

# 2005 Monitoring Summary



## Hatchet Creek at AL Highway 148 or Clay County Road 7 (33.19137/-86.04696)

### BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Hatchet Creek watershed for biological and water quality monitoring as part of the [2005 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.

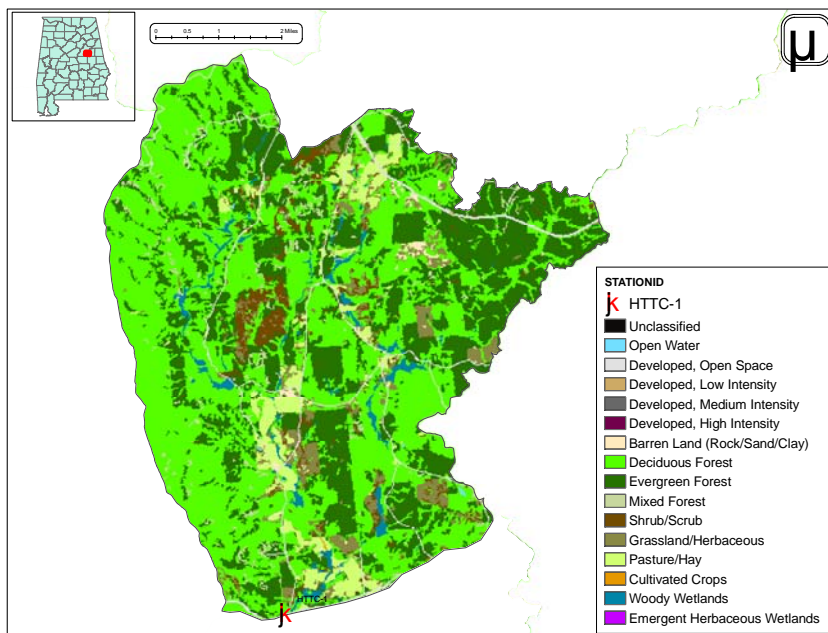
**Table 1.** Summary of watershed characteristics.

Watershed Characteristics	
Drainage Area (mi <sup>2</sup> )	42
Ecoregion <sup>a</sup>	45a
<b>% Landuse</b>	
Open water	<1
Wetland	Woody 2
Forest	Deciduous 50
	Evergreen 30
	Mixed 2
Shrub/scrub	3
Grassland/herbaceous	5
Pasture/hay	5
Cultivated crops	<1
Development	Open space 2
	Low intensity <1
Barren	<1
Population/km <sup>2b</sup>	6
# NPDES Permits <sup>c</sup>	<b>TOTAL</b> 3
Construction Stormwater	2
Mining General Permit (old)	1

a. Southern Inner Piedmont  
 b. 2000 US Census data  
 c. #NPDES permits downloaded from ADEM's NPDES Management System database, 9 Jun 2008

**Table 2.** Physical characteristics of Hatchet Creek at HTTC-1, July 6, 2005.

Physical characteristics	
Width (ft)	30
Canopy cover	Est. 50/50
Depth (ft)	
	Run 1.0
	Pool 2.0
% of Reach	
	Run 50
	Pool 50
% Substrate	
	Boulder 5
	Cobble 35
	Gravel 20
	Sand 27
	Silt 10
	Organic Matter 3



**Figure 1.** Sampling location and landuse within the Hatchet Creek watershed at HTTC-1.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hatchet Creek is a second order [Fish & Wildlife \(F&W\)](#) stream located in Clay County. It is a Piedmont stream located within the Talladega National Forest. Landuse within the watershed is primarily forest (84%), with some grassland and pasture areas (Fig. 1). There are a few permitted discharges within the watershed.

### REACH CHARACTERISTICS

[General observations](#) (Table 2) and [habitat assessments](#) (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 HTTC-1 is a low-gradient, glide-pool stream reach characterized by cobble, gravel, and sand substrates. A low-head dam is present downstream of the reach. Overall habitat quality was rated as *sub-optimal* for supporting biological communities.

### BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's [Intensive Multi-habitat Bioassessment methodology \(WMB-D\)](#). The WMB-D 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 an average of all individual metric scores. The final score indicated the biological community to be in *fair* condition (Table 4) and characteristic of low-gradient, glide-pool reaches in the Piedmont ecoregion.

**Table 3.** Results of habitat assessment conducted on Hatchet Creek at HTTC -1, July 6, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	67	Sub-optimal (59-70)
Sediment deposition	70	Sub-optimal (59-70)
Sinuosity	45	Marginal (45-64)
Bank and vegetative stability	71	Sub-optimal (60-74)
Riparian buffer	55	Marginal (50-69)
Habitat assessment score	142	
<b>% Maximum score</b>	<b>64</b>	<b>Sub-optimal (59-70)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted in Hatchet Creek at HTTC-1, July 6, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores	Rating
<b>Taxa richness measures</b>			
# EPT genera	20	80	Excellent (>78)
<b>Taxonomic composition measures</b>			
% Non-insect taxa	11	71	Fair (61.8-92.7)
% Plecoptera	2	5	Fair (3.7-5.6)
% Dominant taxa	31	48	Fair (47.0-70.5)
<b>Functional composition measures</b>			
% Predators	13	4	Very Poor (<15.1)
<b>Tolerance measures</b>			
Beck's community tolerance index	12	55	Good (31.8-65.9)
% Nutrient tolerant organisms	40	51	Fair (50.8-76.2)
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>45</b>	<b>Fair (37-56)</b>

## WATER CHEMISTRY

Results of water chemistry 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 to help identify any stressors to the biological communities. Median concentrations of nutrients, total and dissolved sediments, metals, and chlorides were similar to the 90<sup>th</sup> percentile of data collected in least-impaired ecoreference reaches in the Southern Inner Piedmont.

## CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Results of intensive water quality and the habitat assessment suggest that limited habitat and obstructed flow may contribute to the degraded community conditions.

**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	Median	Avg	SD
<b>Physical</b>						
Temperature (°C)	7	12.0	27.0	16.0	18.6	6.5
Turbidity (NTU)	8	3.8	13.7	7.2	8.0	3.0
Total dissolved solids (mg/L)	7	18.0	81.0	43.0	47.4	23.2
Total suspended solids (mg/L)	7	3.0	38.0	8.0	12.0	11.7
Specific conductance (µmhos)	8	30.4	39.6	34.2	34.3	3.0
Hardness (mg/L)	5	8.9	15.5	10.6	11.7	2.7
Alkalinity (mg/L)	7	5.7	17.1	10.6	10.8	3.6
Stream Flow (cfs)	8	7.5	161.2	35.5	59.0	---
<b>Chemical</b>						
Dissolved oxygen (mg/L)	8	6.7	10	8.2	8.3	1.4
pH (su)	8	6.3	7.02	6.7	6.7	0.3
Ammonia Nitrogen (mg/L)	7	< 0.015	< 0.015	0.008	0.008	0.000
<sup>J</sup> Nitrate+Nitrite Nitrogen (mg/L)	7	0.003	0.135	0.052	0.058	0.039
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.424	0.075	0.159	0.147
Total nitrogen (mg/L)	7	< 0.076	0.559	0.128	0.217	0.178
<sup>J</sup> Dissolved reactive phosphorus (mg/L)	7	< 0.004	1.151	0.007	0.169	0.433
Total phosphorus (mg/L)	7	0.004	0.046	0.032	0.031	0.013
CBOD-5 (mg/L)	7	1.0	2.8	1.9	1.9	0.7
Chlorides (mg/L)	7	3.6	4.1	3.7	3.8	0.2
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	0.00
<b>Total Metals</b>						
Aluminum (mg/L)	4	0.026	0.16	0.078	0.086	0.1
Iron (mg/L)	4	0.43	0.841	0.7615	0.699	0.2
Manganese (mg/L)	4	0.028	0.107	0.0655	0.067	0.0
<b>Dissolved Metals</b>						
Aluminum (mg/L)	4	< 0.015	< 0.015	0.0075	0.008	0.0
Antimony (µg/L)	4	< 2	< 2	1	1	0.0
Arsenic (µg/L)	4	< 10	< 10	5	5	0.0
Cadmium (mg/L)	4	< 0.005	< 0.005	0.0025	0.0025	0.0
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	0.0
Copper (mg/L)	4	< 0.005	< 0.005	0.0025	0.003	0.0
Iron (mg/L)	4	0.043	0.388	0.311	0.2633	0.2
Lead (µg/L)	4	< 2	< 2	1	1	0.0
Manganese (mg/L)	4	0.005	0.052	0.0335	0.031	0.0
<sup>J</sup> Mercury (µg/L)	4	< 0.3	< 0.3	0.225	0.225	0.1
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.0
Selenium (µg/L)	4	< 10	< 10	5	5	0.0
Silver (mg/L)	4	< 0.003	< 0.003	0.0015	0.0015	0.0
Thallium (µg/L)	4	< 1	< 1	0.5	0.500	0.0
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.0
<b>Biological</b>						
<sup>J</sup> Chlorophyll a (µg/L)	7	0.27	4.01	0.80	1.32	1.3
<sup>J</sup> Fecal Coliform (col/100 mL)	7	41	370	190	180	118

J=estimate; N= # samples.

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