Draft

Total Maximum Daily Load

Evaluation

for

Two Stream Segments

in the

Savannah River Basin

for

Enterococci

Submitted to:
The U.S. Environmental Protection Agency
Region 4
Atlanta, Georgia

Submitted by:
The Georgia Department of Natural Resources
Environmental Protection Division
Atlanta, Georgia

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EXECUTIVE SUMMARY

The State of Georgia assesses its waterbodies for compliance with water quality standards criteria established for their designated uses as required by the Federal Clean Water Act (CWA). Assessed waterbodies are placed into one of three categories, supporting designated use, not supporting designated use, or assessment pending, depending on water quality assessment results. These waterbodies are found on Georgia's 305(b) list as required by that section of the CWA that defines the assessment process, and are published in *Water Quality in Georgia 2024-2025* (GA EPD, 2026). This document is available on the Georgia Environmental Protection Division (EPD) website.

The subset of the water bodies that do not meet designated uses on the 305(b) list are also assigned to Georgia's 303(d) list, named after that section of the CWA. Although the 305(b) and 303(d) lists are two distinct requirements under the CWA, Georgia reports both lists in one combined format called the Integrated 305(b)/303(d) List, which is found in Appendix A of *Water Quality in Georgia 2024-2025* (GA EPD, 2026). Water bodies on the 303(d) list are denoted as Category 5, and are required to have a Total Maximum Daily Load (TMDL) evaluation for the water quality constituent(s) in violation of the water quality standard.

A TMDL is defined as the sum of the individual waste load allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources, as well as natural background (40 CFR 130.2) for a given waterbody. The TMDL must also include a margin of safety (MOS), either implicitly or explicitly, that accounts for the uncertainty in the relationship between pollutant loads and the water quality response of the receiving waterbody. A point source is defined as a discernable, confined, and discrete conveyance from which pollutants are or may be discharged to surface waters. Nonpoint sources are diffuse, and generally, but not always, involve accumulated bacteria that wash off land surfaces as a result of storm events. An important part of the TMDL analysis is the identification of potential source categories.

Every waterbody in the State has one or more designated uses, and each designated use has water quality criteria established to protect it. The State of Georgia has placed two (2) beach segments in the Savannah River Basin on the 303(d) list of impaired waters because they were assessed as "not supporting" their designated use of "Recreation" due to violation of the enterococci water quality criteria. The water quality criteria for enterococci bacteria for coastal waters with a designated use of recreation is as follows:

> Coastal and estuarine waters: Culturable enterococci not to exceed a geometric mean of 35 counts per 100 mL based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours. There shall be no greater than a ten percent excursion frequency of an enterococci statistical threshold value (STV) of 130 counts per 100 mL in the same 30-day interval.

The process of developing enterococci bacteria TMDLs for listed segments in the Savannah River Basin includes the determination of the following:

- The current critical enterococci load to the beach under existing conditions;
- The TMDL for similar conditions under which the current critical load was determined; and
- The percent reduction in the current critical enterococci load necessary to achieve the TMDL.

The calculation of the enterococci load at any point on a beach requires the enterococci concentration and a waterbody volume. The availability of water quality and flow data varies considerably among listed segments. A mass balance approach was used to determine the current enterococci load and TMDL. The enterococci load and required reduction for the listed beach segments is summarized in the table below.

Management practices that may be used to help reduce enterococci source loads include:

- Compliance with National Pollutant Discharge Elimination System (NPDES) permit limits and requirements;
- Adoption of Natural Resources Conservation Service (NRCS) conservation practices; and
- Application of Best Management Practices (BMPs) appropriate to reduce nonpoint sources.

The amount of enterococci bacteria delivered to a waterbody is difficult to determine. However, the use of these management practices should improve water quality of the beach, and future monitoring will provide a measurement of TMDL implementation.

Enterococci Loads and Required Load Reductions for the 303(d) Listed Beach Segments in the Savannah River Basin

Stream Segment	Description	Bacterial Indicator	Current Load (counts / 30 days)[1]	TMDL Components					Needed Percent Reduction
				WLA (counts/ 30 days)[2]	WLAsw (counts/ 30 days)[1]	LA (counts/ 30 days)[1]	MOS (counts/ 30 days)[1]	TMDL (counts/ 30 days)[1]	
Tybee Island - Polk Street Beach (GAR030601090313)	End of Beach to Jetty	Enterococci	300 x Q_{Total}	2.60E+12	35 x Q_{WLASW}	35 x Q_{LA}	3.5 x Q_{Total}	35 x Q_{Total}	57%
Tybee Island - Strand Beach at Pier (GAR030601090316)	11th Street to 18th Street	Enterococci	273 x Q_{Total}	2.60E+12	35 x Q_{WLASW}	35 x Q_{LA}	3.5 x Q_{Total}	35 x Q_{Total}	52%

Notes:

[1]The impaired beach is tidal in nature. Therefore, the current load, load allocations, and TMDL are expressed as a function of the total flow (Q_{Total}) at any given time

[2]The assigned Enterococci load from individual NPDES permitted facilities for WLAs are determined as the product of the Enterococci 30-day water quality criteria (35 counts/100mL) and the facility permitted monthly average discharge, or long-term average flow provided in the most recent NPDES permit application.

1.0 INTRODUCTION

1.1 Background

The State of Georgia assesses its waterbodies for compliance with water quality standards criteria established for their designated uses as required by the Federal Clean Water Act (CWA). Assessed waterbodies are placed into one of three categories depending on water quality assessment results, supporting designated use, not supporting designated use, or assessment pending. These waterbodies are found on Georgia's 305(b) list as required by that section of the CWA that addresses the assessment process, and are published in *Water Quality in Georgia 2024-2025* (GA EPD, 2026). This document is available on the Georgia Environmental Protection Division (EPD) website.

A subset of the waterbodies that do not meet designated uses, those in Category 5 on the 305(b) list, are assigned to Georgia's 303(d) list, named after that section of the CWA. Waterbodies included in the 303(d) list are required to have a Total Maximum Daily Load (TMDL) evaluation for the water quality constituent(s) in violation of the water quality criteria. The TMDL in this document is based on the 2026 303(d) listing, which is available on the EPD website. The TMDL process establishes the allowable loading of pollutants or other quantifiable parameters for a waterbody based on the relationship between pollution sources and instream water quality conditions. This allows water quality-based controls to be developed to reduce pollution and restore and maintain water quality.

The list identifies the stream segments that are not supporting the designated use classifications due to exceedances of water quality standards for enterococci bacteria. Enterococci bacteria are used as an indicator of the potential presence of pathogens in a stream. Table 1 presents the beach segments in the Savannah River Basin included on the 2026 303(d) list for exceedances of the enterococci standard criteria.

Table 1. Beach Segments Listed on the 2026 303(d) List for Enterococci in the Savannah River Basin

Reach ID	Stream Segment	Location	County	Segment Length (miles)	Designated Use	Use Support Status
GAR030601090313	Tybee Island - Polk Street Beach	End of Beach to Jetty	Chatham	1.8	Recreation	Not Supporting
GAR030601090316	Tybee Island - Strand Beach at Pier	11th Street to 18th Street	Chatham	0.7	Recreation	Not Supporting

1.2 Watershed Description

The Savannah River Basin encompasses more than 10,570 square miles and the river forms the border between the states of South Carolina and Georgia. The Savannah River begins in the Blue Ridge Mountains of north Georgia and South Carolina where the Seneca and Tugaloo rivers meet and flow into Lake Hartwell. The Savannah River then flows southeast for more than 300 miles to the Atlantic Ocean. Upstream of Augusta, the river flows through Richard B. Russell Lake, Clarks Hill Reservoir, and Lake Stephens. The river flows through three geographically distinct ecoregions, beginning its meandering path in the Blue Ridge, flowing through the rich soils of the Piedmont, and ending in the Coastal Plain, where it forms a braided network of tidal creeks that empty into the Atlantic Ocean, near Savannah.

The United States Geologic Survey (USGS) has divided the Savannah Basin into nine sub-basins, or Hydrologic Unit Codes (HUCs), of which seven are partially or completely located within Georgia. The HUCs located in Georgia are numbered 03060102 through 03060106, and 03060108 through 03060109. Figure 1 shows the location of the Savannah River Basin in the State of Georgia. Figure 2 shows the locations of the eight-digit HUC sub-basins within the Savannah River Basin located in Georgia. Figure 3 indicates the location of the 303(d) listed stream segments in the Savannah River Basin.

The listed beach segments are located on the north side of Tybee Island where the south channel of the Savannah River meets the Atlantic Ocean, and along the southeast side of Tybee Island where the pier and downtown commercial districts are located. The watershed that is estimated to contribute estuarine and tidal mixing to each of the beach segments encompasses the greater Savannah Harbor drainage basin, including the upland freshwater tributaries in the Savannah area and the tidal marshes between the mainland and the barrier islands.

The land use characteristics of the Savannah River Basin watersheds were determined using data from the Georgia Land Use Trends (GLUT) for Year 2020. This raster land use trend product was developed by the University of Georgia – Natural Resources Spatial Analysis Laboratory (NARSAL) and follows land use trends for years 1974, 1985, 1991, 1998, 2001, 2005, 2008, 2015, and 2020. Some of the NARSAL land use types were reclassified, aggregated into similar land use types, and used in the final watershed characterization. Table 2 lists the watershed land use distribution for the drainage areas of the two stream segments.

1.3 State Water Planning

The Georgia Legislature enacted the Metropolitan North Georgia Water Planning District Act in 2001 to create the Metropolitan North Georgia Water Planning District (MNGWPD) to preserve and protect water resources in the 15-county metropolitan Atlanta area. The MNGWPD is charged with the development of comprehensive regional and watershed specific water resource management plans to be implemented by local governments in the metropolitan Atlanta area. The MNGWPD issued its first water resource management plan documents in 2003.

In 2004, the Georgia Legislature enacted the Comprehensive State-wide Water Management Planning Act to ensure management of water resources in a sustainable manner to support the state's economy, to protect public health and natural systems, and to enhance the quality of life for all citizens on a state-wide level. GA EPD later developed the 2008 Comprehensive State-wide Water Management Plan, which established Georgia's ten Regional Water Planning Councils (RWPCs) and laid the groundwork for the RWPCs to develop their own Regional Water Plans. The boundaries of these ten RWPCs, in addition to the MNGWPD, are shown in Figure 4. All waterbodies covered by the TMDL except the segment of Savannah Harbor are located within the boundaries of the Savannah-Upper Ogeechee Regional Water Planning Council. Savannah Harbor is located in the Coastal Georgia Water Planning Region.

In 2011, each RWPC developed and adopted Regional Water Plans, which identify ranges of actions or management practices to help meet the State's water quality challenges. Implementation of these plans is critical in meeting Georgia's water resource challenges. The Coastal Georgia RWPC updated its Water Plan in June 2017, which was adopted by GA EPD in July 2017. The plan was again revised in June 2023 based on new forecast and resource assessment information. All Regional Water Plans are subject to periodic review and revision on a 5-year cycle, and the Councils are currently scheduled to update their Plans again in 2027. Their Water Plan is available here.

1.4 Water Quality Standard

The water use classification for the listed stream segments in the Savannah River Basin is Recreation. The criterion violated is listed as enterococci. The potential causes listed include urban runoff and nonpoint sources. The use classification water quality standards for enterococci bacteria, as stated in the *State of Georgia's Rules and Regulations for Water Quality Control*, Chapter 391-3-6-.03(6)(b)(i) (GA EPD, 2022), are:

(b) Recreation: Primary contact recreational activities that occur year round such as swimming, diving, whitewater boating (class III and above), water skiing, and surfing, or for any other use requiring water of a lower quality, such as recreational fishing. These criteria are not to be interpreted as encouraging water contact sports in proximity to sewage or industrial waste discharges regardless of treatment requirements:

(i) Bacteria

1. Coastal and estuarine waters: Culturable enterococci not to exceed a geometric mean of 35 counts per 100 mL based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours. There shall be no greater than a ten percent excursion frequency of an enterococci statistical threshold value (STV) of 130 counts per 100 mL in the same 30-day interval.

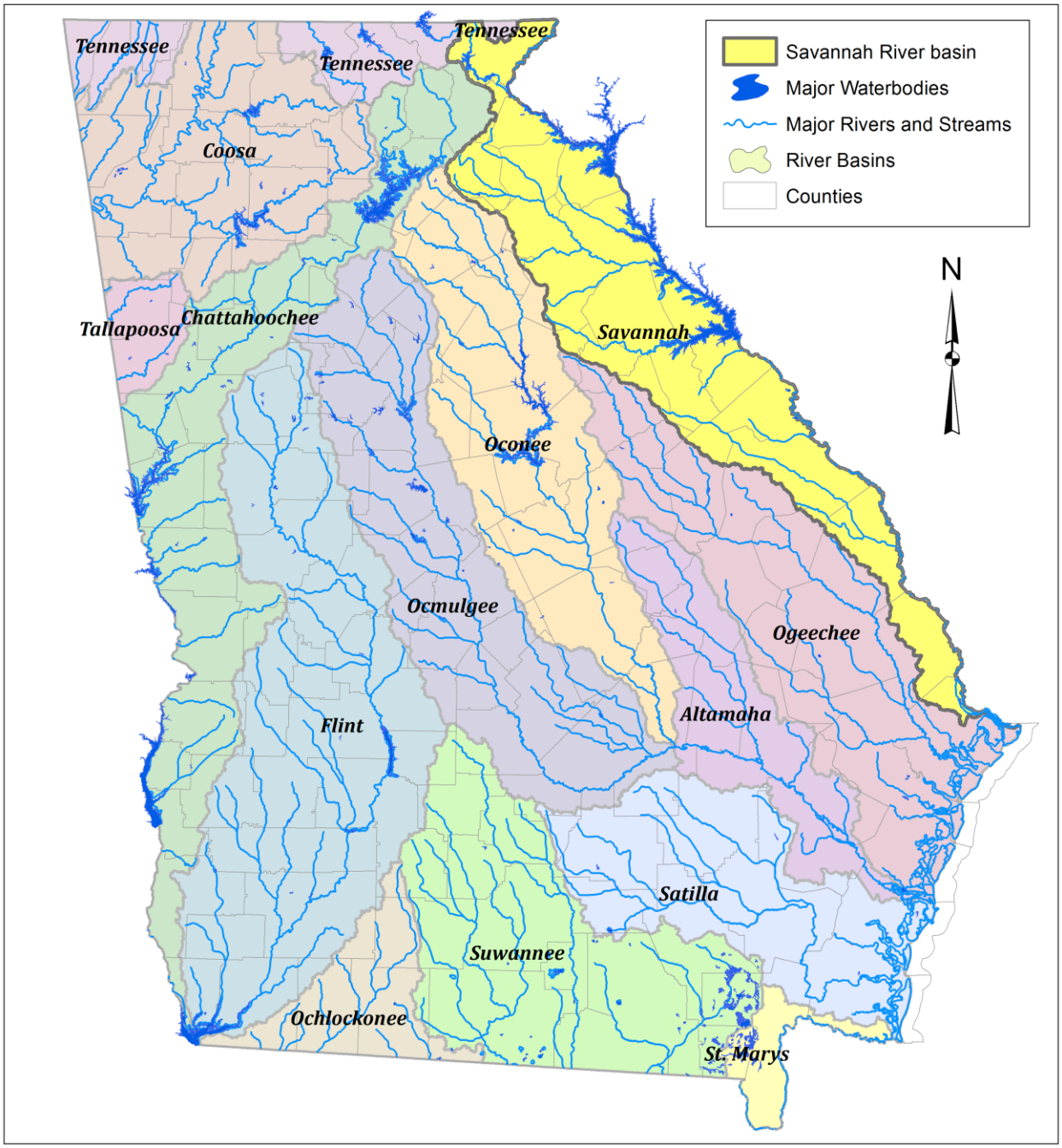

Figure 1. Savannah River Basin and the River Basins of Georgia

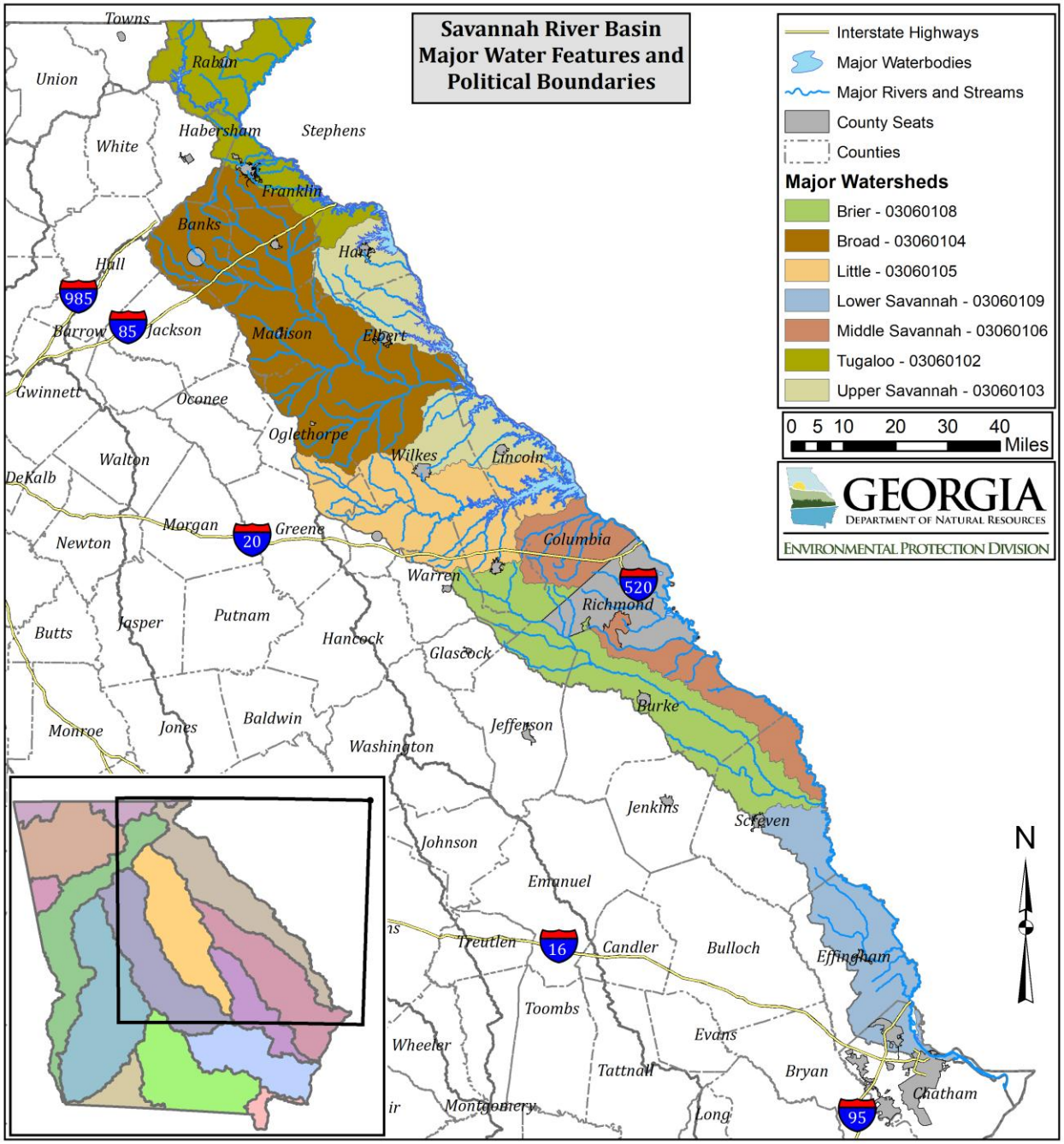

Figure 2. Major Political Boundaries, Water Features, and U.S.G.S. 8-digit HUC Watersheds within the Savannah River Basin

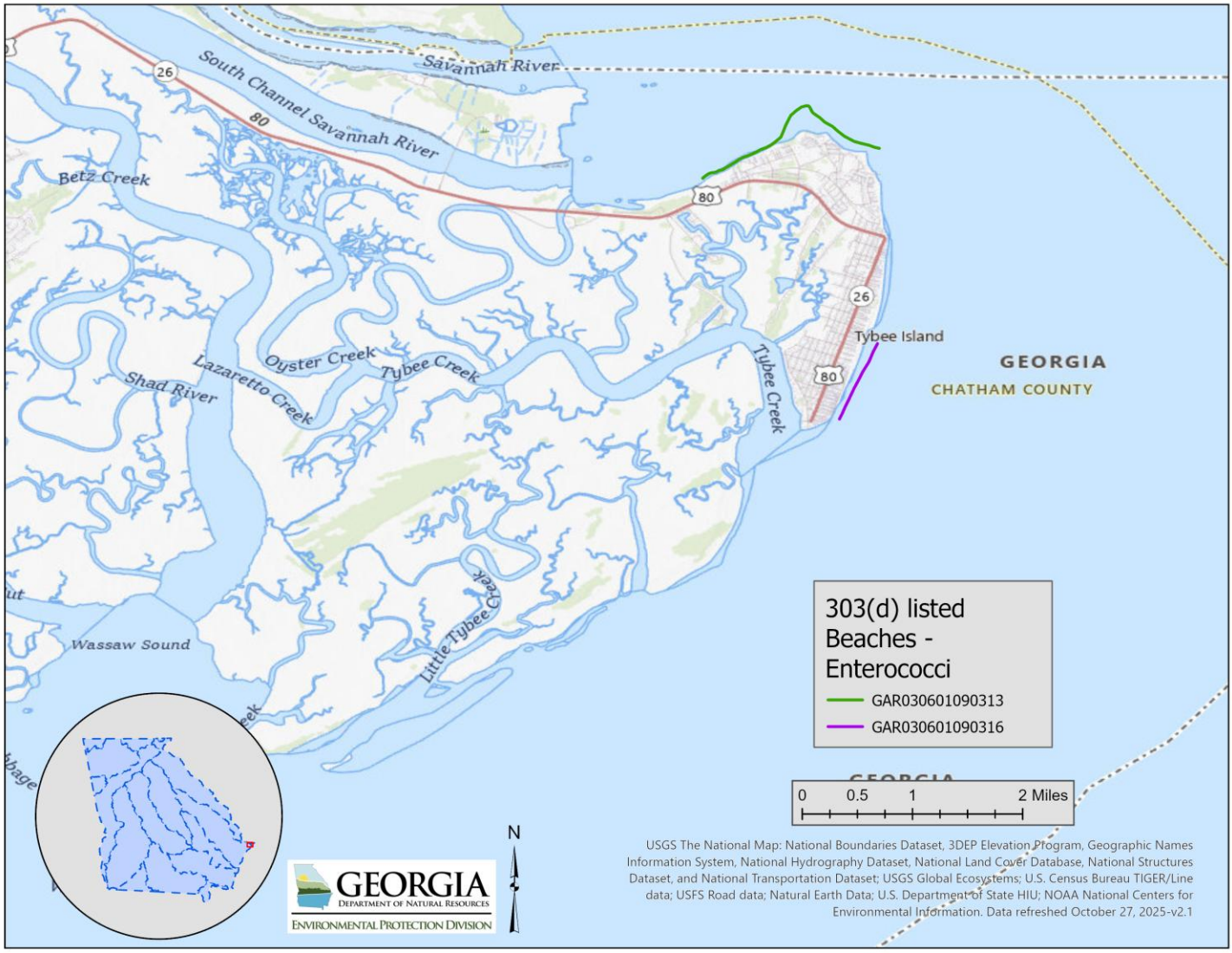

Figure 3. Impaired Beach Segments in Savannah River Basin

Table 2. Savannah River Basin 303(d) Beach Segments Listed for Enterococci - Watershed Land Coverage

Stream Segment and Station ID	Land Use Categories - Acres (Percent)														
	Beaches, Dunes, Mud	Open Water	Developed, Low Intensity	Developed, Medium Intensity	Developed, High Intensity	Transitional, Clearcut, Sparse	Quarries/Strip Mines	Forest	Row Crops	Pasture, Hay	Other Grasses (Developed Open Space, Utility Swaths, Golf Courses)	Forested Wetlands	Non-Forested Wetlands (Salt/Brackish)	Non-Forested Wetlands (Freshwater)	Total
Greater Savannah River Estuary	**10644.7**	**28884.6**	**10147.9**	**9331.0**	**10671.6**	**1712.7**	**19.3**	**19129.5**	**841.3**	**3331.9**	**10111.2**	**53859.6**	**42374.5**	**17998.9**	**219058.7**
Applies to all beach segments	4.9	13.2	4.6	4.3	4.9	0.8	0.0	8.7	0.4	1.5	4.6	24.6	19.3	8.2	100.0
Polk Street Beach	**74.7**	**6.7**	**9.1**	**23.4**	**40.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**6.7**	**0.2**	**18.9**	**0.4**	**180.4**
GAR030601090313	41.4	3.7	5.1	12.9	22.3	0.0	0.0	0.0	0.0	0.0	3.7	0.1	10.5	0.2	100.0
Strand Beach at Pier	**37.1**	**0.4**	**2.2**	**8.5**	**40.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.4**	**0.0**	**0.0**	**0.0**	**91.0**
GAR030601090316	40.8	0.5	2.4	9.3	44.3	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	100.0

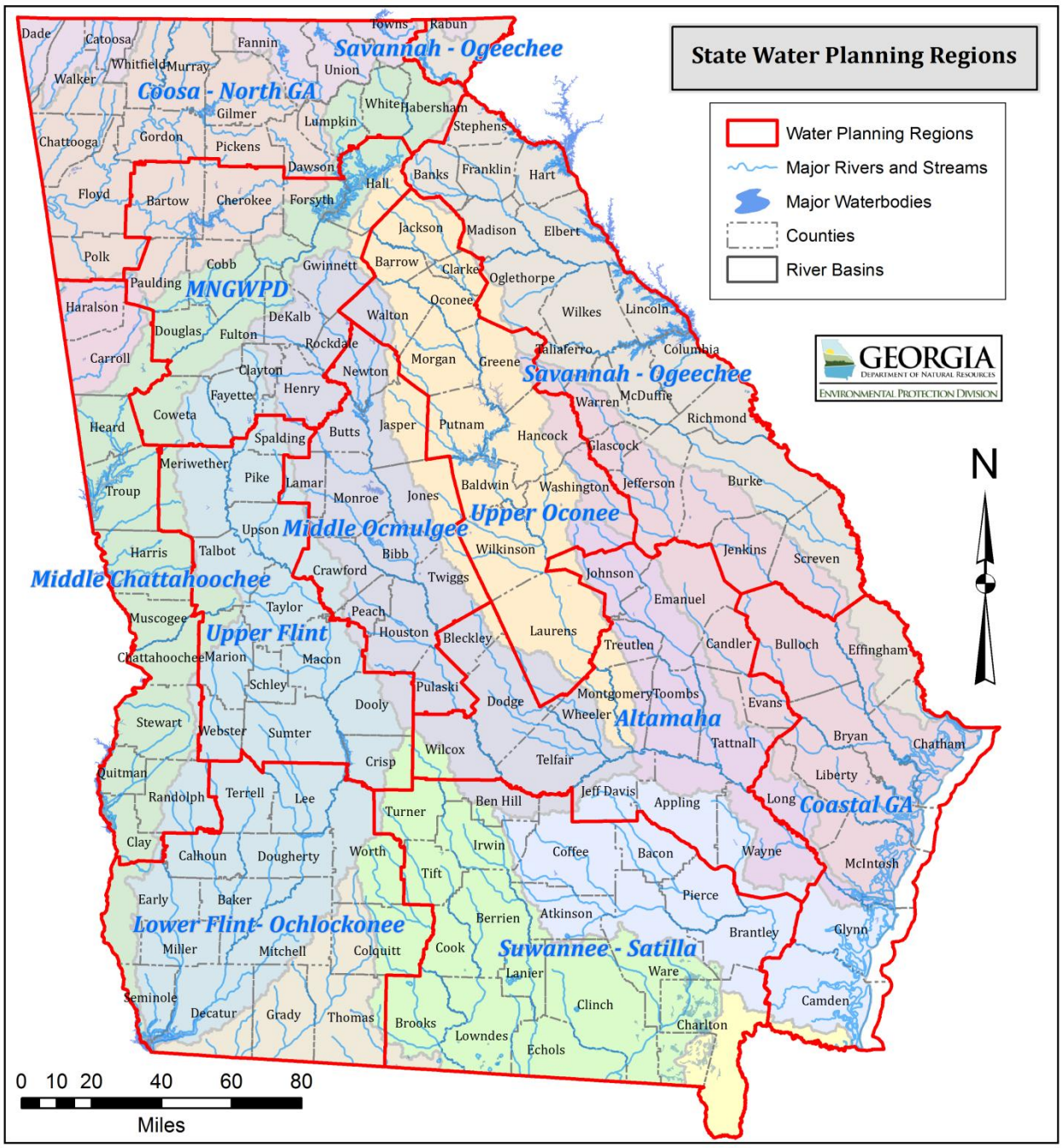

Figure 4. Boundaries of the Regional Water Planning Councils and the Metropolitan North Georgia Water Planning District

2.0 WATER QUALITY ASSESSMENT

Waterbodies are placed on the 303(d) list as not supporting their designated use based on assessment of water quality sampling data compared to the applicable water quality standard. For estuarine water with the designated use of “Recreation”, enterococci samples collected within a 30-day period that have a geometric mean in excess of 35 counts per 100 milliliters are in violation of the bacteria water quality standard. In addition, a sample or samples collected within the same 30-day period shall not have a greater than 10% excursion frequency of the statistical threshold value (STV) of 130 counts per 100 milliliters. A waterbody is placed on this list if more than 10% of the 30-day calculated geometric means exceed the enterococci criterion or if more than 10% of the samples in the same 30-day exceed the STV criterion.

Enterococci data used for the TMDL developed in this document were collected during calendar years 2020 through 2025 by Georgia Coastal Resources Division (CRD) staff. A summary of sampling station location and sampling dates are given in Table 3. These data are presented in Appendix A

Table 3. Enterococci Sampling Stations and Dates – Tybee Island Beaches

Stream Segment	Location	CRD Monitoring Station ID	Monitoring Station Coordinates	Monitoring Station Description	Sample Date Range	Criteria Violation Type(s)
Tybee Island - Polk Street Beach	End of Beach to Jetty	TYP	32.02613333, -80.8547333	Tybee Island Polk St	2020 – 2025	STV
Tybee Island - Strand Beach at Pier	11th Street to 18th Street	TYST	31.9929872, -80.84579443	Tybee Island Strand	2020 - 2025	Geomean STV

3.0 SOURCE ASSESSMENT

An important part of the TMDL analysis is the identification of potential source categories. Sources are broadly classified as either point or nonpoint sources. A point source is defined as a discernable, confined, and discrete conveyance from which pollutants are or may be discharged to surface waters. Nonpoint sources are diffuse, and generally, but not always, involve accumulation of enterococci bacteria on land surfaces that wash off as a result of storm events.

3.1 Point Source Assessment

Title IV of the Clean Water Act establishes the National Pollutant Discharge Elimination System (NPDES) permit program. There are two basic kinds of NPDES permits: 1) municipal and industrial wastewater treatment facilities, and 2) regulated stormwater discharges.

3.1.1 Wastewater Treatment Facilities

In general, NPDES point source discharge permits are issued to Publicly Owned Treatment Works (POTWs) and Non-Publicly Owned Treatment Works (Non-POTWs) authorizing the discharge of treated wastewater to surface waters. POTWs are commonly associated with city and county owned wastewater treatment facilities; whereas Non-POTWs are associated with industrial, private, and federal facilities. The permits include permit conditions, requirements, and numeric effluent limits developed using federal and state effluent guidelines (secondary treatment standards for POTWs and technology-based limits (TBELs) for Non-POTWs) or on water quality standards (water quality-based effluent limits, WQBELs).

The United States Environmental Protection Agency (USEPA) has developed technology-based standards and guidelines, which establish a minimum standard of pollution control for POTW and Non-POTW discharges without regard for the quality of the receiving waters. For POTWs, EPA has established Secondary Treatment Standards. For Non-POTW, the TBELs are based on Best Practical Control Technology Currently Available (BPT), Best Conventional Control Technology (BCT), Best Available Technology Economically Achievable (BAT), and New Source Performance Standards. The level of control required by each facility is dependent on the source of wastewater generated and the pollutants found in the discharge.

The USEPA and the States have also developed numeric and narrative water quality criteria to protect a stream’s designated uses. Typically, these criteria are based on the results of aquatic toxicity tests and/or human health criteria and include a margin of safety. Wastewater NPDES permits also include WQBELs to protect these narrative and numeric water quality criteria and their designated uses. WQBELs ensure water quality standards are met in the receiving water and downstream uses are protected.

For purposes of this TMDL, permitted wastewater treatment facilities are considered point sources, and include POTWs and Non-POTWs. Pollutants discharged from wastewater treatment plants can contribute bacteria to receiving waters. As of 2024, there are ten (10) NPDES permitted discharges identified in the watershed of the listed segments in the Savannah River Basin that could potentially impact beaches on the 2026 303(d) list for enterococci bacteria. Typically, the contributing watershed for a 303(d) listed segment is defined as the area upstream of the segment. Due to the tidal nature of the impaired beach segments covered in this TMDL document, the contributing watershed was delineated to cover areas upstream and downstream of the monitoring station where water quality standard violations were observed.

Table 4 provides the monthly average discharge flows and enterococci concentrations for these facilities. These data were obtained from the Discharge Monitoring Reports (DMRs) for calendar year 2020-2025. The permitted flows and enterococci concentrations for these facilities are also included in this table. Table 5 provides a list of existing Non-POTW discharges without bacteria permit limits. It is possible these facilities could contribute bacteria to receiving water because of the type of treatment processes they employ.

Combined sewer systems convey a mixture of raw sewage and stormwater in the same conveyance structure to the wastewater treatment plant. These are considered a component of municipal wastewater treatment facilities. When the combined sewage exceeds the capacity of the wastewater treatment plant, the excess is diverted to a combined sewage overflow (CSO) discharge point. There are no permitted CSO outfalls in the Savannah River Basin.

Table 4. NPDES Facilities Discharging Enterococci into Savannah River Basin 303(d) Listed Beach Segments

Facility Name	NPDES Permit No.	Permit Category	Receiving Stream	303(d) Listed Segment(s)	NPDES Permit Limits		Actual Discharge (2020-2025)		Number of Bacteria Violations	Number of Spills
					Average Monthly Flow (MGD)[a]	Average Monthly Bacteria (No./100mL)[b]	Average Monthly Flow (MGD)[a]	Average Monthly Bacteria (No./100mL)[b]		
Garden City (Garden City WPCP)	GA0031038	Municipal	Savannah River	GAR030601090313 GAR030601090316	2.0	200 (Fecal Coliform)	1	6	Monthly Avg: 0 Weekly Avg: 0	7
International Paper Company (Port Wentworth Mill)	GA0002798	Industrial	Savannah Harbor		Report	35 (Enterococci)	10	FC: 3170 Ent: 80	Ent Monthly Avg: 19 Ent Daily Max: 23	0
Port Wentworth, City of (Port Wentworth WPCP)	GA0038814	Municipal	Savannah River		2.0	23 (Fecal Coliform)	1	7	Monthly Avg: 2 Weekly Avg: 2	11
Savannah Yacht Club, Inc. (Savannah Yacht Club WPCP)	GA0033189	Municipal	Wilmington River		0.00825	200 (Fecal Coliform)	0.006	1	Monthly Avg: 0 Daily Max: 1	0
Savannah, City of (Crossroads WPCP)	GA0038326	Municipal	Unnamed Tributary of St. Augustine Creek		3.0	200 (Fecal Coliform)	2.80	3	Monthly Avg: 0 Weekly Avg: 0	2
Savannah, City of (President Street WPCP)	GA0025348	Municipal	Savannah River		27.0	200 (Fecal Coliform)	15	4	Monthly Avg: 0 Weekly Avg: 0	39
Savannah, City of (Travis Field WPCP)	GA0020427	Municipal	Pipemakers Canal		8.0	200 (Fecal Coliform)	1.2	2	Monthly Avg: 0 Weekly Avg: 0	2
Savannah, City of (Wilshire WPCP)	GA0020443	Municipal	Savannah River Harbor		4.5	200 (Fecal Coliform)	2.9	2	Monthly Avg: 0 Weekly Avg: 0	10

Facility Name	NPDES Permit No.	Permit Category	Receiving Stream	303(d) Listed Segment(s)	NPDES Permit Limits		Actual Discharge (2020-2025)		Number of Bacteria Violations	Number of Spills
					Average Monthly Flow (MGD)[a]	Average Monthly Bacteria (No./100mL)[b]	Average Monthly Flow (MGD)[a]	Average Monthly Bacteria (No./100mL)[b]		
Sulfco, LLC	GA0003646	Industrial	Savannah River	GAR030601090313 GAR030601090316	Report	35 (Enterococci)	1	FC: 20 Ent: 6	FC Daily Max: 8 Ent Daily Max: 4	0
Tybee Island, City of (Tybee Island WPCP)	GA0020061	Municipal	Atlantic Ocean (mouth of Savannah River)		0.89	35 (Enterococci)	0.7	7	Monthly Avg: 0 Weekly Avg: 0	1
					1.15	35 (Enterococci)	1.0	10	Monthly Avg: 2 Weekly Avg: 2	

Source: EPD – Discharge Monitoring Report (DMR) data from ICIS-NPDES

Notes: [a] Values shown are the annual average of the monthly average flows.
[b] Values shown are the annual average of the monthly means.

Table 5. NPDES Non-POTW Facilities without Bacteria Permit Limits that Discharge Into or Upstream of 303(d) Listed Beach Segments in the Savannah River Basin

Facility Name	NPDES Permit No.	Permit Category	Receiving Stream	303(d) Listed Segment(s)	Number of Spills
International Paper (Savannah Mill)	GA0001988	Industrial	Savannah River	GAR030601090313 GAR030601090316	0
SeaGate Terminals Savannah, LLC	GA0002437	Industrial	Savannah Harbor	GAR030601090313 GAR030601090316	0
Gulfstream Aerospace Corporation	GA0003255	Industrial	Pipemakers Canal	GAR030601090313 GAR030601090316	0

Facility Name	NPDES Permit	Permit	Receiving	303(d) Listed	Number of
Imperial Savannah, LP	GA0003611	Industrial	Savannah Harbor	GAR030601090313 GAR030601090316	0
Savannah Yacht Center, Inc.	GA0003671	Industrial	Savannah Harbor	GAR030601090313 GAR030601090316	0
GAF Materials Corporation	GA0003841	Industrial	Savannah River	GAR030601090313 GAR030601090316	0
Solenis LLC	GA0026867	Industrial	Dundee Canal	GAR030601090313 GAR030601090316	0
Colonial Terminals, Inc	GA0037923	Industrial	Savannah River	GAR030601090313 GAR030601090316	0
Ergon Asphalt & Emulsions, Inc.	GA0038687	Industrial	Unnamed Tributary to Dundee Canal	GAR030601090313 GAR030601090316	0
BASF Corporation	GA0048330	Industrial	Savannah River	GAR030601090313 GAR030601090316	0
Elba Liquefaction Company, LLC	GA0050254	Industrial	South Channel Savannah River	GAR030601090313 GAR030601090316	0
Fuji Vegetable Oil, Inc	GA0038521	Industrial	Unnamed tributary to Savannah Harbor	GAR030601090313 GAR030601090316	0
Georgia Atlantic Port, LLC	GA0047783	Industrial	Savannah River	GAR030601090313 GAR030601090316	0
EMD Performance Materials Corp.	GA0034355	Industrial	Savannah River	GAR030601090313 GAR030601090316	1

3.1.2 Regulated Stormwater Discharges

Discharges of stormwater authorized under a NPDES permit are considered a point source. Unlike other wastewater NPDES permits that establish end-of-pipe effluent limits, stormwater NPDES permits establish best management practices (BMPs) and controls that are intended to reduce the quantity of pollutants that stormwater picks up and carries into storm sewer systems during rainfall events "to the maximum extent practicable." Currently, regulated stormwater discharges that may contain enterococci bacteria consist of those associated with industrial activities and large, medium, and small municipal separate storm sewer systems (MS4s) that serve populations of 10,000 or more.

3.1.2.1 Industrial General Stormwater NPDES Permit

Stormwater discharges associated with industrial activities are currently covered under the 2022 NPDES General Permit for Stormwater Discharges Associated with Industrial Activity (GAR050000) also called the Industrial General Permit (IGP). This permit requires visual monitoring of stormwater discharges, site inspections, implementation of BMPs, preparation of a Storm Water Pollution Prevention Plan (SWPPP), and annual reporting. The IGP requires that stormwater discharging into an impaired stream segment or within one linear mile upstream of, and within the same watershed as, any portion of an impaired stream segment identified as "not supporting" its designated use(s), must satisfy the requirements of Appendix C of the 2022 IGP, if the pollutant(s) of concern for which the impaired stream segment has been listed may be exposed to stormwater as a result of industrial activity at the site. If a facility is covered under Appendix C of the IGP, then benchmark monitoring for the pollutant(s) of concern is required. Delineations of both supporting and not supporting waterbodies are provided on the GA EPD website, and are available in ESRI ArcGIS shapefile format or in KMZ format for use in Google Earth. Interested parties may evaluate their proximity to not supporting waterbodies by utilizing these geospatial files.

3.1.2.2 MS4 NPDES Permits

The collection, conveyance, and discharge of diffuse stormwater to local waterbodies by a public entity are regulated in Georgia by the NPDES MS4 permits. These MS4 permits have been issued under two phases. Phase I MS4 permits cover medium and large cities, and counties with populations over 100,000. Each individual Phase I MS4 permit requires the prohibition of non-stormwater discharges (i.e., illicit discharges) into the storm sewer systems and controls to reduce the discharge of pollutants to the maximum extent practicable, including the use of management practices, control techniques and systems, as well as design and engineering methods (Federal Register, 1990). A site-specific Storm Water Management Plan (SWMP) outlining appropriate controls is required by and referenced in the permit. A program to monitor and control pollutants in stormwater discharges from industrial facilities, construction sites, and highly visible pollutant sources that exist within the MS4 area must be implemented under the permit. Additionally, monitoring of not supporting streams, public education and involvement, post-construction stormwater controls, low impact development, and annual reporting requirements must all be addressed by the permittee on an ongoing basis. As of 2022, fifty-seven (57) counties and municipalities are covered by Phase I MS4 permits in Georgia.

The 1999 Phase II regulation requires small MS4s in U.S. Census Bureau defined urbanized areas, as well as MS4s designated by the permitting authority, to obtain NPDES permit coverage for their stormwater discharges. The universe of regulated small MS4s automatically expands every 10 years based on where population growth has concentrated in certain areas of the state as identified by each decennial census. Prior to the 2020 census, the automatic

designation of small MS4s was based on urbanized areas defined by the U.S. Census Bureau. In the 2020 U.S. census, the distinction between urbanized areas and urban clusters (population of at least 2,500 but fewer than 50,000) was discontinued and updated urban area definitions were established. In June 2023, EPA published a rule stating that automatic designation of new small MS4s will be based on “urban areas with a population of at least 50,000”

As of 2026, Eighty-one (81) municipalities, thirty-five (35) counties, six (6) Department of Defense facilities, and the Georgia Department of Transportation (GDOT) are permitted under the Phase II stormwater regulations in Georgia. All municipal Phase II permittees are authorized to discharge under General NPDES Stormwater Permit GAG610000. Department of Defense facilities are authorized to discharge under General NPDES Stormwater Permit GAG480000. GDOT owned or operated facilities are authorized to discharge under General NPDES Stormwater Permit GAR041000.

Under these general permits, each permittee must design and implement a SWMP that incorporates BMPs that focus on public education and involvement, illicit discharge detection and elimination, construction site runoff control, post-construction stormwater management, and pollution prevention in municipal operations. Table 6 provides the Phase I and Phase II counties, communities, and other entities covered by MS4s Permits in the Savannah River Basin. There are nine (9) permitted MS4s that discharge into or upstream of the beach segments not supporting their designated use for enterococci.

Table 6. Phase I and II Permitted MS4s in the Savannah River Basin Discharging to the Watershed of the 303(d) Listed Beach Segments

Permit No.	MS4 Permittee	MS4 Phase	Impaired Stream Segments
GAS000207	Bloomingdale	Phase 1 Medium	GAR030601090313 GAR030601090316
GAS000208	Garden City	Phase 1 Medium	
GAS000209	Pooler	Phase 1 Medium	
GAS000210	Port Wentworth	Phase 1 Medium	
GAS000205	Savannah	Phase 1 Medium	
GAS000211	Thunderbolt	Phase 1 Medium	
GAS000212	Tybee	Phase 1 Medium	
GAS000206	Chatham County	Phase 1 Medium	
GAG610000	Effingham County	Phase 2 Small > 10,000 Population	

Source: Nonpoint Source Program, GA EPD, 2026

Table 7 provides the total drainage area for the watershed of the listed beaches, the percentage of watershed area that is within regulated MS4 areas, and the area percentage of urban land use types within the MS4 area contained within the watershed. The land use types that are considered urban include 1) developed open space, 2) developed low intensity, 3) developed medium intensity, 4) developed high intensity, 5) utility swaths, and 6) golf courses.

Table 7. Percentage of MS4 City or County Urban Area Upstream of 303(d) Listed Beach Segments in the Savannah River Basin

Beach Segments	Reach ID	Total Watershed Area (acres)	% Watershed Covered by MS4	% Urban Land in MS4 Area
Ogeechee and Savannah Combined Study Area	GAR030601090313 GAR030601090316	219058.7	73.56	23.94

3.1.3 Concentrated Animal Feeding Operations

Animal feeding operations (AFOs) are agricultural operations where animals are kept and raised in confined situations. AFOs that meet the regulatory definition of a concentrated animal feeding operation (CAFO) are regulated under the NPDES permitting program. The NPDES program regulates the discharge of pollutants from point sources to waters of the state. From 1999 through 2001, Georgia adopted rules for permitting swine and non-swine liquid manure animal feeding operations (AFOs). Georgia rules required medium size AFOs with more than 300 animal units (AU), but less than 1,000 AU, to apply for a non-discharge state land application system (LAS) waste disposal permit. Large operations with more than 1000 AU were required to apply for an NPDES permit (also non-discharge) as a CAFO. The USEPA CAFO regulations were successfully appealed in 2005. They were revised to comply with the court's decision that NPDES permits only be required for actual discharges. Georgia's rules were amended on August 7, 2012, to reflect the USEPA revisions. The revised state rules authorize LAS permitting of medium and large size liquid manure AFOs unless they elect to obtain an NPDES permit. There are no known liquid manure CAFOs located within the watershed for the listed beach segments in the Savannah River Basin.

In 2002, the USEPA promulgated expanded NPDES permit regulations for CAFOs that added dry manure poultry operations larger than 125,000 broilers or 82,000 layers. In accordance with the Georgia rule amendment discussed above, the general permit covering these facilities has been terminated and they are no longer covered under any permit. Georgia is consistently among the top three states in the U.S. in terms of poultry operations. The majority of poultry farms are dry manure operations where the manure is stored for a time and then land applied. Freshly-stored litter can be a nonpoint source of enterococci. However, land-applied litter that was previously stored for an extended length of time typically exhibits very low enterococci levels.

3.2 Nonpoint Source Assessment

In general, nonpoint sources cannot be identified as entering a waterbody through a discrete conveyance at a single location. Typical nonpoint sources of enterococci bacteria include:

- Wildlife
- Agricultural Livestock
  - Animal grazing

  - Animal access to streams
  - Application of manure to pastureland and cropland
- Urban Development
  - Leaking sanitary sewer lines
  - Leaking septic systems
  - Land Application Systems
  - Landfills

In urban areas, a large portion of stormwater runoff may be collected in storm sewer systems and discharged through distinct outlet structures. For large urban areas, these storm sewer discharge points may be regulated as described in Section 3.1.2.

3.2.1 Wildlife

The significance of wildlife as a source of enterococci bacteria in tidal streams and beaches along the coastline varies considerably depending on the animal species present in the watershed. Based on information provided by the Georgia Wildlife Resources Division (WRD) of GA DNR, the greatest wildlife sources of enterococci are the animals that spend a large portion of their time in or around aquatic habitats. Of these, waterfowl are considered to be the most significant source, because when present, they are typically found in large numbers on the water surface. Other animals regularly found around aquatic environments include racoons, beavers, muskrats, and to a lesser extent, river otters and minks. Recently, rapidly expanding feral swine populations have become a substantial presence in the floodplain areas of the major rivers in Georgia. In addition, along coastal areas, warm blooded marine mammals can be a source of enterococci, including cetaceans and seals.

White-tailed deer populations are abundant throughout the Savannah River Basin. Enterococci bacteria contributions to waterbodies from deer are generally considered to be less significant than that of waterfowl, racoons, and beavers. This is because a greater portion of their time is spent in terrestrial habitats. This also holds true for other terrestrial mammals such as squirrels and rabbits, and for terrestrial birds (GA WRD, 2007). However, feces deposited on the land surface can result in the introduction of enterococci to streams during runoff events. Between storm events, considerable decomposition of the fecal matter might occur, resulting in a decrease in the associated enterococci numbers.

3.2.2 Agricultural Livestock

Agricultural livestock are a potential source of enterococci to streams in the Savannah River Basin. The animals grazing on pastureland deposit their feces onto land surfaces, where it can then be transported during storm events to nearby streams. Animal access to pastureland varies monthly, resulting in varying enterococci loading rates throughout the year. Beef cattle spend all of their time in pastures, while dairy cattle and hogs are periodically confined. In addition, agricultural livestock will often have direct access to streams that pass through their pastures, and can thus impact water quality in a more direct manner (USDA, 2002).

Table 8 provides the estimated number of beef cattle, dairy cattle, goats, horses, swine, sheep, and chickens reported by county.

Table 8. Estimated Agricultural Livestock Populations in Counties Located in the Watershed of the 303(d) Listed Beach Segments in the Savannah River Basin

County	Livestock								
							Chickens		
	Total Beef Head	Dairy Cattle	Swine	Sheep	Horses	Goats	Broilers ($ value)	Layers ($ value)	Pullets ($ value)
Chatham	250	0	0	0	350	0	$ -	$ -	$ -
Effingham	4715	0	40	100	500	1,500	$ -	$ -	$ -

Source: Center for Agribusiness and Economic Development, UGA 2024

3.2.3 Urban Development

Enterococci bacteria from urban areas are attributable to multiple sources, including: domestic animals, leaks and overflows from sanitary sewer systems, illicit discharges, leaking septic systems, runoff from improper disposal of waste materials, and leachate from both operational and closed landfills.

Urban runoff can contain high concentrations of enterococci from domestic animals and urban wildlife. Enterococci bacteria enter streams by direct washoff from the land surface, or the runoff may be diverted to a stormwater collection system and discharged through a discrete outlet structure. For large, medium, and small urban areas (populations greater than 50,000), the stormwater outlets are regulated under MS4 permits (see Section 3.1.2). For smaller urban areas, the stormwater discharge outlets currently remain unregulated.

In addition to urban animal sources of enterococci, there may be illicit connections to the storm sewer system. As part of the MS4 permitting program, municipalities are required to conduct dry-weather monitoring to identify and then eliminate these illicit discharges. Enterococci bacteria may also enter streams from leaky sewer pipes, or during storm events when inflow and infiltration can cause sewer overflows. An additional potential source along coastal areas is discharge from marine vessels.

3.2.3.1 Leaking Septic Systems

A portion of the enterococci contributions in the Savannah River Basin may be attributed to failure of septic systems and illicit discharges of raw sewage. Table 9 presents the number of septic systems in each county located within the watershed of the listed beaches of the Savannah River Basin existing at the end of 2020 and the number existing at the end of 2025. This is based on data provided by the Georgia Department of Public Health and information obtained from the U.S. Census. In addition, an estimate of the number of septic systems installed and repaired during the period from 2020 through 2025 is given. These data show an increase in the number of septic systems in all of the counties. Often, this is a reflection of population increases outpacing the expansion of sewage collection systems.

In addition to an estimation of county-wide septic systems, an approximate number of septic tanks within the City of Tybee Island was determined through discussions with the City's Water and Sewer Department. Currently, there are roughly 100 septic tanks within the City. Due to the proximity to the impaired beach segments, contaminated groundwater from damaged septic

tanks within the City may affect water quality at the beach monitoring locations.

Table 9. Estimated Number of Septic Systems in Counties Located in the Watershed of the 303(d) Listed Beach Segments in the Savannah River Basin

County	Existing Septic Systems (2020)	Existing Septic Systems (2025)	Number of Septic Systems Installed (2020 to 2025)	Number of Septic Systems Repaired (2020 to 2025)
Chatham	15511	15683	172	575
Effingham	19369	20211	842	606

Source: The Georgia Dept. of Public Health, Environmental Health Section, 2025

3.2.3.2 Land Application Systems

Some communities and industries use land application systems (LAS) for wastewater disposal. These facilities are required through LAS permits to dispose of their treated wastewater by land application, and to operate as non-discharging systems that do not contribute wastewater effluent runoff to surface waters. However, sometimes the soil's percolation rate is exceeded when applying the wastewater, or encountering excess precipitation, resulting in runoff. This runoff could contribute enterococci bacteria to nearby surface waters. Runoff of stormwater might also carry surface residual containing enterococci bacteria. Listed in Table 10 below is the permitted LAS system with a flow greater than 0.1 MGD identified within the watershed of the 303(d) listed beaches in the Savannah River Basin.

Table 10: Permitted Land Application Systems in the Savannah River Basin

LAS Name	State Permit No.	County	Type	Permitted Monthly Avg. Flow (MGD)	Impaired Stream Watershed
Utilities, Inc. of Georgia (Skidaway Island WPCP)	GAJ030941	Chatham	Municipal	1.25	GAR030601090313 GAR030601090316

Source: Georgia Pollutant Discharge Elimination System, GA EPD, 2024

3.2.3.3 Landfills

Leachate from landfills may contain enterococci bacteria that could at some point reach surface waters. Sanitary (or municipal) landfills are the most likely to serve as a source of enterococci bacteria. These types of landfills receive household wastes, animal manure, offal, hatchery and poultry processing plant wastes, dead animals, and other types of wastes. Older sanitary landfills were not lined and most have been closed. Those that remain active and have not been lined operate as construction/demolition landfills. Currently active sanitary landfills are lined and have leachate collection systems. All landfills, excluding inert landfills, are now required to install environmental monitoring systems for groundwater and methane sampling.

There are 12 permitted landfills located within the watershed of the listed beach segments in the Savannah River Basin. Of these, 3 are operating landfills and 9 are closed or in other non-operating status. Table 11 presents the landfills in the vicinity of the 303(d) listed stream segments.

Table 11. Landfills Located in the Watershed of the 303(d) Listed Beach Segments in the Savannah River Basin

Facility Name	Permit Number	County	Interest Type	Operating Status
Centerpoint Garden City, LLC Landfill	025-071D(LI)	Chatham	Industrial Landfill	Released
Chatham Co - SR 367 Wilmington Island Ph 2 (L)	025-058D(L)	Chatham	Construction & Demolition Landfill	Closed
Clifton Equipment Rental Company, Inc.	025-030D(L)	Chatham	Industrial Landfill	Closed
Ductile Iron of America (LI)	025-025D(LI)	Chatham	Industrial Landfill	Closed
E M Chemicals-O'Leary Rd (LI)	025-035D(LI)	Chatham	Industrial Landfill	Permit Revoked
Garrett - Kelley Hill Rd Ph	APLI 0253	Chatham	Industrial Landfill	Permit Inactive
Georgia Power Company - Plant Kraft Grumman Road CCR Landfill	APL 0258	Chatham	Industrial Landfill	Permit Applied For
GPA-Hutchinson Island (L)	025-067D(L)	Chatham	Inert Landfill	Operating
Port Wentworth - Augustine Creek (L)	025-046D(L)	Chatham	Construction & Demolition Landfill	Archived
Republic Services - Savannah Regional Industrial Landfill, Inc	025-072D(L)(I)	Chatham	Commercial Industrial Landfill	Operating
Savannah Sugar-US 17 (LI)	025-018D(LI)	Chatham	Industrial Landfill	Operating
Tybee Island - Polk Ave/Van Horne Dr (L)	025-048D(L)	Chatham	Construction & Demolition Landfill	Archived

Source: EPD, Land Protection Branch, Solid Waste Management Program, 2019

4.0 ANALYTICAL APPROACH

The process of developing enterococci TMDLs for the Savannah River Basin listed beach segments includes the determination of the following:

- The current critical enterococci load to the beach under existing conditions;
- The TMDL for similar conditions under which the current load was determined; and
- The percent reduction in the current critical enterococci load necessary to achieve the TMDL.

The calculation of the enterococci load in a coastal beach segment requires the enterococci concentration and an estimate of the volume of water affected. A mass balance approach was used to determine the current enterococci load and TMDL. For the listed segments, enterococci sampling data were compared to the regulatory criteria.

4.1 Mass Balance Approach

For those water bodies in which sufficient water quality data were collected to list them as impaired, a mass balance approach was used. This method involves comparing the current critical load to the applicable enterococci water quality criteria. It is assumed that these are the critical conditions for aquatic life.

The coastal setting of listed beach segments on Tybee Island means the flow regimes are dictated by the coastal tides, and continually vary as the tide is coming in and going out. As a result, the current critical loads and the TMDLs are expressed as equations that show the loads as a function of the total flow at any given time. The general equations for the critical load and the TMDL are:

$$L_{critical} = C_{critical} \times Q_{est}$$

Where:

$L_{critical}$ = current critical enterococci load
$C_{critical}$ = enterococci concentration
Q_{est} = estimated instantaneous flow

and:

$$TMDL = C_{criterion} \times Q_{est}$$

Where:

TMDL = total maximum daily enterococci load
$C_{criterion}$ = enterococci criterion
Q_{est} = estimated instantaneous flow

The current critical loads used only represent the worst-case scenario that occurred during the sampling period.

Since instantaneous samples are used to evaluate compliance with the standards, as well as the need for a TMDL, this flow dependent load, or concentration approach makes it easier to evaluate compliance with the TMDL. Each sample concentration is compared to the STV of 130 counts/100 mL. Calculation of the load then depends on the total flow at the time the sample is

collected. The figure in Appendix A graphically illustrates the comparison of plots of enterococci concentrations over time in relation to the STV. The loads are represented by multiplying the concentrations by the total flows.

The difference between the current critical load and the TMDL represents the load reduction required for the beach segment to meet the appropriate instream enterococci standard. If a single sample exceeds the enterococci criterion, then the TMDL is based on the criteria exceedance requiring the largest load reduction. The percent load reduction can be expressed as follows:

$$\text{Percent Load Reduction} = \frac{L_{critical} - TMDL_{critical}}{L_{critical}} \times 100$$

5.0 TOTAL MAXIMUM DAILY LOAD

A Total Maximum Daily Load (TMDL) is the amount of a pollutant that can be assimilated by the receiving waterbody without exceeding the applicable water quality standard. In this case it is the enterococci bacteria standard. A TMDL is the sum of the individual waste load allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources, as well as natural background (40 CFR 130.2) for a given waterbody. The TMDL must also include a margin of safety (MOS), either implicitly or explicitly, that accounts for the uncertainty in the relationship between pollutant loads and the water quality response of the receiving waterbody. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measures. For enterococci bacteria, the TMDLs are expressed as counts per day.

A TMDL is expressed as follows:

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

The TMDL calculates the WLAs and LAs with a margin of safety to meet the waterbody's water quality standards. The allocations are based on estimates that use the best available data and provide the basis to establish or modify existing controls so that water quality standards can be achieved. In developing a TMDL, it is important to consider whether adequate data are available to identify the sources, and to understand the fate and transport of the pollutant(s) to be controlled.

TMDLs may be developed using a phased approach. Under a phased approach, the TMDL includes: 1) WLAs that confirm existing limits and controls or lead to new limits, and 2) LAs that confirm existing controls or include implementing new controls (USEPA, 1991). A phased TMDL requires additional data be collected to determine if load reductions required by the TMDL are leading to the attainment of water quality standards.

Watershed-based plans may be developed to address and assess both point and nonpoint sources. These plans establish a schedule or timetable for the installation and evaluation of source control measures, data collection, and assessment of water quality standard attainment. Future monitoring of the listed beach segments' water quality may be used to evaluate this phase of the TMDL, and if necessary, to reallocate the loads.

The enterococci load calculated for the listed beach segments includes the sum of the total loads from all point and nonpoint sources for the segments. The upstream point sources are included in the wasteload allocations for the listed segments. In situations where two or more adjacent segments are listed, the enterococci loads to each segment are individually evaluated on a localized watershed basis. Point source loads originating in upstream segments are included in the background loads of the downstream segments. The following sections describe the various enterococci TMDL components.

5.1 Waste Load Allocations

5.1.1 Wastewater Treatment Facilities

The wasteload allocation (WLA) is the portion of the receiving water's loading capacity that is allocated to existing or future point sources. WLAs are provided to the point sources from POTW and Non-POTW wastewater treatment systems with NPDES end-of-pipe effluent limits established to meet the applicable water quality standard. In addition, the permits include routine monitoring and reporting requirements.

For facilities that currently have a bacteria effluent limits, the permit information, receiving stream, impaired stream and WLAs are provided in Table 12. This information is provided for facilities that discharge into or within 25 miles upstream of the listed segments. In most cases, the WLAs are calculated based on permitted or design flow and permitted bacteria concentration which is based on the geometric mean enterococci water quality criteria. There are currently ten facilities in the Savannah River Basin that discharge into or within 25 miles upstream of listed beach segments. The loads are expressed as an accumulated load over a 30-day period and presented in units of counts per 30 days.

If enterococci limits are not present in facility NPDES permits, effluent sampling for enterococci will be incorporated into each facility's NPDES permit in order to evaluate if each discharge contributes to the violation of the enterococci water quality criteria. Facility effluent monitoring should utilize analytical methods that have a sufficiently low method detection limit so that comparisons to the water quality criteria may be made.

If a facility expands its capacity and the permitted flow increases, the wasteload allocation for the facility would increase in proportion to the flow.

Table 12. WLAs for NPDES Facilities Discharging Enterococci into the Watershed of the 303(d) Listed Beach Segments in the Savannah River Basin

Facility Name	NPDES Permit No.	Receiving Stream	Listed Stream Segment	Bacterial Indictor	WLA (counts/ 30 days)	30 Day Geometric Mean Concentration (counts/100mL)
Garden City (Garden City WPCP)	GA0031038	Savannah River	GAR030601090313 GAR030601090316	Enterococci	7.95E+10	35
International Paper Company (Port Wentworth Mill) [a]	GA0002798	Savannah Harbor	GAR030601090313 GAR030601090316	Enterococci	6.52E+11	35
Port Wentworth, City of (Port Wentworth WPCP)	GA0038814	Savannah River	GAR030601090313 GAR030601090316	Enterococci	7.95E+10	35
Savannah Yacht Club, Inc. (Savannah Yacht Club WPCP)	GA0033189	Wilmington River	GAR030601090313 GAR030601090316	Enterococci	3.28E+08	35

Facility Name	NPDES Permit No.	Receiving Stream	Listed Stream Segment	Bacterial Indictor	WLA (counts/ 30 days)	30 Day Geometric Mean Concentration (counts/100mL)
Savannah, City of (Crossroads WPCP)	GA0038326	Unnamed Tributary of St. Augustine Creek	GAR030601090313 GAR030601090316	Enterococci	1.19E+11	35
Savannah, City of (President Street WPCP)	GA0025348	Savannah River	GAR030601090313 GAR030601090316	Enterococci	1.07E+12	35
Savannah, City of (Travis Field WPCP)	GA0020427	Pipemakers Canal	GAR030601090313 GAR030601090316	Enterococci	3.18E+11	35
Savannah, City of (Wilshire WPCP)	GA0020443	Savannah River Harbor	GAR030601090313 GAR030601090316	Enterococci	1.79E+11	35
Sulfco, LLC [a]	GA0003646	Savannah River	GAR030601090313 GAR030601090316	Enterococci	5.48E+10	35
Tybee Island, City of (Tybee Island WPCP)	GA0020061	Atlantic Ocean (mouth of Savannah River)	GAR030601090313 GAR030601090316	Enterococci	4.57E+10	35

[a] Based on average flow stated in permit application – there are no permit flow limits

Non-POTW facilities that discharge sanitary wastewater directly or sanitary waste streams commingled with other waste streams will be given a bacteria effluent limit in their permit. Potential WLAs for existing Non-POTW permittees without bacteria permit limits would be the facility design flow multiplied by the appropriate bacteria criterion, 35 counts/100mL for enterococci in estuarine waters or 126 counts/100 mL for E. coli in non-estuarine waters as a 30-day geometric mean. For these facilities, it is not known if their discharge contains any bacteria at levels that would exceed the instream water quality criteria because of the type of treatment processes employed. Therefore, existing Non-POTW facilities may be required to submit bacteria data with their NPDES permit renewal application. Non-POTW permittees must collect, analyze, and submit appropriate bacteria data from at least 4 samples collected 24 hours apart within a 30-day period. GA EPD will evaluate these data and determine if a permit limit for bacteria is needed. There are currently fourteen (14) known existing Non-POTW discharges without bacteria permit limits in the contributing watersheds, as noted in Table 5.

5.1.2 Regulated Stormwater Discharges

State and Federal Rules define stormwater discharges covered by NPDES permits as point sources. However, stormwater discharges are from diffuse sources and there are multiple stormwater outfalls. Stormwater sources (point and nonpoint) are different than traditional NPDES permitted sources in four respects: 1) they do not produce a continuous (pollutant loading) discharge; 2) their pollutant loading depends on the intensity, duration, and frequency of rainfall events, over which the permittee has no control; 3) the activities contributing to the pollutant loading may include the various allowable activities of others, and control of these activities is not solely within the discretion of the permittee; and 4) they do not have wastewater treatment plants that control specific pollutants to meet numerical limits.

The intent of stormwater NPDES permits is not to treat the water after collection, but to reduce the exposure of stormwater to pollutants by implementing various controls. It would be infeasible and prohibitively expensive to control pollutant discharges from each stormwater outfall. Therefore, stormwater NPDES permits require the establishment of controls or BMPs to reduce the pollutants entering the environment.

The waste load allocations from stormwater discharges associated with MS4s (WLA_{sw}) are estimated based on the percentage of urban area in each watershed covered by the MS4 stormwater permit. At this time, the portion of each watershed that goes directly to a permitted storm sewer and that which goes through non-permitted point sources, or is sheet flow or agricultural runoff, has not been clearly defined. Thus, it is assumed that approximately 70 percent of stormwater runoff from the regulated urban area is collected by the municipal separate storm sewer systems. This can be represented by the following equation:

$$WLA_{SW} = Q_{WLAsw} \times C_{standard}$$

where: WLA_{SW} = Wasteload Allocation for permitted storm water runoff from all MS4 urban areas

Q_{WLAsw} = Runoff from all MS4 urban areas conveyed through permitted storm water structures

$Q_{WLAsw} = \Sigma Q_{urban} \times 0.7$

ΣQ_{urban} = Sum of all storm water runoff from MS4 urban lands

$C_{standard}$ = 30-day geometric mean of 35 counts/100 mL

= STV of 130 counts/100 mL

For stormwater permits, compliance with the terms and conditions of the permit is effective implementation of the WLA_{SW} to the Maximum Extent Practicable (MEP), and demonstrates consistency with the assumptions and requirements of the TMDL. EPD acknowledges that progress with the assumptions and requirements of the TMDL by stormwater permittees may take one or more permit iterations. Achieving the TMDL reductions may constitute compliance with a storm water management plan (SWMP) or a storm water pollution prevention plan (SWPPP), provided the MEP definition is met, even where the numeric percent reduction may not be achieved so long as reasonable progress is made toward attainment of water quality standards using an iterative BMP process.

5.1.3 Concentrated Animal Feeding Operations

Wet manure facilities are either included under an LAS General Permit or an NPDES General Permit. A small number of wet manure operations have an individual NPDES permit. Dry

manure facilities are not required to obtain permits (see Section 3.1.3). There are no wet and/or dry manure CAFOs located in the watershed of the listed beach segments in the Savannah River Basin.

5.2 Load Allocations

The load allocation is the portion of the receiving water's loading capacity that is attributed to existing or future nonpoint sources or to natural background sources. Nonpoint sources are identified in 40 CFR 130.6 as follows:

- Residual waste;
- Land disposal;
- Agricultural and silvicultural;
- Mines;
- Construction;
- Saltwater intrusion; and
- Urban stormwater (unregulated).

The LA is calculated as the remaining portion of the TMDL load available, after allocating the WLA, WLAsw, and the MOS, using the following equation:

$$LA = TMDL - (\Sigma WLA + \Sigma WLAsw + MOS)$$

As described above, there are two types of load allocations: loads to the stream independent of precipitation, including sources such as failing septic systems, leachate from landfills, animals in the stream, leaking sewer system collection lines, and background loads; and loads associated with enterococci accumulation on land surfaces that is washed off during storm events, including runoff from saturated LAS fields. At this time, it is not possible to partition the various sources of load allocations. In the future, after additional data has been collected, it may be possible to partition the load allocation by source.

The LA for all flows and conditions can be described by the following equation:

$$LA = Q_{LA} \times C_{standard}$$

where: LA = Load Allocation
Q_{LA} = Flow from all nonpoint sources
$Q_{LA} = Q_{Total} - (\Sigma Q_{WLA} + \Sigma Q_{WLAsw})$
Q_{Total} = Total flow
ΣQ_{WLA} = Sum of all current, potential, and future NPDES permitted wastewater treatment discharges
ΣQ_{WLAsw} = Sum of runoff from all MS4 urban areas conveyed through permitted storm water structures
$C_{standard}$ = 30-day geometric mean of 35 cnts/10 0mL
= STV of 130 cnts/100 mL

Table 13 presents the total LA expressed as the 30-day geometric mean multiplied by the total nonpoint source flow.

5.3 Seasonal Variation

The Georgia enterococci criteria are not seasonal. One set of numeric criteria applies equally to the entire calendar year. The enterococci sampling data used for this TMDL were collected for years 2020 through 2025 during all seasons. Potential seasonal effects were taken into account as part of the analysis of this data.

5.4 Margin of Safety

The MOS is a required component of TMDL development. There are two basic methods for incorporating the MOS: 1) implicitly incorporate the MOS using conservative modeling assumptions to develop allocations; or 2) explicitly specify a portion of the TMDL as the MOS and use the remainder for allocations. For this TMDL, an explicit MOS of 10 percent of the TMDL was used. The MOS values are presented in Table 13.

5.5 Total Enterococci Load

The enterococci TMDL for the listed beach segments is dependent on the estimated waterbody critical flow and the applicable state water quality standard.

The total maximum daily enterococci loads for Georgia are given below:

$TMDL_{geo}$ = 35 counts (as a 30-day geometric mean)/100 mL x Volume

$TMDL_{STV}$ = 130 counts (as an individual sample)/100 mL x Volume

$Q_{Total} = \Sigma Q_{WLA} + \Sigma Q_{WLAsw} + Q_{LA}$

ΣQ_{WLA} = Sum of all current, potential, and future NPDES permitted wastewater treatment discharges

ΣQ_{WLAsw} = Sum of runoff from all MS4 urban areas conveyed through permitted storm water structures

Q_{LA} = Flow from all nonpoint sources

$C_{standard}$ = 30-day geometric mean of 35 counts/100mL
= STV of 130 counts/100 mL

For purposes of determining necessary load reductions required to meet the water quality criteria, the current critical TMDL was determined. This load is the product of the applicable enterococci standard and the total flow used to calculate the current critical load. The applicable standard for the listed beach segments is the 30-day geometric mean of 35 counts/100mL. The TMDL represents the sum of the allocated loads from point (WLA and WLA_{sw}) and nonpoint (LA) sources located within the immediate drainage area of the listed segments, and a margin of safety (MOS). For these calculations, the bacteria contributed by a permitted facility to the WLA was the product of the bacteria permit limit concentration and the monthly average permitted flow, or long-term average flow provided in the most recent NPDES permit application. The current critical load and corresponding TMDL, WLAs (WLA and WLA_{sw}), LA, MOS, and percent load reduction for the Savannah River Basin listed beach segments are presented in Table 13.

The relationship of the current critical load to the TMDL is shown graphically in Appendix A. The critical load is the critical concentration multiplied by total flow volume, and the TMDL is the

STV criterion multiplied by the total flow volume. The vertical distance between the two values represents the load reduction necessary to achieve the TMDL. As a consequence of the localized nature of the load evaluations, the calculated enterococci load reduction pertains to point and nonpoint sources occurring within the immediate drainage area of the listed segments. These current critical values represent a worst-case scenario for the limited set of data. Thus, the load reduction required is a conservative estimate, and should be sufficient to prevent exceedances of the instream enterococci standard for a wide range of conditions.

Evaluation of the relationship between instream water quality and the potential sources of pollutant loading is an important component of TMDL development, and is the basis for later implementation of corrective measures and BMPs. For the current TMDL, the association between enterococci loads and the potential sources occurring within the subwatershed of the segments was examined on a qualitative basis.

Table 13. Enterococci Loads and Required Load Reductions for the 303(d) Listed Beach Segments in the Savannah River Basin

Stream Segment	Description	Bacterial Indicator	Current Load (counts / 30 days)[1]	TMDL Components					Needed Percent Reduction
				WLA (counts/ 30 days)[2]	WLAsw (counts/ 30 days)[1]	LA (counts/ 30 days)[1]	MOS (counts/ 30 days)[1]	TMDL (counts/ 30 days)[1]	
Tybee Island - Polk Street Beach (GAR030601090313)	End of Beach to Jetty	Enterococci	300 x Q_{Total}	2.60E+12	35 x Q_{WLASW}	35 x Q_{LA}	3.5 x Q_{Total}	35 x Q_{Total}	57%
Tybee Island - Strand Beach at Pier (GAR030601090316)	11th Street to 18th Street	Enterococci	273 x Q_{Total}	2.60E+12	35 x Q_{WLASW}	35 x Q_{LA}	3.5 x Q_{Total}	35 x Q_{Total}	52%

Notes:

[1]The impaired beach is tidal in nature. Therefore, the current load, load allocations, and TMDL are expressed as a function of the total flow (Q_{Total}) at any given time.

[2]The assigned Enterococci load from individual NPDES permitted facilities for WLAs are determined as the product of the Enterococci 30-day water quality criteria (35 counts/100mL) and the facility permitted monthly average discharge, or long-term average flow provided in the most recent NPDES permit application.

6.0 RECOMMENDATIONS

The TMDL process consists of an evaluation of the subwatersheds for each 303(d) listed stream segment to identify, as best as possible, the sources of the enterococci loads causing the stream to exceed instream standards. The TMDL analysis was performed using the best available data to specify WLAs and LAs that will meet enterococci water quality criteria so as to support the use classification specified for each listed segment.

This TMDL represents part of a long-term process to reduce enterococci loading to meet water quality standards in the Savannah River Basin. Implementation strategies will be reviewed and the TMDLs will be refined as necessary in the next phase (next five-year cycle). The phased approach will support progress toward water quality standards attainment in the future. In accordance with USEPA TMDL guidance, these TMDLs may be revised based on the results of future monitoring and source characterization data efforts. The following recommendations emphasize further source identification and involve the collection of data to support the current allocations and subsequent source reductions.

6.1 Monitoring

Water quality monitoring is conducted at a number of locations across the State each year. Sampling is conducted statewide by EPD personnel in Atlanta, Brunswick, Cartersville, and Tifton. Beach sampling is conducted by CRD personnel. Additional monitoring sites are added as necessary.

In the case where a watershed-based plan has been developed for a listed stream segment, an appropriate water quality monitoring program will be outlined. The monitoring program will be developed to help identify the various enterococci sources. The monitoring program may be used to verify the 303(d) stream segment listings. This will be especially valuable for those segments where limited data resulted in the listing.

The Georgia Department of Natural Resources (DNR) and the National Oceanic and Atmospheric Administration (NOAA) awarded a 2-year grant to Georgia Southern University and the Jekyll Island Authority to study water quality at Jekyll Island recreational beaches. A goal of the study was to determine the sources of bacterial pollution utilizing microbial source tracking. Results of this research may guide future efforts towards TMDL implementation.

6.2 Enterococci Management Practices

Based on the findings of the source assessment, NPDES point source enterococci loads from wastewater treatment facilities usually do not significantly contribute to the impairment of the listed stream segments. This is because most facilities are required to treat to levels corresponding to instream water quality criteria. Sources of enterococci in urban areas include wastes that are attributable to domestic animals, leaks and overflows from sanitary sewer systems, illicit discharges of sanitary waste, leaking septic systems, discharge from marine vessels, runoff from improper disposal of waste materials, and leachate from both operational and closed landfills. In agricultural areas, potential sources of enterococci may include animals grazing in pastures and direct access of livestock to streams. Wildlife, especially waterfowl in tidal marsh areas, can be a significant source of enterococci bacteria.

Management practices are recommended to reduce enterococci source loads to the listed 303(d) beach segments, with the result of achieving the enterococci standard criteria. These recommended management practices include:

- Compliance with NPDES (wastewater, construction, industrial stormwater, and/or MS4) permit limits and requirements;
- Implementation of *Georgia's Best Management Practices for Forestry* (GFC, 2009);
- Implementation of recommended water quality management practices in the *Coastal Georgia Regional Water Plan (2023)*
- Implementation of *Best Management Practices for Georgia Agriculture* (GSWCC, 2013) and Adoption of National Resource Conservation Service (NRCS) Conservation Practices for agriculture;
- Implementation of the *Coastal Stormwater Supplement to the Georgia Stormwater Management Manual* (CWP, 2009) to facilitate water quality treatment of stormwater runoff, including bacteria removal, through structural stormwater BMP installation.

6.2.1 Point Source Approaches

Point sources are defined as discharges of treated wastewater or stormwater into rivers and streams at discrete locations. The NPDES permit program provides a basis for municipal, industrial, and stormwater permits, monitoring and compliance with permit limitations, and appropriate enforcement actions for violations. In accordance with EPD rules and regulations, all discharges from point source facilities are required to be in compliance with the conditions of their NPDES permit at all times.

For stormwater permits, compliance with the terms and conditions of the permit is effective implementation of the WLA to the Maximum Extent Practicable (MEP), and demonstrates consistency with the assumptions and requirements of the TMDL. EPD acknowledges that progress with the assumptions and requirements of the TMDL by stormwater permittees may take one or more permit iterations. Achieving the TMDL reductions may constitute compliance with a storm water management plan (SWMP) or a storm water pollution prevention plan (SWPPP), provided the MEP definition is met, even where the numeric percent reduction may not be achieved so long as reasonable progress is made toward attainment of water quality standards using an iterative BMP process.

Municipal and industrial wastewater treatment facilities with the potential for bacteria in their discharge are given end-of-pipe limits to meet the applicable water quality standard. An exception is constructed wetland systems, which have a natural level of bacteria input from animals attracted to the artificial wetlands. Wetland bacteria permit limits are monitored prior to discharge to the wetlands. In addition, the permits include routine monitoring and reporting requirements.

6.2.2 Nonpoint Source Approaches

EPD is responsible for administering and enforcing laws to protect the waters of the State. EPD is the lead agency for implementing the State's Nonpoint Source Management Program. Regulatory responsibilities that have a bearing on nonpoint source pollution include establishing water quality standards and use classifications, assessing and reporting water quality conditions, and regulating land use activities that may affect water quality. Georgia is working

with local governments, agricultural and forestry agencies such as the Natural Resources Conservation Service, the Georgia Soil and Water Conservation Commission, and the Georgia Forestry Commission, to foster the implementation of BMPs to address nonpoint source pollution. In addition, public education efforts are being targeted to individual stakeholders to provide information regarding the use of BMPs to protect water quality. The following sections describe, in more detail, recommendations to reduce nonpoint source loads of enterococci bacteria in Georgia's surface waters.

6.2.2.1 Agricultural Sources

EPD should coordinate with other agencies that are responsible for agricultural activities in the state to address issues concerning enterococci loading from agricultural lands. It is recommended that information such as livestock populations by subwatershed, animal access to streams, manure storage and application practices be periodically reviewed so that watershed evaluations can be updated to reflect current conditions. It is also recommended that BMPs be utilized to reduce the amount of enterococci bacteria transported to surface waters from agricultural sources to the maximum extent practicable.

The following three organizations have primary responsibility for working with farmers to promote soil and water conservation, and to protect water quality:

- University of Georgia (UGA) - Cooperative Extension Service;
- Georgia Soil and Water Conservation Commission (GSWCC); and
- Natural Resources Conservation Service (NRCS).

UGA has faculty, County Cooperative Extension Agents, and technical specialists who provide services in several key areas relating to agricultural impacts on water quality. EPD designated the GSWCC as the lead agency for agricultural Nonpoint Source Management in the State. The GSWCC develops nonpoint source management programs and conducts educational activities to promote conservation and protection of land and water devoted to agricultural uses.

The NRCS works with federal, state, and local governments to provide financial and technical assistance to farmers. The NRCS develops standards and specifications for BMPs that are to be used to improve, protect, and/or maintain our state's natural resources. In addition, every five years, the NRCS conducts the National Resources Inventory (NRI). The NRI is a statistically-based sample of land use and natural resource conditions and trends that covers non-federal land in the United States.

The NRCS is also providing technical assistance to the GSWCC and the EPD with the Georgia River Basin Planning Program. Planning activities associated with this program will describe conditions of the agricultural natural resource base once every five years. It is recommended that the GSWCC and the NRCS continue to encourage BMP implementation, education efforts, and river basin surveys with regard to river basin planning.

6.2.2.2 Urban Sources

Both point and nonpoint sources of enterococci bacteria can be significant in the Savannah River Basin urban areas. Urban sources of enterococci can best be addressed using a strategy that involves public participation and intergovernmental coordination to reduce the discharge of pollutants to the maximum extent practicable. Management practices, control techniques, public education, and other appropriate methods and provisions may be employed. In addition

to water quality monitoring programs, discussed in Section 6.1, the following activities and programs conducted by cities, counties, and state agencies are recommended:

- Uphold requirements that all new and replacement sanitary sewage systems be designed to minimize discharges into storm sewer systems;
- Further develop and streamline mechanisms for reporting and correcting illicit connections, breaks, surcharges, and general sanitary sewer system problems;
- Maintain compliance with stormwater NPDES permit requirements; and
- Continue efforts to increase public awareness and education towards the impact of human activities in urban settings on water quality, ranging from the consequences of industrial and municipal discharges to the activities of individuals in residential neighborhoods.

6.3 Reasonable Assurance

GA EPD is responsible for administering and enforcing laws to protect the waters of the State. Reasonable assurance ensures that a TMDL's wasteload and load allocations are properly distributed to meet the applicable water quality standards. Without such distribution, a TMDL's ability to serve as an effective guidepost for water quality improvement is significantly diminished. Federal regulations implementing the CWA require that effluent limits in permits be consistent with "the assumptions and requirements of any available [WLA]" in an approved TMDL [40 CFR 122.44(d)(1)(vii)(B)]. NPDES point source permits will be given effluent limits in the permit consistent with the individual WLAs specified in the TMDL.

The GA EPD is the lead agency for implementing the State's Nonpoint Source Management Program. Regulatory responsibilities that have a bearing on nonpoint source pollution include establishing water quality criteria and use classifications, assessing and reporting water quality conditions, and regulating land use activities that may affect water quality. Georgia is working with local governments, agricultural and forestry agencies, such as the NRCS the GSWCC, and the GFC, to foster the implementation of BMPs to address nonpoint sources. In addition, public education efforts will be targeted to individual stakeholders to provide information regarding the use of BMPs to protect water quality.

6.4 Public Participation

A thirty-day public notice was provided for this TMDL. During that time, the TMDL was available on the EPD website, a copy of the TMDL was provided on request, and the public was invited to provide comments on the TMDL.

7.0 INITIAL TMDL IMPLEMENTATION PLAN

This plan identifies applicable State-wide programs and activities that may be employed to manage point and nonpoint sources of bacteria loads for the beach segments in the Savannah River Basin. Local watershed planning and management initiatives will be fostered, supported, or developed through a variety of mechanisms. Implementation may be addressed by Watershed-Based Plans or other assessments funded by Section 319(h) grants, the local development of watershed protection plans, or "Targeted Outreach" initiated by EPD. These initiatives will supplement or possibly replace this initial implementation plan. Implementation actions should also be guided by the recommended management practices and actions contained within the *Coastal Georgia Regional Water Plan* (Coastal Georgia Regional Council, 2023) developed as part of *Georgia's Comprehensive State-wide Water Management Plan* implementation (Georgia Water Council, 2008).

7.1 Impaired Segments

This initial plan is applicable to the following waterbody that was added to Georgia's 303(d) list available on the EPD website (epd.georgia.gov):

Beach Segments Listed on the 2026 303(d) List for Enterococci in the Savannah River Basin

Reach ID	Stream Segment	Location	County	Segment Length (miles)	Designated Use	Use Support Status
GAR030601090313	Tybee Island - Polk Street Beach	End of Beach to Jetty	Chatham	1.8	Recreation	Not Supporting
GAR030601090316	Tybee Island - Strand Beach at Pier	11th Street to 18th Street	Chatham	0.7	Recreation	Not Supporting

Enterococci bacteria are used as an indicator of the potential presence of pathogens in a waterbody. The current water quality standard for coastal recreation [*State of Georgia's Rules and Regulations for Water Quality Control*, Chapter 391-3-6-.03(6)(b)(i)(1)] (GA EPD, 2022), are:

(b) Recreation: Primary contact recreational activities that occur year round such as swimming, diving, whitewater boating (class III and above), water skiing, and surfing, or for any other use requiring water of a lower quality, such as recreational fishing. These criteria are not to be interpreted as encouraging water contact sports in proximity to sewage or industrial waste discharges regardless of treatment requirements:

(i) Bacteria

1. Coastal and estuarine waters: Culturable enterococci not to exceed a geometric mean of 35 counts per 100 mL based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours. There shall be no greater than a ten percent excursion frequency of an enterococci statistical threshold value (STV) of 130 counts per 100 mL in the same 30-day interval.

7.2 Potential Sources

An important part of the TMDL analysis is the identification of potential source categories. A source assessment characterizes the known and suspected bacteria sources in the watershed.

Sources are broadly classified as either point or nonpoint sources. A point source is defined as a discernable, confined, and discrete conveyance from which pollutants are or may be discharged to surface waters. Point sources of bacteria include NPDES permittees discharging treated wastewater and stormwater. Nonpoint sources of bacteria are diffuse sources that cannot be identified as entering the waterbody at a single location. These sources generally involve land use activities that contribute bacteria to streams during a rainfall runoff event.

NPDES point source enterococci loads from wastewater treatment facilities usually do not contribute to impairments. This is because these facilities are required to treat to levels equivalent to instream water quality criteria. However, point sources can and do fail, which may contribute to bacteria loads through leaks and overflows from sanitary sewer systems, CAFOs, or leachate from operational landfills.

Nonpoint sources of enterococci in urban areas include wastes that are attributable to domestic animals, illicit discharges of sanitary waste, leaking septic systems, discharge from marine vessels, runoff from improper disposal of waste materials, and leachate from closed landfills. In non-urban areas, potential sources of enterococci may include animals grazing in pastures, and direct access of livestock to streams. Wildlife, especially waterfowl, can be a significant source of enterococci bacteria.

7.3 Management Practices and Activities

EPD is responsible for administering and enforcing laws to protect the waters of the State and is the lead agency for implementing the State's Nonpoint Source Management Program. Georgia is working with local governments, agricultural and forestry agencies such as the Georgia Department of Agriculture, the Natural Resource Conservation Service (NRCS), the Georgia Soil and Water Conservation Commission (GSWCC), and the Georgia Forestry Commission (GFC) to foster implementation of BMPs that address nonpoint source pollution. The following management practices are recommended to reduce enterococci loads to stream segments:

- Sustain compliance with NPDES treated wastewater permit requirements;
- Sustain compliance with NPDES MS4 permit requirements, where applicable;
- Compliance with future NPDES Industrial General Permit requirements, including where applicable, achieving benchmark levels for monitored constituents;
- Ensure storm water management plans are in place and being implemented by the local governments, and by the industrial facilities located in the watershed;
- Adoption and implementation of the *Coastal Stormwater Supplement to the Georgia Stormwater Management Manual* (CWP, 2009) to facilitate water quality treatment of stormwater runoff, including bacteria removal, through structural stormwater BMP installation.
- Continue efforts to increase public awareness and education regarding the impact of human activities on water quality, ranging from industrial and municipal discharges to individual's activities in residential neighborhoods;
- Implementation of recommended Water Quality management practices in the *Coastal Georgia Regional Water Plan* (GA EPD, 2023)
- Adoption and implementation of NRCS Conservation Practices for primary agricultural lands;
- Implementation of *Best Management Practices for Georgia Agriculture* (GSWCC, 2013)
- Application of BMPs appropriate to specific non-urban and urban land uses;
- Adoption of local ordinances (i.e. septic tanks, stormwater, etc.) that address local water quality; and

- Implementation of *Georgia's Best Management Practices for Forestry* (GFC, 2009);
- Further develop and streamline mechanisms for reporting and correcting illicit discharges, breaks, surcharges, and general sanitary sewer system problems;

Public education efforts target individual stakeholders to provide information regarding the use of BMPs to protect water quality. EPD will continue efforts to increase awareness and educate the public about the impact of human activities on water quality.

7.4 Monitoring

EPD encourages local governments and municipalities to develop water quality monitoring programs. These programs can help pinpoint various enterococci sources, as well as verify the 303(d) listings of beaches and tidal streams. This will be particularly valuable for those segments where listing was based on limited data. In addition, regularly scheduled sampling will determine if there has been some improvement in the water quality of the listed segments. EPD is available to assist in providing technical guidance regarding the preparation of monitoring plans and Sampling Quality Assurance Plans (SQAP).

7.5 Future Action

This Initial TMDL Implementation Plan includes a general approach to pollutant source identification as well as management practices to address pollutants. In the future, EPD will continue to determine and assess the appropriate point and non-point source management measures needed to achieve the TMDLs and also to protect and restore water quality in impaired waterbodies.
For point sources, any wasteload allocations for wastewater treatment plant facilities will be implemented in the form of water quality-based effluent limitations in NPDES permits. Any wasteload allocations for regulated stormwater will be implemented in the form of best management practices in the NPDES permits. Contributions of bacteria from regulated communities may also be managed using permit requirements such as watershed assessments, watershed protection plans, and long term monitoring. These measures will be directed through current point source management programs.

EPD will work to support watershed restoration, improvement and protection projects that address nonpoint source pollution. This is a process whereby EPD and/or Regional Commissions or other agencies or local governments, under a contract with EPD, will develop a watershed management plan intended to address water quality at the small watershed level (HUC 10 or smaller). These plans will be developed as resources and willing partners become available. The development of these plans may be funded via several grant sources, including, but not limited to: Clean Water Act Section 319(h), Section 604(b), and/or Section 106 grant funds. These plans are intended for implementation upon completion.

Any watershed management plan that specifically addresses a waterbody contained within this TMDL will supersede this Initial TMDL Implementation Plan for that waterbody, once EPD accepts and/or approves the plan. Watershed management plans intended to address this TMDL and other water quality concerns, prepared for EPD, and for which EPD and/or the EPD Contractor are responsible, will contain at a minimum the US EPA's 9 Elements of Watershed Planning:

1) An identification of the sources or groups of similar sources contributing to nonpoint source pollution to be controlled to implement load allocations or achieve water quality standards. Sources should be identified at the subcategory level with estimates of the extent to which they are present in the watershed (e.g., X numbers

of cattle feedlots needing upgrading, Y acres of row crops needing improved bacteria control, or Z linear miles of eroded streambank needing remediation);

2) An estimate of the load reductions expected for the management measures;

3) A description of the NPS management measures that will need to be implemented to achieve the load reductions established in the TMDL or to achieve water quality standards;

4) An estimate of the sources of funding needed, and/or authorities that will be relied upon, to implement the plan;

5) An information/education component that will be used to enhance public understanding of and participation in implementing the plan;

6) A schedule for implementing the management measures that is reasonably expeditious;

7) A description of interim, measurable milestones (e.g., amount of load reductions, improvement in biological or habitat parameters) for determining whether management measures or other control actions are being implemented;

8) A set of criteria that can be used to determine whether substantial progress is being made towards attaining water quality standards and, if not, the criteria for determining whether the plan needs to be revised; and;

9) A monitoring component to evaluate the effectiveness of the implementation efforts, measured against the criteria established under item (8).

The public will be provided an opportunity to participate in the development of watershed management plans that are prepared for EPD, and for which EPD and/or the EPD Contractor are responsible, and will be able to comment on them before they are finalized.

EPD will offer technical and financial assistance, when and where available, in the preparation of watershed management plans that address the impaired waterbodies listed in this TMDL document. Assistance may include but will not be limited to:

- Assessments of pollutant sources within watersheds;
- Determinations of appropriate management practices to address impairments;
- Identification of potential stakeholders and other partners;
- Developing a plan for outreach to the general public and other groups;
- Assessing the resources needed to implement the plan upon completion; and
- Other needs determined by the lead organization responsible for plan development.

EPD will also make this same assistance available, if needed, to proactively address water quality concerns. This assistance may be in the way of financial, technical, or other aid and may be requested and provided outside of the TMDL process or schedule.

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Appendix A

Enterococci Monitoring Data

Enterococci Sampling Stations and Dates – Savannah River Basin

Stream Segment	Location	CRD Monitoring Station ID	Monitoring Station Coordinates	Monitoring Station Description	Sample Date Range
Tybee Island - Polk Street Beach	End of Beach to Jetty	TYP	32.02613333, -80.8547333	Tybee Island Polk St	2020 – 2025
Tybee Island - Strand Beach at Pier	11th Street to 18th Street	TYST	31.9929872, -80.84579443	Tybee Island Strand	2020 - 2025

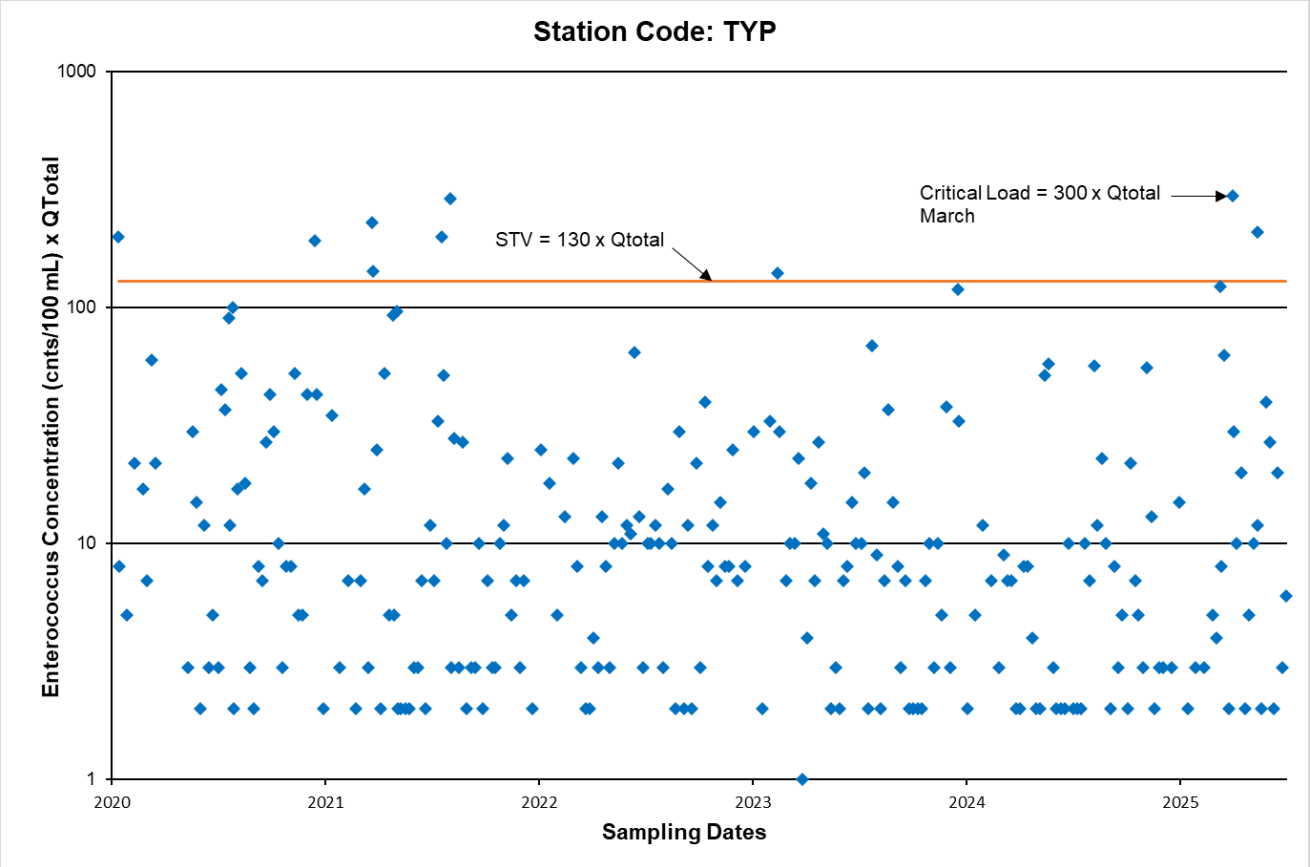

Figure A-1A

Enterococci Data for Figure A-1A	
Station Code: TYP	
Date	Cnts/100 mL

Enterococci Data for Figure A-1A	
Station Code: TYP	
Date	Cnts/100 mL
1/13/2020	200
1/15/2020	8
1/27/2020	5
2/10/2020	22
2/24/2020	17
3/2/2020	7
3/9/2020	60
3/16/2020	22
5/11/2020	3
5/18/2020	30
5/26/2020	15
6/1/2020	2
6/8/2020	12
6/15/2020	3
6/22/2020	5
6/29/2020	-
7/1/2020	3
7/6/2020	45
7/13/2020	37
7/20/2020	91
7/22/2020	12
7/27/2020	100
7/28/2020	2
8/4/2020	17
8/10/2020	53
8/17/2020	18
8/24/2020	3
8/31/2020	2
9/8/2020	8
9/14/2020	7
9/21/2020	27
9/28/2020	43
10/5/2020	30
10/13/2020	10
10/19/2020	3
10/26/2020	8
11/2/2020	8
11/9/2020	53
11/16/2020	5

Enterococci Data for Figure A-1A	
Station Code: TYP	
Date	Cnts/100 mL
11/23/2020	5
11/30/2020	43
12/14/2020	192
12/16/2020	43
12/28/2020	2
01/11/21	35
01/25/21	3
02/08/21	7
02/22/21	2
03/01/21	7
03/08/21	17
03/15/21	3
03/22/21	230
03/23/21	143
03/29/21	25
04/05/21	2
04/12/21	53
04/19/21	5
04/26/21	93
04/27/21	5
05/03/21	97
05/05/21	2
05/10/21	2
05/17/21	2
05/24/21	2
06/01/21	3
06/07/21	3
06/14/21	7
06/21/21	2
06/28/21	12
07/06/21	7
07/12/21	33
07/19/21	200
07/21/21	52
07/26/21	10
08/02/21	290
08/04/21	3
08/09/21	28
08/16/21	3

Enterococci Data for Figure A-1A	
Station Code: TYP	
Date	Cnts/100 mL
08/23/21	27
08/30/21	2
09/07/21	3
09/13/21	3
09/20/21	10
09/27/21	2
10/04/21	7
10/12/21	3
10/18/21	3
10/25/21	10
11/01/21	12
11/08/21	23
11/15/21	5
11/22/21	7
11/29/21	3
12/06/21	7
12/20/21	2
01/04/22	25
01/18/22	18
01/31/22	5
02/14/22	13
02/28/22	23
03/07/22	8
03/14/22	3
03/21/22	2
03/28/22	2
04/04/22	4
04/11/22	3
04/18/22	13
04/25/22	8
05/02/22	3
05/09/22	10
05/16/22	22
05/23/22	10
05/31/22	12
06/06/22	11
06/13/22	65
06/21/22	13
06/27/22	3

Enterococci Data for Figure A-1A	
Station Code: TYP	
Date	Cnts/100 mL
07/05/22	10
07/11/22	10
07/18/22	12
07/25/22	10
08/01/22	3
08/08/22	17
08/15/22	10
08/22/22	2
08/29/22	30
09/06/22	2
09/12/22	12
09/19/22	2
09/26/22	22
10/03/22	3
10/11/22	40
10/17/22	8
10/24/22	12
10/31/22	7
11/07/22	15
11/14/22	8
11/21/22	8
11/28/22	25
12/05/22	7
12/19/22	8
1/3/2023	30
1/17/2023	2
1/30/2023	33
2/13/2023	140
2/15/2023	30
2/27/2023	7
3/6/2023	10
3/13/2023	10
3/20/2023	23
3/27/2023	1
4/3/2023	4
4/10/2023	18
4/17/2023	7
4/24/2023	27
5/1/2023	11

Enterococci Data for Figure A-1A	
Station Code: TYP	
Date	Cnts/100 mL
5/8/2023	10
5/15/2023	2
5/22/2023	3
5/30/2023	2
6/5/2023	7
6/12/2023	8
6/20/2023	15
6/26/2023	10
7/5/2023	10
7/10/2023	20
7/17/2023	2
7/24/2023	69
7/31/2023	9
8/7/2023	2
8/14/2023	7
8/21/2023	37
8/28/2023	15
9/5/2023	8
9/11/2023	3
9/18/2023	7
9/25/2023	2
10/2/2023	2
10/10/2023	2
10/16/2023	2
10/23/2023	7
10/30/2023	10
11/6/2023	3
11/13/2023	10
11/20/2023	5
11/27/2023	38
12/4/2023	3
12/18/2023	120
12/19/2023	33
1/2/2024	2
1/16/2024	5
1/29/2024	12
2/12/2024	7
2/26/2024	3
3/4/2024	9

Enterococci Data for Figure A-1A	
Station Code: TYP	
Date	Cnts/100 mL
3/11/2024	7
3/18/2024	7
3/25/2024	2
4/1/2024	2
4/8/2024	8
4/15/2024	8
4/22/2024	4
4/29/2024	2
5/6/2024	2
5/13/2024	52
5/20/2024	58
5/28/2024	3
6/3/2024	2
6/10/2024	2
6/17/2024	2
6/24/2024	10
7/1/2024	2
7/8/2024	2
7/15/2024	2
7/22/2024	10
7/29/2024	7
8/7/2024	57
8/12/2024	12
8/19/2024	23
8/26/2024	10
9/3/2024	2
9/9/2024	8
9/16/2024	3
9/23/2024	5
10/2/2024	2
10/7/2024	22
10/15/2024	7
10/21/2024	5
10/28/2024	3
11/4/2024	56
11/12/2024	13
11/18/2024	2
11/25/2024	3
12/2/2024	3

Enterococci Data for Figure A-1A	
Station Code: TYP	
Date	Cnts/100 mL
12/16/2024	3
12/30/2024	15
1/13/2025	2
1/27/2025	3
2/10/2025	3
2/24/2025	5
3/3/2025	4
3/10/2025	123
3/11/2025	8
3/17/2025	63
3/24/2025	2
3/31/2025	300
4/2/2025	30
4/7/2025	10
4/14/2025	20
4/21/2025	2
4/28/2025	5
5/5/2025	10
5/12/2025	210
5/13/2025	12
5/19/2025	2
5/27/2025	40
6/2/2025	27
6/9/2025	2
6/16/2025	20
6/23/2025	3
6/30/2025	6

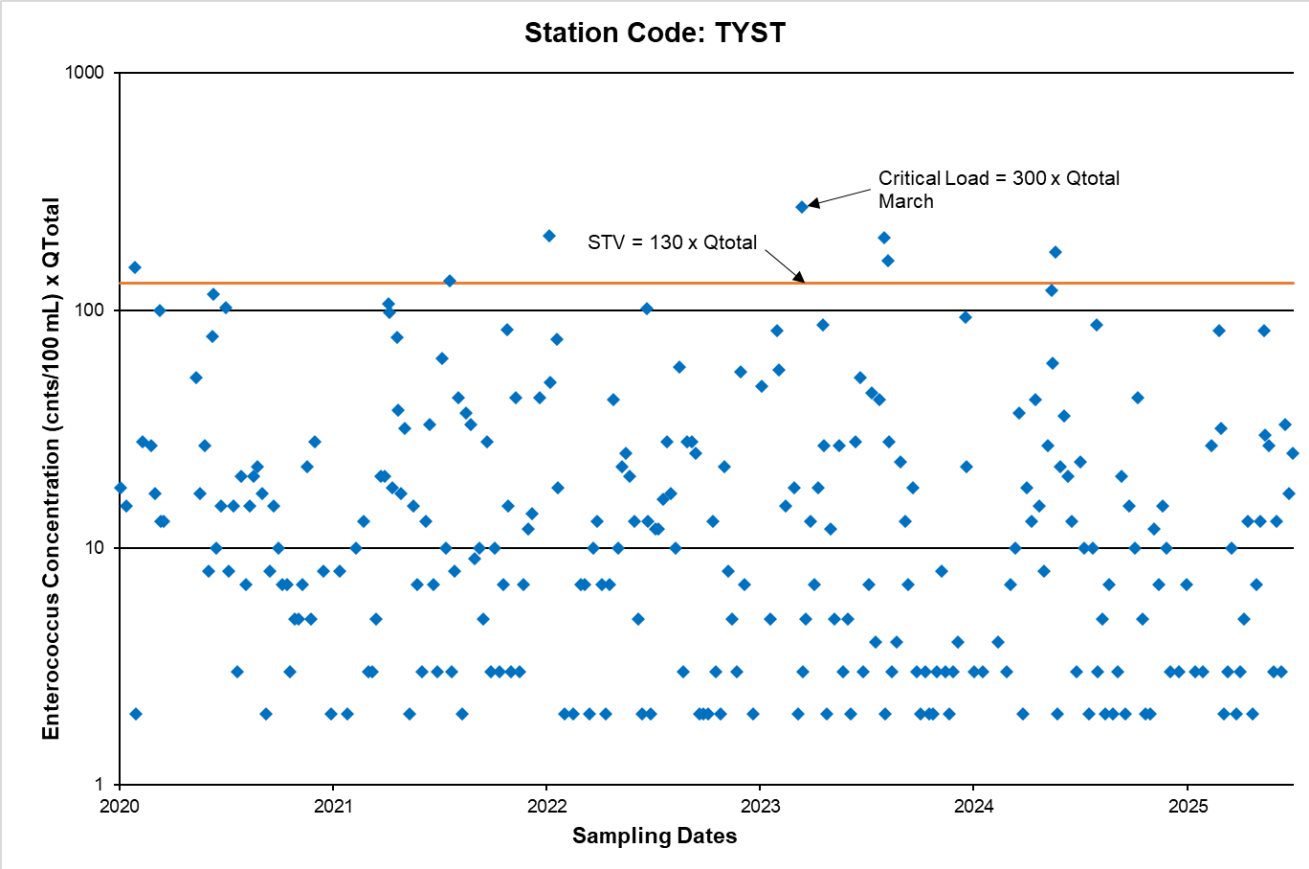

Figure A-2A

Data for Figure A-2A	
Station Code: TYST	
Date	Cnts/100 mL
1/2/2020	18
1/13/2020	15
1/27/2020	152
1/29/2020	2
2/10/2020	28
2/24/2020	27
3/2/2020	17
3/9/2020	100
3/11/2020	13
3/16/2020	13
5/11/2020	52
5/18/2020	17
5/26/2020	27
6/1/2020	8
6/8/2020	78

Data for Figure A-2A	
Station Code: TYST	
Date	Cnts/100 mL
6/10/2020	117
6/15/2020	10
6/22/2020	15
6/29/2020	-
7/1/2020	103
7/6/2020	8
7/13/2020	15
7/20/2020	3
7/27/2020	20
8/4/2020	7
8/10/2020	15
8/17/2020	20
8/24/2020	22
8/31/2020	17
9/8/2020	2
9/14/2020	8
9/21/2020	15
9/28/2020	10
10/5/2020	7
10/13/2020	7
10/19/2020	3
10/26/2020	5
11/2/2020	5
11/9/2020	7
11/16/2020	22
11/23/2020	5
11/30/2020	28
12/14/2020	8
12/28/2020	2
01/11/21	8
01/25/21	2
02/08/21	10
02/22/21	13
03/01/21	3
03/08/21	3
03/15/21	5
03/22/21	20
03/29/21	20
04/05/21	107

Data for Figure A-2A	
Station Code: TYST	
Date	Cnts/100 mL
04/07/21	98
04/12/21	18
04/19/21	77
04/21/21	38
04/26/21	17
05/03/21	32
05/10/21	2
05/17/21	15
05/24/21	7
06/01/21	3
06/07/21	13
06/14/21	33
06/21/21	7
06/28/21	3
07/06/21	63
07/12/21	10
07/19/21	134
07/21/21	3
07/26/21	8
08/02/21	43
08/09/21	2
08/16/21	37
08/23/21	33
08/30/21	9
09/07/21	10
09/13/21	5
09/20/21	28
09/27/21	3
10/04/21	10
10/12/21	3
10/18/21	7
10/25/21	83
10/26/21	15
11/01/21	3
11/08/21	43
11/15/21	3
11/22/21	7
11/29/21	12
12/06/21	14

Data for Figure A-2A	
Station Code: TYST	
Date	Cnts/100 mL
12/20/21	43
01/04/22	207
01/06/22	50
01/18/22	76
01/20/22	18
01/31/22	2
02/14/22	2
02/28/22	7
03/07/22	7
03/14/22	2
03/21/22	10
03/28/22	13
04/04/22	7
04/11/22	2
04/18/22	7
04/25/22	42
05/02/22	10
05/09/22	22
05/16/22	25
05/23/22	20
05/31/22	13
06/06/22	5
06/13/22	2
06/21/22	102
06/23/22	13
06/27/22	2
07/05/22	12
07/11/22	12
07/18/22	16
07/25/22	28
08/01/22	17
08/08/22	10
08/15/22	58
08/22/22	3
08/29/22	28
09/06/22	28
09/12/22	25
09/19/22	2
09/26/22	2

Data for Figure A-2A	
Station Code: TYST	
Date	Cnts/100 mL
10/03/22	2
10/11/22	13
10/17/22	3
10/24/22	2
10/31/22	22
11/07/22	8
11/14/22	5
11/21/22	3
11/28/22	55
12/05/22	7
12/19/22	2
1/3/2023	48
1/17/2023	5
1/30/2023	82
2/1/2023	56
2/13/2023	15
2/27/2023	18
3/6/2023	2
3/13/2023	273
3/14/2023	3
3/20/2023	5
3/27/2023	13
4/3/2023	7
4/10/2023	18
4/17/2023	87
4/19/2023	27
4/24/2023	2
5/1/2023	12
5/8/2023	5
5/15/2023	27
5/22/2023	3
5/30/2023	5
6/5/2023	2
6/12/2023	28
6/20/2023	52
6/26/2023	3
7/5/2023	7
7/10/2023	45
7/17/2023	4

Data for Figure A-2A	
Station Code: TYST	
Date	Cnts/100 mL
7/24/2023	42
7/31/2023	203
8/2/2023	2
8/7/2023	163
8/8/2023	28
8/14/2023	3
8/21/2023	4
8/28/2023	23
9/5/2023	13
9/11/2023	7
9/18/2023	18
9/25/2023	3
10/2/2023	2
10/10/2023	3
10/16/2023	2
10/23/2023	2
10/30/2023	3
11/6/2023	8
11/13/2023	3
11/20/2023	2
11/27/2023	3
12/4/2023	4
12/18/2023	94
12/19/2023	22
1/2/2024	3
1/16/2024	3
1/29/2024	-
2/12/2024	4
2/26/2024	3
3/4/2024	7
3/11/2024	10
3/18/2024	37
3/25/2024	2
4/1/2024	18
4/8/2024	13
4/15/2024	42
4/22/2024	15
4/29/2024	8
5/6/2024	27

Data for Figure A-2A	
Station Code: TYST	
Date	Cnts/100 mL
5/13/2024	122
5/15/2024	60
5/20/2024	176
5/22/2024	2
5/28/2024	22
6/3/2024	36
6/10/2024	20
6/17/2024	13
6/24/2024	3
7/1/2024	23
7/8/2024	10
7/15/2024	2
7/22/2024	10
7/29/2024	87
7/31/2024	3
8/7/2024	5
8/12/2024	2
8/19/2024	7
8/26/2024	2
9/3/2024	3
9/9/2024	20
9/16/2024	2
9/23/2024	15
10/2/2024	10
10/7/2024	43
10/15/2024	5
10/21/2024	2
10/28/2024	2
11/4/2024	12
11/12/2024	7
11/18/2024	15
11/25/2024	10
12/2/2024	3
12/16/2024	3
12/30/2024	7
1/13/2025	3
1/27/2025	3
2/10/2025	27
2/24/2025	82

Data for Figure A-2A	
Station Code: TYST	
Date	Cnts/100 mL
2/26/2025	32
3/3/2025	2
3/10/2025	3
3/17/2025	10
3/24/2025	2
3/31/2025	3
4/7/2025	5
4/14/2025	13
4/21/2025	2
4/28/2025	7
5/5/2025	13
5/12/2025	82
5/13/2025	30
5/19/2025	27
5/27/2025	3
6/2/2025	13
6/9/2025	3
6/16/2025	33
6/23/2025	17
6/30/2025	25