Bacteria Indicator Supplement
Coosa River Basin – 2004 Fecal Coliform TMDL
Action ID: GAR4_22_14_15

As part of the 2019 Water Quality Standards Triennial Review, Georgia proposed *E. coli* and enterococci criteria for waters designated as fishing, coastal fishing, and drinking water to protect recreators who may inadvertently ingest water. Enterococci is the bacterial indicator for estuarine water, while *E. coli* is the bacterial indicator for all other waters. E. coli and enterococci have a better correlation with gastrointestinal illness than fecal coliform, and the E. coli and enterococci criteria are as protective of the fecal coliform criterion. Georgia EPD adopted the primary contact criteria for the recreational months, May through October, when immersion is expected to occur, and there is a higher likelihood of water ingestion. For non-recreational months, November through April, EPD adopted secondary contact criteria based on the estimated incidental water consumption rate from the 2019 update to Chapter 3 of the EPA Exposure Factors Handbook, Ingestion of Water and Other Select Liquids. Prior to these changes, fecal coliform was the bacterial indicator for the designated uses described above.

This supplement was developed to document the translation of the fecal coliform calculations to the new bacteria indicator, either *E. coli* or enterococci, for segments listed in the existing approved Total Maximum Daily Load (TMDL) document. To the extent that the existing approved TMDL document makes specific permitting recommendations based on fecal coliform, those recommendations will be translated to the approved bacteria indicator in all permits.

The loading curve approach was used to determine the allowable summer and winter seasonal loads. For waterbodies designated as recreational waters, a single curve represents the TMDL and is the 30-day recreational geometric mean criteria for the various bacterial indicators. For waterbodies designated as fishing, coastal fishing, and drinking water, two curves represent the TMDL. One curve represents the summer TMDL for the period May through October when the 30-day geometric mean water quality criteria are equal to the primary contact recreation bacteria criteria for the various indicators, and the second curve represents the winter TMDL for the period November through April when the 30-day geometric mean criteria are higher and are equal to the secondary contact recreation bacteria criteria.

The TMDL also has a single sample maximum criterion for fecal coliform or a Statistical Threshold Value (STV) for *E. coli* and enterococci. The single sample maximum applies for the months of November through April; whereas, the STV applies year round. The STV shall not be exceeded more than 10% of the time in a 30-day period. If a single sample exceeds the maximum criterion or the STV and a geometric mean criterion was also exceeded, then the TMDL is based on the criteria exceedance requiring the largest load reduction. The difference between the critical load and the TMDL curve represented the load reduction required for the stream segment to meet the appropriate instream standard.

The TMDL calculation is given using the following equation:

$$TMDL = C_{standard} \times Q$$

Where: TMDL = Total Maximum Bacteria Load either as a 30-day geometric mean or a single sample maximum
$C_{standard}$ = applicable state water quality standard
Q = stream flow

The applicable water quality standard for fecal coliform was:

May-October 200 counts/100 mL (as a 30-day geometric mean)
November-April 1,000 counts/100 mL (as a 30-day geometric mean)
November-April 4,000 counts/100 mL (as a single sample maximum)

The applicable water quality standard for *E. coli* is:

May-October 126 counts/100 mL (as a 30-day geometric mean)
May-October 410 counts/100 mL (as a STV)
November-April 265 counts/100 mL (as a 30-day geometric mean)
November-April 861 counts/100 mL (as a STV)

The applicable water quality standard for enterococci is:

May-October 35 counts/100 mL (as a 30-day geometric mean)
May-October 130 counts/100 mL (as a STV)
November-April 74 counts/100 mL (as a 30-day geometric mean)
November-April 273 counts/100 mL (as a STV)

TMDLs are the sum of all wasteload allocations (WLA) plus load allocation (LA) plus a margin of safety (MOS), or, stated as an equation, TMDL = ∑WLA + ∑LA + MOS. The MOS can be either implicit or explicit. For bacteria TMDLs, the practice has been to allocate an explicit ten percent MOS. TMDLs have given WLAs for all point sources equivalent to the recreational 30-day geometric mean criteria. The LA has also been given as the appropriate seasonal 30-day geometric mean criteria.

The wasteload allocation (WLA) is the portion of the receiving water's loading capacity that is allocated to existing or future point sources. WLAs were provided to the point sources with municipal wastewater treatment systems and to point sources with sanitary waste streams. Industrial wastewater treatment systems may also receive a WLA if they discharge bacteria because of the type of treatment processes employed or due to commingled sanitary waste streams.

For permitted point sources identified in the original TMDL, the WLAs were calculated based on permitted or design flow and primary recreation season bacteria criteria and are expressed as an accumulated load over a 30-day period and presented in units of counts per 30 days. If a facility expands its capacity and the permitted flow increases, the WLA for the facility would increase in proportion to the flow. If there is a new facility, the WLA would be the design flow times the summertime bacteria criteria. The established WLAs will meet the applicable water quality criteria. In addition, the permits may include routine monitoring and reporting requirements.

The reasonable assurance language included in the original TMDL in Section 6.3 shall be considered superseded and replaced by the following language.

The 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 standards and use classifications, assessing and reporting water quality conditions, and regulating land use activities that may affect water quality. Georgia works 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 best management practices to address nonpoint sources. In addition, public education efforts will be targeted to individual stakeholders to provide information regarding the use of best management practices to protect water quality.

Table 14a. *E. coli* WLAs Required

Facility Name	Permit No.	Receiving Stream	Listed Stream Segment	Bacteria Indicator	WLA (counts/ 30 days)
Adairsville North WPCP	GA0046035	Oothkalooga Creek	Oostanaula River -Oothkalooge Creek to Hwy 156	*E. coli*	1.44E+11
Bartow Co. Southeast WPCP	GA0037664	Etowah River	Etowah River - Lake Allatoona to Richland Ck	*E. coli*	1.44E+10
Bartow Co Two Run WPCP	GA0020702	Two Run Creek	Two Run Creek	*E. coli*	1.44E+10
Big Canoe WPCP	GA0030252	Blackwell Creek	Long Swamp Creek	*E. coli*	5.37E+09
Calhoun WPCP	GA0030333	Oostanaula River	Oostanaula River - Oothkalooge Creek to Hwy 156	*E. coli*	2.29E+12
Cartersville WPCP	GA0024091	Etowah River	Etowah River - Lake Allatoona to Richland Ck	*E. coli*	1.73E+12
Cave Spring WPCP	GA0025721	Little Cedar Creek	Big Cedar Creek/Cedar Creek	*E. coli*	3.16E+10
Cedartown WPCP	GA0024074	Cedar Creek	Big Cedar Creek/Cedar Creek	*E. coli*	5.01E+11
Chatsworth WPCP	GA0032492	Holly Creek	Holly Creek - Rock Creek to Conasauga River	*E. coli*	4.30E+11
Dallas North WPCP	GA0026034	Lawrence Creek Trib	Pumpkinvine Creek	*E. coli*	7.18E+10
Dallas West WPCP	GA0026026	Weaver Creek Trib	Pumpkinvine Creek	*E. coli*	1.29E+11
Ellijay WPCP	GA0021369	Coosawattee River	Coosawattee River	*E. coli*	3.58E+11
Emerson Pond WPCP	GA0026115	Pumpkinvine Creek	Pumpkinvine Creek	*E. coli*	2.46E+10
Fulton Co. Little River WPCP	GA0033251	Little River	Lake Allatoona – Little River Embayment	*E. coli*	1.44E+11
Jasper WPCP	GA0032204	Hammond's Creek	Sharp Mountain Creek	*E. coli*	1.15E+11
Lafayette WPCP	GA0025712	Chattooga Creek	Chattooga River - Cane Creek, Trion to Henry Br	*E. coli*	5.01E+11
Polk Co. Aragon WPCP	GA0026182	Euharlee Creek	Euharlee Creek	*E. coli*	2.44E+10
Rockmart WPCP	GA0026042	Euharlee Creek	Euharlee Creek	*E. coli*	4.30E+11
Rome Coosa WPCP	GA0024341	Coosa River	Coosa River - Rome to Hwy 100	*E. coli*	2.87E+11
Rome WPCP	GA0024112	Coosa River	Coosa River - Rome to Hwy 100	*E. coli*	2.58E+12
Summerville WPCP	GA0025704	Chattooga River	Chattooga River - Henry Br. to Lyerly	*E. coli*	2.87E+11
Trion WPCP	GA0025607	Chattooga River	Chattooga River - Cane Creek, Trion to Henry Br	*E. coli*	7.18E+11
Woodstock WPCP	GA0026263	Rubes Creek Trib	Rubes Creek	*E. coli*	7.18E+10

Table 15a. *E. coli* Loads Required

Stream Segment[a]	Location	Bacteria Indicator	Current Load (counts/ 30 days)	TMDL Components					Percent Reduction
				WLA[1] (counts/ 30 days)	WLAsw (counts/ 30 days)	LA (counts/ 30 days)	MOS (counts/ 30 days)	TMDL (counts/ 30 days)	
Acworth Creek GAR031501040908	Tributary to Lake Acworth (Cobb Co.)	*E. coli*	[2]		9.77E+09	4.18E+09	1.54E+09	1.54E+10	Undetermined[3]
Allatoona Creek GAR031501040905	Cobb County	*E. coli*	[2]		2.29E+11	3.24E+11	6.15E+10	6.15E+11	Undetermined[3]
Amicalola Creek GAR031501040205, GAR031501040206	Headwaters near Hwy 52 to Etowah River (Dawson Co.)	*E. coli*	[2]			2.67E+13	2.97E+12	2.97E+13	Undetermined[3]
Armuchee Creek GAR031501030501	Oostanaula River Tributary (Floyd Co.)	*E. coli*	[2]			3.43E+13	3.82E+12	3.82E+13	Undetermined[3]
Beech Creek GAR031501050207	Downstream Hicks Lake, near Rome (Floyd Co.)	*E. coli*	[2]		2.27E+10	4.43E+11	5.17E+10	5.17E+11	Undetermined[3]
Big Cedar Creek/Cedar Creek GAR031501050111	Cedar Creek Headwaters, Cedartown to Coosa River, Lake Weiss (Polk, Floyd Co.)	*E. coli*	[2]	2.22E+11		9.51E+12	1.08E+12	1.08E+13	Undetermined[3]
Big Dry Creek GAR031501030611	Rome (Floyd Co.)	*E. coli*	[2]		3.31E+11	9.14E+11	1.39E+11	1.39E+12	Undetermined[3]
Butler Creek GAR031501040901	Cobb County	*E. coli*	[2]		4.21E+11	3.86E+11	8.95E+10	8.95E+11	Undetermined[3]
Cane Creek GAR031501050410	Dry Creek to Chattooga River (Walker/Chattooga Co.)	*E. coli*	[2]			1.01E+12	1.12E+11	1.12E+12	Undetermined[3]
Cartecay River GAR031501020101	Owltown Creek to Coosawattee River (Gilmer Co.)	*E. coli*	[2]			1.03E+15	1.15E+14	1.15E+15	Undetermined[3]
Chattooga River GAR031501050608	Cane Creek, Trion to Henry Branch (Chattooga Co.)	*E. coli*	[2]	1.93E+11		1.10E+13	1.24E+12	1.24E+13	Undetermined[3]
Chattooga River GAR031501050609	Henry Branch to Lyerly (Chattooga Co.)	*E. coli*	[2]	5.66E+11		1.35E+13	1.56E+12	1.56E+13	Undetermined[3]
Coahulla Creek GAR031501010301	Below 728 Road to Mill Creek (Whitfield Co.)	*E. coli*	[2]		4.79E+14	2.17E+15	2.94E+14	2.94E+15	Undetermined[3]
Conasauga River GAR031501010502	Hwy 286 to Holly Creek (Whitfield, Murray Co.)	*E. coli*	[2]		1.49E+14	2.93E+15	3.42E+14	3.42E+15	Undetermined[3]
Conasauga River GAR031501010511, GAR031501010512	Holly Creek to Oostanaula River (Murray, Gordon Co.)	*E. coli*	[2]		2.25E+12	3.70E+13	4.36E+12	4.36E+13	Undetermined[3]
Coosa River GAR031501050208	Rome to Hwy 100 (Floyd Co.)	*E. coli*	[2]	2.90E+12	9.45E+13	3.58E+15	4.09E+14	4.09E+15	Undetermined[3]

Stream Segment[a]	Location	Bacteria Indicator	Current Load (counts/ 30 days)	TMDL Components					Percent Reduction
				WLA[1] (counts/ 30 days)	WLAsw (counts/ 30 days)	LA (counts/ 30 days)	MOS (counts/ 30 days)	TMDL (counts/ 30 days)	
Coosawattee River GAR031501020411, GAR031501020412	Confluence with Ellijay River to Mountaintown Creek (Gilmer Co.)	*E. coli*	[2]	3.21E+11		3.16E+13	3.55E+12	3.55E+13	Undetermined[3]
Ellijay River GAR031501020201	Upstream Coosawattee River (Gilmer Co.)	*E. coli*	[2]			6.30E+12	6.99E+11	6.99E+12	Undetermined[3]
Etowah River GAR031501040110	Clear Creek to Forsyth Co. Line (Dawson Co.)	*E. coli*	[2]			1.44E+13	1.60E+12	1.60E+13	Undetermined[3]
Etowah River GAR031501040302	Settingdown Creek to Long Swamp Creek (Cherokee Co.)	*E. coli*	[2]		5.49E+12	3.99E+13	5.04E+12	5.04E+13	Undetermined[3]
Etowah River GAR031501041309, GAR031501041310	Lake Allatoona to Richland Creek (Bartow Co.)	*E. coli*	[2]	1.32E+12	1.25E+12	1.33E+14	1.51E+13	1.51E+14	Undetermined[3]
Etowah River GAR031501041503	Euharlee Creek to US Hwy 411 (Bartow Co.)	*E. coli*	[2]		2.02E+12	6.93E+13	7.88E+12	7.88E+13	Undetermined[3]
Etowah River GAR031501041601	Hwy 411 to Coosa River (Bartow, Floyd Co.)	*E. coli*	[2]		3.81E+14	9.83E+15	1.13E+15	1.13E+16	Undetermined[3]
Euharlee Creek GAR031501041401	Hills Creek to upstream Plant Bowen (Bartow Co.)	*E. coli*	[2]			6.99E+12	7.94E+11	7.94E+12	Undetermined[3]
Flat Creek GAR031501020409, GAR031501020402	Upstream Coosawattee River (Gilmer Co.)	*E. coli*	[2]			2.41E+12	2.68E+11	2.68E+12	Undetermined[3]
Holly Creek GAR031501010401	Rock Creek to Conasauga River (Murray Co.)	*E. coli*	[2]			2.52E+12	2.80E+11	2.80E+12	Undetermined[3]
Lake Acworth GAR031501040910	Upper/Mid-Lake (Cobb County)	*E. coli*	[2]		4.36E+11	1.39E+12	2.02E+11	2.02E+12	Undetermined[3]
Lake Allatoona	Carter's Creek Embayment (Bartow County)	*E. coli*	[2]				2.52E+02	2.52E+03	Undetermined[3]
Lake Allatoona GAR031501040809	Little River Embayment (Cherokee Co.)	*E. coli*	Improperly listed						
Lake Allatoona	Tanyard Creek Embayment (Bartow County)	*E. coli*	Improperly listed						
Little Allatoona Creek GAR031501040906	Cobb County	*E. coli*	[2]			2.09E+11	5.99E+10	5.99E+11	Undetermined[3]
Little Noonday Creek GAR031501040801	Cobb County	*E. coli*	[2]		4.12E+11	2.16E+11	6.99E+10	6.99E+11	Undetermined[3]
Long Swamp Creek GAR031501040403	Hwy 53 to Etowah River Near Ball Ground (Pickens, Gilmer Co.)	*E. coli*	[2]	6.24E+08		1.07E+13	1.19E+12	1.19E+13	Undetermined[3]

Stream Segment[a]	Location	Bacteria Indicator	Current Load (counts/ 30 days)	TMDL Components					Percent Reduction
				WLA[1] (counts/ 30 days)	WLAsw (counts/ 30 days)	LA (counts/ 30 days)	MOS (counts/ 30 days)	TMDL (counts/ 30 days)	
Mountaintown Creek GAR031501020301	Hwy 282 to Coosawattee River (Gilmer Co.)	*E. coli*	[2]			5.62E+12	6.24E+11	6.24E+12	Undetermined[3]
Oostanaula River GAR031501030204	Oothkalooga Creek to Hwy 156 (Gordon Co.)	*E. coli*	[2]	1.05E+12	2.96E+12	8.76E+13	1.01E+13	1.01E+14	Undetermined[3]
Oostanaula River GAR031501030609	Hwy 156 to Hwy 140 (Gordon, Floyd Co.)	*E. coli*	[2]		4.36E+12	1.41E+14	1.61E+13	1.61E+14	Undetermined[3]
Oostanaula River GAR031501030608	Hwy 140 to Coosa River (Floyd Co.)	*E. coli*	[2]		5.00E+12	1.40E+14	1.61E+13	1.61E+14	Undetermined[3]
Owl Creek GAR031501041002	Lake Allatoona Tributary (Cherokee Co.)	*E. coli*	[2]			8.38E+10	2.00E+10	2.00E+11	Undetermined[3]
Pine Log Creek GAR031501020701	Cedar Creek to Salacoa Creek (Gordon Co.)	*E. coli*	[2]			6.43E+12	7.18E+11	7.18E+12	Undetermined[3]
Proctor Creek GAR031501040902	Cobb County	*E. coli*	[2]		3.66E+11	3.52E+11	8.00E+10	8.00E+11	Undetermined[3]
Pumpkinvine Creek GAR031501041101	Little Pumpkinvine Creek to Etowah River (Paulding, Bartow Co.)	*E. coli*	[2]	8.32E+10	2.51E+12	2.60E+13	3.18E+12	3.18E+13	Undetermined[3]
Raccoon Creek GAR031501050610	U/S Chattooga River, Berryton (Chattooga Co.)	*E. coli*	[2]			1.27E+12	1.41E+11	1.41E+12	Undetermined[3]
Raccoon Creek GAR031501041202	Pegamore Lake to Etowah River (Paulding, Bartow Co.)	*E. coli*	[2]			2.51E+12	2.78E+11	2.78E+12	Undetermined[3]
Rocky Creek GAR031501040806	Fulton County	*E. coli*	[2]		3.89E+11	3.29E+11	8.00E+10	8.00E+11	Undetermined[3]
Rubes Creek GAR031501040804	Cobb/Cherokee Counties	*E. coli*	[2]	6.49E+10	6.93E+11				Undetermined[3]
Sharp Mountain Creek GAR031501040503	Rock Creek to Etowah River (Cherokee Co.)	*E. coli*	[2]	6.12E+10		1.08E+13	1.21E+12	1.21E+13	Undetermined[3]
Silver Creek GAR031501041602	Rome (Floyd Co.)	*E. coli*	[2]		3.94E+11	1.85E+12	2.49E+11	2.49E+12	Undetermined[3]
Spring Creek GAR031501050401	Walker/Chattooga County	*E. coli*	[2]			2.02E+12	2.24E+11	2.24E+12	Undetermined[3]
Spring Creek GAR031501041603	Etowah River Tributary (Floyd Co.)	*E. coli*	[2]			1.30E+14	1.44E+13	1.44E+14	Undetermined[3]
Tails Creek GAR031501020403	Hwy 282 to Carters Lake (Gilmer Co.)	*E. coli*	[2]			8.63E+12	9.58E+11	9.58E+12	Undetermined[3]
Talking Rock Creek GAR031501020513	Ga. Hwy 136 to Pickens/Gilmer County Line (Pickens Co.)	*E. coli*	[2]			7.37E+12	8.19E+11	8.19E+12	Undetermined[3]

Stream Segment[a]	Location	Bacteria Indicator	Current Load (counts/ 30 days)	TMDL Components					Percent Reduction
				WLA[1] (counts/ 30 days)	WLAsw (counts/ 30 days)	LA (counts/ 30 days)	MOS (counts/ 30 days)	TMDL (counts/ 30 days)	
Tanyard Creek GAR031501040903	White Lake to Lake Allatoona (Cobb Co.)	*E. coli*	[2]		6.62E+10	5.85E+10	1.39E+10	1.39E+11	Undetermined[3]
Tributary to Allatoona Creek GAR031501040904	Cobb County (Midway Road)	*E. coli*	[2]		7.69E+10	1.03E+11	2.00E+10	2.00E+11	Undetermined[3]
Tributary to Oothkalooga Creek GAR031501030110	Peters Street to Oothkalooga Creek, Calhoun (Gordon Co.)	*E. coli*	[2]			1.82E+11	2.02E+10	2.02E+11	Undetermined[3]
Tributary to Pettit Creek GAR031501041302	Cartersville (Bartow Co.)	*E. coli*	[2]			8.32E+10	9.26E+09	9.26E+10	Undetermined[3]
Two Run Creek GAR031501041502	Clear Creek to Etowah River (Bartow Co.)	*E. coli*	[2]	1.30E+10		2.58E+13	2.87E+12	2.87E+13	Undetermined[3]
Webb Creek GAR031501050215	Coosa River Tributary	*E. coli*	[2]			2.12E+11	2.36E+10	2.36E+11	Undetermined[3]
Woodward Creek GAR031501030607	Oostanaula River Tributary (Floyd Co.)	*E. coli*	[2]			3.33E+13	3.70E+12	3.70E+13	Undetermined[3]

(1) The assigned bacteria load from the NPDES permitted facility for WLA was determined as the product of the *E. coli* permit limit and the facility average monthly discharge at the time of the critical load.
(2) Samples were not analyzed for E. coli, therefore critical load calculation not possible
(3) Percent reduction could not be determined due to absence of current load calculation
(a) Stream segments identified in Table 15a with multiple ID numbers (GAR###) represent segments that have been split into smaller subsections in the biennial 305(b)/303(d) list of waters since the original issuance of the approved TMDL.