

# 2012 Monitoring Summary



## Hatchet Creek at Tyler Ford in Coosa County (32.91330/ -86.28442)

### BACKGROUND

Hatchet Creek is one of the streams the Alabama Department of Environmental Management (ADEM) monitors as a “best attainable condition” reference watershed for comparison with streams throughout the Southern Inner Piedmont ecoregion.

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 and to estimate overall water quality within the ACT basin group.



Figure 1. Hatchet Creek at HATC-3, June 8, 2012.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hatchet Creek at HATC-3 is an *Outstanding Alabama Waterway (OAW), Swimming and Other Whole Body Water-Contact Sports (S), and Fish & Wildlife (F&W)* stream located in the Coosa River basin. Based on the 2006 National Land Cover Dataset, land cover within the watershed is approximately 78% forested. As of September 1, 2012, ADEM’s NPDES Management System database showed 37 permitted discharges located within the watershed.

### 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 is a high-gradient, riffle-run stream characterized by cobble and gravel substrates typical of the Southern Inner Piedmont ecoregion (Figure 1). Overall habitat quality was rated as *optimal* for supporting macroinvertebrate communities.

### BIOASSESSMENT RESULTS

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

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
<b>Basin</b>		Coosa River
<b>Drainage Area (mi<sup>2</sup>)</b>		268
<b>Ecoregion<sup>a</sup></b>		45a
<b>% Landuse</b>		
Open water		<1
Wetland	Woody	2
Forest	Deciduous	47
	Evergreen	30
	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
<b>Population/km<sup>2b</sup></b>		8
<b># NPDES Permits<sup>c</sup></b>	<b>TOTAL</b>	37
	Construction Stormwater	18
	Mining	3
	Industrial General	2
	Industrial Individual	4
	Municipal Individual	4
	Underground Injection Control	6

a.Southern Inner Piedmont

b.2000 US Census

c.#NPDES outfalls downloaded from ADEM’s NPDES Management System database, September 1, 2012.

Table 2. Physical characteristics of Hatchet Creek at HATC-3, October 30, 2012.

Physical Characteristics		
<b>Width (ft)</b>		100
<b>Canopy cover</b>		Open
<b>Depth (ft)</b>		
	Riffle	0.8
	Run	1
	Pool	3
<b>% of Reach</b>		
	Riffle	35
	Run	50
	Pool	15
<b>% Substrate</b>		
	Bedrock	10
	Boulder	10
	Cobble	35
	Gravel	25
	Sand	15
	Silt	1
	Organic Matter	4

**Table 3.** Results of habitat assessment conducted on Hatchet Creek at HATC-3 on October 30, 2012.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	85	Optimal (> 70)
Sediment Deposition	85	Optimal (> 70)
Sinuosity	45	Marginal (45-64)
Bank and Vegetative Stability	83	Optimal (> 74)
Riparian Buffer	88	Sub-optimal (70-89)
<b>Habitat Assessment Score</b>	<b>191</b>	
<b>% Maximum score</b>	<b>80</b>	<b>Optimal (&gt; 70)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted in Hatchet Creek at HATC-3, June 8, 2012.

Macroinvertebrate Assessment		
	Results	Scores
<b>Taxa richness and diversity measures</b>		<b>(0-100)</b>
# EPT taxa	33	100
Shannon Diversity	4.63	90
<b>Taxonomic composition measures</b>		
% EPT minus Baetidae and Hydropsychidae	22	46
% Non-insect taxa	8	73
<b>Tolerance measures</b>		
% Tolerant taxa	22	79
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>77.5</b>
<b>WMB-I Assessment Rating</b>		<b>Good (70-85)</b>

## WATER CHEMISTRY

Results of water chemistry are presented in Table 5. *In situ* measurements and water samples were collected monthly or semi-monthly (metals) during April through November of 2012 to help identify any stressors to the biological communities. Specific conductance and hardness values were greater than median concentrations of reference data. Median values of dissolved antimony and thallium were greater than 90% of all verified ecoregional reference reach data collected in the Southern Inner Piedmont ecoregion. Temperature exceeded the criterion applicable to Hatchet Creek's OAW, S, and F&W use classifications in the August station visit.

## SUMMARY

Landuse, road density, and population density categorize Hatchet Creek among the least-disturbed watersheds in the ACT basin group. Habitat assessment results indicate the habitat within the reach to be in *optimal* condition. Bioassessment results indicate the macroinvertebrate community to be in *good* condition. Specific conductance, hardness, antimony, and thallium levels should be monitored to ensure the elevated levels do not impair the stream.

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**Table 5.** Summary of water quality data collected April-November, 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	E
<b>Physical</b>							
Temperature (°C)	8	13.6	30.2 <sup>C</sup>	23.1	22.4	5.6	1
Turbidity (NTU)	9	2.1	146.0	4.4	19.7	47.4	
<sup>J</sup> Total Dissolved Solids (mg/L)	8	10.0	68.0	38.0	35.8	17.5	
Total Suspended Solids (mg/L)	8	< 1.0	77.0	0.5	10.1	27.0	
Specific Conductance (µmhos)	8	31.0	50.0	42.3 <sup>G</sup>	42.0	5.8	
Hardness (mg/L)	4	9.9	13.2	11.6 <sup>G</sup>	11.5	1.4	
Alkalinity (mg/L)	8	10.0	21.6	15.0	15.6	4.0	
Stream Flow (cfs)	7	43.6	192.6	44.2	67.9	55.2	
<b>Chemical</b>							
Dissolved Oxygen (mg/L)	8	7.0	9.5	8.1	8.3	0.9	
pH (su)	8	6.5	7.4	6.9	6.9	0.3	
Ammonia Nitrogen (mg/L)	8	< 0.007	< 0.008	0.004	0.004	0.000	
<sup>J</sup> Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.005	0.059	0.004	0.013	0.019	
<sup>J</sup> Total Kjeldahl Nitrogen (mg/L)	8	< 0.041	0.457	0.091	0.171	0.183	
<sup>J</sup> Total Nitrogen (mg/L)	8	< 0.023	0.510	0.099	0.183	0.194	
<sup>J</sup> Dissolved Reactive Phosphorus (mg/L)	8	< 0.004	0.006	0.002	0.004	0.002	
<sup>J</sup> Total Phosphorus (mg/L)	8	0.009	0.145	0.012	0.028	0.047	
<sup>J</sup> CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0	
COD (mg/L)	8	7.3	30.6	13.8	15.6	7.4	
TOC (mg/L)	6	1.6	4.8	2.3	2.6	1.2	
Chlorides (mg/L)	8	1.3	2.0	1.7	1.7	0.2	
<b>Total Metals</b>							
<sup>J</sup> Aluminum (mg/L)	4	0.059	3.330	0.103	0.899	1.621	
Iron (mg/L)	4	0.411	5.260	0.524	1.680	2.387	
<sup>J</sup> Manganese (mg/L)	4	0.012	0.198	0.055	0.080	0.082	
<b>Dissolved Metals</b>							
<sup>J</sup> Aluminum (mg/L)	4	< 0.043	0.053	0.022	0.029	0.016	
Antimony (µg/L)	4	< 3.6	< 3.6	1.8 <sup>M</sup>	1.8	0.0	
Arsenic (µg/L)	4	< 1.8	< 1.8	0.9	0.9	0.0	
Cadmium (mg/L)	4	< 0.022	< 0.046	0.017	0.017	0.007	
Chromium (mg/L)	4	< 0.009	< 0.009	0.004	0.004	0.000	
Copper (mg/L)	4	< 0.020	< 0.020	0.010	0.010	0.000	
<sup>J</sup> Iron (mg/L)	4	0.128	0.330	0.233	0.231	0.084	
Lead (µg/L)	4	< 0.9	< 0.9	0.4	0.4	0.0	
<sup>J</sup> Manganese (mg/L)	4	< 0.007	0.053	0.024	0.026	0.024	
Mercury (µg/L)	4	< 0.035	< 0.035	0.018	0.018	0.000	
Nickel (mg/L)	4	< 0.042	< 0.042	0.021	0.021	0.000	
Selenium (µg/L)	4	< 2.5	< 2.5	1.2	1.2	0.0	
Silver (mg/L)	4	< 0.015	< 0.215	0.058	0.058	0.058	
Thallium (µg/L)	4	< 1.4	< 1.4	0.7 <sup>M</sup>	0.7	0.0	
Zinc (mg/L)	4	< 0.012	< 0.012	0.006	0.006	0.000	
<b>Biological</b>							
Chlorophyll a (ug/L)	8	< 0.10	2.67	0.29	0.90	1.13	
<sup>J</sup> E. coli (col/100mL)	8	24	> 2420	41	346	839	

J=estimate; N=number of samples, E=number of samples that exceed criterion; C= OAW, S, and F&W criterion violated; G=value greater than median concentration of all verified reference data collected in ecoregion 45a; M=value greater than 90% of all verified ecoregional reference reach data collected in the sub-ecoregion 45a