

2014 Monitoring Summary



Ihagee Creek at Russell County Road 18 (32.23850 /-84.98069)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Ihagee Creek watershed for biological and water quality monitoring as part of the 2014 Assessment of the Southeast Alabama (SE AL) Rivers Basins. The objectives of the SE AL Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the SE AL basin group. Ihagee Creek was added to Alabama's §303(d) list of impaired water bodies in 2012, based on data collected in 2005 and 2008. Water quality impairments, siltation and subsequent habitat alteration, were deemed to have been caused by land development and silvicultural activities.



Figure 1. Ihagee Creek at IHGR-1, May 14, 2014.

REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the fish community assessment. In comparison with reference reaches in the same ecoregion, they give an indication of the physical condition of the site and the quality and availability of habitat. Ihagee Creek at IHGR-1 is a riffle-run stream and instream substrates were dominated by clay and sand (Figure 1). Habitat quality and availability within the reach were rated *sub-optimal* for supporting healthy fish communities.

BIOASSESSMENT RESULTS

The fish community in Ihagee Creek at IHGR-1 was sampled using Alabama's Fish Community Index of Biotic Integrity (AL-IBI), developed through a multi-agency (GSA, ADCNR, ADEM) project to establish a comprehensive fish community bioassessment tool for Wadeable streams and rivers across the State. The data collected during this survey were used to score the overall health of the fish community, based on conditions expected for Wadeable streams and rivers in the *Southern Plains* Ichthyoregion. The AL-IBI uses twelve measures of species richness and diversity, tolerance/intolerance, and abundance, condition, and reproduction to assess the overall health of the fish community. The final IBI score is the sum of all individual metrics on a 60 point scale. The IBI score for Ihagee Creek at IHGR-1 was 38, indicating the fish community to be in *fair* condition.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Ihagee Creek is a *Swimming/Fish & Wildlife (S/F&W)* stream located within the *Southern Hilly Gulf Coastal Plain* sub-ecoregion. It drains approximately 27 mi² in Russell County before its confluence with the Chattahoochee River. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (41%) and shrub. Population density is relatively low, and less than ten percent of the area is developed. As of April 1, 2016, there are no NPDES permitted outfalls active in this watershed.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Chattahoochee River
Basin		
Drainage Area (mi²)		27
Ecoregion^a		65D
% Landuse^b		
Open water		<1%
Wetland	Woody	8%
	Emergent herbaceous	<1%
Forest	Deciduous	18%
	Evergreen	19%
	Mixed	7%
Shrub/scrub		18%
Grassland/herbaceous		1%
Pasture/hay		10%
Cultivated crops		9%
Development	Open space	7%
	Low intensity	1%
	Moderate intensity	<1%
	High intensity	<1%
Population/km^{2c}		23

a. Southern Hilly Gulf Coastal Plain
b. 2011 National Land Cover dataset
c. 2010 US Census

Table 2. Physical characteristics of Ihagee Creek at IHGR-1, July 16, 2014.

Physical Characteristics		
Width (ft)		35
Canopy cover		Estimate 50/50
Depth (ft)	Riffle	0.5
	Run	1.5
	Pool	4.5
% of Reach	Riffle	30
	Run	40
	Pool	30
% Substrate	Bedrock	5
	Boulder	2
	Clay	30
	Cobble	12
	Gravel	10
	Hard Pan Clay	15
	Sand	20
	Silt	6

Table 3. Results of the habitat assessment conducted on Ihagee Creek at IHGR-1, July 16, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	64	Sub-optimal (55-79)
Sediment Deposition	71	Sub-optimal (55-79)
Riffle Frequency	90	Optimal >79
Bank and Vegetative Stability	78	Sub-optimal (58-79)
Riparian Buffer	79	Sub-optimal (60-84)
Habitat Assessment Score	148	
% Maximum Score	74	Sub-optimal (57-80)

Table 4. Results of the fish community assessment conducted in Ihagee Creek at IHGR-1, July 16, 2014.

Fish Community Assessment		
Species Richness & Diversity	Results	Score
Total native species	16	3
Number shiner species	3	3
Number of sucker species	0	1
Number of centrarchid species	5	3
Number of darter+madtom species	2	1
Tolerance & Intolerance Measures		
Percent of tolerant species	6.35	3
Percent Green Sunfish & Yellow Bullhead	0	5
Trophic Measures		
Percent insectivorous cyprinids	30.16	3
Percent invertivores	25.4	3
Percent top carnivores	12.7	5
Abundance, Condition & Reproductive Measures		
Percent DELT+hybrids	0	5
Number of lithophilic spawners	7	3
IBI Assessment Score		38
Condition		Fair

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly, March through October of 2014. Additionally, field parameters were collected during the fish community assessment on July 16. Four out of eight *E. coli* samples exceeded the single sample summer criterion for the *S/F&W* use classification. Median concentrations of total nitrogen and dissolved iron were higher than expected for streams in the *Southern Hilly Coastal Plain* sub-ecoregion (65d). All organic samples with the exception of Atrazine were less than minimum detection limits (MDL).

SUMMARY

The habitat at Ihagee Creek at IHGR-1 was assessed and found to be *sub-optimal* in its ability to support healthy and diverse fish communities. The overall fish community condition was rated as *fair*. *E. coli* samples did not meet the single sample summer criterion for *S/F&W* streams on four occasions in 2014.

Monitoring of Ihagee Creek at IHGR-1 should continue to ensure that conditions remain stable at the site.

Table 5. Summary of water quality data collected March through October, 2014. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL) when results were less than this value. Median, average (Avg), and standard deviations (SD) values were calculated by multiplying the MDL by 0.5 when results were less than this value.

Parameter	N	Min	Max	Median	Avg	SD	Q	E
Physical								
Temperature (°C)	9	14.6	23.70	20.7	19.8	3.4		
Turbidity (NTU)	9	7.4	13.2	9.8	10.0	2.0		
Total Dissolved Solids (mg/L)	8	11.0	85.0	58.5	52.8	23.3		
Total Suspended Solids (mg/L)	8	1.0	6.0	5.5	4.9	1.7		
Specific Conductance (µmhos)	9	39.4	47.8	43.1	43.8	2.8		
Hardness (mg/L)	4	10.7	13.1	12.2	12.0	1.0		
^J Alkalinity (mg/L)	8	3.0	4.7	3.8	3.8	0.6		
Stream Flow (cfs)	9	5.6	30.7	9.8	15.0	10.8		
Stream Flow during Sampling (cfs)	9	5.6	30.7	9.8	15.0	10.8		
Chemical								
Dissolved Oxygen (mg/L)	9	8.3	10.2	8.9	9.1	0.7		
pH (su)	9	6.0	6.2	6.2	6.1	0.1		
Ammonia Nitrogen (mg/L)	8	< 0.006	< 0.010	0.003	0.004	0.001		
Nitrate+Nitrite Nitrogen (mg/L)	8	0.189	0.482	0.448	0.382	0.119		
Total Kjeldahl Nitrogen (mg/L)	8	0.168	0.730	0.414	0.419	0.167		
Total Nitrogen (mg/L)	8	0.357	1.053	0.821	^M 0.801	0.207		
^J Dissolved Reactive Phosphorus (mg/L)	8	0.006	0.018	0.012	0.012	0.004		
Total Phosphorus (mg/L)	8	0.027	0.052	0.046	0.044	0.009		
CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0		
Chlorides (mg/L)	8	3.1	3.5	3.2	3.3	0.2		
Atrazine (µg/L)	1				0.37			
Total Metals								
^J Aluminum (mg/L)	4	0.160	0.399	0.245	0.262	0.100		
Iron (mg/L)	4	1.690	3.350	2.105	2.312	0.740		
^J Manganese (mg/L)	4	0.030	0.064	0.044	0.046	0.014		
Dissolved Metals								
^J Aluminum (mg/L)	4	< 0.050	0.138	0.068	0.075	0.047		
Antimony (µg/L)	4	< 0.2	< 0.2	0.1	0.1	0.0		
^J Arsenic (µg/L)	4	0.6	0.9	^H 0.7	0.7	0.1	4	
Cadmium (µg/L)	4	< 0.246	< 0.246	0.123	0.123	0.000		
^J Chromium (µg/L)	4	0.416	1.164	0.925	0.858	0.357		
^J Copper (mg/L)	4	< 0.0003	0.0003	0.0001	0.0001	0.000		
Iron (mg/L)	4	0.882	1.470	1.006	^M 1.091	0.262		
^J Lead (µg/L)	4	0.2	0.3	^S 0.2	0.3	0.0	2	
^J Manganese (mg/L)	4	0.025	0.054	0.036	0.038	0.012		
^J Nickel (mg/L)	4	0.001	0.001	0.001	0.001	0.000		
Selenium (µg/L)	4	< 0.4	< 0.4	0.2	0.2	0.0		
Silver (µg/L)	4	< 0.252	< 0.252	0.126	0.126	0.000		
Thallium (µg/L)	4	< 0.2	< 0.2	0.1	0.1	0.0		
^J Zinc (mg/L)	4	0.004	0.008	0.005	0.005	0.002		
Biological								
Chlorophyll a (µg/L)	8	< 0.10	17.09	2.94	4.61	5.49		
<i>E. coli</i> (col/100 mL)	8	109	1120	^C 227	318	332	4	

C=*S* (*Swimming*) use single sample maximum criterion for pathogens exceeded; E=# samples that exceeded criterion; H=*S/F&W* human health criterion exceeded; J=estimate; M=value greater than 90% median concentration of all verified reference reach data collected in ecoregion 65d; N=# of samples; Q=# of uncertain exceedances; S=*S/F&W* hardness-adjusted aquatic life use criterion exceeded.

FOR MORE INFORMATION, CONTACT:
Hugh E. Cox, ADEM Environmental Indicator Section
1350 Coliseum Boulevard Montgomery, AL 36110
(334) 260-2753 hec@adem.state.al.us