

2012 Monitoring Summary



Hatchet Creek approximately 4 miles upstream of Coosa County Road 18 (32.94392/-86.23579)

BACKGROUND

Hatchet Creek is one the streams the Alabama Department of Environmental Management (ADEM) monitors as a “best attainable condition” reference watershed for comparison with other large riffle-run streams.

Additionally, Hatchet Creek was selected for biological and water quality monitoring as part of the 2012 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River Basins. The objectives of the ACT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the ACT basin group. The data collected will also be used to develop and refine ADEM’s assessment methods in nonwadeable, flowing water bodies.

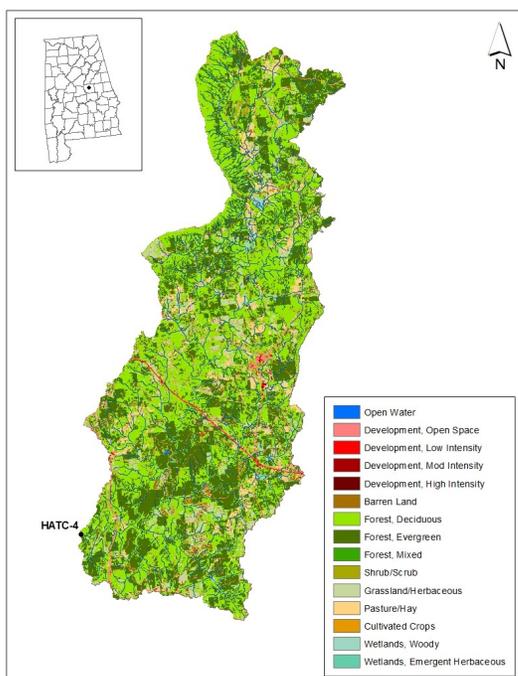


Figure 1. Sampling location and landuse within the Hatchet Creek watershed at HATC-4.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hatchet Creek at HATC-4 is a *Outstanding Alabama Water (OAW)/Swimming and Other Whole Body Water-Contact Sports (S)/Fish & Wildlife (F&W)* stream located in Coosa County (Figure 1). It is located within the Southern Inner Piedmont ecoregion (45a). Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (77%). Less than seven percent of the watershed is developed. As of September 1, 2012, ADEM has issued a total of 34 NPDES permits in the area, most of which are construction stormwater permits.

REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the macroinvertebrate 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. Hatchet Creek at HATC-4 is a riffle-run stream reach characterized primarily by bedrock substrate. The diversity of stable habitat categorized the stream reach as *optimal* for supporting biological communities.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Coosa River
Basin		Coosa River
Drainage Area (mi²)		237
Ecoregion^a		45a
% Landuse		
Open water		<1
Wetland	Woody	2
Forest	Deciduous	47
	Evergreen	29
	Mixed	1
Shrub/scrub		2
Grassland/herbaceous		8
Pasture/hay		4
Cultivated crops		<1
Development	Open space	4
	Low intensity	<1
	Moderate intensity	<1
	High intensity	<1
Barren		1
Population/km^{2b}		9
# NPDES Permits^c	TOTAL	34
Construction Stormwater		18
Industrial General		2
Industrial Individual		4
Municipal Individual		4
Underground Injection Control		6

a. Southern Inner Piedmont

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, September 1, 2012.

Table 2. Physical characteristics of Hatchet Creek at HATC-4, July 5, 2012.

Physical Characteristics		
Width (ft)	90	
Canopy Cover	Open	
Depth (ft)	Riffle	0.5
	Run	0.8
	Pool	1.5
% of Reach	Riffle	10
	Run	13
	Pool	77
% Substrate	Bedrock	57
	Boulder	7
	Cobble	3
	Gravel	10
	Sand	23

Table 3. Results of the habitat assessment conducted in Hatchet Creek at HATC-4, July 5, 2012.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	64	Sub-optimal (59-70)
Sediment Deposition	81	Optimal (>70)
Sinuosity	75	Sub-optimal (65-84)
Bank and Vegetative Stability	86	Optimal (>75)
Riparian Buffer	85	Sub-optimal (70-90)
Habitat Assessment Score	181	
% Maximum Score	75	Optimal (>70)

Table 4. Results of the macroinvertebrate assessment conducted in Hatchet Creek at HATC-4, July 5, 2012.

Macroinvertebrate Assessment		
	Results	Scores
Taxa richness and diversity measures		(0-100)
# EPT taxa	26	96
Shannon Diversity	4.08	64
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	10	20
% Non-insect taxa	10	63
Tolerance measures		
% Tolerant taxa	26	66
WMB-I Assessment Score	---	61.6
WMB-I Assessment Rating		Fair (47-69)

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Nonwadeable Intensive Multi-habitat Bioassessment methodology (NWMB-I). This method 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 *good* condition (Table 4).

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected monthly or semi-monthly during January through December of 2012 to help identify any stressors to the biological communities. Due to limited access at HATC-4, monthly water quality samples were collected at a road crossing approximately 4 miles downstream of the station. Dissolved thallium concentrations appear to have exceeded *F&W* human health criterion for fish consumption in one of three samples collected. However, there was heavy rain in the area in the days prior to sampling. Median specific conductance, hardness, and antimony were higher than expected based on data from established reference reaches in the Southern Inner Piedmont ecoregion.

SUMMARY

Overall habitat quality was categorized as *optimal* for supporting macroinvertebrate communities. Water chemistry analyses showed dissolved thallium concentrations may have been above *F&W* human health criterion in one of three samples, potentially due to elevated flows. Median conductivity, hardness, and antimony concentrations were higher than expected for streams in ecoregion 45a. Monitoring should continue to ensure that water quality and biological conditions meet current standards.

Table 5. Summary of water quality data collected January-December, 2012. 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	Q
Physical							
Temperature (°C)	12	10.0	30.2	19.4	19.5	7.7	
Turbidity (NTU)	12	1.8	9.8	3.7	4.2	2.4	
^J Total Dissolved Solids (mg/L)	12	22.0	70.0	40.0	43.7	15.0	
Total Suspended Solids (mg/L)	12	< 1.0	8.0	0.5	1.2	2.2	
Specific Conductance (µmhos)	12	34.8	50.5	42.7 ^G	42.8	5.4	
Hardness (mg/L)	3	11.7	16.0	12.5 ^G	13.4	2.3	
Alkalinity (mg/L)	12	9.6	59.1	16.0	19.1	13.2	
Stream Flow (cfs)	11	4.0	508.0	42.0	130.2	153.2	
Chemical							
Dissolved Oxygen (mg/L)	12	7.5	11.6	9.3	9.5	1.4	
pH (su)	12	6.6	8.0	7.3	7.2	0.4	
Ammonia Nitrogen (mg/L)	12	< 0.007	< 0.008	0.004	0.004	0.000	
^J Nitrate+Nitrite Nitrogen (mg/L)	12	< 0.002	0.039	0.002	0.008	0.011	
^J Total Kjeldahl Nitrogen (mg/L)	12	< 0.041	0.263	0.116	0.120	0.089	
^J Total Nitrogen (mg/L)	12	< 0.023	0.302	0.118	0.127	0.092	
^J Dissolved Reactive Phosphorus (mg/L)	12	< 0.004	0.007	0.004	0.005	0.002	
^J Total Phosphorus (mg/L)	12	0.008	0.015	0.011	0.011	0.002	
CBOD-5 (mg/L)	12	< 2.0	3.4	1.0	1.2	0.7	
COD (mg/L)	8	< 2.4	24.0	9.6	10.4	7.4	
^J TOC (mg/L)	8	1.4	2.2	1.8	1.8	0.3	
Chlorides (mg/L)	12	1.6	2.1	1.8	1.8	0.1	
Total Metals							
^J Aluminum (mg/L)	3	0.048	0.144	0.112	0.101	0.049	
Iron (mg/L)	3	0.376	0.536	0.439	0.450	0.081	
^J Manganese (mg/L)	3	< 0.007	0.038	0.023	0.022	0.017	
Dissolved Metals							
Aluminum (mg/L)	3	< 0.043	< 0.043	0.022	0.022	0.000	
Antimony (µg/L)	3	< 3.6	< 3.6	1.8 ^M	1.8	0.0	
Arsenic (µg/L)	3	< 1.8	< 1.8	0.9	0.9	0.0	
Cadmium (µg/L)	3	< 0.022	< 0.046	0.023	0.019	0.007	
Chromium (mg/L)	2	< 0.009	< 0.009	0.004	0.004	0.000	
Copper (mg/L)	2	< 0.020	< 0.020	0.010	0.010	0.000	
^J Iron (mg/L)	3	< 0.019	0.297	0.180	0.162	0.144	
Lead (µg/L)	3	< 0.9	< 0.9	0.4	0.4	0.0	
^J Manganese (mg/L)	3	< 0.007	0.027	0.020	0.017	0.012	
Mercury (µg/L)	3	< 0.035	< 0.035	0.018	0.018	0.000	
Nickel (mg/L)	3	< 0.042	< 0.042	0.021	0.021	0.000	
Selenium (µg/L)	3	< 2.5	< 2.5	1.2	1.2	0.0	
Silver (µg/L)	3	< 0.015	0.215	0.108	0.074	0.058	
^J Thallium (µg/L)	3	< 1.4	1.8 ^H	0.7	1.0	0.6	1
Zinc (mg/L)	3	< 0.012	< 0.012	0.006	0.006	0.000	
Biological							
Chlorophyll a (ug/L)	12	< 0.10	0.80	0.27	0.26	0.23	
^J E. coli (col/100mL)	8	16	579	44	114	191	

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 45a; H=*F&W* human health criterion exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 45a; N=# samples; Q=# of uncertain exceedances.

FOR MORE INFORMATION, CONTACT:

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