

2005 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 1999 Basin-wide Screening Assessment of the Chattahoochee Basin. The screening assessments were conducted at stream reaches where land use estimates and non-point source information from the local Soil and Water Conservation Districts indicated a moderate or high potential for impairment from non-point sources in non-urban areas. Results of the 2001 screening-level evaluation identified Ihagee Creek at IHGR-1 for further monitoring during the 2005 Basin Assessment of the Chattahoochee River Basin to more fully assess biological conditions at the site, as well as the extent and cause of any impairment.

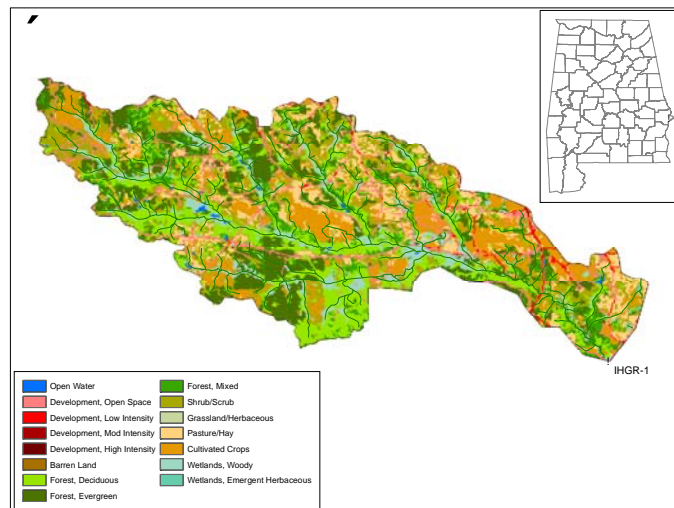


Figure 1. Sampling location and landuse in the Ihagee Creek watershed at IHGR-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Ihagee Creek is a *Swimming/Fish & Wildlife (S/F&W)* stream located near the city of Fort Mitchell, Alabama in Russell County. Land use within the watershed is forest (42%), shrub/scrub, cultivated crops and pastureland. Population density is relatively low. As of June 9, 2008, six NPDES permits have been issued in the watershed.

REACH CHARACTERISTICS

Ihagee Creek at IHGR-1 is a high-gradient, riffle-run, bedrock-bottomed stream (Table 2). Overall habitat quality was categorized as *optimal*, although embeddedness and sedimentation have been noted at the site since it was sampled in 1995. Additionally, the high percentage of bedrock limits instream habitat and refuge during high flow events.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). The WMB-I uses measures of taxonomic richness, community composition, and community tolerance to assess the overall health of the macroinvertebrate community. Each metric is scored on a 100 point scale. The final score is the average of all individual metric scores. The final score indicated the biological community to be in *poor* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Chattahoochee River
Basin		Chattahoochee River
Drainage Area (mi²)		27
Ecoregion^a		65d
% Landuse		
Open water		<1
Wetland	Woody	8
	Emergent herbaceous	<1
Forest	Deciduous	19
	Evergreen	15
	Mixed	8
Shrub/scrub		18
Grassland/herbaceous		<1
Pasture/hay		11
Cultivated crops		13
Development	Open space	7
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Population/km^{2b}		2
# NPDES Permits^c	TOTAL	6
	Construction Stormwater	4
	Industrial General	1
	Underground Injection Control	1

a.Southern Hilly Gulf Coastal Plain

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database June 9, 2008

Table 2. Physical characteristics of Ihagee Creek at IHGR-1, June 15, 2005.

Physical Characteristics	
Width (ft)	35
Canopy Cover	Open
Depth (ft)	
	Riffle 0.3
	Run 0.8
	Pool 2.5
% of Reach	
	Riffle 43
	Run 47
	Pool 10
% Substrate	
	Bedrock 70
	Boulder 2
	Cobble 3
	Gravel 3
	Sand 15
	Silt 5
	Organic Matter 2

Table 3. Results of the habitat assessment conducted in Ihagee Creek at IHGR-1 on June 15, 2005.

Habitat Assessment	(%Maximum Score)	Rating
Instream Habitat Quality	68	Optimal >65
Sediment Deposition	74	Optimal >65
Sinuosity	93	Optimal >84
Bank and Vegetative Stability	79	Optimal >74
Riparian Buffer	89	Sub-optimal (70-89)
Habitat Assessment Score	187	
% Maximum Score	78	Optimal >65

Table 4. Results of the macroinvertebrate bioassessment in Ihagee Creek at IHGR-1 on June 15, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores	Rating
	(0-100)		
Taxa richness measures			
# Ephemeroptera (mayfly) genera	5	42	Poor (23-46)
# Plecoptera (stonefly) genera	2	33	Fair (32-49)
# Trichoptera (caddisfly) genera	3	25	Poor (22-44)
Taxonomic composition measures			
% Non-insect taxa	10	59	Fair (49.5-74.1)
% Non-insect organisms	1	97	Excellent (>97)
% Plecoptera	1	3	Very Poor (<6.56)
Tolerance measures			
Beck's community tolerance index	6	21	Poor (20.2-40.9)
WMB-I Assessment Score	--	40	Poor (24-48)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during March through October of 2005. Median nitrate-nitrite nitrogen and total nitrogen (nutrients) values were higher than expected for the ecoregion, as were median values for total iron and total manganese and dissolved iron. Samples collected on April 7, 2005 resulted in an elevated fecal coliform count (2000 col/100mL), a pH less than 6.0 standard units, and the detection of atrazine (herbicide). Field notes show that it had rained the day before the sampling event, possibly explaining some of these results.

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data.

Bioassessment results indicated that the macroinvertebrate community in Ihagee Creek at IHGR-1 to be in *poor* condition, in spite of *optimal* habitat condition and availability.

Water quality results show a slight nutrient enrichment problem that may have had some impact on the macroinvertebrate community. Additionally, sedimentation problems have been noted throughout in Ihagee Creek at IHGR-1 since monitoring began in 1995.

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Table 5. Summary of water quality data collected March-October, 2005. 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	Med	Avg	SD
Physical						
Temperature (°C)	9	15.0	29.0	23.0	22.4	5.0
Width (Ft.)	3	35.0	50.0	35.0	40.0	8.7
Turbidity (NTU)	9	4.8	139.0	12.6	24.4	43.1
Total Dissolved Solids (mg/L)	7	32.0	92.0	63.0	61.7	22.6
Total Suspended Solids (mg/L)	7	4.0	169.0	10.0	31.9	60.6
Specific Conductance (µmhos)	9	34.6	62.8	40.2	42.5	9.0
Hardness (mg/L)	5	8.9	15.3	10.7	11.7	2.9
Alkalinity (mg/L)	7	2.9	6.3	3.6	4.1	1.2
Stream Flow (cfs)	8	7.9	22.4	15.2	14.9	5.0
Chemical						
Dissolved Oxygen (mg/L)	9	7.4	10.6	7.6	8.3	1.2
pH (su)	9	5.9 ^c	8.4	6.5	6.6	0.7
Ammonia Nitrogen (mg/L)	7	< 0.015	< 0.015	0.008	0.008	0.000
Nitrate+Nitrite Nitrogen (mg/L)	7	0.026	0.363	0.201 ^M	0.231	0.117
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	1.115	0.550	0.573	0.355
Total Nitrogen (mg/L)	7	< 0.276	1.297	0.792 ^M	0.804	0.317
Dissolved Reactive Phosphorus (mg/L)	7	< 0.004	0.036	0.010	0.012	0.011
Total Phosphorus (mg/L)	7	0.026	0.075	0.058	0.054	0.020
CBOD-5 (mg/L)	7	< 0.4	3.3	1.4	1.7	1.2
Chlorides (mg/L) ^J	7	3.9	12.1	5.7	6.3	2.7
Atrazine (µg/L)	2	< 0.05	0.08	0.05	0.05	0.04
Total Metals						
Aluminum (mg/L)	4	< 0.015	1.620	0.202	0.508	0.749
Iron (mg/L)	4	3.110	5.020	3.680 ^M	3.872	0.815
Manganese (mg/L)	4	0.066	0.143	0.100 ^M	0.102	0.032
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	0.218	0.008	0.060	0.105
Antimony (µg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0
Arsenic (µg/L)	4	< 10.0	< 10.0	5.0	5.0	0.0
Cadmium (mg/L)	4	< 0.005	< 0.005	0.002	0.002	0.000
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	0.000
Copper (mg/L)	4	< 0.005	< 0.005	0.002	0.002	0.000
Iron (mg/L)	4	0.174	1.330	0.814 ^M	0.783	0.505
Lead (µg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0
Manganese (mg/L)	4	< 0.005	0.059	0.050	0.041	0.026
Mercury (µg/L) ^J	4	< 0.3	< 0.3	0.2	0.2	0.0
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Selenium (µg/L)	4	< 10.0	< 10.0	5.0	5.0	0.0
Silver (mg/L)	4	< 0.003	< 0.003	0.002	0.002	0.000
Thallium (µg/L)	4	< 1.0	< 1.0	0.5	0.5	0.0
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Biological						
Chlorophyll a (ug/L) ^J	7	0.53	12.82	3.20	3.85	4.12
Fecal Coliform (col/100 mL) ^J	7	63	2,000	120	397	710

J=estimate; N= # of samples; C=value exceeds established criteria for F&W water use classification; M=value >90th percentile of all verified ecoregional reference reach data collected within eco-region 65d.