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Upper Ocmulgee River Resource Conservation & Development Council, Inc.

Bob Scott

SOUTH RIVER WATERSHED IMPROVEMENT PLAN

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Acknowledgements

The Upper Ocmulgee River Resource Conservation and Development Council, Inc., would like to express its appreciation to the many organizations and individuals that assisted with the research and compilation of information presented in this plan. First on the list of those we would like to thank are the Environmental Protection Agency and the Georgia Environmental Protection Division for funding the preparation of the document. In addition, the council would like to thank the many individuals associated with the Natural Resources Conservation Service, the Georgia Environmental Protection Division, the City of Atlanta Office of Watershed Protection, the Watershed Protection Division of the DeKalb County Department of Watershed Management, the Rockdale County MIS Department, and the Atlanta Regional Commission that contributed time and effort by providing information and guidance. Other organizations that contributed to this plan include the South River Watershed Alliance, the Rockdale County Commission, the Rockdale County Environmental Health Department, the Henry County Stormwater Department, the Henry County Environmental Health Department, and the University of Georgia Cooperative Extension.

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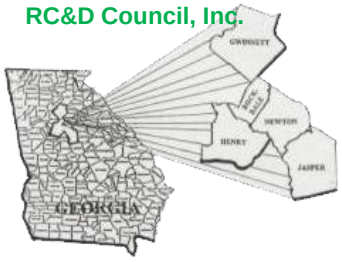

The preparation of this document was financed in part through a grant from the U.S. Environmental Protection Agency under the provisions of Section 319(h) of the Federal Water Pollution Control Act, as amended.

Project Background and Objectives

The South River, along with several of its tributaries, was found to be impaired because of a failure to meet water quality standards for fecal coliform bacteria. Following development of a Total Maximum Daily Load (TMDL) for Fecal Coliform by the Georgia Environmental Protection Division (Georgia EPD) for the South River basin in 2002, a TMDL Implementation Plan for the portion of the basin contained within Hydrologic Unit Code (HUC) 0307010301 was completed in 2003 by the Atlanta Regional Commission (ARC). An updated TMDL for Fecal Coliform for the entire Ocmulgee River Basin (which includes HUC 0307010301) was completed by the Georgia EPD in 2007.

The Upper Ocmulgee River Resource Conservation & Development Council (RC&D) applied for, and received a 319(h) grant from the Georgia EPD to update the Fecal Coliform Bacteria TMDL Implementation Plan for HUC 0307010301. Rather than simply updating the Implementation Plan, the RC&D has developed this Watershed Improvement Plan (WIP). The WIP includes not only a discussion of actions to bring the streams in the basin into compliance with water quality standards for fecal coliform, but also discusses ways to improve the quality of the streams in other areas of concern identified by stakeholders within the basin. The development of this WIP also addresses the nine minimum elements EPA has identified as critical for achieving improvements in water quality. These nine elements are:

1. Identification of causes of impairment
2. An estimate of the load reductions expected from management measures
3. A description of the nonpoint source management measures that will need to be implemented to achieve the load reductions
4. Estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement this plan
5. An information and education component used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the nonpoint source management measures that will be implemented
6. Schedule for implementing the nonpoint source management measures identified in this plan
7. A description of interim measurable milestones for determining whether nonpoint source management measures or other control actions are being implemented

8. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards
9. A monitoring component to evaluate the effectiveness of the implementation efforts over time.

1.0 Watershed Overview - South River Basin Description

1.1 South River

Depending on what map you look at or what report you read, the South River either begins in East Point near Norman Berry Drive or it originates in the City of Atlanta near University Avenue with a watershed reaching up to just north of I-20. In 2008 the City of Atlanta completed a Watershed Improvement Plan (WIP) for the watershed of this northern stream which is sometimes called the North Fork - South River. In that WIP Atlanta designated the stream as McDaniel Branch, a tributary of the South River. In order to be consistent with that WIP, this project shall also consider McDaniel Branch as a tributary and the South River shall be considered to begin in East Point. In East Point where the river first emerges from underground, it is milky white in color (see photo) as a result of leachate from a long closed cotton processing plant. The cotton plant site has been designated as a class 1 hazardous waste site. It is not known when funds will become available to begin clean-up of this site.

From East Point the river flows approximately 58 miles to Jackson Lake where it joins with the Alcovy and Yellow rivers to form the Ocmulgee River. The basin includes portions of Fulton, Clayton, Henry, Rockdale, and Newton counties. The HUC covered by this WIP (HUC 0307010301) covers the upper portion of the basin from East Point to the GA Hwy 20 Bridge.

As the river flows north and east from its origin, it passes through residential neighborhoods as well as commercial areas before it is joined by McDaniel Branch just south of Lakewood Park. From there it continues in an easterly direction through park areas (Swann Preserve, Browns Mill Golf Course, Sugar Creek Golf Course, Panola Mountain State Park, etc.), industrial areas, and more residential neighborhoods before entering generally rural lands in eastern Dekalb, Rockdale, Henry, and Newton Counties.

1.2 Tributaries

Within HUC 0307010301 there are approximately 60 tributaries to the South River. These tributaries vary in length from less than a mile to roughly 18 miles. The drainage basins of these tributaries include land uses that range from industrial to agricultural. Detailed information regarding 11 of these tributaries is provided below in the discussion of impaired streams.

Honey Creek below Susong Rd

1.3 NPDES Discharges

Atlanta East Area CSOs - GA0037168

The one NPDES combined sewer overflow (CSO) permit in the HUC is held by Atlanta for its East Area CSOs. The permit covers discharges from two (CSO) facilities: the Custer Ave. CSO (located at 780 Custer Ave.) and the Intrenchment Creek Water Quality Control Facility (WQCF) CSO (located at 1510 Key Rd.). The Intrenchment Creek WQCF CSO is located on the same property as the Intrenchment Creek Water Reclamation Center (WRC). Normal sewage flow up to 20 million gallons per day (MGD) is piped from the Custer Ave. CSO to the Intrenchment Creek WRC where it receives preliminary treatment before being pumped to the South River WRC. The wastewater receives additional treatment at the South River WRC and is then discharged to the Chattahoochee River.

When a rain event occurs and flow at the Custer Ave CSO exceeds 20 MGD, treatment of the excess flow, first at the Custer Ave CSO facility and then at the Intrenchment Creek CSO facility is initiated. At Custer Ave the additional water passes through coarse and fine screening, filtration, and dechlorination before being discharged into the East Storage Tunnel which runs from the Custer Ave site to the Intrenchment Creek CSO site. Pumps at the Intrenchment Creek site lift the water from the tunnel to the WQCF treatment facility. Processes at the facility include vortex separators for grit removal, flocculation/sedimentation, and disinfection with sodium hypochlorite. Following this treatment train, the water is discharged from the CSO to Intrenchment Creek. This discharge is located a short distance upstream of Key Road.

Under most circumstances the only CSO discharge is from the Intrenchment Creek facility. However, there are two scenarios which can lead to a discharge from the Custer Ave CSO as well. One of these scenarios would occur if the tunnel completely filled up (it holds 44 MGD). At that point the gate to the tunnel at the Custer Ave facility would close and the additional treated water would be discharged to Intrenchment

Creek. The other scenario which could lead to a discharge at the Custer Ave CSO would occur anytime the influent flow rate exceeds 50 MGD. Flow in excess of 50 MGD is discharged into Intrenchment Creek. In either case, the water would have received coarse and fine screening, filtration, chlorination and de-chlorination before being discharged.

DeKalb County Snapfinger Creek Water Pollution Control Plant (WPCP) –GA0024147 and Pole Bridge WPCP – GA0026816

The Snapfinger WPCP is located off of Flakes Mill Road. It is permitted to discharge a monthly average of 36 MGD. The permit limit for fecal coliform bacteria is set at a monthly average geometric mean of 200 counts per 100 ml (#/100ml). The annual average for the effluent fecal coliform has actually been under 20 (#/100ml). The wastewater from this plant is discharged to the South River upstream of the mouth of Snapfinger Creek.

The Pole Bridge WPCP is located on Flat Bridge Road. Its permitted monthly discharge is 20 MGD. The limit for fecal coliform is the same as at the Snapfinger WPCP. The performance of the plant regarding fecal coliform is comparable to that of the Snapfinger WPCP with the annual average under 20 (#/100ml). The plant discharges to the South River a short distance upstream of where Pole Bridge Creek empties into the South River.

Rockdale County Honey Creek WPCP – GA0022659

The Honey Creek WPCP discharges to McClain Branch (aka McClane Creek) near Troupe Smith Rd. The monthly average permitted flow for this plant is 0.3 MGD. This plant is considered a “minor” facility since it discharges less than 1.0 MGD. The permit limit for fecal coliform bacteria is set at a monthly average geometric mean of 200 (#/100ml).

1.4 Water Quality Data

As a preliminary step in the development of this WIP, water quality samples were collected from the South River and all of the impaired tributaries using the Georgia Adopt-A-Stream (AAS) protocols to see if the data would show any “hot spots” (i.e., areas where bacteria levels consistently above the AAS threshold of concern might indicate the presence of an illegal discharge, failing septic system, etc.). With the help of volunteers from the South River Watershed Alliance, 26 sites were sampled once per month with a minimum of six samples collected per site. The sample sites are shown in Figure 1. A list of the sites, including their AAS ID, is presented in Table 1.

Figure 1: Stream Sampling Sites

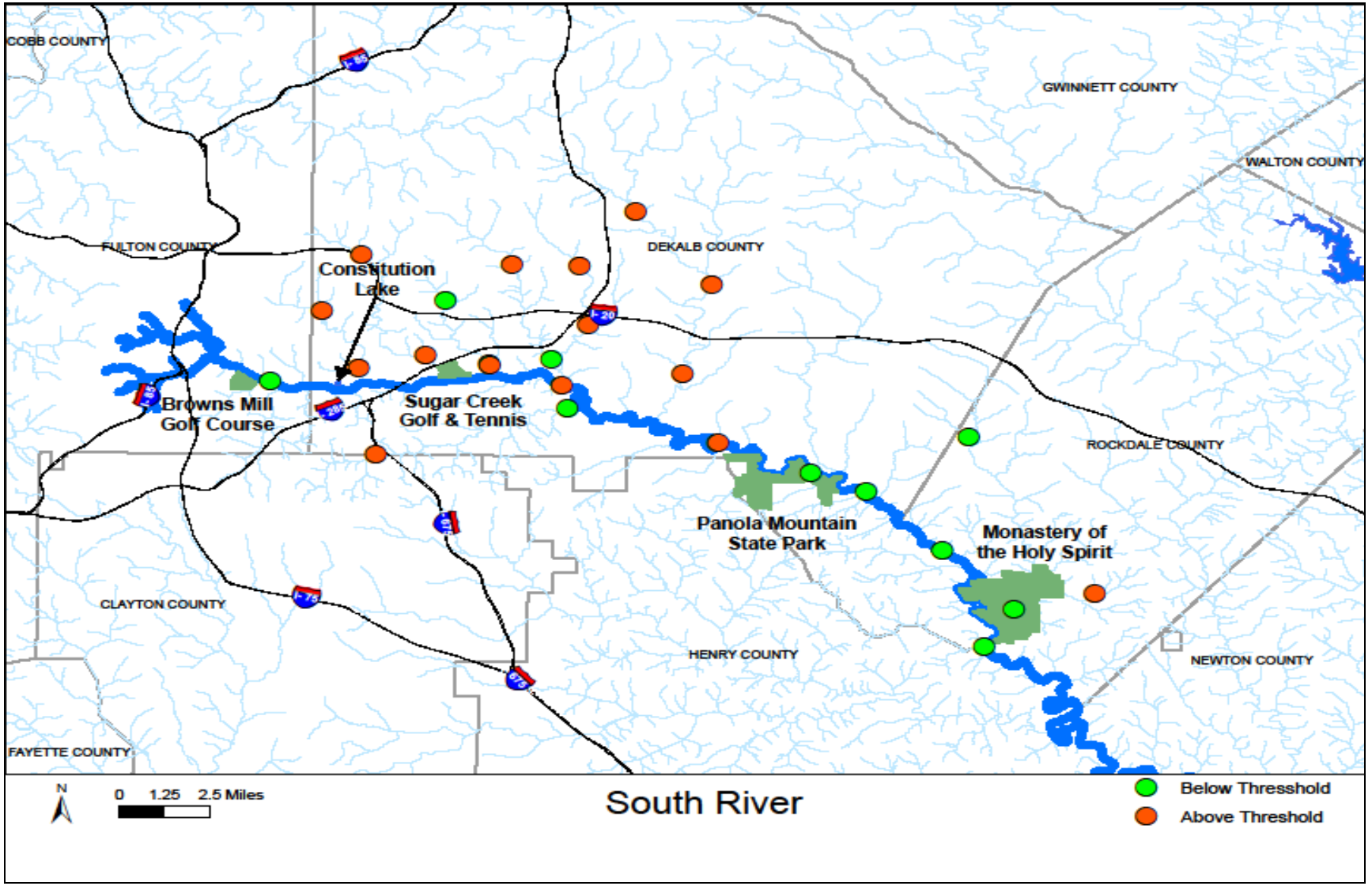

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Table 1 South River Basin Sample Sites

Sample Location	AAS ID
Cobbs Creek @ Glenwood Rd.	S-2636
Cobbs Creek @ Rainbow Dr.	S-2637
Conley Creek @ River Rd.	S-2627
Conley Creek @ E. Conley Rd.	S-2738
Doless Creek near mouth	S-2746
Doolittle Creek @ Tilson Rd.	S-2638
Doolittle Creek @ Clifton Springs Rd	S-2747
Honey Creek @ Woodlands Cemetery Rd.	S-2631
Honey Creek @ Klondike Rd. SW	S-2659
Intrenchment Creek @ Custer Ave.	S-2639
Intrenchment Creek @ Constitution Rd.	S-2640
McClain Branch - Honey Cr. Golf Course near 16th green	S-2737
Shoal Creek @ Glenwood Rd.	S-2632
Shoal Creek @ Columbia Dr.	S-2641
Snapfinger Creek @ Snapfinger Rd.	S-2626
Snapfinger Creek @ Redan RD.	S-2642
Snapfinger Creek @ Covington Hwy	S-2643
South River @ Flat Bridge	S-2629
South River @ Waldrop Rd	S-2644
South River @ Klondike Rd.	S-2645
South River @ Panola Shoals	S-2647
South River @ Oglesby Bridge Rd.	S-2744
South River @ GA Hwy 138	S-2745
South River @ Jonesboro Rd.	S-2749
Sugar Creek @ Clifton Church Rd.	S-2628
Sugar Creek Trib @ Memorial Park	S-2748

While high bacteria counts were found throughout the basin, especially following a rain event, the majority of the samples had bacteria counts within the acceptable range (i.e., no “hot spots” were found). All of the data collected during this study can be seen at the “Adopt-A-Stream” website (www.georgiaadoptastream.com/db/) using the site IDs listed above.

In addition to the data collected for this project, a large volume of water quality data is available for the South River and its tributaries that has been collected over the years by Clayton County, DeKalb County, Rockdale County, the City of Atlanta, the Georgia EPD, and several AAS volunteer groups. The data from the various sites span different years depending on the purpose for which they were collected. Aside from data from the main stem of the South River, data is also available from Shoal Creek, Cobbs Creek, Conley Creek, Intrenchment Creek, Sugar Creek, Doolittle Creek, Snapfinger Creek, Barbershela Creek, Pole Bridge Creek, and Honey Creek. The volume of data is too large to include in this report but can be obtained from the AAS web site and from the governments listed above. While not all of the data collected can be used to measure compliance with stream standards it is sufficient to say that the

data which can be used to assess compliance with stream standards has continued to show water quality standard violations on the streams included on the 303(d) list.

1.5 Land Use

As mentioned earlier, land use within the HUC runs the gamut from industrial to rural/agricultural. The Atlanta Regional Commission (ARC) maintains GIS coverages of the land uses within its district, which includes this HUC. Figure 2 shows the land use coverage for HUC 0307010301. Tables 2 - 7 provide a breakdown by county of the land use types.

Figure 2: Land Use in the South River Basin – HUC 0307010301

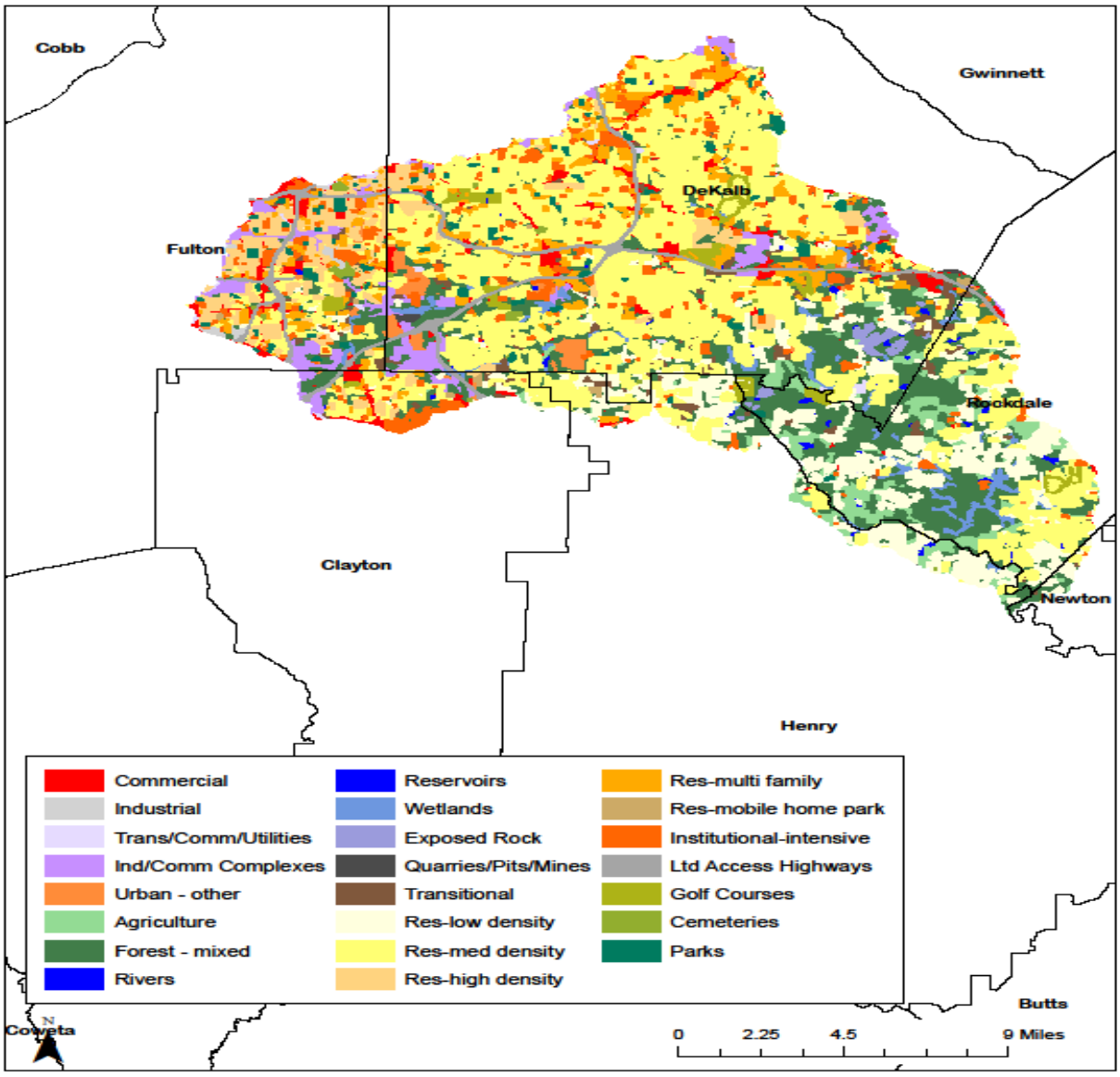

Table 2: Clayton County Land Use

Clayton County		
Land Use Category	**Acres**	**Percent**
Agriculture	72	1%
Cemeteries	8	0%
Commercial	658	10%
Forest	1409	21%
Golf Courses	38	1%
Industrial/Commercial	700	11%
Institutional	623	9%
Limited Access Roadway	138	2%
Residential High Density	309	5%
Residential Low Density	347	5%
Residential Medium Density	1849	28%
Residential Mobile Home	54	1%
Residential - multi family	124	2%
Reservoirs	15	0%
TCU (Transportation/Communication/Utility)	24	0%
Transitional	149	2%
Urban - Other	90	1%
Wetlands	16	0%
Total	6624	100%

Table 3: DeKalb County Land Use

DeKalb County				
Land Use Category		**Acres**		**Percent**
Agriculture		1280		1%
Cemeteries		212		0%
Commercial		5245		6%
Exposed Rock		491		1%
Forest		15,119		17%
Golf Courses		1011		1%
Industrial		44		0%
Industrial/Commercial		3495		4%
Institutional		3376		4%
Limited Access Roadway		1435		2%
Parks		1071		1%
Quarries		97		0%
Residential High Density		1942		2%
Residential Low Density		3185		4%
Residential Medium Density		40,689		45%
Residential Mobile Home		55		0%
Residential - multi family		4811		5%
Reservoirs		416		0%
TCU (Transportation/Communication/Utility)		425		0%
Transitional		2163		2%
Urban - Other		2009		2%
Wetlands		1025		1%
Total		89,595		100%

Table 4: Fulton County Land Use

Fulton County		
Land Use Category	**Acres**	**Percent**
Agriculture	0	0%
Cemeteries	174	1%
Commercial	2184	11%
Forest	1851	10%
Golf Courses	170	1%
Industrial	447	2%
Industrial/Commercial	2229	12%
Institutional	1118	6%
Limited Access Roadway	741	4%
Parks	482	3%
Residential High Density	4597	24%
Residential Low Density	340	2%
Residential Medium Density	2500	13%
Residential Mobile Home	33	0%
Residential - multi family	1128	6%
Reservoirs	10	0%
TCU (Transportation/Communication/Utility)	239	1%
Transitional	497	3%
Urban Other	278	1%
Wetlands	100	1%
Total	19,118	100%

Table 5: Henry County Land Use

Henry County				
Land Use		**Acres**		**Percent**
Agriculture		1281		12%
Cemeteries		3		0%
Commercial		138		1%
Exposed Rock		7		0%
Forest		2181		21%
Golf Courses		69		1%
Institutional		93		1%
Parks		11		0%
Residential High Density		15		0%
Residential Low Density		3959		38%
Residential Medium Density		2159		21%
Residential Mobile Home		48		0%
Residential - multi family		60		1%
Reservoirs		72		1%
Transitional		293		3%
Urban - Other		4		0%
Wetlands		87		1%
Total		10,482		100%

Table 6: Newton County Land Use

Newton County				
Land Use Category		**Acres**		**Percent**
Agriculture		66		8%
Commercial		1		0%
Forest		378		46%
Institutional		2		0%
Residential Low Density		286		35%
Residential Medium Density		66		8%
Transitional		19		2%
Total		818		100%

Table 7: Rockdale County Land Use

Rockdale County		
Land Use Category	**Acres**	**Percent**
Agriculture	4754	15%
Cemeteries	4	0%
Commercial	313	1%
Exposed Rock	92	0%
Forest	12,209	38%
Golf Courses	402	1%
Industrial/Commercial	26	0%
Institutional	319	1%
Limited Access Roadway	63	0%
Parks	54	0%
Residential Low Density	6727	21%
Residential Medium Density	5880	18%
Residential - multi family	44	0%
Reservoirs	263	1%
TCU (Transportation/Communication/Utility)	27	0%
Transitional	400	1%
Urban – Other	68	0%
Wetlands	896	3%
Total	32,541	100%

1.6 Water Quality Standards and Impairments within HUC 0301070301

1.6.1 Standards

All of the streams within the South River basin are classified by the Georgia EPD as "fishing." Each stream classification has standards for certain water quality parameters. If those standards are not met, the stream is deemed to be impaired. The stream standard for fecal coliform bacteria for "fishing" streams is as follows:

Summer = 200 counts (as a 30-day geometric mean)/100mL

Winter = 1,000 counts (as a 30-day geometric mean)/100mL

Winter = 4,000 counts (instantaneous)/100 mL

In the case of the South River basin, water samples showed that the river, from its headwaters to Jackson Lake, and 11 of its tributaries between the headwaters and Georgia Hwy 20, do not meet water quality standards for fecal coliform bacteria.

1.6.2 Segments Not Meeting Bacteria Standards - South River & Tributaries

In defining the fecal coliform bacteria TMDL for this HUC, the South River is divided into 3 (or 4 if you count McDaniel Branch as the river and not a tributary) impaired segments: Atlanta to Flakes Mill Road, Flakes Mill Road to Pole Bridge Creek, and Pole Bridge Creek to Hwy 20. The impaired tributaries (in alphabetical order) are Cobbs Creek, Conley Creek, Doless Creek, Doolittle Creek, Honey Creek, Intrenchment Creek, McClain Branch (aka McClane Creek), McDaniel Branch (aka North Fork-South River), Shoal Creek, Snapfinger Creek, and Sugar Creek. The majority of these tributaries and their drainage basins are located either entirely or mostly in DeKalb County. The exceptions are: McDaniel Branch which is in Fulton County, McClain Branch which is in Rockdale County, and Honey Creek which originates in DeKalb but is located mostly in Rockdale County.

Location, stream length, and drainage basin area information for all of the bacteria impaired segments within HUC 0307010301 are shown in Table 8. Maps of these streams are shown in Figures 2-15.

Table 8: Impaired Stream Segments in HUC 0301070301

Stream Segment	Location	Stream Length (miles)	Area (acres)
Cobbs Creek	Headwaters to Shoal Creek	7	6,398
Conley Creek	Headwaters to South River	9	9,857
Doless Creek	Headwaters to Doolittle Creek	2	1,242
Doolittle Creek	Headwaters to South River	5	4,776
Honey Creek	Headwaters to South River	13	18,050
Intrenchment Creek	Headwaters to South River	6	7,241
McClain Branch (McClane Creek)	Headwaters to Honey Creek	2	2,622
Shoal Creek	Headwaters to South River	7	5,324
Snapfinger Creek	DeKalb County	18	24,622
McDaniel Branch (North Fork - South River)	Atlanta (Fulton County)	3	3,666
South River	Atlanta to Flakes Mill Road	16	65,108
South River	Flakes Mill Road to Pole Bridge Creek	9	116,867
South River	Pole Bridge Creek to Hwy 20	15	159,229
Sugar Creek	u/s Memorial Driver to South River	6	5,673

Figure 3: Cobbs Creek

Figure 4: Conley Creek

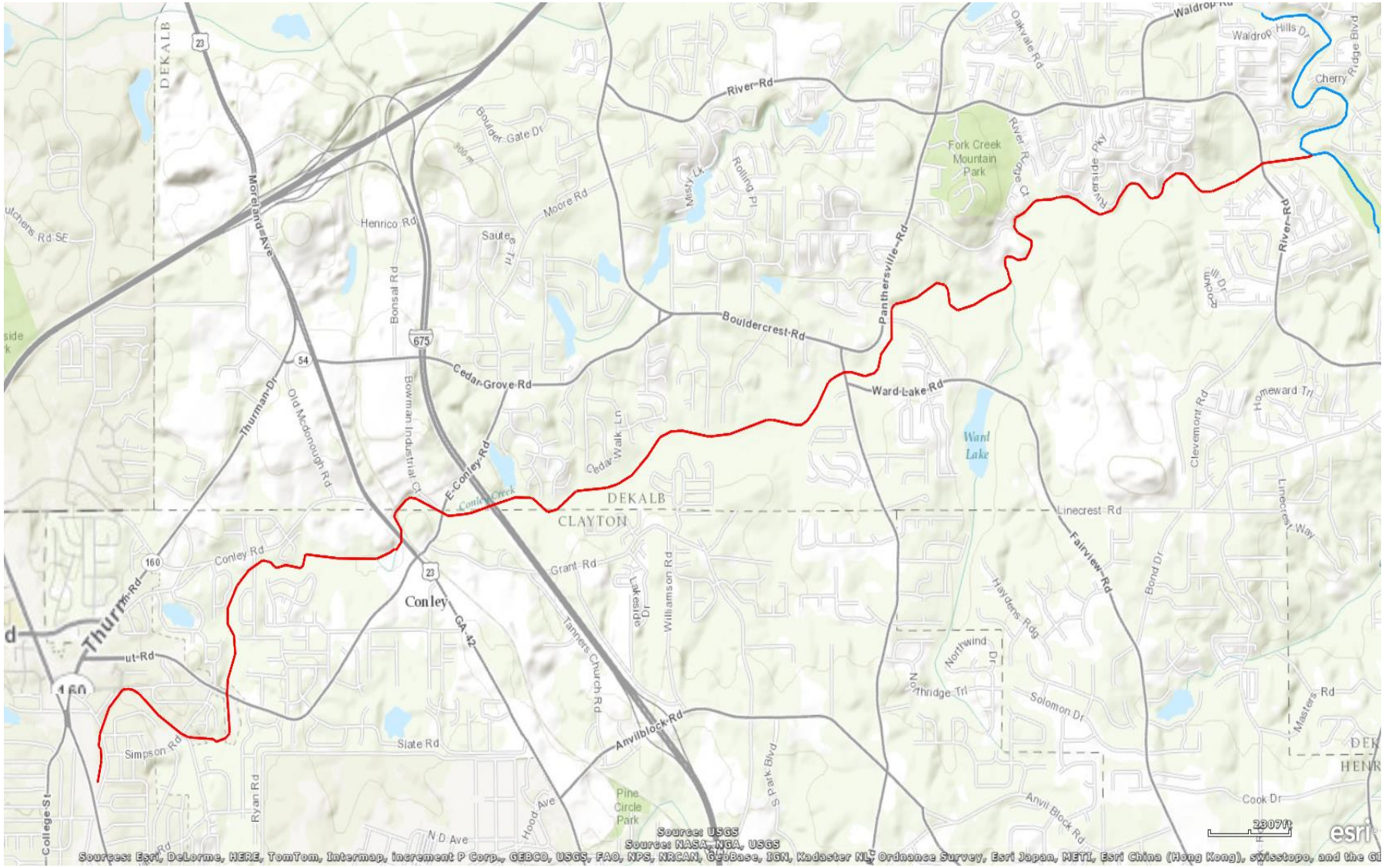

Figure 5: Doless Creek

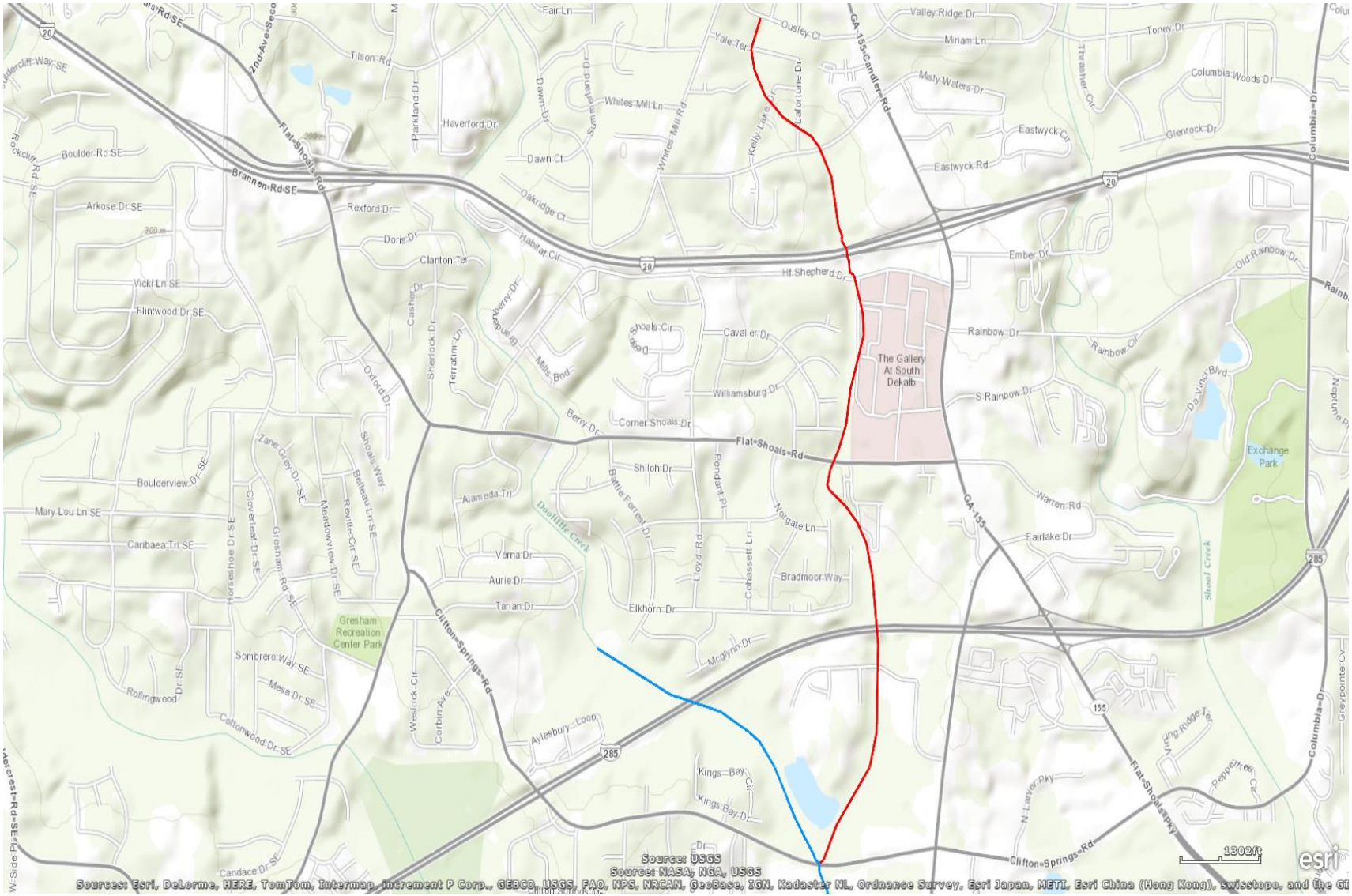

Figure 6: Doolittle Creek

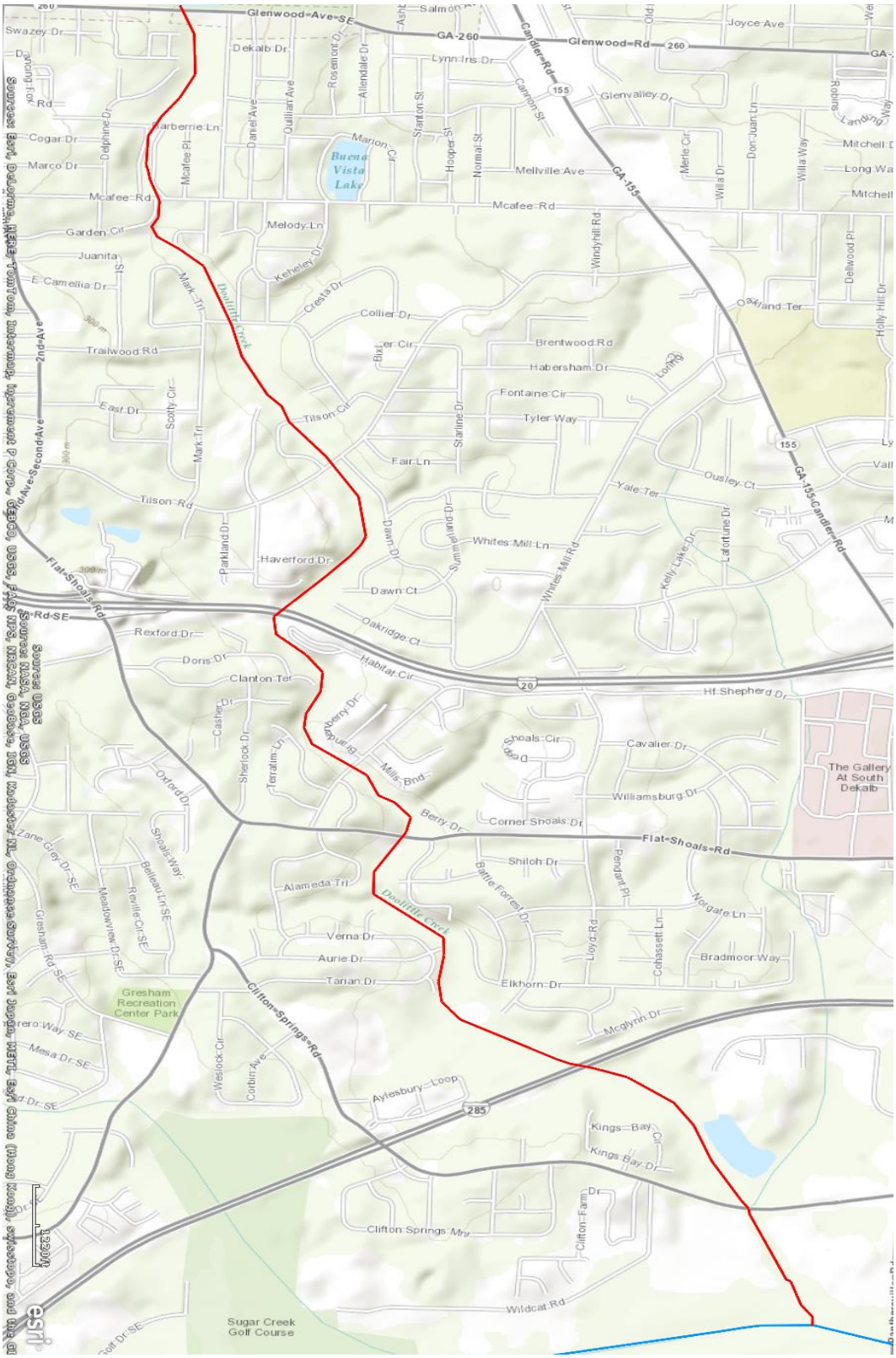

Figure 7: Honey Creek

Figure 8: Intrenchment Creek

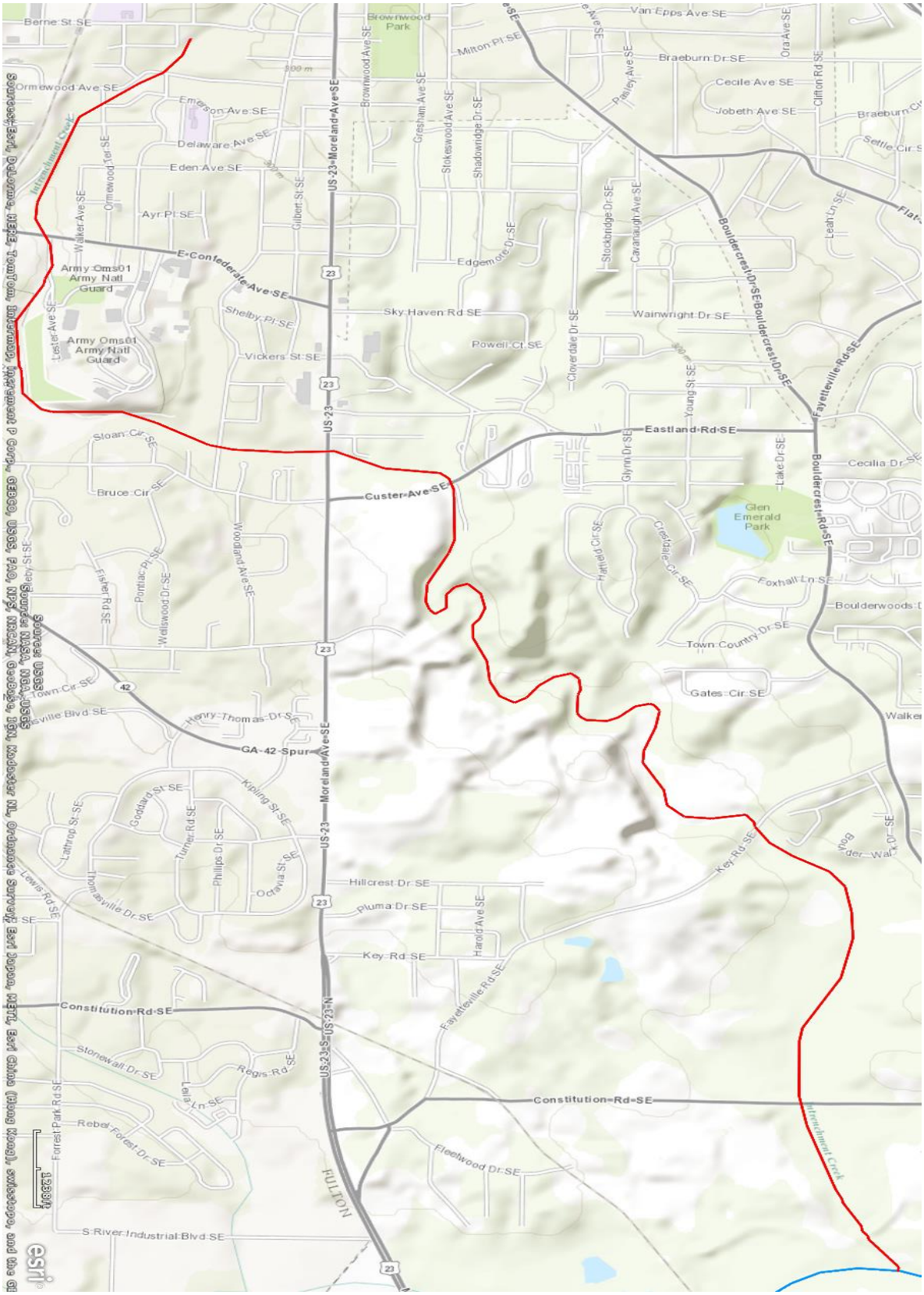

Figure 9: McClain Branch

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Figure 10: Shoal Creek

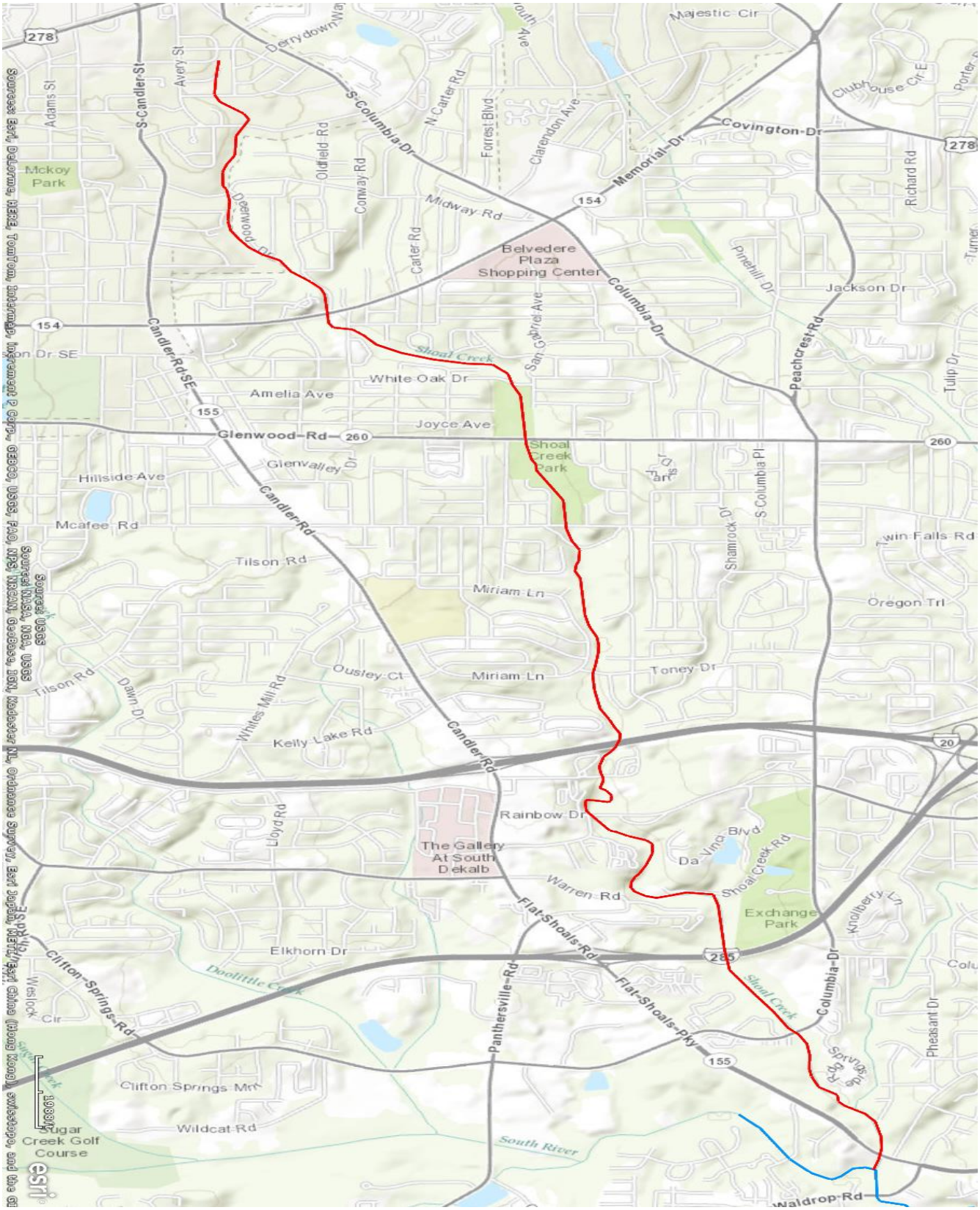


Figure 11: Snapfinger Creek

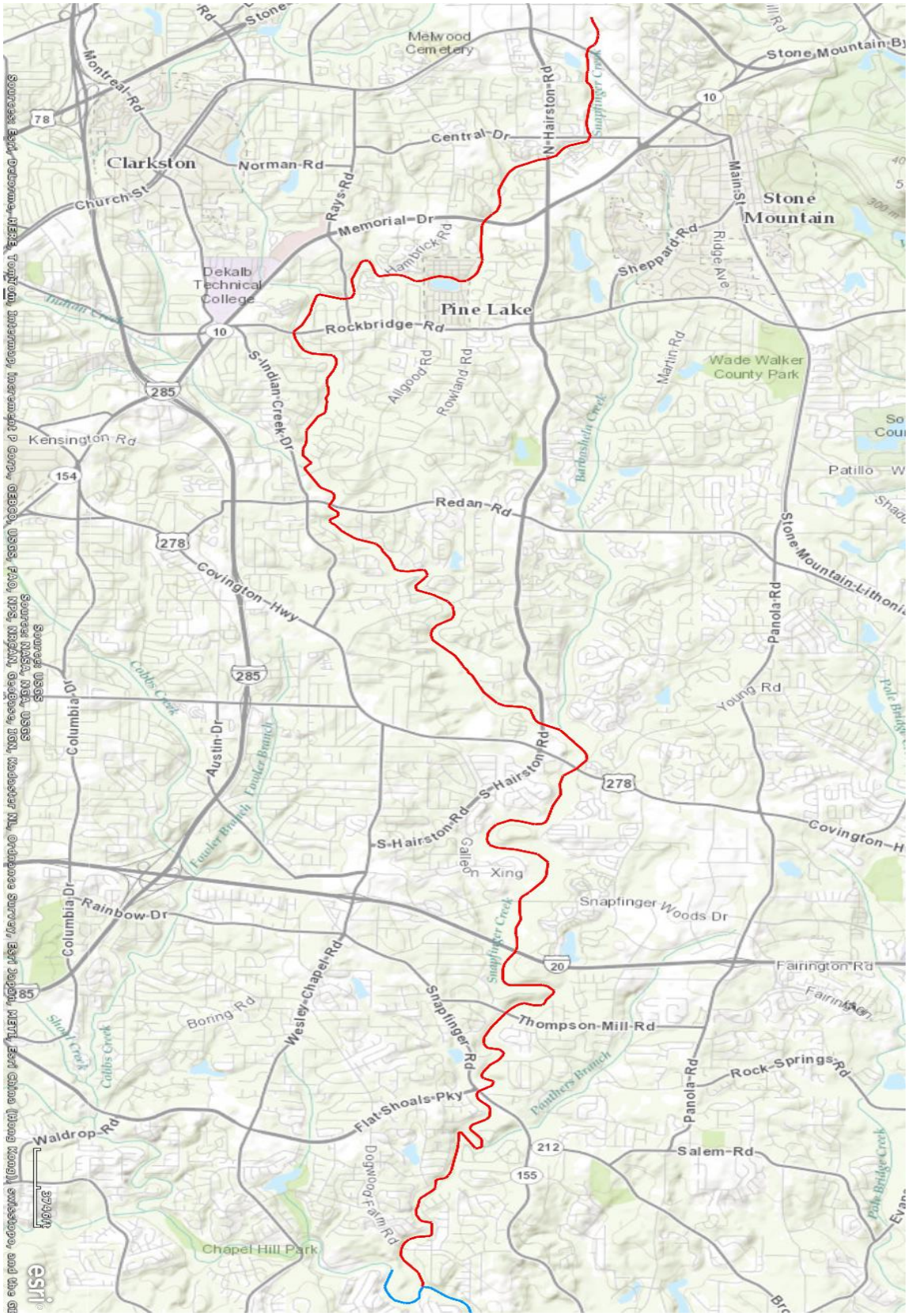


Figure 12: McDaniel Branch / South River – North Branch

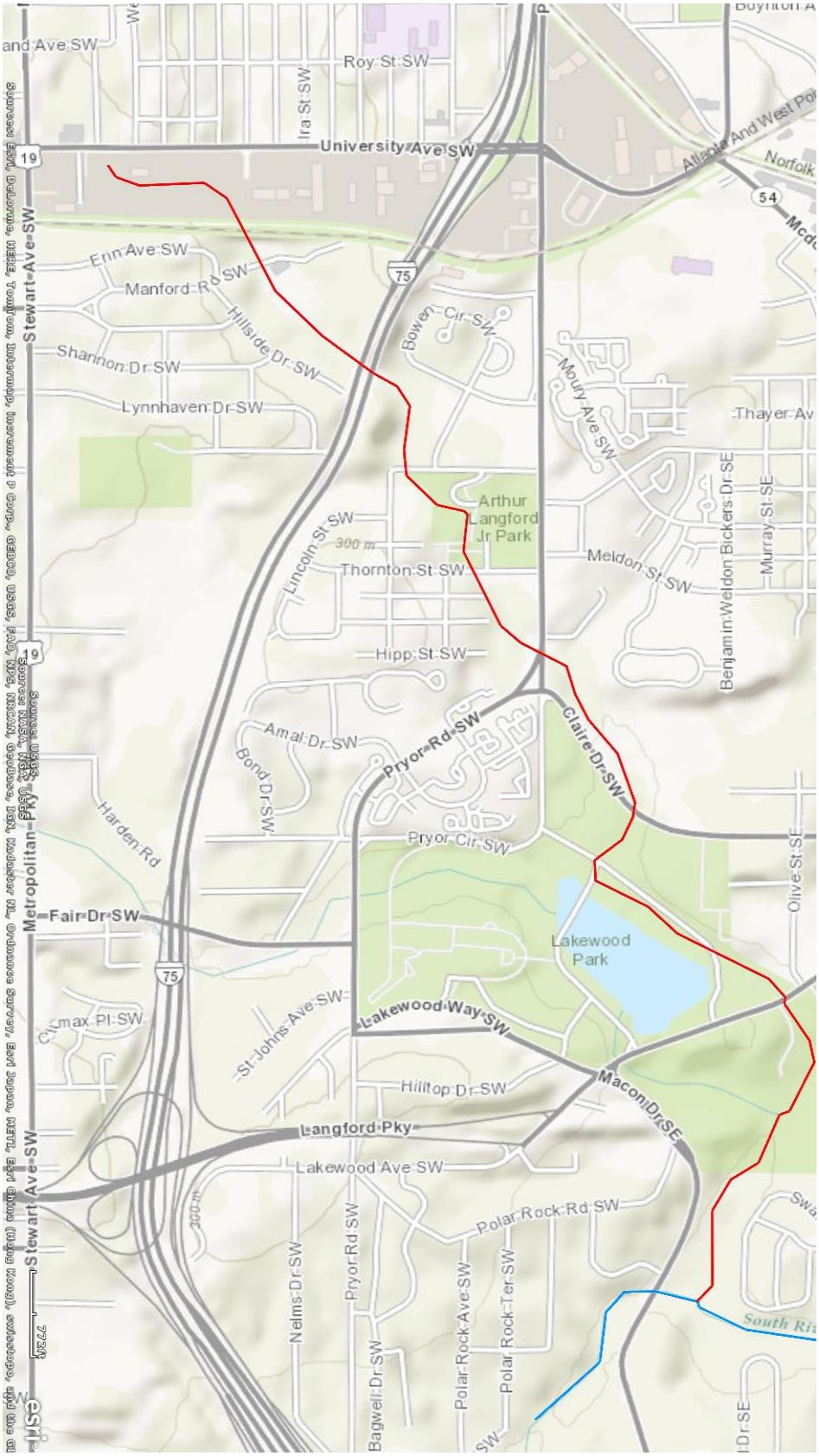


Figure 13: South River – Atlanta to Flakes Mill Rd

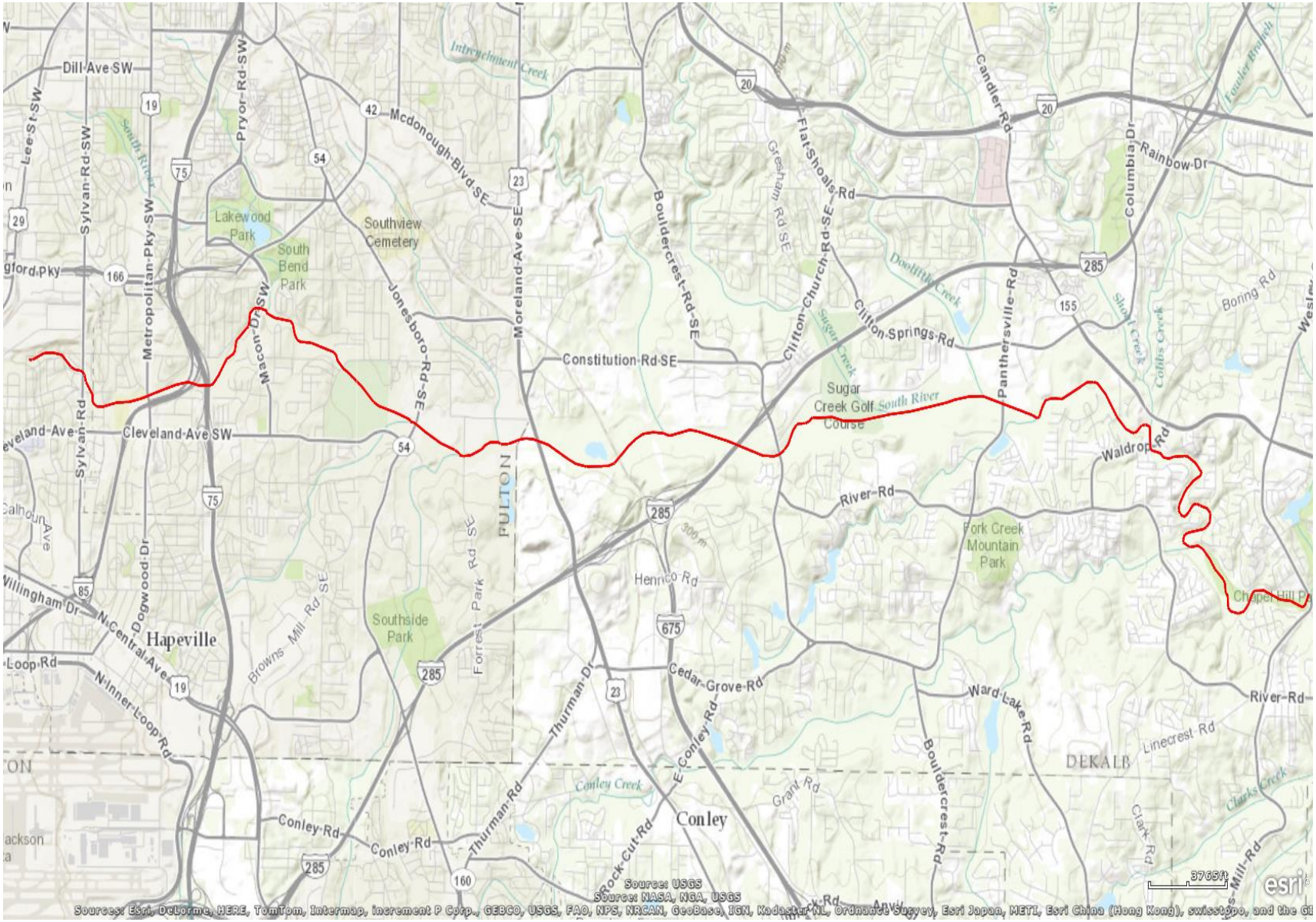


Figure 14: South River – Flakes Mill Rd to Pole Bridge Creek

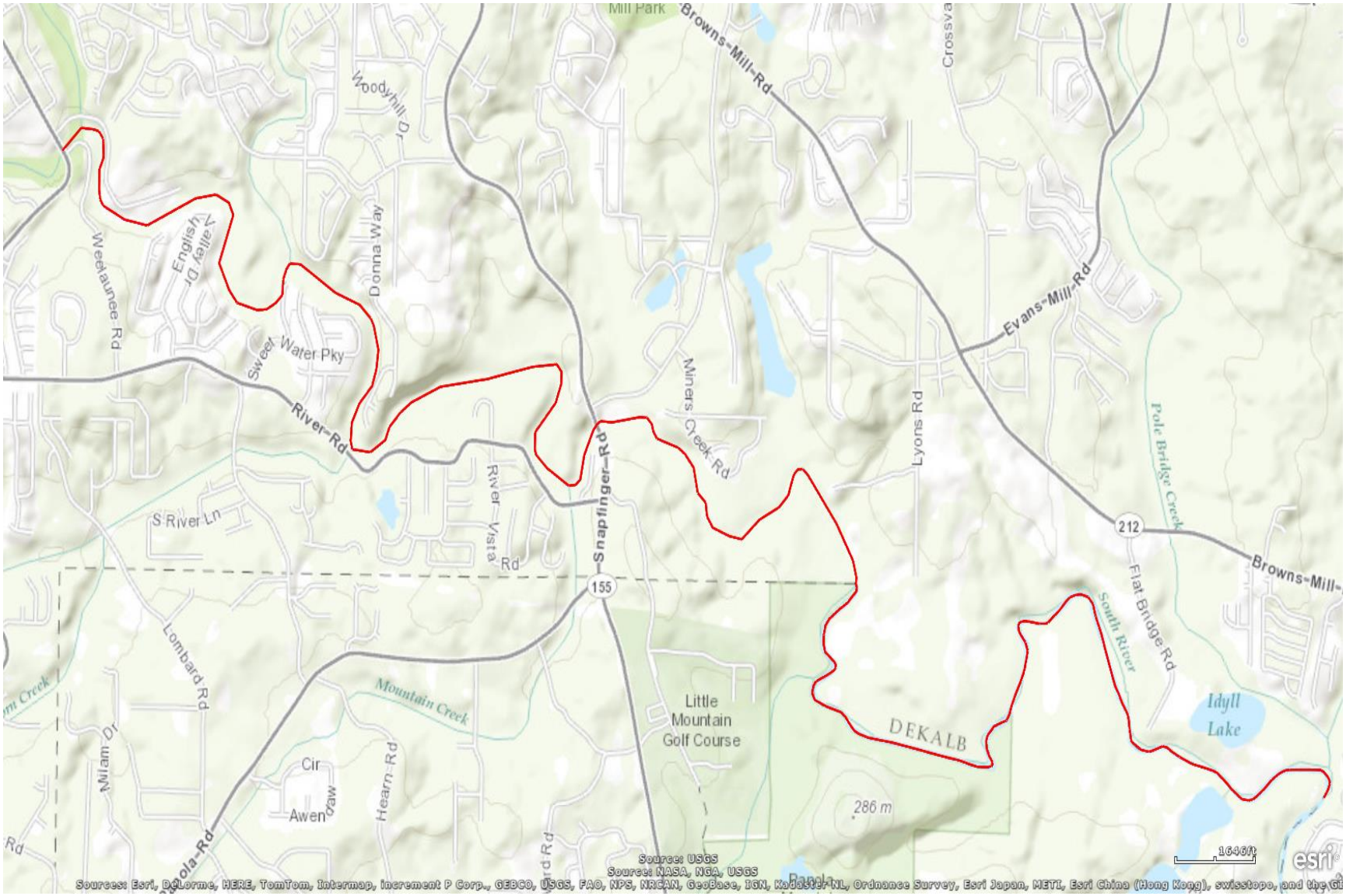


Figure 15: South River – Pole Bridge Creek to GA Hwy 20

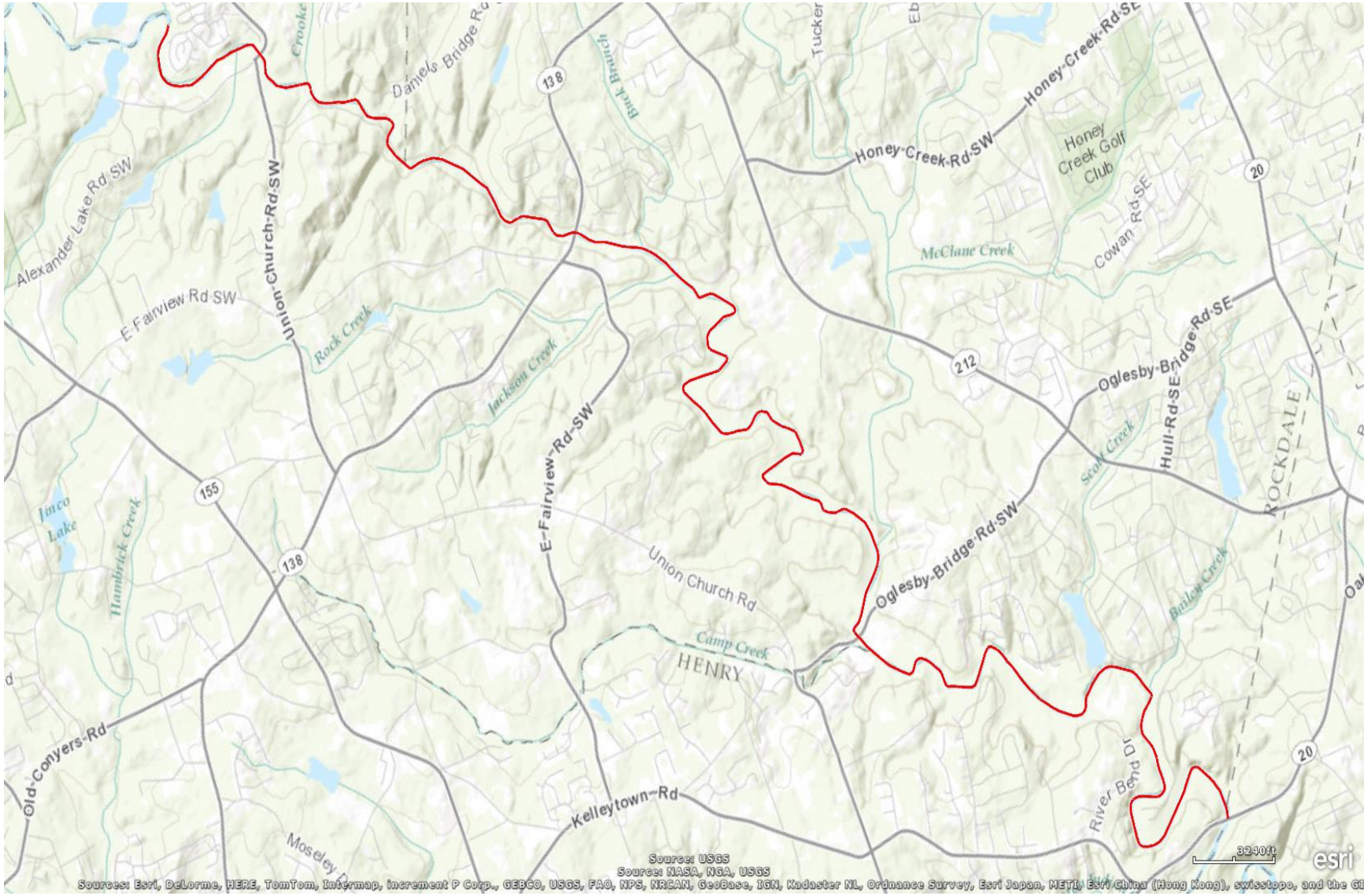
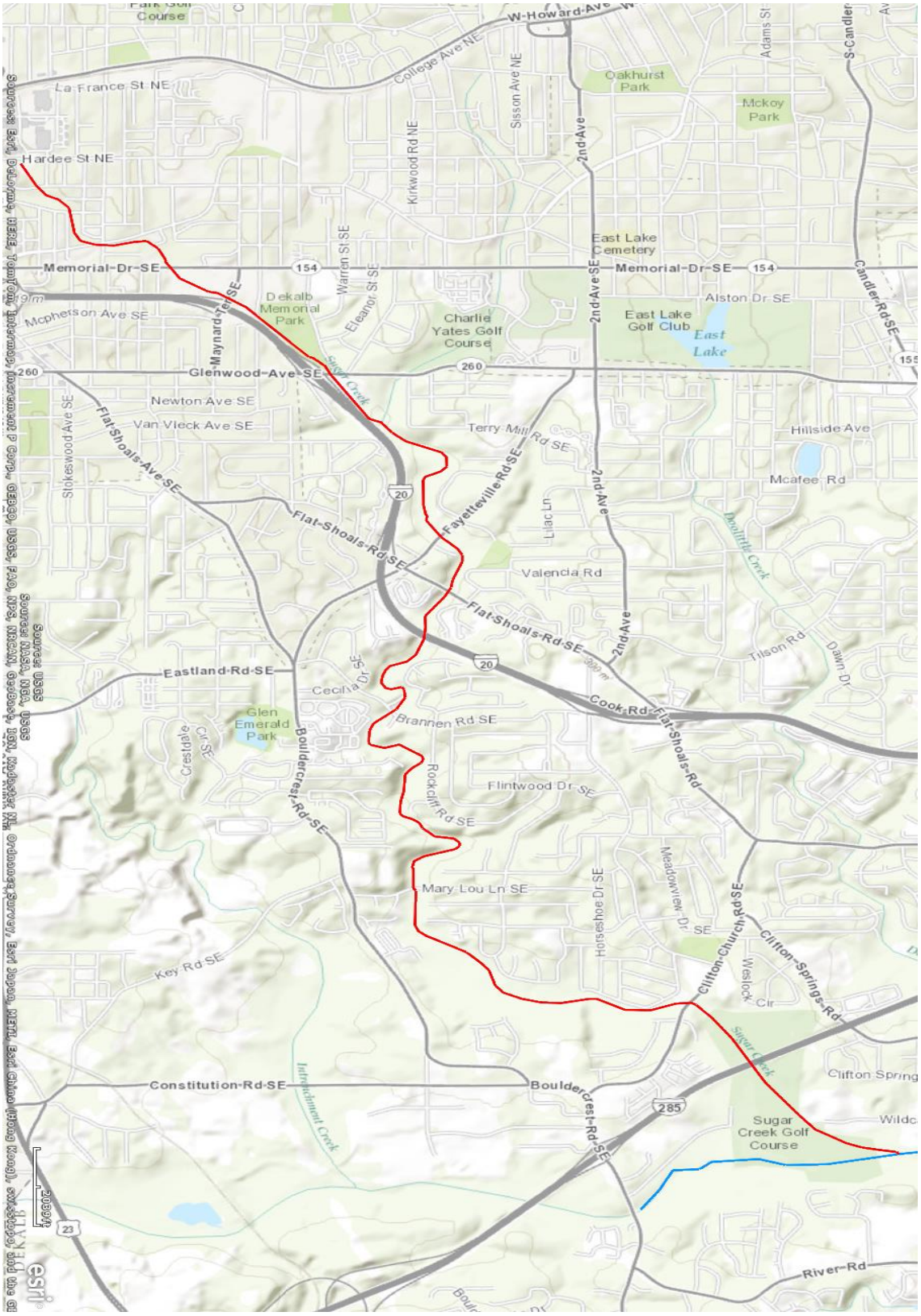


Figure 16: Sugar Creek



2.0 Watershed Improvement Goals

2.1 TMDL Fecal Coliform Load Reduction Definitions

When a stream segment is found to be impaired, the Clean Water Act requires that a total maximum daily load (TMDL) be developed for that impaired stream segment. A TMDL is the amount of a pollutant that can be assimilated by the receiving water body without exceeding the applicable water quality standard. The TMDL is calculated as the sum of the individual waste load allocations (WLAs) from point sources, load allocations (LAs) for nonpoint sources as well as natural background (defined in 40 CFR 130.2) for a given water body, and a margin of safety (MOS) that accounts for the uncertainty in the relationship between pollutant loads and the water quality responses of the receiving water body. Thus, a TMDL is expressed as:

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

For fecal coliform bacteria, TMDLs are expressed as counts per 100 ml (#/100ml) as a geometric mean calculated for a 30 day time period. For this project, the water quality standard for which the TMDL is calculated is the seasonal fecal coliform standards defined earlier.

2.1.1 Wasteload Allocations

The wasteload allocation element of the TMDL calculation includes both the WLA for each wastewater treatment plant discharge and the WLA_{SW} for permitted municipal separate storm sewer systems (MS4s). While the WLA for the three treatment plant discharges is defined in their permits, the wasteload allocations from storm water discharges associated with MS4s are estimated based on the percentage of urban area in each watershed covered by the MS4 storm water permit. It is assumed that approximately 70 percent of storm water runoff from the regulated urban area is collected by the municipal separate storm sewer systems since the portion of storm water in each watershed that goes directly to a permitted storm sewer and that which goes to a stream by other methods (non-permitted point sources, sheet flow, or agricultural runoff) is not clearly defined.

Phase I and Phase MS4s included in the WLA component of the TMDL for this basin are listed in Table 9.

Table 9: Phase I Permitted MS4s in HUC #0301070301

Name	Permit No.	Watershed
Atlanta	GAS000100	Ocmulgee, Flint, Chattahoochee
Avondale Estates	GAS000137	Ocmulgee, Chattahoochee
Clarkston	GAS000106	Ocmulgee, Chattahoochee
Clayton County	GAS000107	Ocmulgee, Flint
Decatur	GAS000110	Ocmulgee, Chattahoochee
DeKalb County	GAS000111	Ocmulgee, Chattahoochee
East Point	GAS000114	Ocmulgee, Flint, Chattahoochee
Forest Park	GAS000116	Ocmulgee, Flint, Chattahoochee
Fulton County	GAS000117	Ocmulgee, Flint, Chattahoochee, Coosa
Hapeville	GAS000119	Ocmulgee, Flint, Chattahoochee
Lithonia	GAS000124	Ocmulgee
Pine Lake	GAS000143	Ocmulgee
Stone Mountain	GAS000134	Ocmulgee

Table 10: Phase II Permitted MS4s in HUC #0301070301

Name	Watershed
Conyers	Ocmulgee
Rockdale County	Ocmulgee
Henry County	Ocmulgee, Flint

Table 11 identifies all of the watersheds within HUC #0301070201 that occur within Phase I or Phase II MS4 areas. It also provides the total area of each of these watersheds and the percentage of the watershed that is an MS4 area.

Table 11: Percentage of Watersheds Occurring in MS4 Areas

Name	Total Area (acres)	% in MS4 area
Cobbs Creek	6,398.0	100.0
Conley Creek	9,857.0	100.0
Doless Creek	1,242.0	100.0
Doolittle Creek	4,776.0	100.0
Honey Creek	18,050.0	79.7
Intrenchment Creek	7,241.0	100.0
McClain Branch	2,622.0	100.0
North Branch South River	3,666.0	100.0
Shoal Creek Headwaters to South River	5,324.0	100.0
Snapfinger Creek	24,622.0	100.0
South River Atlanta to Flakes Mill Road	65,108.0	100.0
South River Flakes Mill Road to Pole Bridge Cr	116,867.0	85.1
South River Pole Bridge Cr to Hwy 20	159,229.0	83.9
Sugar Creek u/s Memorial Drive to South River	5,673.0	100.0

2.1.2 Load Allocations

The load allocation (LA) 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 listed in 40 CFR 130.6 as follows:

- Residual waste;
- Land disposal;
- Agricultural and silvicultural;
- Mines;
- Construction;
- Saltwater intrusion; and urban storm water (non-permitted).

The LA is calculated as the remaining portion of the TMDL load available, after allocating the WLA and MOS, as shown below:

$$\sum LA = TMDL - (\sum WLA + \sum MOS)$$

2.1.3 Margin of Safety

The MOS is a required component of any TMDL development. It reflects the uncertainty of the load allocations. In this particular TMDL, the MOS is defined as 10% of the TMDL for the stream segment.

2.2 Total Fecal Coliform Load Calculations

The fecal coliform TMDL for the listed stream segments is based on the product of the applicable seasonal fecal coliform standard and the mean flow used to calculate the current critical load. It represents the sum of the allocated loads from point and nonpoint sources located within the immediate drainage area of the listed segment, the NPDES-permitted point discharges with recorded fecal coliform violations from the nearest upstream sub watersheds (there are none of these in the TMDLs for HUC #0301070301) and a margin of safety. The fecal load contributed by each of the treatment facilities to the WLA was the product of the fecal coliform permitted limit and the average monthly discharge at the time of the critical load. The critical loads and corresponding TMDLs, WLAs (WLA and WLA_{sw}), LAs, MOSs and percent load reductions for HUC #0301070301 per the 2007 TMDL are presented in the following table:

Table 12: Fecal Coliform Loads and Required Fecal Coliform Load Reductions

Stream Segment	Current Load (counts/ 30 days)	TMDL Components					Percent Reduction
		WLA (counts/ 30 days)	WLA_{SW} (counts/ 30 days)	LA (counts/ 30 days)	MOS (counts/ 30 days)	TMDL (counts/ 30 days)	
Cobbs Creek	1.80 E+13		1.05 E+12	3.00E+11	1.50 E+11	1.50 E+12	92
Conley Creek	6.89 E+12		1.20 E+12	3.44E+11	1.72 E+11	1.72 E+12	75
Doless Creek	9.24E+11		1.88E+10	5.36E+09	2.68E+09	2.68E+10	97
Doolittle Creek	2.25E+13		8.23E+11	2.35E+11	1.18E+11	1.18E+12	95
Honey Creek	2.45E+13		1.69E+12	1.02E+12	3.01E+11	3.01E+12	88
Intrenchment Creek	3.52E+12		1.19E+12	3.39E+11	1.69E+11	1.69E+12	52
McClain Branch	1.60E+12	6.83E+10	6.13E+11	1.07E+11	8.76E+10	8.76E+11	45
Shoal Creek – Headwaters to South River	6.13E+12		8.73E+11	2.49E+11	1.25E+11	1.25E+12	80
Snapfinger Creek	7.16E+13		4.03E+12	1.15E+12	5.76E+11	5.76E+12	92
South River – North Branch (McDaniel Branch)	No Data				No Data	No Data	No Data
South River – Atlanta to Flakes Mill Road	6.00E+14		1.07E+13	3.05E+12	1.52E+12	1.52E+13	97
South River – Flakes Mill Rd to Pole Bridge Creek	1.81E+14	5.97E+12	1.29E+13	6.42E+11	2.17E+12	2.17E+13	88
South River – Pole Bridge Creek to Hwy 20	3.12E+14	2.66E+12	3.11E+13	1.38E+13	5.29E+12	5.29E+13	83
Sugar Creek – u/s Memorial Drive to South River	4.22E+12		6.29E+11	1.98E+11	9.89E+10	9.89E+11	77

3.0 Causes of Impairment

In the 2003 TMDL Implementation Plan, the following were identified as the causes for the stream impairment:

- Urban runoff
- Septic tank system failures
- Animal waste
- Sanitary sewer overflows (SSOs)
- Illicit connections to the storm drains
- Custer Ave. combined sewer overflow (CSO)
- McDaniel Street CSO
- Atlanta's Intrenchment Creek Wastewater Reclamation Facility (WRF)
- DeKalb County's Snapfinger and Pole Bridge Water Pollution Control Plants (WPCPs)
- Rockdale County's Honey Creek WPCP

When the Fecal Coliform Bacteria TMDL was done by the Georgia EPD for the entire Upper Ocmulgee River basin in 2007, the causes for impairment (for the portion of the basin under consideration in this document) were ascertained to be much the same as in 2003. The list of impairment sources included expansion/clarification for some of the previously defined sources of pollution. The 2007 list is as follows:

- Urban development including:
  - Leaking sanitary sewer lines
  - Leaking septic systems
  - Landfills
- Wildlife:
  - Waterfowl (ducks and geese)
  - Raccoons
  - Beaver
  - Muskrats
  - River otters
  - Mink
  - Deer
- Agricultural livestock
  - Grazing areas
  - Access to streams
  - Land application of manure to pastureland & cropland
- CSOs
- Wastewater treatment facilities

Most of the causes for fecal bacteria impairment in the basin identified in 2003 and 2007 still exist. In the 2007 TMDL, estimates were provided of the number of septic systems and agricultural livestock populations in the basin. These are shown in Tables 13 and 14 respectively.

Table 13: Number of Septic Systems in the Ocmulgee River Basin

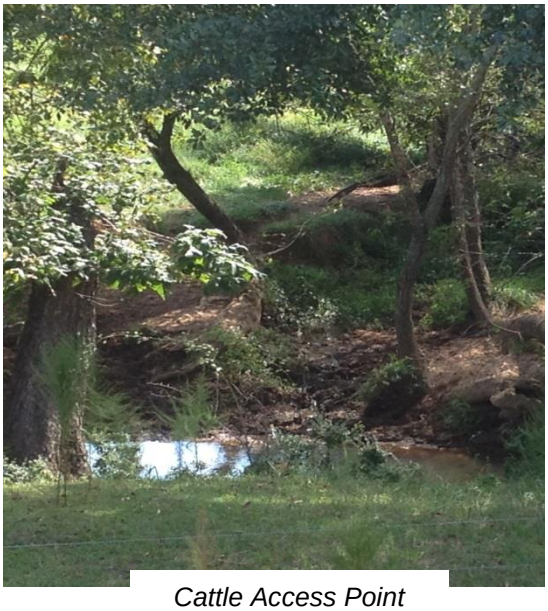
County	Existing Septic Systems (1990)	Existing Septic Systems (2004)	No. of Septic Systems Installed (1990 to 2004)
DeKalb	20,432	21,748	1,316
Henry	14,903	34,903	20,000
Rockdale	10,455	12,901	2,446

Table 14: Estimated Agricultural Livestock Populations in the Ocmulgee River Basin

County	Livestock								
	Beef Cattle	Dairy Cattle	Swine	Sheep	Horses	Goats	Chickens-Layers	Chickens-Broilers Sold	Chickens-Breeders
DeKalb	-	-	-	190	-	-	-	-	-
Henry	7,925	-	275	714	-	45	-	-	7,925
Rockdale	1,000	-	200	3,500	-	-	-	-	1,000

The wastewater treatment facilities referenced in the 2007 TMDL were discussed previously in the watershed overview. While these facilities do discharge fecal coliform bacteria, the level of treatment provided results in the effluent meeting or being below stream standards. Therefore, they do not contribute to the violations of bacteria standards.

The CSO discharge situation has changed since the TMDL was completed in January, 2007. The McDaniel St. basin storm and sanitary sewers were completely separated (work completed in August 2007) and what was previously the McDaniel Street CSO facility now provides screening for stormwater only. The storm and sanitary sewers in the Intrenchment Creek basin, however, were not completely separated and the CSO discharges remain at Custer Ave and Intrenchment Creek as discussed in the overview section of this report.



Cattle Access Point

All of that being said, the causes for fecal coliform impairment in the basin are:

- failing septic systems
- illicit connections to storm drains

- Sanitary Sewer Overflows (SSOs)
- CSOs,
- agricultural livestock,
- wildlife,
- urban runoff, and
- issues associated with extensive urban and commercial/industrial development done prior to a time when water quality concerns were considered in development ordinances.

4.0 Actions to Improve Water Quality

The actions that were identified in the previous TMDL and TMDL implementation plan:

- public education,
- enforcement of development and stormwater ordinances,
- reducing/eliminating stream access by livestock,
- sewer maintenance,
- elimination of cross connections,
- septic tank maintenance/repair/replacement/elimination,
- public involvement,
- elimination of SSOs,
- elimination of the CSOs, and
- stream bank stabilization and buffer restoration

remain valid steps to take to bring the streams into compliance. Most of them, to one degree or another, are being implemented by the city and county governments in the basin.

4.1 Metro Water District Requirements

There are two primary driving forces in play which are helping to bring many of these actions to pass. The first is the fact that all of the communities in this HUC are part of the Metro North Georgia Water Planning District (MNGWPD or Metro Water District). The Metro Water District was created by the Georgia General Assembly in 2001 “to establish policy, create plans, and promote intergovernmental coordination of all water issues in the District from a regional perspective.” The Metro Water District has developed regional and watershed-specific plans for stormwater management, wastewater treatment and water supply and conservation. These three plans (originally adopted in 2003 and updated in 2009) are intended to “protect water quality and public water supplies in and downstream of the region, protect recreational values of the water in and downstream of the region, and minimize potential adverse impacts of development on waters in and downstream of the region.” These plans provide legal requirements for action by local jurisdictions. The MNGWPD Watershed Management

Plan (WMP) requires local jurisdictions to identify significantly impacted watersheds and develop plans that include improvement projects to address impacts to these areas. These plans are known as Watershed Improvement Plans (WIPs).

4.2 MS4 Requirements

The second driving force is that these communities are covered by MS4 permits as discussed above. One of the requirements for all MS4 permittees is that they develop a Stormwater Management Plan (SWMP) for their MS4 area. The SWMP must meet the standard of "reducing pollutants to the Maximum Extent Practicable" (MEP). The Georgia EPD defines MEP as "the technology-based discharge standards and controls necessary for the reduction of pollutants discharged from a municipal separate storm sewer system. These standards and controls may consist of a combination of best management practices, control techniques, system design and engineering methods, and such other provisions for the reduction of pollutants discharged from a municipal separate storm sewer system as described in the Stormwater Management Program."

The Georgia EPD has defined programmatic actions to meet the pollutant reduction requirements. These actions involve meeting six minimum control measures:

1. Public Education and Outreach on Stormwater Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Storm Water Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal operations

4.3 Community Planning and Actions

In response to these mandates communities have adopted and implemented regulations, developed plans, and taken actions recommended in those plans. For example there are a variety of public education and outreach efforts being implemented including development of educational brochures, bill inserts with information about stormwater issues, encouragement/coordination of adopt-a-stream groups, and participation in and organization of Rivers Alive cleanup activities. Several communities have put educational information as well as their stormwater plans on their web sites. Examples include:

Clayton County
http://www.ccwa.us/pollution-solution
http://www.ccwa.us/tools-and-resources

City of Atlanta
http://www.cleanwateratlanta.org/environmentaleducation/

City of Decatur

http://www.decaturga.com/Modules/ShowDocument.aspx?documentid=1392 "Stormwater Management Plan"

City of Pine Lake

http://www.pinelakega.com/environment-green-space/waterfirst-plan/
http://www.pinelakega.com/environment-green-space/stormwater-utility-plan/

Dekalb County Department of Watershed Management

http://www.dekalbwatershed.com/education.html
http://www.dekalbwatershed.com/education_community.html
http://www.dekalbwatershed.com/environmental_outreach.html

Henry County

http://www.co.henry.ga.us/Stormwater/WhyStormwaterMatters.shtml
http://www.co.henry.ga.us/Stormwater/EffectsOfStormwaterRunoff.shtml
http://www.co.henry.ga.us/Stormwater/WhatsBeingDone.shtml
http://www.co.henry.ga.us/Stormwater/PublicOutreach.shtml
http://www.co.henry.ga.us/Stormwater/AdoptAStream.shtml

Rockdale County

http://www.rockdalecounty.org/main.cfm?id=2767 "Things You Can Do to Reduce Stormwater Runoff Pollution"
http://www.rockdalecounty.org/main.cfm?id=3588 "Watershed Management & Volunteer Opportunities"
http://www.rockdalecounty.org/main.cfm?id=3629 Stormwater Educational Brochures

4.3.1 City of Atlanta

Per the requirements of the MNGWPD and EPD, the City of Atlanta has developed the following reports/plans:

- **McDaniel Branch Watershed Improvement Plan** (December 2008)
  Watershed improvement projects identified in this document are classified as either stream restoration or stormwater infrastructure retrofit actions.
- **City of Atlanta Watershed Assessment** (June 2009)
  The assessment evaluated sources of pollution within the city and had the following conclusions:
  - sources of the fecal coliform and upland sediment loads are primarily from residential land uses (67% and 46% respectively).
  - 64% of the annual suspended sediment load comes from in-stream contributions and 36% from watershed runoff
  - leaking sanitary sewer infrastructure and SSOs are sources of fecal bacteria contamination.
- **South River Watershed Improvement Plan** (May 2010)

Included in this WIP are capital projects and other management practices focused primarily on upland water quality and hydrology improvements. Lowland improvement strategies such as stream channel and buffer improvements are not a part of this plan.

The city is moving forward with nonpoint source protection initiatives outlined in the WIPs and in the consent agreements as funds allow. These BMP initiatives include education outreach through inserts in water bills, online videos, etc. They also include installation of "green" features at existing facilities such as the rain garden in Adair Park, as well as purchasing sections of land for green space and stream restoration. The city has recently completed restoration of a section of McDaniel Branch immediately downstream of where the branch emerges from culverts under I-75 which was one of the projects recommended in the McDaniel Branch WIP.

4.3.2 Dekalb County

DeKalb County has, since 2001, developed/modified a number of plans for improving water quality in the South River basin. These plans have been developed not only in response to the Metro Water District and MS4 requirements but also as a result of EPD's requirement for Watershed Protection Plans whenever expansion of a Wastewater treatment plant discharge is proposed. The planning done by the county includes the following:

- **South River Watershed Assessment and Management Plan** (2001)
  The study addressed watershed characterization, modeling, management, and public involvement to evaluate water quality conditions in the South River Watershed.
- **South River Watershed Implementation Project** (February 2003)
  DeKalb County's implementation plan for programmatic actions to mitigate water quality impairment in the South River watershed.
- **Amendment to the South River Watershed Assessment** (November 2007)
  This update of the 2001 Watershed Assessment included characterization and assessment including habitat and biological ratings. It was done in support of permit applications for expanded discharges from the Pole Bridge and Snapfinger AWTFs.
- Consent Decree between Dekalb County and USEPA and Georgia EPD (December 2010)
  This is an agreement between the USEPA, the Georgia EPD, and DeKalb County that the County will "use its best efforts to prepare and implement all plans, measures, reports, and construction, maintenance, and operational activities called for under this Consent Decree to achieve the goals of: (1) full compliance with the CWA, GWQCA, and the regulations promulgated thereunder, and (2) the elimination of all SSOs." The

agreement lists 10 specific programmatic actions DeKalb County will take under a Capacity, Management, Operations, and Maintenance (CMOM) program to eliminate SSOs and comply with Clean Water Act requirements.

- **2012 Biological Monitoring Report** (June 2012)
  Habitat and biological (macroinvertebrate and fish) communities were evaluated at five monitoring locations as a part of the long-term monitoring effort by the Dekalb County Public Works Department under the Watershed Protection Plan.
- **Watershed Protection Plan** (October 2012)
  This county-wide Watershed Protection Plan (WPP) was developed as an update of the original 2001 South River Watershed Assessment and Management Plan. This document provides details of the county's program for managing and monitoring water quality to meet the current stormwater management requirements and guidelines of the Metropolitan North Georgia Water Planning District and the Georgia EPD.
- **Stream Cleanup Plan** *South River, South Fork Peachtree Creek, and Snapfinger Creek* (December 2012)
  The consent decree, mentioned above, also required the county to implement a Supplemental Environmental Project (SEP). This plan defines the work that will be done under the SEP on the three streams mentioned. It is intended that the trash and debris removal be done by a contractor to be hired through a bid process.
- **NPDES MS4 Stormwater Management Plan** (January 2013)
  The program outlined in this plan includes: structural and source control measures; illicit discharge detection and elimination; industrial facility stormwater runoff controls; construction site management; staffing and equipment; highly visible pollutant source program; public education and outreach; and green infrastructure.
- **South River Cleanup Plan** (February 2013)
  As a follow-up to the Stream Cleanup Plan developed for the SEP, this plan focused on the 32 South River sites identified in the Stream Cleanup Plan, providing current evaluation of trash and debris quantities and location of access points for removal of the trash and debris. This document will be used as a part of the bid process.
- **South River Action Plan** (draft, November 2013)
  The study looked at current water quality data, summarized trends in water quality and current sources of impairment and opportunities for improvement.

In addition to the studies listed above, the county conducted a pilot study to identify failing septic systems through use of color infrared aerial photography. The pilot

study was conducted from November 2009 through February 2010 in three watersheds – Camp Creek, Stone Mountain Creek, and Snapfinger Creek. There were 482 sites identified as potential failure sites. Field verification was done at 304 of these sites from which 88 failure sites were identified. Of these 88 failure sites, 70 were located in the Snapfinger Creek watershed.

4.3.3 Rockdale County

As a part of the MNGWPD and a holder of an MS4 NPDES permit, Rockdale County has followed the requirements of the District Stormwater Plan and Georgia EPD's six minimum control measures to reduce pollutants. Meeting these requirements has not required extensive studies to this point.

4.3.4 Army Corps of Engineers

Not associated with MS4 permits or Metro District Plan requirements, the Army Corps of Engineers (COE) completed a report on the findings of a "feasibility phase investigation" (covering multiple metro Atlanta jurisdictions) regarding "aquatic ecosystem restoration to the Indian, Sugar, Intrenchment, and Snapfinger Creek (ISIS) watersheds" (May, 2012). The areas of concern and planning objectives for the study were as follows:

Table 15: Problems in the ISIS watersheds and planning objectives

Problems	Objectives
Continued loss and degradation of aquatic habitat	Improve Georgia's Fish Index of Biotic Integrity (FIBI) and benthic multimetric index (BMI) in the overall watershed for Sugar Creek by at least 3% and 5%, respectively, and 5% and 10% for Snapfinger Creek
Continued loss and degradation of riparian habitat	Improve physical habitat conditions (as defined by Georgia's Habitat Assessment) in the overall watershed by at least 5% for Sugar Creek and 10% for Snapfinger Creek
Altered hydrology	Reduce peak flows in Sugar and Snapfinger Creeks by at least 10%
Excessive bank failure and high stream banks	Improve riparian and floodplain functions (as defined by Georgia's Habitat Assessment)
Invasive species are replacing native tree cover	Improve riparian and floodplain functions (as defined by Georgia's Habitat Assessment)

When the ISIS study began the City of Atlanta was in the process of implementing overflow capacity relief projects and wastewater sewershed separation projects to reduce the frequency and potential for occurrence of combined sewer overflows in the Intrenchment Creek watershed. Because the long term effects of these projects couldn't be known during the study period, restoration activities were not recommended for the Intrenchment Creek watershed. Restoration activities for the other watersheds were developed which met the objectives defined above. While these objectives do not

speak directly to reducing bacteria in the streams, accomplishing those objectives will require actions - protecting & improving the buffers along the streams, slowing/controlling direct runoff into the streams, etc. - that will contribute indirectly to reducing bacteria pollution.

5.0 Plan for Future Actions

As discussed above, all of the communities in the HUC are required to have plans to bring the streams into compliance with water quality standards. In addition to addressing standards, they are also working to reduce/clean up trash entering the streams through educational and public involvement activities required by their MS4 permits and the MNGWPD stormwater management plan. Atlanta and Dekalb County have developed watershed improvement and protection plans that address reducing pollution in specific streams. Cost and time estimates were made for the specific work proposed in those plans.

For DeKalb County, the 2010 watershed protection plan update proposed the following actions to bring the streams into compliance:

- *Conduct a stream inventory* – identify problem areas, potential restoration projects, and assess overall stream health
- *Identify potential water quality issues* – based on stream inventory observations and modeling efforts
- *Develop stream restoration and stormwater BMP projects* – list of potential projects based on observation, need, and modeled stream and watershed conditions
- *Calculate pollutant load reductions* – using a GIS-based model, develop pollutant load reductions for single projects or project bundles
- *Conduct storm sewer system master planning* – based on inventory of the system and development of a hydrologic and hydraulic model of the system, determine the list of capital and maintenance projects needed to improve and maintain the system
- *Prepare design, permitting and construction cost estimates* – develop planning level cost estimates which can be used to evaluate the overall benefit/cost ratio for each project developed
- *Develop summary sheets for each potential project* – used into the future to further refine project implementation

While detailed cost estimates won't be available until the survey and design work is done, an estimate for annual implementation costs of $3.61 M was included in the WPP. Among the items included in that annual implementation estimate was "conducting restoration/retrofits" which was estimated to require $2M per year. Retrofit activities alone were estimated to cost up to $87M which translates to 44 years for that work to be completed if all $2M is spent on retrofits. The cost of in-stream restoration efforts won't be estimated until the detailed work is done for each basin. Costs will be

refined as watershed improvement plans are developed for each basin. This approach – going to each of the streams/segments and developing more detailed watershed improvement plans for them will ultimately be what is necessary to bring not only the DeKalb County streams but the Atlanta and Rockdale County streams as well, into compliance.

As a part of developing this WIP, an advisory group was established which included community members from throughout the basin as well as professionals who deal with water quality issues. Their recommendations for areas that need to be addressed by this project included the following:

Failed Septic System

- Septic systems
  - Repair or replace if failing
  - Regular maintenance (e.g., pump out)
  - Elimination if possible
- Trash and debris cleanup
- Erosion control / stream bank stabilization
  - Backyard
  - Ag projects
- Animal waste control
- Public education

As the detailed work for each impaired stream segment moves forward, these recommended activities (trash removal, septic tank maintenance/repair/replacement/ elimination, public education, and agricultural improvements) should all continue to be pursued. The MNGWPD estimated in 2006 in "Septic Systems Status and Issues Working Paper" that there were roughly 73,000 septic tanks in DeKalb, Henry and Rockdale Counties. Assuming only half of these are in the South River basin, and that 1/5th receive regular maintenance (e.g., pump out every 5 years), the annual cost for pump out of the tanks would be approximately $2.9M. Homeowners could be encouraged to do this and other maintenance tasks through funding of 50% of the costs through 319(h) grants. Similarly, erosion reduction through stream buffer planting, reducing farm animal access to streams, etc. could be encouraged through 319(h) grant funding for a portion of the cost of the work.

5.1 Funding

Funding for the work to be done will have to come from a number of sources including:

- General fund

- Water & sewer fees
- Stormwater utility fees
- Development application and permit fees

In addition to the sources listed above, there are number of state & federal grant programs that could partially fund implementation of the activities necessary to restore and maintain the health of the streams. Grant programs currently available include:

- Section 319 Nonpoint Source Management Programs Grants – Under Section 319 (h) of the Clean Water Act, the U.S. Environmental Protection Agency awards a Nonpoint Source Implementation Grant to the Georgia EPD to fund projects to support the implementation of the Georgia Nonpoint Source Management Program.
- Section 106 of the Clean Water Act – States & Tribes receive Federal funds to administer the programs that protect their surface water and ground waters. 106 funds are used to: set water quality standards; monitor the quality of rivers, streams, and aquifers; develop plans for improving water quality; and, issue and enforce National Pollution Discharge Elimination System (NPDES) permits for the discharge of wastewater from sewage treatment plants and industrial facilities.
- Section 206 Aquatic Ecosystem Restoration – Section 206 of the Water Resources Development Act of 1996 allows the Army Corps of Engineers to plan, design and build projects to restore aquatic ecosystems for fish and wildlife. Projects must be in the public interest and cost effective. They are limited to $5M in Federal cost.
- Georgia Clean Water Revolving Loan Fund – This fund is administered and granted through the Georgia Environmental Facilities Authority (GEFA) which provides funding for a variety of wastewater infrastructure and non-point source projects. Low interest loans are available at 20-year intervals for qualified communities.
- Land Conservation Financing – In 2006 Georgia developed legislation enabling GEFA to provide grants and loans to cities and counties for land conservation projects in partnership with the Georgia Land Conservation Program. Eligible land conservation projects must demonstrate goals related to flood protection, water quality protection, wetlands protection, riparian zone protection and other goals deemed eligible. Cities and counties can receive funds to purchase land or conservation easements through this program.
- National Fish and Wildlife Foundation (NFWF) – NFWF, a nonprofit organization established by Congress in 1984, awards challenge grants for natural resource conservation projects.
- Flood Mitigation Assistance (FMA) program – FMA helps states and communities identify and implement measures to reduce or eliminate the long-term risk of

flood damage to homes and other structures insurable under the National Flood Insurance Program (NFIP).

- Flood Hazard Mitigation and Riverine Ecosystem Restoration Program – Known as Challenge 21, this watershed based program focuses on identifying sustainable solutions to flooding problems by examining nonstructural solutions in flood-prone areas, while retaining traditional measures where appropriate.
- Community Development Block Grant Program (CDBG) – This program is funded through the Georgia Department of Community Affairs and is intended to develop viable urban communities by providing housing, a suitable living environment, and expanding economic opportunities. Specific activities may include acquisition of real property, relocation and demolition, rehabilitation of structures, and provision of public facilities and improvements, such as new or improved water and sewer facilities.
- Sustainable Development Challenge Grants – Administered by EPA, these Grants are intended to initiate community-based projects that promote environmentally and economically sustainable development.

Low interest loans available for communities from other sources may also provide some of the funding for the projects that have been/will be proposed in the watershed improvement plans.

5.2 Verifying Effectiveness of BMPs

There are several locations where the Georgia EPD, Atlanta, DeKalb County, and Rockdale County are currently collecting water quality and quantity samples. Continued sampling at these sites (and others that may be deemed more appropriate) should provide evidence that the BMPs designed to reduce pollution are being effective. Some of the BMPs proposed (e.g., septic tank pumping) are preventative and will not provide reductions from current loads but will prevent increased discharge of bacteria from failed septic systems. For trash and debris removal, documentation of the pounds of trash removed will provide the evidence of the effectiveness of the work. These actions to verify the effectiveness of the work will be a responsibility of the various government entities.

Summary

Restoring the quality of the South River watershed streams will require overcoming a variety of challenges ranging from historical land uses which contribute to erosion problems to the continued bacteria contributions from domestic and farm animal waste, failing septic systems, SSOs, and CSOs, to people indifferent to the consequences of tossing their trash on the ground and/or into the streams. However, with sufficient time, money, public education, and commitment on the part of the local governments, the plan exists for restoration of the streams. Concerned citizens and

local governments have begun to implement that plan and, if the plan is followed, will eventually bring the streams into compliance with water quality standards.

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