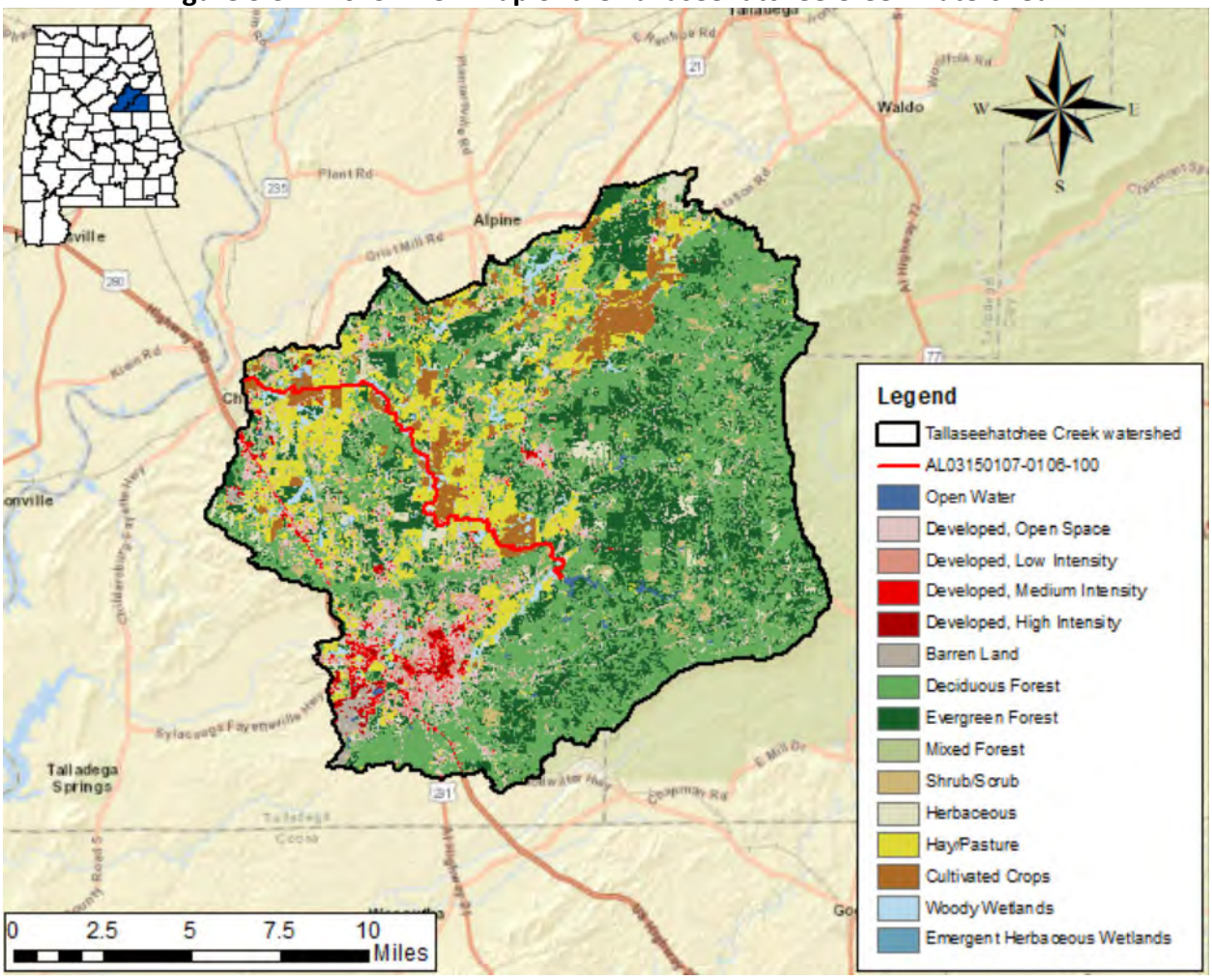


Figure 3.3.2: 2019 NLCD map of the Tallaseehatchee Creek watershed



Land use percentages for the Shirtee Creek watershed were determined from the 2019 NLCD. The total drainage area of the Shirtee Creek watershed is approximately 21 square miles. Table 3.3.2 lists the various land uses and their associated percentages for the Shirtee Creek watershed. A pie chart illustrating the major cumulative land use types for the Shirtee Creek watershed is shown in Figure 3.3.3.

Table 3.3.2: Shirtee Creek watershed land use (2019 NLCD)

Land Use	Miles^2	Acres	Percent
Open Water	0.11	70.50	0.53%
Developed, Open Space	3.30	2109.19	15.71%
Developed, Low Intensity	2.50	1601.47	11.93%
Developed, Medium Intensity	1.45	927.61	6.91%
Developed, High Intensity	0.94	603.58	4.50%
Barren Land	1.07	686.53	5.11%
Deciduous Forest	4.25	2718.78	20.25%
Evergreen Forest	2.50	1599.69	11.91%
Mixed Forest	1.74	1110.64	8.27%
Shrub/Scrub	0.28	182.36	1.36%
Herbaceous	0.57	362.28	2.70%
Hay/Pasture	1.97	1259.87	9.38%
Cultivated Crops	0.00	0.00	0.00%
Woody Wetlands	0.28	176.58	1.32%
Emergent Herbaceous Wetlands	0.03	18.68	0.14%
Totals→	20.98	13427.75	100.00%
Class Description	**Miles^2**	**Acres**	**Percent**
Open Water	0.11	70.50	0.53%
Agricultural Lands	1.97	1259.87	9.38%
Forested/Natural	9.64	6169.01	45.94%
Developed Land (Grouped)	9.26	5928.38	44.15%
Totals→	**20.98**	**13427.75**	**100.00%**

Figure 3.3.3: Shirtee Creek watershed cumulative land use distribution

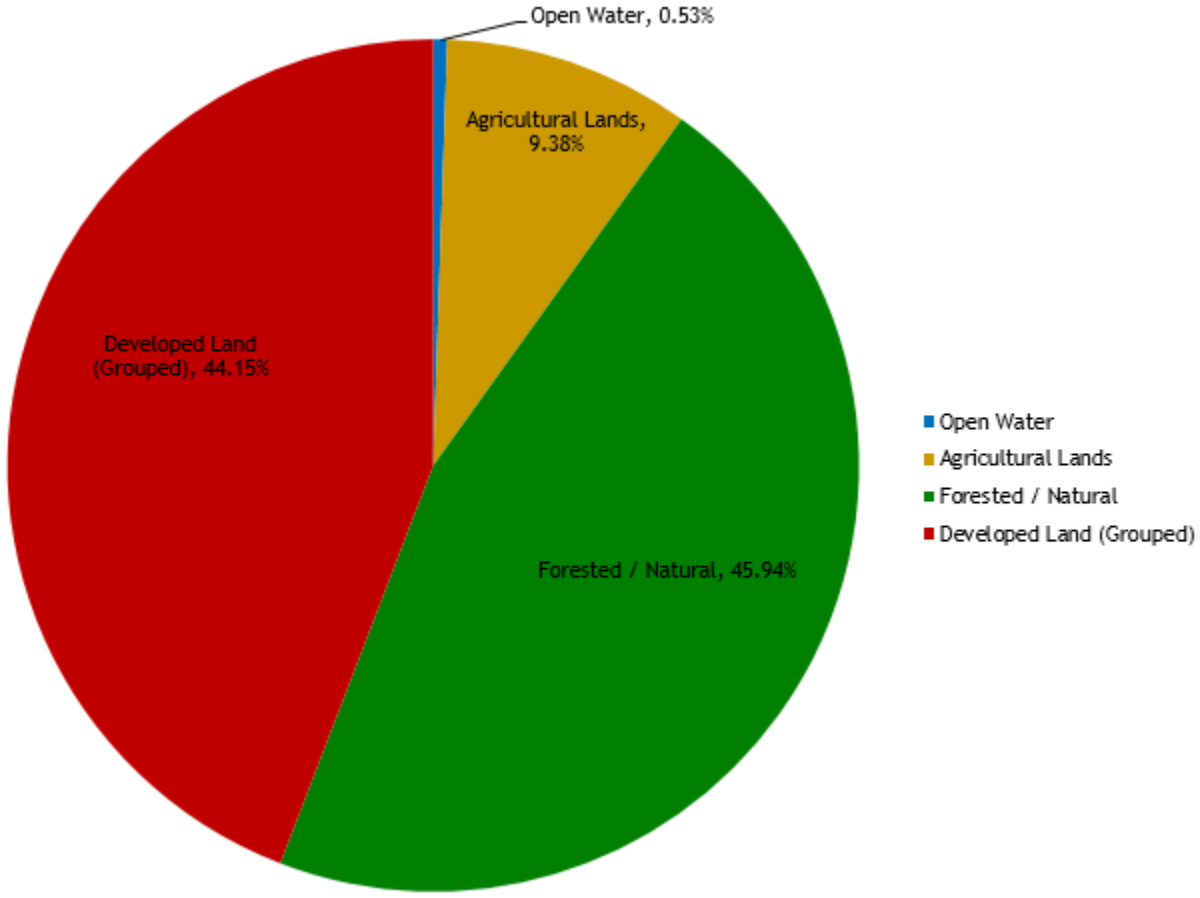
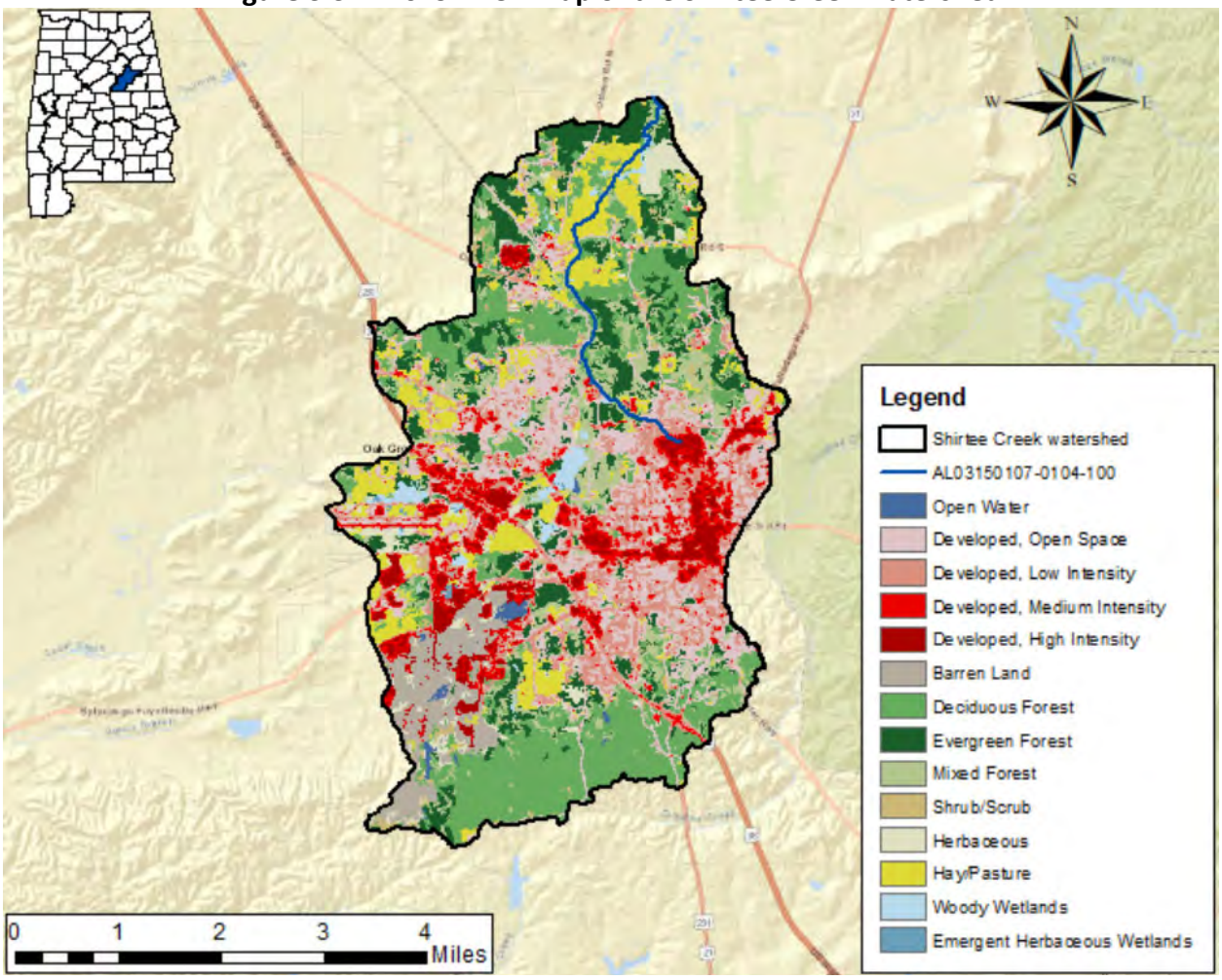


Figure 3.3.4: 2019 NLCD map of the Shirtee Creek watershed



Land use percentages for the Weewoka Creek watershed were determined from the 2019 NLCD. The total drainage area of the Weewoka Creek watershed is approximately 44.1 square miles. Table 3.3.3 lists the various land uses and their associated percentages for the Weewoka Creek watershed. A pie chart illustrating the major cumulative land use types for the Weewoka Creek watershed is shown in Figure 3.3.5.

Table 3.3.3: Weewoka Creek watershed land use (2019 NLCD)

Land Use	Miles^2	Acres	Percent
Open Water	0.09	57.60	0.20%
Developed, Open Space	1.50	962.30	3.41%
Developed, Low Intensity	0.35	223.95	0.79%
Developed, Medium Intensity	0.12	77.39	0.27%
Developed, High Intensity	0.01	4.23	0.01%
Barren Land	0.02	12.68	0.04%
Deciduous Forest	14.77	9453.78	33.53%
Evergreen Forest	9.17	5868.78	20.82%
Mixed Forest	2.00	1278.10	4.53%
Shrub/Scrub	1.68	1076.39	3.82%
Herbaceous	1.57	1005.00	3.56%
Hay/Pasture	7.05	4509.28	16.00%
Cultivated Crops	4.86	3107.30	11.02%
Woody Wetlands	0.84	534.64	1.90%
Emergent Herbaceous Wetlands	0.03	20.02	0.07%
Totals→	**44.05**	**28191.43**	**100.00%**
Class Description	**Miles^2**	**Acres**	**Percent**
Open Water	0.09	57.60	0.20%
Agricultural Lands	11.90	7616.58	27.02%
Forested/Natural	30.06	19236.71	68.24%
Developed Land (Grouped)	2.00	1280.55	4.54%
Totals→	**44.05**	**28191.43**	**100.00%**

Figure 3.3.5: Weewoka Creek watershed cumulative land use distribution

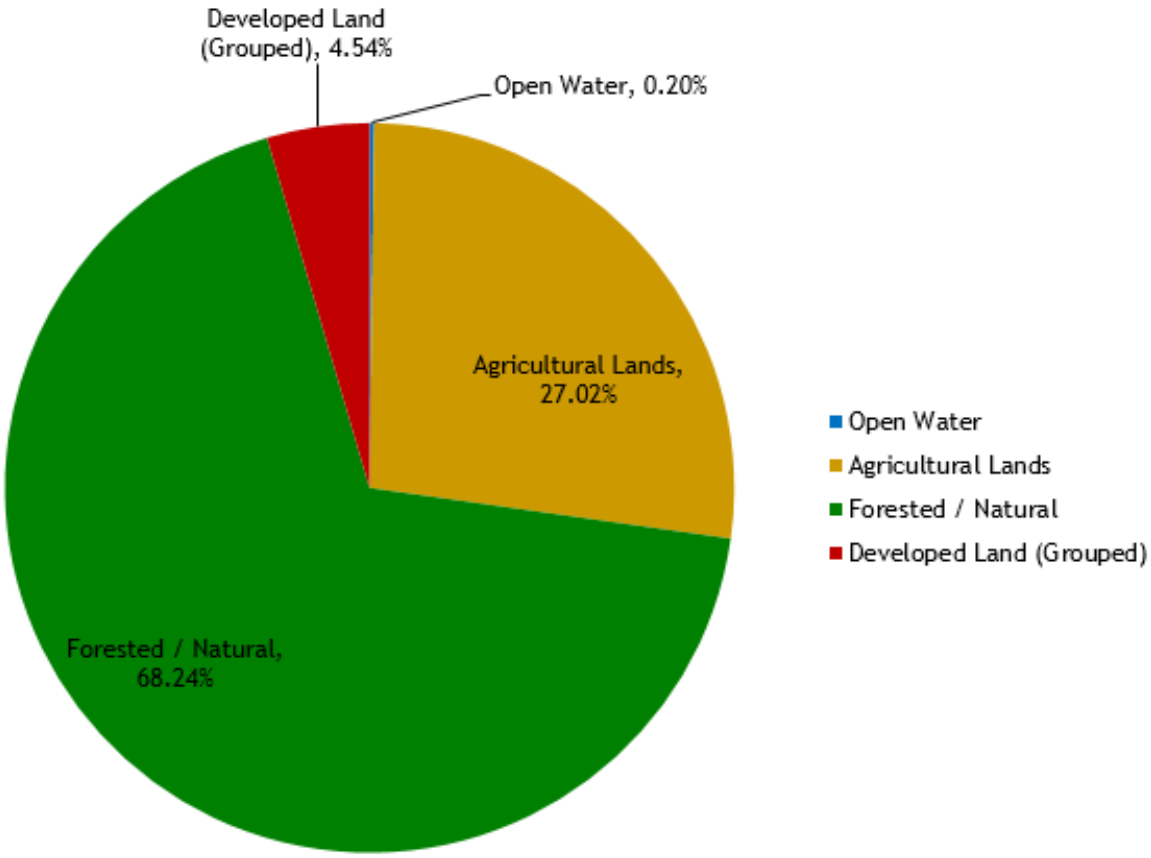
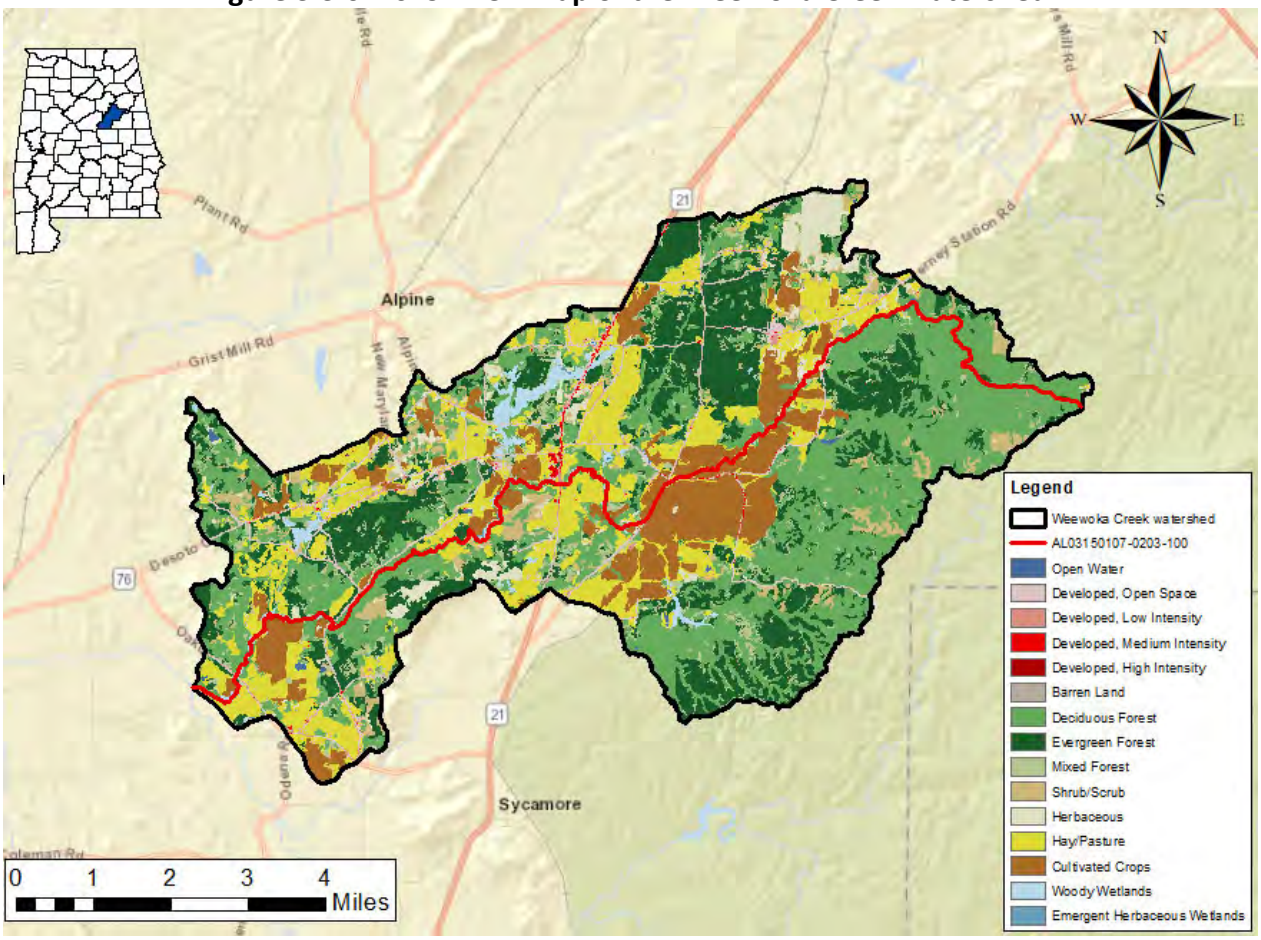


Figure 3.3.6: 2019 NLCD Map of the Weewoka Creek watershed



3.4 Linkage between Numeric Targets and Sources

The predominant land use coverages in the Shirtee Creek watershed are forested/natural and developed land, followed by agriculture. For the Weewoka Creek and Tallaseehatchee Creek watersheds, the predominant land use is forested/natural, followed by agriculture and developed land. 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 are from agricultural land uses, urban runoff, and sewer/septic system failures. 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

ADEM collected monthly (March – October) *E. coli* bacteria samples in Tallaseehatchee Creek at station TH-1 during 2018-2019 and 2021-2022. Two intensive bacteria studies (July and September) were also conducted at station TH-1 during the 2022 sampling season. Each intensive bacteria study consisted of collecting at least five *E. coli* bacteria samples over a 30-day time window, with a minimum of 24 hours between each sample collection. A geometric mean was calculated from each intensive bacteria study.

A total of 30 *E. coli* samples have been collected at station TH-1 since 2018. Of the 30 total *E. coli* samples, six exceeded the single sample summer maximum criterion of 298 colonies/100 ml. Intensive bacteria studies were performed during the months of July and September in 2022. The July and September calculated *E. coli* geometric means violated the geometric mean criterion of 126 colonies/100 ml. A summary of the *E. coli* results is provided below in Table 3.5.1. All *E. coli* criteria exceedances are highlighted in red.

Table 3.5.1: *E. coli* Data for Tallaseehatchee Creek at TH-1 (2018-2019, 2021-2022)

TH-1				
Activity Date	Flow (cfs)	E. coli Discrete (col/100 mL)	Geometric Mean (col/100 mL)	Qualifier Code
6/14/2018	-	547.5	-	-
8/9/2018	35.9	218.7	-	-
10/17/2018	23.1	325.5	-	-
6/11/2019	69.3	156.5	-	-
8/5/2019	20.1	70.3	-	H
10/3/2019	14.4	142.1	-	-
3/10/2021	90.3	41.7	-	H
4/14/2021	111.4	122.3	-	H
5/26/2021	79	90.6	-	H
6/16/2021	-	160.7	-	H
7/7/2021	-	2419.6	-	GH
8/4/2021	142.3	152.9	-	H
9/15/2021	39.7	488.4		H
10/13/2021	30	166.4		H
3/9/2022	-	2419.6		G
4/7/2022	-	920.8		-
5/4/2022	96.2	86		-
6/9/2022	-	920.8		-
7/14/2022	71.8	133.3		-
7/21/2022	-	101.9		-
7/26/2022	43.4	178.5	130.3	-
7/27/2022	40.5	93.3		-
7/28/2022	42.6	98.8		-
8/10/2022	52.2	218.7		-
9/15/2022	39.6	160.7		-
9/20/2022	32.1	193.5		-
9/22/2022	30.6	228.2	312.7	-
9/28/2022	25.8	248.9		-
9/29/2022	24.2	218.7		-
10/13/2022	120.6	2419.6		G

*H = The analytical holding times for analysis are exceeded.
*G = The amount of analyte is above an acceptable level for quantitation and is likely higher than the reported value.
*GH = The analytical holding times for analysis are exceeded. The actual number was probably greater than the number reported.

ADEM collected monthly (March – October) *E. coli* bacteria samples in Shirtee Creek at station SHRT-1 during 2018-2019 and 2021-2022. Two intensive bacteria studies (July and September) were also conducted at station SHRT-1 during the 2022 sampling season. Each intensive bacteria study consisted of collecting at least five *E. coli* bacteria samples over a 30-day time window, with a minimum of 24 hours between each sample collection. A geometric mean was calculated from each intensive bacteria study.

A total of 30 *E. coli* samples have been collected at station SHRT-1 since 2018. Of the 30 *E. coli* samples, three exceeded the single sample summer maximum criterion of 298 colonies/100 ml. Intensive bacteria studies were performed during the months of July and September in 2022. The calculated geometric means for both July and September were below the geometric mean criterion of 126 colonies/100 ml. A summary of the *E. coli* results is provided below in Table 3.5.2. All *E. coli* criteria exceedances are highlighted in red.

Table 3.5.2: *E. coli* Data for Shirtee Creek at SHRT-1 (2018-2019, 2021-2022)

SHRT-1				
Activity Date	Flow (cfs)	E. coli Discrete (col/100 mL)	Geometric Mean (col/100 mL)	Qualifier Code
6/14/2018	3.1	770.1	-	-
8/9/2018	24.2	161.6	-	-
10/17/2018	18.3	62.4	-	-
6/11/2019	29.4	86.2	-	-
8/5/2019	5.8	60.9	-	H
10/3/2019	13.1	83.9	-	-
3/10/2021	32.2	22.8	-	H
4/14/2021	39.6	150	-	H
5/26/2021	27.6	185	-	H
6/16/2021	21.8	103.9	-	H
7/7/2021	71.3	920.8	-	H
8/4/2021	33.6	64.5	-	H
9/15/2021	29.4	185	-	H
10/13/2021	28.4	166.4	-	H
3/8/2022	29.4	166.4	-	-
4/6/2022	132	461.1	-	-
5/3/2022	21.8	235.9	-	-
6/9/2022	152	2419.6	-	G
7/12/2022	23	178.5	100.2	-
7/21/2022	21.8	81.6		-
7/26/2022	21.8	98.7		-
7/27/2022	21.8	81.6		-
7/28/2022	20.6	53.7		-
8/9/2022	23	160.7		-
9/15/2022	21.8	79.8	79.8	-
9/20/2022	26.8	71.7		-
9/22/2022	25.5	88.4		-
9/27/2022	36.5	77.6		-
9/29/2022	23	111.2		-
10/12/2022	24.2	59.1		-

*H = The analytical holding times for analysis are exceeded.
*G = The amount of analyte is above an acceptable level for quantitation and is likely higher than the reported value.

ADEM collected monthly (March – October) *E. coli* bacteria samples in Weewoka Creek at stations WEET-2 and WWOT-37 during the 2022 sampling season. Two intensive bacteria studies (July and September) were conducted at station WWOT-37 during this time. Each intensive bacteria study consisted of collecting at least five *E. coli* bacteria samples over a 30-day time window, with a minimum of 24 hours between each sample collection. A geometric mean was calculated from each intensive bacteria study.

A total of 24 *E. coli* samples were collected on Weewoka Creek in 2022. Of the 24 total *E. coli* samples, eight were collected at WEET-2 while sixteen were collected at WWOT-37. There were two single sample exceedances at WEET-2 and three single sample exceedances at WWOT-37 during the 2022 sampling season. Intensive bacteria studies were conducted at WWOT-37. Both the July and September calculated *E. coli* geometric means violated the geometric mean criterion of 126 colonies/100 ml. A summary of the *E. coli* results is provided below in Table 3.5.3. and Table 3.5.4. All *E. coli* criteria exceedances are highlighted in red.

Table 3.5.3: *E. coli* Data for Weewoka Creek at WEET-2 (2022)

WEET-2				
Activity Date	Flow (cfs)	E. coli Discrete (col/100 mL)	Geometric Mean (col/100 mL)	Qualifier Code
3/9/2022	-	2419.6	-	G
4/7/2022	-	186	-	-
5/4/2022	21.5	103.6	-	-
6/9/2022	-	2419.6	-	G
7/14/2022	15.3	107.6	-	-
8/10/2022	13	222.4	-	-
9/28/2022	7.7	183.5	-	-
10/13/2022	27.9	2419.6	-	G

*G = The amount of analyte is above an acceptable level for quantitation and is likely higher than the reported value.

Table 3.5.4: *E. coli* Data for Weewoka Creek at WWOT-37 (2022)

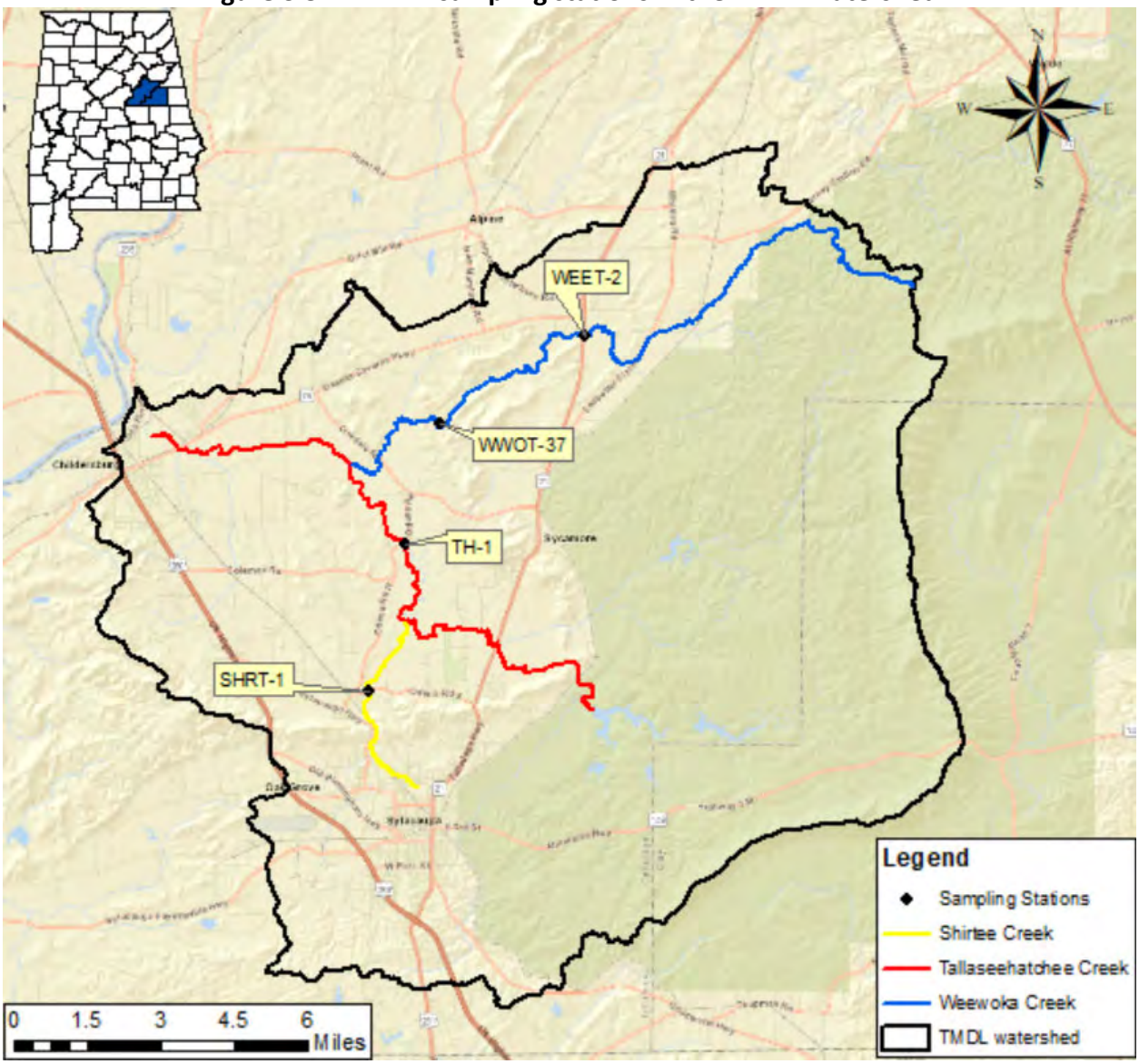
WWOT-37				
Activity Date	Flow (cfs)	E. coli Discrete (col/100 mL)	Geometric Mean (col/100 mL)	Qualifier Code
3/9/2022	-	2419.6	-	G
4/7/2022	-	228.2	-	-
5/4/2022	26.9	137.6	-	-
6/9/2022	-	1203.3	-	-
7/14/2022	17.6	137.6	163.7	-
7/21/2022	15.9	193.5		-
7/26/2022	13.9	145		-
7/27/2022	12.6	78.9		-
7/28/2022	13.7	115.3		-
8/10/2022	20.2	547.5		-
9/15/2022	8.4	209.8	280.5	-
9/20/2022	9.6	275.5		-
9/22/2022	6.8	100.6		-
9/28/2022	8.4	248.1		-
9/29/2022	9.1	139.6		-
10/13/2022	77.6	2419.6		G

*G = The amount of analyte is above an acceptable level for quantitation and is likely higher than the reported value.

Table 3.5.5: ADEM sampling stations in the TMDL watershed

Station	Latitude	Longitude	Description
TH-1	33.255339	-86.259666	Tallaseehatchee Creek at County Road 105
SHRT-1	33.21202	-86.27324	Shirtee Creek at Talladega County Road 24
WEET-2	33.316486	-86.19627	Weewoka Creek at Alabama Highway 21
WWOT-37	33.2905	-86.247	Weewoka Creek at County Road 139

Figure 3.5.1: ADEM sampling stations in the TMDL watershed



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 watershed for this TMDL generally follows the trends described above for the summer months of May through October. The critical conditions were taken to be those with the highest *E. coli* single sample exceedance value and/or geometric mean exceedance value.

Data from TH-1 will be used to represent the conditions in Tallaseehatchee Creek. The single sample collected on October 13, 2022 (2419.6 col/100 mL) and the intensive bacteria study during the month of September 2022 (312.7 col/100 mL) will be used to estimate the TMDL pathogen loadings in Tallaseehatchee Creek under critical conditions. A stream flow of 120.6 cfs will be used for the single sample maximum and an average streamflow of 45.5 cfs will be used for the geometric mean.

Data from SHRT-1 will be used to represent the conditions in Shirtee Creek. The single sample collected on June 9, 2022 (2419.6 col/100 mL) and the intensive bacteria study during the month of July (100.2 col/100 mL) will be used to estimate the TMDL pathogen loadings in Shirtee Creek under critical conditions. A stream flow of 152 cubic feet per second (cfs) will be used for the single sample maximum and an average streamflow of 22 cfs will be used for the geometric mean.

Data from WWOT-37 will be used to represent the conditions in Weewoka Creek. The single sample collected on October 13, 2022 (2419.6 col/100 mL) and the intensive bacteria study during the month of September (280.52 col/100 mL) will be used to estimate the TMDL pathogen loadings in Weewoka Creek under critical conditions. A stream flow of 77.6 cfs will be used for the single sample maximum and an average streamflow of 20 cfs will be used for the geometric mean.

3.7 Margin of Safety

There are two methods for incorporating a Margin of Safety (MOS) in the TMDL 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 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 or calculated flow data. The single sample *E. coli* maximum criterion of 298 colonies/100 ml was reduced by

10% to 268.2 colonies/100 ml, while the geometric mean criterion was reduced in the same fashion 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 waste load 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:

$$TMDL = \sum WLA + \sum LA + MOS$$

The TMDL is the total amount of a pollutant that can be assimilated by the receiving waterbody while achieving water quality standards under critical conditions. Pathogen TMDL loads are typically expressed in terms of organism counts per day (colonies/day), in accordance with 40 CFR 130.2(i).

4.2 TMDL Calculations

A mass balance approach was used to calculate the pathogen TMDLs for Tallaseehatchee Creek, Shirtee Creek, and Weewoka 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 in-stream flow times a conversion factor. Existing loads were calculated for the highest geometric mean sample exceedance and the highest single sample exceedance. In the same manner, allowable loads were calculated for both the single sample criterion of 298 col/100 ml and the geometric mean criterion of 126 col/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 Tallaseehatchee Creek - Existing Conditions

The **single sample** mass loading was calculated by multiplying the highest *E. coli* single sample exceedance concentration of 2419.6 colonies/100 ml by the measured flow on the day of the exceedance. The calculation for the existing condition was based on the measurement at TH-1 on October 13, 2022, which can be found above in Table 3.5.1. The product of the concentration, measured flow, and a conversion factor gives the total mass loading (colonies per day) of *E. coli* in Tallaseehatchee Creek under the single sample exceedance condition.

$$\frac{120.6\ \text{ft}^3}{\text{s}} \times \frac{2419.6\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{7.14 \times 10^{12}\text{colonies}}{\text{day}}$$

The **geometric mean** mass loading was calculated by multiplying the highest geometric mean exceedance concentration of 312.7 colonies/100 ml times the average of the five measured daily stream flows. This concentration was calculated based on measurements at TH-1 between September 15, 2022, and October 13, 2022, and can be found above in Table 3.5.2. The average stream flow was calculated to be 45.5 cfs. The product of these two values times the conversion factor gives the total mass loading (colonies per day) of *E. coli* in Tallaseehatchee Creek under the geometric mean exceedance condition.

$$\frac{45.5\ \text{ft}^3}{\text{s}} \times \frac{312.7\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{3.48 \times 10^{11}\text{colonies}}{\text{day}}$$

The **continuous point sources** mass loading was calculated by taking the average discharge flow from the month of October 2022 (since this is when the highest exceedance occurred) and multiplying that by the reported maximum daily *E. coli* value for the same month for each applicable facility. These numbers were found in the October 2022 DMRs submitted by the facilities.

Fairmont WWTP (AL0020010):

$$0.07\ MGD\ \times \frac{1.55\ ft^3}{s * MGD} \times \frac{30\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{7.96 \times 10^7 colonies}{day}$$

Sycamore WWTP (AL0061573):

$$0.017\ MGD\ \times \frac{1.55\ ft^3}{s * MGD} \times \frac{32\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{2.06 \times 10^7 colonies}{day}$$

Sylacauga J. Earl Ham WWTP (AL0020001):

$$1.698\ MGD\ \times \frac{1.55\ ft^3}{s * MGD} \times \frac{34\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{2.19 \times 10^9 colonies}{day}$$

4.2.2 Tallaseehatchee 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 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:

$$\frac{120.6\ \text{ft}^3}{\text{s}} \times \frac{268.2\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{7.91 \times 10^{11}\text{colonies}}{\text{day}}$$

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

$$\frac{120.6\ \text{ft}^3}{\text{s}} \times \frac{29.8\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{8.79 \times 10^{10}\text{colonies}}{\text{day}}$$

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

$$\frac{45.5\ ft^3}{s} \times \frac{113.4\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100mL * s}{ft^3 * day} = \frac{1.26 \times 10^{11} colonies}{day}$$

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

$$\frac{45.5\ ft^3}{s} \times \frac{12.6\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{1.40 \times 10^{10} colonies}{day}$$

The WLA portion of this TMDL was calculated by multiplying the design flow of each facility by the applicable in-stream single sample *E. coli* criterion. This value was then multiplied by a conversion factor to come up with the appropriate loading. The calculations for Fairmont WWTP and Sycamore WWTP can be seen below.

Fairmont WWTP (AL0020010):

$$0.22\ MGD\ \times \frac{1.55\ ft^3}{s * MGD} \times \frac{298\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{2.49 \times 10^9 colonies}{day}$$

Sycamore WWTP (AL0061573):

$$0.043\ MGD \times \frac{1.55\ ft^3}{s * MGD} \times \frac{298\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{4.86 \times 10^8 colonies}{day}$$

Sylacauga J. Earl Ham WWTP (AL0020001):

$$4.8\ MGD\ \times \frac{1.55\ ft^3}{s * MGD} \times \frac{298\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{5.42 \times 10^{10} colonies}{day}$$

The difference between the existing conditions (violation event) and the allowable conditions 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 in Tallaseehatchee Creek. Table 4.2.2.1 below depicts the existing and allowable *E. coli* loads and required reductions for the Tallaseehatchee Creek watershed.

Table 4.2.2.1: Tallaseehatchee Creek - *E. coli* loads and required reductions (TH-1)

Source	Existing Load (colonies/day)	Allowable Load (colonies/day)	Required Reduction (colonies/day)	% Reduction
Single Sample Load	7.14E+12	7.91E+11	6.35E+12	89%
Geometric Mean Load	3.48E+11	1.26E+11	2.22E+11	64%
Fairmont WWTP (AL0020010)	7.96E+7	2.49E+9	0	0%
Sycamore WWTP (AL0061573)	2.06E+7	4.86E+8	0	0%
J. Earl Ham WWTP (AL0020001)	2.19E+9	5.42E+10	0	0%

From Table 4.2.2.1, compliance with the single sample maximum criterion of 298 colonies/100 ml requires a reduction of 89% in the *E. coli* load. The TMDL, WLA, LA and MOS values necessary to achieve the applicable *E. coli* criteria are provided in Table 4.2.2.2 below.

Table 4.2.2.2: *E. coli* TMDL for Tallaseehatchee Creek (AL03150107-0106-100)

TMDL[e]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[a]			Load Allocation (LA)	
		WWTPs[b]	MS4s[c]	Leaking Collection Systems[d]		
(col/day)	(col/day)	(col/day)	% reduction	(col/day)	(col/day)	% reduction
8.79E+11	8.79E+10	5.72E+10	N/A	0	7.34E+11	89%

N/A – Not applicable
a. There are no CAFOs in the Tallaseehatchee Creek watershed. Future CAFOs will be assigned a waste load allocation (WLA) of zero.
b. Current and future WWTPs must meet the applicable in-stream water quality criteria for pathogens at the point of discharge.
c. Future MS4 areas would be required to demonstrate consistency with the assumptions and requirements of this TMDL.
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. TMDL was established using the single sample maximum criterion of 298 colonies/100 ml.

4.2.3 Shirtee Creek - Existing Conditions

The **single sample** mass loading was calculated by multiplying the highest *E. coli* single sample exceedance concentration of 2419.6 colonies/100 ml by the measured flow on the day of the exceedance. The calculation for the existing condition was based on the measurement at SHRT-1 on June 9, 2022, which can be found above in Table 3.5.2. The product of the concentration, measured flow, and a conversion factor gives the total mass loading (colonies per day) of *E. coli* in Shirtee Creek under the single sample exceedance condition.

$$\frac{152\ \text{ft}^3}{\text{s}} \times \frac{2419.6\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{9.0 \times 10^{12}\ \text{colonies}}{\text{day}}$$

The **geometric mean** mass loading was calculated by multiplying the highest geometric mean concentration of 100.2 colonies/100 ml times the average of the five measured daily stream flows. This concentration was calculated based on measurements at SHRT-1 between July 12, 2022, and August 9, 2022, and can be found above in Table 3.5.2. The average stream flow was calculated to be 22 cfs. The product of these two values times the conversion factor gives the total mass loading (colonies per day) of *E. coli* in Shirtee Creek under the geometric mean condition.

$$\frac{22\ \text{ft}^3}{\text{s}} \times \frac{100.2\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{5.39 \times 10^{10}\text{colonies}}{\text{day}}$$

The **continuous point sources** mass loading was calculated by taking the average discharge flow from the month of June 2022 (since this is when the highest exceedance occurred) and multiplying that by the reported maximum daily *E. coli* value for the same month for each applicable facility. These numbers were found in the June 2022 Discharge Monitoring Reports (DMRs) submitted by the facility.

Sylacauga J. Earl Ham WWTP (AL0020001):

$$2.948\ MGD \times \frac{1.55\ ft^3}{s * MGD} \times \frac{99\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{1.11 \times 10^{10} colonies}{day}$$

4.2.4 Shirtee 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 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:

$$\frac{152\ \text{ft}^3}{\text{s}} \times \frac{268.2\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{9.97 \times 10^{11}\text{colonies}}{\text{day}}$$

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

$$\frac{152\ \text{ft}^3}{\text{s}} \times \frac{29.8\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{1.11 \times 10^{11}\text{colonies}}{\text{day}}$$

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

$$\frac{22\ ft^3}{s} \times \frac{113.4\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100mL * s}{ft^3 * day} = \frac{6.1 \times 10^{10} colonies}{day}$$

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

$$\frac{22\ ft^3}{s} \times \frac{12.6\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{6.78 \times 10^{9} colonies}{day}$$

The WLA portion of this TMDL was calculated by multiplying the design flow of the facility by the applicable in-stream single sample *E. coli* criterion. This value was then multiplied by a conversion factor to come up with the appropriate loading. The calculations for Sylacauga J. Earl Ham WWTP can be seen below.

Sylacauga J. Earl Ham WWTP (AL0020001):

$$4.8\ MGD\ \times \frac{1.55\ ft^3}{s * MGD} \times \frac{298\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{5.42 \times 10^{10} colonies}{day}$$

The difference between the existing conditions (violation event) and the allowable conditions 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 in Shirtee Creek. Table 4.2.4.1 below depicts the existing and allowable *E. coli* loads and required reductions for the Shirtee Creek watershed.

Table 4.2.4.1: Shirtee Creek – *E. coli* loads and required reductions (SHRT-1)

Source	Existing Load (colonies/day)	Allowable Load (colonies/day)	Required Reduction (colonies/day)	% Reduction
Single Sample Load	9.00E+12	9.97E+11	8.00E+12	89%
Geometric Mean Load	5.39E+10	6.10E+10	0	0%
J. Earl Ham WWTP (AL0020001)	1.11E+10	5.42E+10	0	0%

From Table 4.2.4.1, compliance with the single sample maximum criterion of 298 colonies/100 ml requires a reduction of 89% in the *E. coli* load. The TMDL, WLA, LA and MOS values necessary to achieve the applicable *E. coli* criteria are provided in Table 4.2.4.2 below.

Table 4.2.4.2: *E. coli* TMDL for Shirtee Creek (AL03150107-0104-100)

TMDL[e]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[a]			Load Allocation (LA)	
		WWTPs[b]	MS4s[c]	Leaking Collection Systems[d]		
(col/day)	(col/day)	(col/day)	% reduction	(col/day)	(col/day)	% reduction
1.11E+12	1.11E+11	5.42E+10	N/A	0	9.43E+11	89%

N/A – Not applicable
a. There are no CAFOs in the Shirtee Creek watershed. Future CAFOs will be assigned a waste load allocation (WLA) of zero.
b. Current and future WWTPs must meet the applicable in-stream water quality criteria for pathogens at the point of discharge.
c. Future MS4 areas would be required to demonstrate consistency with the assumptions and requirements of this TMDL.
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. TMDL was established using the single sample maximum criterion of 298 colonies/100 ml.

4.2.5 Weewoka Creek - Existing Conditions

The **single sample** mass loading was calculated by multiplying the highest *E. coli* single sample exceedance concentration of 2419.6 colonies/100 ml by the measured flow on the day of the exceedance. The calculation for the existing condition was based on the measurement at WWOT-37 on October 13, 2022, which can be found above in Table 3.5.4. The product of the concentration, measured flow, and a conversion factor gives the total mass loading (colonies per day) of *E. coli* in Weewoka Creek under the single sample exceedance condition.

$$\frac{77.6\ \text{ft}^3}{\text{s}} \times \frac{2419.6\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{4.59 \times 10^{12}\text{colonies}}{\text{day}}$$

The **geometric mean** mass loading was calculated by multiplying the highest geometric mean exceedance concentration of 280.5 colonies/100 ml times the average of the measured daily stream flows during the intensive study. The concentration at WWOT-37 was calculated based on measurements between September 15, 2022, and October 13, 2022, and can be found above in Table 3.5.4. The average stream flow was calculated to be 20 cfs. The product of these two values times the conversion factor gives the total mass loading (colonies per day) of *E. coli* in Weewoka Creek under the geometric mean exceedance condition.

$$\frac{20\ \text{ft}^3}{\text{s}} \times \frac{280.5\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{1.37 \times 10^{11}\text{colonies}}{\text{day}}$$

The **continuous point sources** mass loading was calculated by taking the average discharge flow from the month of October 2022 (since this is when the highest exceedance occurred) and multiplying that by the reported maximum daily *E. coli* value for the same month for each applicable facility.

The Winterboro School Lagoon (AL0058823) reported no discharge on the October 2022 DMR. Therefore, the existing load for this facility is zero.

4.2.6 Weewoka 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 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:

$$\frac{77.6\ \text{ft}^3}{\text{s}} \times \frac{268.2\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{5.09 \times 10^{11}\text{colonies}}{\text{day}}$$

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

$$\frac{77.6\ \text{ft}^3}{\text{s}} \times \frac{29.8\ \text{colonies}}{100\ \text{ml}} \times \frac{24{,}465{,}755 * 100\ \text{ml} * \text{s}}{\text{ft}^3 * \text{day}} = \frac{5.66 \times 10^{10}\text{colonies}}{\text{day}}$$

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

$$\frac{20\ ft^3}{s} \times \frac{113.4\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100 mL * s}{ft^3 * day} = \frac{5.54 \times 10^{10} colonies}{day}$$

The explicit margin of safety (WWOT-37) of 12.6 colonies/100 ml equals a daily loading of:

$$\frac{20\ ft^3}{s} \times \frac{12.6\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{6.16 \times 10^{9} colonies}{day}$$

The WLA portion of this TMDL was calculated by multiplying the design flow of the facility by the applicable in-stream single sample *E. coli* criterion. This value was then multiplied by a conversion factor to come up with the appropriate loading. The calculations for Winterboro School Lagoon can be seen below.

Winterboro School Lagoon (AL0058823):

$$0.014\ MGD \times \frac{1.55\ ft^3}{s * MGD} \times \frac{298\ colonies}{100\ mL} \times \frac{24{,}465{,}755 * 100\ mL * s}{ft^3 * day} = \frac{1.58 \times 10^{8} colonies}{day}$$

The difference between the existing conditions (violation event) and the allowable conditions 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 in Weewoka Creek. Table 4.2.6.1 below depicts the existing and allowable *E. coli* loads and required reductions for the Weewoka Creek watershed.

Table 4.2.6.1: Weewoka Creek - *E. coli* loads and required reductions (WWOT-37)

Source	Existing Load (colonies/day)	Allowable Load (colonies/day)	Required Reduction (colonies/day)	% Reduction
Single Sample Load	4.59E+12	5.09E+11	4.09E+12	89%
Geometric Mean Load	1.37E+11	5.54E+10	8.17E+10	60%
Winterboro School Lagoon (AL0058823)	0	1.58E+8	0	0%

Table 4.2.6.2: *E. coli* TMDL for Weewoka Creek (AL03150107-0203-100)

TMDL[e]	Margin of Safety (MOS)	Waste Load Allocation (WLA)[a]			Load Allocation (LA)	
		WWTPs[b]	MS4s[c]	Leaking Collection Systems[d]		
(col/day)	(col/day)	(col/day)	% reduction	(col/day)	(col/day)	% reduction
5.66E+11	5.66E+10	1.58E+8	N/A	0	5.09E+11	89%

N/A – Not applicable
a. There are no CAFOs in the Weewoka Creek watershed. Future CAFOs will be assigned a waste load allocation (WLA) of zero.
b. Current and future WWTPs must meet the applicable in-stream water quality criteria for pathogens at the point of discharge.
c. Future MS4 areas would be required to demonstrate consistency with the assumptions and requirements of this TMDL.
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. TMDL was established using the single sample maximum criterion of 298 colonies/100 ml.

4.3 TMDL Summary

Tallaseehatchee Creek was placed on Alabama's §303(d) list in 2018 based on data collected from 2011 to 2016 at station TH-1. A mass balance approach was used to calculate the *E. coli* TMDL for Tallaseehatchee Creek. Based on the TMDL analysis, it was determined that an 89% reduction in *E. coli* loading was necessary to achieve compliance with applicable water quality standards.

Shirtee Creek was placed on Alabama's §303(d) list in 2018 based on data collected from 2011 to 2016 at station SHRT-1. A mass balance approach was used to calculate the *E. coli* TMDL for Shirtee Creek. Based on the TMDL analysis, it was determined that an 89% reduction in *E. coli* loading was necessary to achieve compliance with applicable water quality standards.

Weewoka Creek was placed on Alabama's §303(d) list in 2018 based on data collected from 2015 and 2016 at stations WEET-2 and WWOT-37. A mass balance approach was used to calculate the *E. coli* TMDL for Weewoka Creek. Based on the TMDL analysis, it was determined that an 89% 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 storm water 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 will be implemented through voluntary measures/best management practices (BMPs). Cooperation and active participation by the general public and various other groups is 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. As additional data and/or information become 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 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	2022/2025
Alabama, Cahaba, Mobile, Tallapoosa, Tennessee (Pickwick and Wilson)	2023/2026
Black Warrior, Blackwater, Chattahoochee, Chipola, Choctawhatchee, Escambia, Perdido, Tennessee (Wheeler), Yellow	2024/2027

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 major 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. No written comments were received during the public notice period.

7.0 Appendices

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 Department of Environmental Management (ADEM), Alabama's Water Quality Assessment and Listing Methodology, 2022.

Alabama's §303(d) List and Fact Sheet. 2018, 2020, 2022 ADEM.

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 Continuous Point Source Effluent Data

Table 7.2.1: Sylacauga J. Earl Ham WWTP (AL0020001) *E.coli* data

Monitoring Period End Date	Monthly Average Concentration (col/100 mL)	Maximum Daily Concentration (col/100 mL)
1/31/18	40	461
2/28/18	79	249
3/31/18	163	548
4/30/18	204	2420
5/31/18	66	435
6/30/18	49	261
7/31/18	247	2420
8/31/18	19	79
9/30/18	36	109
10/31/18	8	30
11/30/18	29	243
12/31/18	9	42
1/31/19	110	579
2/28/19	27	76
3/31/19	10	27
4/30/19	13	61
5/31/19	4	13
6/30/19	38	99
7/31/19	19	35
8/31/19	35	79
9/30/19	27	55
10/31/19	24	48
11/30/19	138	2420
12/31/19	13	119
1/31/20	106	1120
2/29/20	19	54
3/31/20	9	48
4/30/20	13	87
5/31/20	6	31
6/30/20	6.62	54
7/31/20	18	86
8/31/20	19	104
9/30/20	11	60
10/31/20	22	77
11/30/20	16	86
12/31/20	11	42
1/31/21	2	17
2/28/21	1	3
3/31/21	9	39
4/30/21	18	63
5/31/21	9	39
6/30/21	38	104
7/31/21	19	78
8/31/21	19	101
9/30/21	60	131
10/31/21	28	204
11/30/21	23	58
12/31/21	21	87
1/31/22	8	31
2/28/22	4	11
3/31/22	11	25
4/30/22	21	31
5/31/22	67	124
6/30/22	20	99
7/31/22	2.3	12
8/31/22	7.4	31.5
9/30/22	11	32
10/31/22	6	34
11/30/22	1.3	8.5
12/31/22	6.07	13.2

Table 7.2.2: Fairmont WWTP (AL0020010) *E.coli* data

Monitoring Period End Date	Monthly Average Concentration (col/100 mL)	Maximum Daily Concentration (col/100 mL)
1/31/18	1	11
2/28/18	12	85
3/31/18	3	23
4/30/18	0	0
5/31/18	43	387
6/30/18	0	0
7/31/18	1	4
8/31/18	1	1
9/30/18	1	2
10/31/18	1	3
11/30/18	14	82
12/31/18	14	107
1/31/19	8	44
2/28/19	3	16
3/31/19	1	2
4/30/19	55	435
5/31/19	14	135
6/30/19	1	4
7/31/19	116	2420
8/31/19	0	0
9/30/19	0	0
10/31/19	1	1
11/30/19	0	0
12/31/19	1	5
1/31/20	4	31
2/29/20	1	2
3/31/20	6	36
4/30/20	0.11	1
5/31/20	5	35
6/30/20	0	0
7/31/20	0	0
8/31/20	0	0
9/30/20	0	0
10/31/20	1	3
11/30/20	1	2
12/31/20	0	0
1/31/21	1	2
2/28/21	1	2
3/31/21	1	1
4/30/21	1	2
5/31/21	1	2
6/30/21	19	167
7/31/21	4	31
8/31/21	20	167
9/30/21	1	2
10/31/21	10	80
11/30/21	7	29
12/31/21	4	10
1/31/22	7	18
2/28/22	5	14
3/31/22	3	11
4/30/22	5	19
5/31/22	0	0
6/30/22	3	19
7/31/22	1	6
8/31/22	1	1
9/30/22	0	0
10/31/22	4	30
11/30/22	1.6	13.4
12/31/22	0.7	6.3

Table 7.2.3: Winterboro School Lagoon (AL0058823) *E.coli* data

Monitoring Period End Date	Monthly Average Concentration (col/100 mL)	Maximum Daily Concentration (col/100 mL)
1/31/15	4	4
2/29/16	28	28
6/30/17	46	46
2/28/18	10	10
2/28/19	12	12
1/31/20	370	370
2/29/20	4	4

Table 7.2.4: Sycamore WWTP (AL0061573) *E.coli* data

Monitoring Period End Date	Monthly Average Concentration (col/100 mL)	Maximum Daily Concentration (col/100 mL)
2/28/18	2	8
3/31/18	1.26	6
4/30/18	9.6	36
5/31/18	4	8
6/30/18	5.5	22
7/31/18	4.4	22
8/31/18	2.5	6
9/30/18	0	0
10/31/18	2.4	10
11/30/18	3	10
12/31/18	0	0
1/31/19	0.5	2
2/28/19	2.5	6
3/31/19	0	0
4/30/19	14	70
5/31/19	0.5	2
6/30/19	10	40
7/31/19	22.4	100
8/31/19	0	0
9/30/19	0.8	4
10/31/19	5	20
11/30/19	6.5	14
12/31/19	8.8	26
1/31/20	0	0
2/29/20	0	0
3/31/20	0.8	4
4/30/20	0.5	2
5/31/20	6	12
6/30/20	3.6	12
7/31/20	12	30
8/31/20	16.4	32
9/30/20	7	20
10/31/20	25	52
11/30/20	57.2	264
12/31/20	20.5	60
1/31/21	300	1200
2/28/21	4	16
3/31/21	0.4	2
4/30/21	1.5	6
5/31/21	1.5	6
6/30/21	3.2	12
7/31/21	300	1200
8/31/21	0	0
9/30/21	1	4
10/31/21	0	0
11/30/21	20.4	80
12/31/21	66.5	260
1/31/22	0	0
2/28/22	377.5	1500
3/31/22	0.5	2
4/30/22	0	0
5/31/22	0.8	4
6/30/22	0	0
7/31/22	0	0
8/31/22	2.4	12
9/30/22	27	70
10/31/22	6.4	32
11/30/22	9.5	34
12/31/22	8	18

7.3 Sanitary Sewer Overflows (SSOs)

Table 7.3.1: Sylacauga J. Earl Ham WWTP (AL0020001) SSOs

SSO Began	Estimated Release Volume (gallons)	Duration (hours)
2023-03-27	<=1,000 gal	2
2023-03-27	<=1,000 gal	1
2023-03-27	<=1,000 gal	2
2023-03-28	25,000 < gallons <= 50,000	30
2023-03-28	10,000 < gallons <= 25,000	26
2023-02-17	10,000 < gallons <= 25,000	7
2023-02-03	1,000 < gallons <= 10,000	6
2022-04-05	<=1,000 gal	1
2022-03-24	10,000 < gallons <= 25,000	20
2022-03-23	1,000 < gallons <= 10,000	4
2022-03-23	1,000 < gallons <= 10,000	6
2021-05-05	1,000 < gallons <=10,000	10
2021-05-05	1,000 < gallons <=10,000	11
2021-04-01	1,000 < gallons <=10,000	14
2020-04-20	<=1,000 gallons	8
2020-03-05	<=1,000 gallons	2
2020-03-06	1,000 < gallons <=10,000	49
2020-02-21	1,000 < gallons <=10,000	31
2020-02-21	1,000 < gallons <=10,000	22
2020-02-21	1,000 < gallons <=10,000	28
2020-02-13	<=1,000 gallons	4
2020-02-14	1,000 < gallons <=10,000	74
2020-02-14	10,000 < gallons <= 25,000	81
2020-02-13	<=1,000 gallons	55
2020-02-14	1,000 < gallons <=10,000	79
2020-02-06	1,000 < gallons <=10,000	4
2020-01-14	1,000 < gallons <=10,000	11
2020-01-14	<=1,000 gallons	4
2020-01-14	<=1,000 gallons	3

Table 7.3.2: Childersburg Pinecrest Lagoon (AL0021458) SSOs

SSO Began	Estimated Release Volume (gallons)	Duration (hours)
2022-06-06	<=1,000 gal	2

Table 7.3.3: Childersburg South Bailey Branch Lagoon (AL0021466) SSOs

SSO Began	Estimated Release Volume (gallons)	Duration (hours)
2021-10-26	<=1,000 gallons	3
2021-06-07	<=1,000 gallons	0
2021-05-06	<=1,000 gallons	4
2020-02-12	10,000 < gallons <= 25,000	41
2020-02-12	<=1,000 gallons	43

7.4 Tallaseehatchee Creek Watershed Photos

Figure 7.4.1: At Station TH-1: Upstream View (9/28/2022)

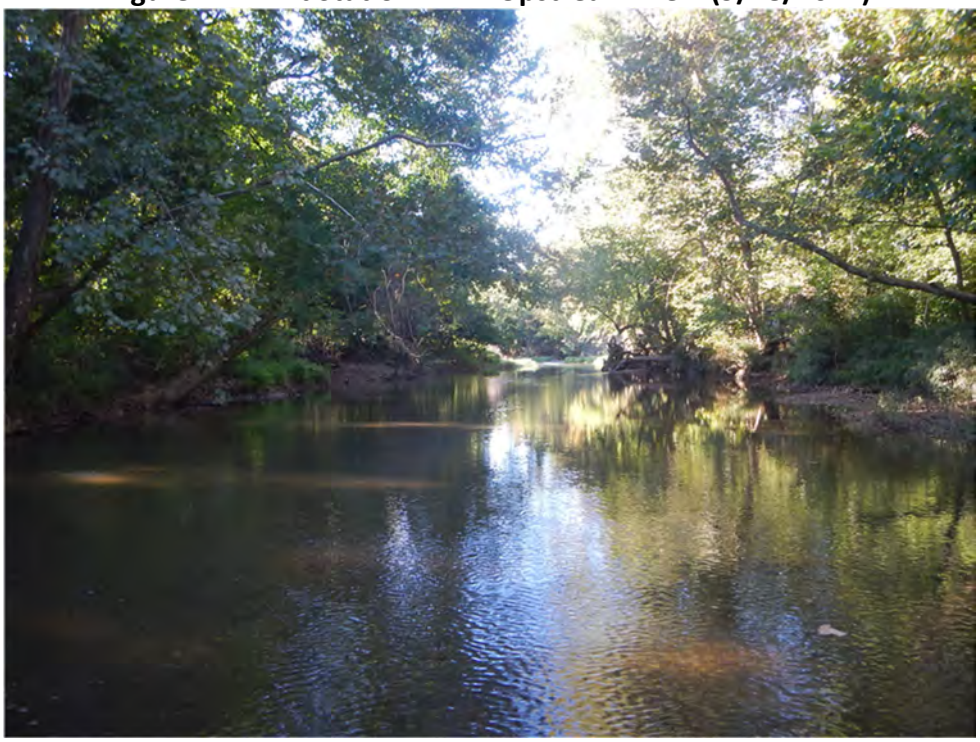


Figure 7.4.2: At Station TH-1: Downstream View (9/28/2022)

7.5 Shirtee Creek Watershed Photos

Figure 7.5.1: At Station SHRT-1: Upstream View (10/12/2022)

Figure 7.5.2: At Station SHRT-1: Downstream View (10/12/2022)

7.6 Weewoka Creek Watershed Photos

Figure 7.6.1: At Station WEET-2: Upstream View (9/28/2022)

Figure 7.6.2: At Station WEET-2: Downstream (9/28/2022)

Figure 7.6.3: At Station WWOT-37: Upstream View (7/14/2022)

Figure 7.6.4: At Station WWOT-37: Downstream View (7/14/2022)