Big Indian Creek HUC #0307010114 (Morgan County, GA)

Watershed Improvement Plan, Revision Phase

September 2011

Prepared by the Northeast Georgia Regional Commission Planning and Government Services Division

with the support of the

Environmental Protection Division of the
Georgia Department of Natural Resources

NEGRC
Northeast Georgia Regional Commission

Georgia Department of Natural Resources

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I. Segment and Watershed Description

The primary jurisdictions that drain to Big Indian Creek include part of Morgan County and a small part of Rutledge and Walton County. The stream segment of concern for this Extended Revision encompasses two HUC 12 watersheds and includes 24,952.89 acres.

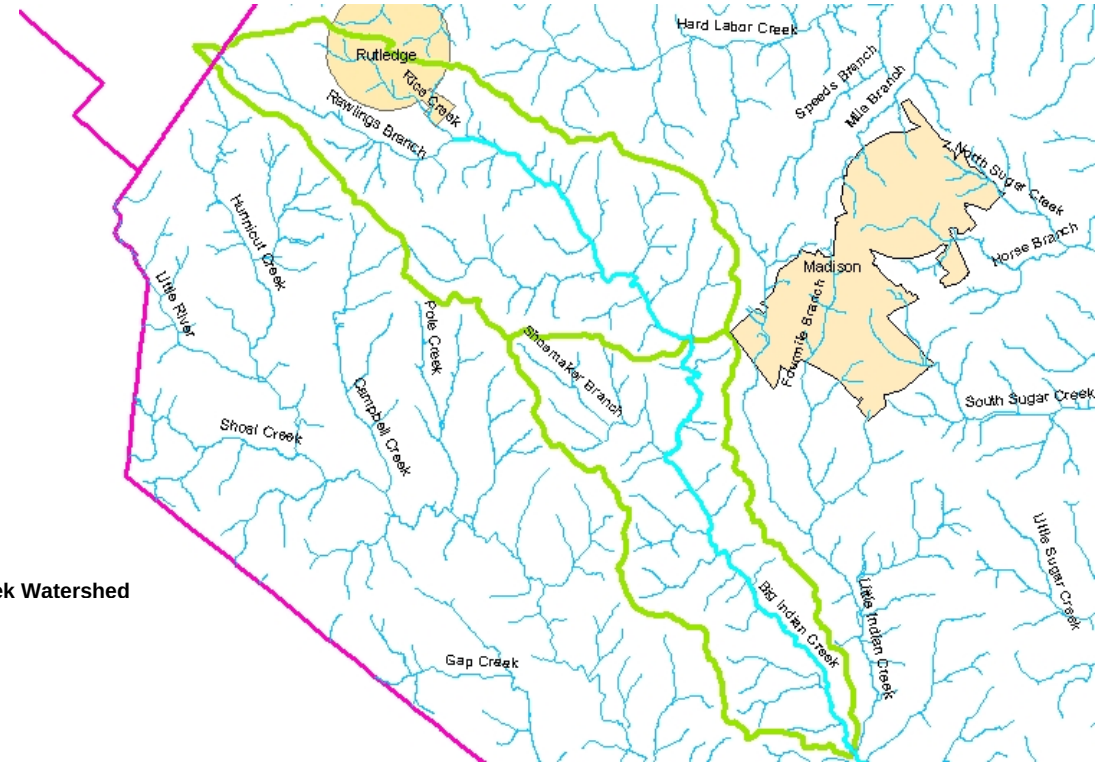


Figure 1: Big Indian Creek Watershed

The topography of the watershed is shallow river channels with moderate banks. Inside bends usually have wide, flat floodplains. Moderately sloping ridges dominate the areas outside the floodplains. Wetlands are present throughout the watershed but are more extensive in the lower half of the watershed

Fifty percent of the land cover in the watershed is pasture/hay and deciduous forest. Agricultural and Crop Forest land use comprise more than 80% of the area in the watershed. The average parcel size is 24.67 acres and the largest parcel is 847.70 acres. Approximately 1/3 of the parcels in the watershed are more than 100 acres, and they are distributed evenly throughout the watershed.

2008 land use in the watershed is defined predominately as agricultural/crop forest (87%), with residential at 8%. Future land use indicates that the watershed will remain relatively unchanged with residential use increasing only to 11%.

Potential sources of non-point source pollutants include private septic systems, wildlife, animal production, and livestock.

Rutledge provides the only public sewerage system in the watershed; it only serves the portion of the city that is in the watershed. The remaining part of the watershed is served by private septic systems.

Livestock contributes high sediment and nutrient loads, as well as high loads of oxygen-demanding chemicals and bacterial and microbial pathogens, which affect human health, and include fecal coliform bacteria. There are cattle and horse farms in the watershed.

Forty-seven percent of the watershed is classified as forest and 25% as pasture/hay. The primary source of fecal coliform in these areas is most likely wildlife; however, it is likely that there are human sources as well. The Georgia DNR Wildlife Resources Division's 2005-2014 Deer Management Plan calculates the actual average deer population for Morgan County (Deer Management Unit 5) to be 44 deer per forested square mile. That would equate to about 5,147 deer in the watershed. "Forested" designates all areas that are not residential, commercial industrial, cropland, or open pastureland. Contributions by deer to coliform bacterial loadings in water bodies are considered less significant than contributions made from water fowl, raccoon, and beaver.

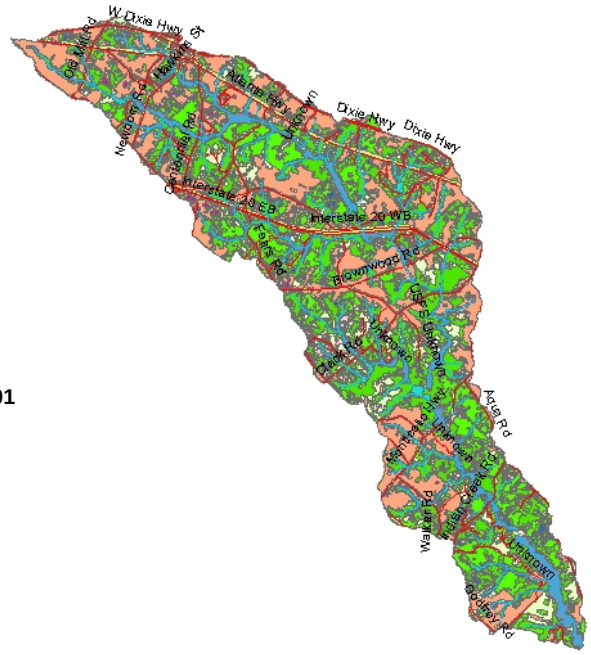


Figure 1: Land Cover 2001

Land Cover 2001

	Acres	% of Total
Barren Land	188.74	0.76
Cultivated Crop	98.18	0.39
Deciduous Forest	7087.97	28.40
Develop High Intensity	4.14	0.02
Develop Low Intensity	252.09	1.01
Develop Med Intensity	16.11	0.06
Develop Open Space	1518.21	6.08
Emergent Wetland	0.87	0.00
Evergreen Forest	4030.63	16.15
Grassland	2731.42	10.95
Mixed Forest	631.75	2.53
Open Water	309.56	1.24
Pasture/Hay	6360.19	25.49
Scrub/Shrub	198.32	0.79
Woody Wetlands	1525.83	6.11
TOTAL	**24953.98**	

Land Use

Category	2008 Acres	% of Total	2028 % of Total
Agricultural	17966.97	72.00	87.96
Commercial	35.02	0.14	0.20
Crop Forest	3315.49	13.29	0.00
Industrial	4.55	0.02	0.02
Parks/Rec/Conservation	0.65	0.00	0.00
Public/Institutional	62.00	0.25	0.14
Residential	2022.69	8.11	11.18
Transportation	327.52	1.31	0.31
Undeveloped	1218	4.88	0.19

TOTAL 24902.89

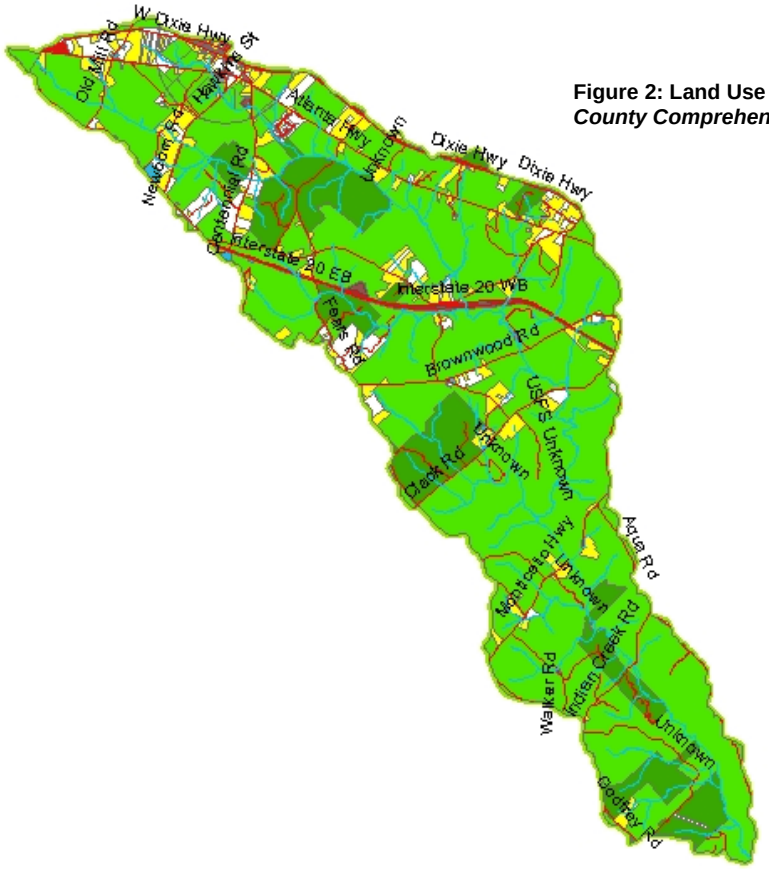


Figure 2: Land Use 2008 (*Morgan County Comprehensive Plan*)

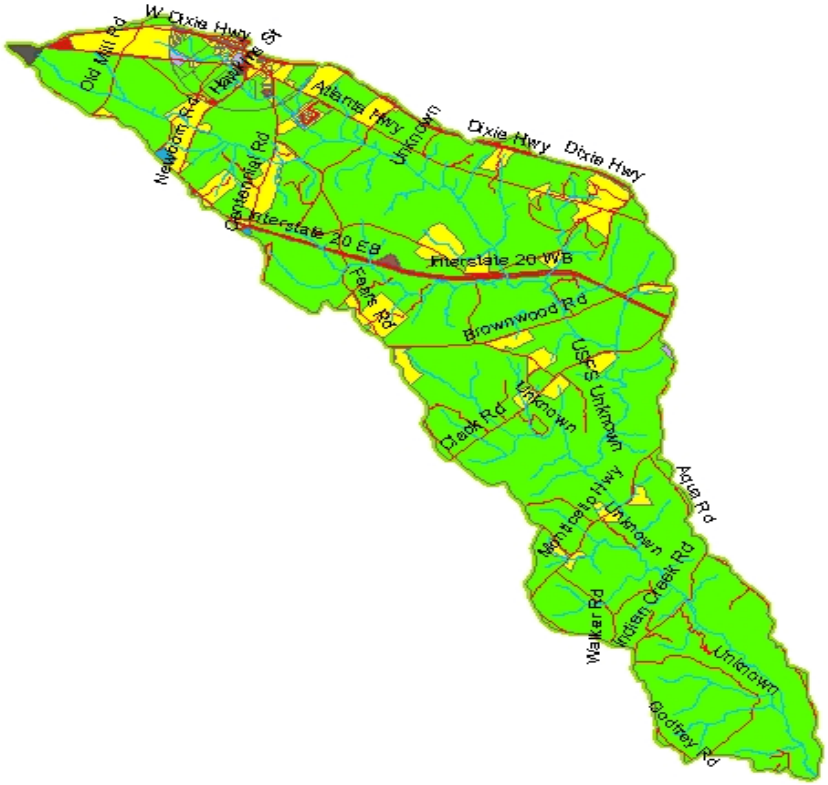


Figure 3: Future Land Use 2028 *(Morgan County Comprehensive Plan)*

II. Water Quality Impairments and Total Maximum Daily Loads

The impaired segment is 11 miles long and flows from Interstate 20 to Big Indian Creek's confluence with Little Indian Creek. The pollutant of concern is fecal coliform. Based on sampling events located at SR 53 near Madison in 1999, Big Indian Creek was placed on the Georgia 303(d) list of impaired water bodies and was identified as only "partially supporting" its designated use of fishing. GA EPD no longer uses the "partially supports" designation, meaning that the stream's current status should now be viewed as "not supporting."

Stream segments are currently defined as supporting or not supporting their water use classification based on water quality sampling data. Previously, a stream was placed on the partially supporting list if more than 10% of the samples exceeded the fecal coliform criteria. Water quality samples collected within a 30-day period that exhibited a geometric mean in excess of 200 counts per 100 milliliters during the period May through October, or in excess of 1000 counts per 100 milliliters during the period of November through April, were in violation of the bacteria water quality standard. There is also a single sample criterion (4000 counts per 100 milliliters) for the months of November through April.

The table below provides the water quality sampling data for Big Indian Creek that precipitated its listing on the Georgia 303(d) list. The February 1999 count of 1765.5 exceeded the allowable count of 1000 during the winter period and is the cause for the listing.

Table 1: 1999 Sampling of Big Indian Creek at Georgia Hwy 83 near Madison

Date	Geometric Mean (counts/100 ml)
2.22.99	1765.5
6.21.99	123.5
8.25.99	170.3
12.20.99	52.1

Source: TMDL Evaluation for Seventy-two Stream Segments in the Oconee River Basin for Fecal Coliform, January 2007

A Total Maximum Daily Load (TMDL) was established by the U.S. Environmental Protection Agency for the entire Oconee River Basin, which includes Big Indian Creek, in 2002. The 2007 report, *Total Maximum Daily Load Evaluation for Seventy-Two Streams in the Oconee River Basin*, indicates that an 83% reduction in fecal coliform loading is required for this stream to achieve its designated use.

III. Visual Surveys and Targeted Watershed Monitoring

A watershed Visual Survey was conducted on July 23, 2009. The five stream crossings visited during the field survey are located at I-20 westbound, Clack Road, SR 83, Indian Creek Road, and Brownwood Road. At the I-20 crossing, the water was opaque and evidenced upstream erosion, the most evidenced in the survey. However, at both the Clack Road and Brownwood Road crossings, the stream appeared clear. The stream corridor is heavily vegetated, both with overhanging trees and stream bank vegetation. There are sand bars throughout much of the watershed, but bank erosion is limited. The stream is narrow and appeared shallow with a depth of about one foot. There were no unusual odors or water surface abnormalities. General photos of the stream are included in the Visual Survey document.

Land activities observed during the watershed drive included horse and cattle production, forestry/pasture, and scattered residential structures.

Water quality sampling was initiated in May under a Targeted Monitoring Plan approved by GA EPD in March 2009. Six locations were identified for E. coli monitoring under the Plan. Monitoring took place at each location in May 2009 and monthly August 2009 - February 2010 in an effort to geographically isolated the major sources of impairment. (*In the revision phase of developing this document, sampling was again conducted monthly from November 2010 through July 2011.*)

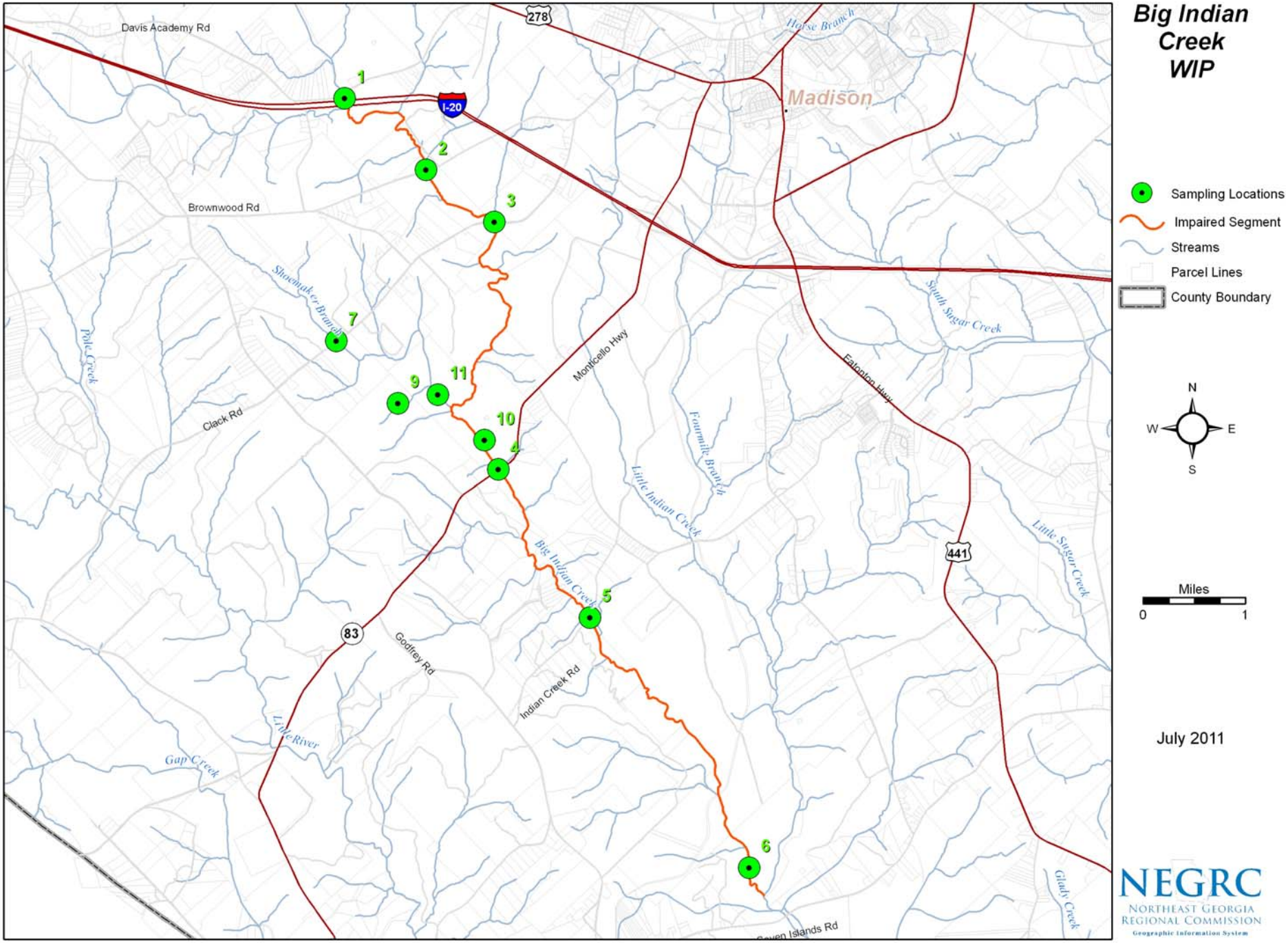
Escherichia coli are rod-shaped bacteria that live in the lower intestines of warm-blooded mammals. They are necessary for the proper digestion of food, but their presence in surface water indicates fecal contamination. E. coli belongs to a group of bacteria (some of which are harmful) known as fecal coliform bacteria. E. coli itself cannot cause illness unless it is introduced into an open wound or the urinary tract.

Humans, livestock, birds, wildlife, and pets can all act as vectors for the introduction of fecal coliforms such as E. coli. Therefore, E. coli can find its way into streams from water that flows over land and into the river (non-point source), or from contaminated waters flowing through outfalls directly into the stream (point source). Farms (especially those with a high density of animals and those that use liquefied manure for fertilization), animal droppings, and pet feces are all examples of non-point source E. coli vectors.

Table 2: Sampling Stations

Station Number	General Location	Sampling site coordinates	Sample Parameters
1	Davis Academy Road adjacent to Interstate 20 westbound bridge	Lat: 33.557648 Long: -83.551555	*E. coli*
2	Big Indian Creek @ upstream side of Brownwood Road bridge	Lat: 33.567798 Long: -83.537493	*E. coli*
3	Big Indian Creek @ upstream side of Clack Road bridge	Lat: 33.560634 Long: -83.525696	*E. coli*

Table 2: Sampling Stations			
Station Number	**General Location**	**Sampling site coordinates**	**Sample Parameters**
4	Big Indian Creek @ upstream side of Monticello Highway bridge (this is the site that corresponds with the 1999 listing site).	Lat: 33.525617 Long:-83.523983	*E. coli*
5	Big Indian Creek @ upstream side of Indian Creek Road bridge	Lat: 33.504978 Long: -83.507871	*E. coli*
6	Big Indian Creek @ pipeline easement approximately 2,000 ft. upstream of Little Indian Creek.	Lat: 33.470069 Long: -83.479957	*E. coli*
7	Shoemaker Branch @ Clack Rd.	Lat: 33.52562 Long: -83.523987	*E. coli*
9	Shoemaker Branch tributary on Bohlen tract	Lat: 33.567799 Long: -83.537491	*E. coli*
10	Big Indian Creek on Patillo tract	Lat: 33.577652 Long: -83.551559	*E. coli*
11	Shoemaker Branch on Patillo tract	Lat: 33.534615 Long: -83.541229	*E. coli*


Big Indian Creek WIP
Davis Academy Rd
278
I-20
Madison
Horse Branch
Brownwood Rd
Shoemaker Branch
Pole Creek
Clack Rd
Monticello Hwy
South Sugar Creek
Fairplay Hwy
Fourmile Branch
Little Indian Creek
Big Indian Creek
Little Sugar Creek
441
83
Godfrey Rd
Indian Creek Rd
Little River
Gap Creek
Gladdy Creek
Sewen Islands Rd
1
2
3
4
5
6
7
9
10
11
Sampling Locations
Impaired Segment
Streams
Parcel Lines
County Boundary
N
W
E
S
Miles
0
1
July 2011
NEGRC
Northeast Georgia Regional Commission
Geographic Information System

Water quality sampling to date provided the following data for each of the 6 sampling locations:

E. Coli Data

	Site 1	*Site 2*	*Site 3*	*Site 4*	*Site 5*	*Site 6*	*Site 7*	*Site 9*	*Site 10*	*Site 11*
5/20/09	267	433	333	467	800	333				
8/18/09	99.9	99.9	366.3	133.2	166.5	99.9				
9/29/09	66.66	233.1	199.8	66.66	133.2	66.66				
11/23/09	466	366	733	400	233	366				
12/16/09	0	67	37	33	233	100				
1/27/10	133	67	33	166	200	400				
2/23/10	33	0	0	0	100	100				
11/23/10			233	33			0	133	0	
12/16/10			133	167			300	2234	66	
1/24/11			100	0			0	133	0	
2/24/11			267	100			566.7	366.7	100	
3/22/11			0	0			100	67	33	
4/19/11			166	33			333	0	0	
5/23/11			67	67			366	33	0	100
6/28/11			67	33			67	33	0	33
7/27/11			33	333	3197		333	67	33	0

US EPA fecal coliform assumes 60% of a fecal coliform is E. coli. Calculating this ratio, as shown below, yields results that can be evaluated against the fecal coliform standard.

Fecal Coliform Criteria

May - October

Geometric means not to exceed 200 MPN/100 ml

No individual sample exceeding 4000 MPN/100 ml

November - April

Geometric mean not to exceed 1,000 MPN/100 ml

No individual sample exceeding 4,000 MPN/100 ml.

Fecal Coliform Conversions

	Site 1	*Site 2*	*Site 3*	*Site 4*	*Site 5*	*Site 6*	*Site 7*	*Site 9*	*Site 10*	*Site 11*
5/20/09	445.0	721.7	555.0	778.3	1333.3	555.0				
8/18/09	166.5	166.5	610.5	222.0	277.5	166.5				
9/29/09	111.1	388.5	333.0	111.1	222.0	111.1				
11/23/09	776.7	610.0	1221.7	666.7	388.3	610.0				
12/16/09	0.0	111.7	61.7	55.0	388.3	166.7				
1/27/10	221.7	111.7	55.0	276.7	333.3	666.7				
2/23/10	55.0	0.0	0.0	0.0	166.7	166.7				
11/23/10			388.3	55.0			0.0	221.7	0.0	
12/16/10			221.7	278.3			500.0	3723.3	110.0	
1/24/11			166.7	0.0			0.0	221.7	0.0	
2/24/11			445.0	166.7			944.5	611.2	166.7	
3/22/11			0.0	0.0			166.7	111.7	55.0	
4/19/11			276.7	55.0			555.0	0.0	0.0	
5/23/11			111.7	111.7			610.0	55.0	0.0	166.7
6/28/11			111.7	55.0			111.7	55.0	0.0	55.0
7/27/11			55.0	555.0	5328.3		555.0	67.0	55.0	0.0

IV. Identification and Ranking of Significant Sources of Impairments

The TMDL plan identifies the following sources of contamination.

Source	Extent	EPD Permitted (Y/N)	Estimated Contribution (Rank 1-5)	Stakeholder Opinion (1-5)	Comments
Agriculture	According to land use data, 72% of watershed is agricultural though, actual agricultural practices are much less.	N	2	Unknown	There is no crop cultivation. There is some livestock though over 50% of operations are fenced from streams. Poultry has replaced some of the cattle operations in recent years. Stakeholders report that few property owners spread animal waste.
Urban	<1%	N	1	1	Rutledge is the on urbanized area in the watershed and only a small portion is in the watershed.
Wildlife	unknown	N	5	unknown	Stakeholders noted beaver in streams and geese in fields adjacent to streams.
Septic Systems	11% of watershed is residential	N	1	1	Residential is scattered and the average lot size in the watershed exceeds 20 acres and many are hundreds or acres. Unknown to what extent failing systems may contribute; however, residential is very low in the watershed.
Sewerage System	The system only serves parts of Rutledge which is <1% of the watershed.	Y (GA008295)	Y	1	Rutledge has the only public sewerage system in the watershed and it has been under consent order and cannot accommodate more capacity.

After reviewing the monitoring data, the stakeholders have been unable to identify any possible source of contamination with the exception of one poultry facility that dramatically expanded during the last 2 years. The facility, located just south of Thankful Road on a tributary to Shoemaker Branch, a tributary to Big Indian Creek. The poultry facility has increased to 4 houses, reportedly holding 30,000 chickens each. There is a pond on the tributary just south of the poultry farm. Since the area between sites 3 and 5 have been consistently high, stakeholders recommend additional water quality testing at newly identified sites (7-10) in an effort to identify whether contamination is coming from Shoemaker Creek and, if so, to narrow down potential sources. (*Revision Phase Note: new testing has been conducted to examine these sites;* ***no evidence of significant contamination has been uncovered****.)*

V. Identification of Applicable Existing Management Measures

Permitted Water Pollution Control Facilities

Rutledge has the sole permitted facility in the watershed, a wastewater treatment plant, permit GA008295. Stakeholders that the facility has been under consent order.

NPDES-permitted Municipal Separate Storm Water Sewer Systems

There are none in the watershed.

Water Supply Watershed Protection Activities

Morgan County adopted a water-supply watershed protection ordinance, a wetlands protection ordinance, and a groundwater recharge protection ordinance. Both the wetlands protection ordinance and groundwater recharge ordinance are applicable within the watershed. Wetlands protection requires maintenance of a 50' undisturbed buffer adjacent to the wetland. The groundwater recharge ordinance requires larger lot sizes where there is no public sewerage and prohibits some land use activities from the recharge area.

Permitted CAFOs

Information is unavailable on CAFOs.

Solid Waste Disposal Sites

There are no solid waste disposal sites in the watershed.

Wastewater permit-drive Watershed Assessments and Protection Plans

A watershed assessment and protection plan was completed for Little Indian Creek and Four Mile Branch; however, the watershed for that stream is outside the Big Indian Creek watershed.

Source Water Assessment Plan (SWAP)

A SWAP was completed for the City of Madison's intake on Hard Labor Creek and the Apalachee River; however, this, too, is outside the Big Indian Creek watershed.

Local Erosion and Sedimentation Control Programs

Both Rutledge and Morgan County have adopted and implemented erosion and sedimentation control programs. GA EPD is the issuing authority for Rutledge and NE District enforces the ordinance. Morgan County serves as the Issuing Authority for unincorporated Morgan County and Building Inspections is responsible for enforcement of the ordinance. The programs require maintenance of a 25' buffer adjacent to all streams.

Local Water Quality Management and Sampling Programs

The only sampling program in the watershed is being conducted under a Targeted Monitoring Plan approved by GA EPD in March 2009. The sampling is being conducted by the Morgan County Planning Department.

Storm Water Utility Districts

There are no storm water utility districts in the watershed.

Watershed Associations and Adopt-A-Stream groups

There are no watershed associations or Adopt-A-Stream groups operating in the watershed.

Section 319 grant project

A list has been requested from the District Conservationist through a FOIA request.

Other existing management measures

Regulation of On-Site Sewage Management Systems
Fence Cattle out of Wetlands and Stream

VI. Recommendations for Additional Management Measures

Monitoring data were reviewed with the Partnership Advisory Council (PAC) on Sept 17, 2010 and again on June 2, 2011. The general consensus from the PAC was that, judging from aerial photography of the watershed, this is a model watershed as it is heavily forested with deep, forested buffers adjacent to the stream. The PAC has been unable to identify the source of the contamination indicated in the 1999 data. Livestock in the watershed is limited to a handful of properties and all have fenced their livestock from the streams.

Morgan County Planning Director Chuck Jarrell, GA EPD Communication/Outreach Specialist Mary Gazaway, and NEGRC Senior Planner John Devine met on July 18, 2011 to discuss the fact that, beyond being unable to identify the source of the contamination indicated in the 1999 data, the data obtained through E. coli monitoring during the WIP development process have indicated the absence of significant, consistent, and concentrated contamination anywhere in the watershed. At that meeting, several implementation actions were outlined:

- Continue monitoring sites 3, 4, 5, 7, 9, 10, and 11 through September 2011
- Attendees, who think the stream may be compliant with water quality criteria, agreed that writing a Sampling and Quality Assurance Plan for the watershed could help to eventually delist the stream
- Work with the Oconee River RC&D to develop this SQAP as part of the RC&D's recently awarded 319(h) grant for the watershed

VII. Partner Organizations and Advisory Groups

Name	Organization	Address	E-mail
Whitney Hunt		PO Box 488 Madison, GA 30650	LWHuntJr@bellsouth.net
Phillip Von Hanstein		2153 Monticello Road Madison, GA 30650	indiancreekfarms@att.net
Ryan Hillsman		1050 Hillsman Road Madison, GA 30650	

Name	Organization	Address	E-mail
Wayne Tankersley		2480 Monticello Road Madison, GA 30650	wtankersley@bellsouth.net
Jeff Banks		1765 Pierce Dairy Road Madison, GA 30650	
Aubrey Moon		2190 Godfrey Road Madison, GA 30650	
Tim Pridgen		660 S. Main Street Madison, GA 30650	
Andrew Ainslie		1016 Dixie Avenue Madison, GA 30650	
Rusty Ewing		PO Box 626 Rutledge, GA 30663	
Danny Atkinson		1911 Davis Academy Road Madison, GA 30650	scaerusty@yahoo.com
Pat Hardy, Sr.		1531 Greensboro Hwy. Madison, Ga 30650	
Chuck Jarrell	Morgan County Planning and Zoning	PO Box 168 Madison, Ga 30650	cjarrell@morganga.org
Keegan Malone	Region 4, GSWCC	3014 Heritage Rd, Ste 1 Milledgeville, GA 31061	region4@gaswcc.org
Luther Jones	Oconee River RC&D	PO Box 247 Watkinsville, GA 30677	luther.jones@ga.usda.gov
Bobby Smith	Morgan County Extension	150 E. Washington St., Ste 201 Madison, GA 30650	
Dennis Brooks	NRCS District Conservationist	Madison, GA 30650	dennis.brooks@ga.usda.gov

VIII. Milestones

- Work with Oconee River RC&D to write a SQAP for Big Indian Creek
- As part of the SQAP, fecal coliform sampling (not E. coli) must be conducted
- If data are compliant, work with GA EPD to delist the impaired segment
- If data are not compliant, continue to support the RC&D's efforts to improve the watershed

IX. Public Involvement

Morgan County appointed an Advisory Committee comprised of property owners in the watershed. This committee was supplemented by county, state, and federal agencies with jurisdiction in the watershed.

X. Recommendations for Monitoring and Criteria for Measuring Success

If fecal coliform data are found to exceed established criteria and do not support delisting the stream, it is imperative that stakeholders work with the RC&D to address any new (or newly-identified) potential sources of contamination in the watershed. Otherwise, if the data show that the stream's "impaired" designation should be removed, stakeholders should promote both the decision to delist it as an indication of stream health and a successful community partnership, and the fact that protecting the future of the stream and the watershed is a critical venture.

Appendix

USEPA Guidelines for Watershed Planning

(9 Key Elements)

Web Access to Section 319 (h) Application Guidelines: http://www.gaepd.org/Documents/epdforms_wpb.html#nps

GA EPD recommends that the Watershed Improvement Plan include the following elements to comply with USEPA Guidelines:

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 sediment control, or Z linear miles of eroded stream bank needing remediation);

2) An estimate of the load reductions expected for the management measures described under paragraph (3) below;

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).