

2005 Monitoring Summary

Hatchet Creek 0.75 Miles North of King’s Bridge Road (Coosa County) (32.94392/-86.23579)

BACKGROUND

Hatchet Creek, designated as an *Outstanding Alabama Water (OAW)*, is one of the streams monitored by the Alabama Department of Environmental Management (ADEM) as a “best attainable condition” reference watershed for larger riffle-run streams throughout the state.

A macroinvertebrate assessment was conducted on Hatchet Creek at HATC-4 on October 12, 2005. These data will be used to develop a nutrient target for the Cahaba River TMDL, monitor the health of Hatchet Creek, and to continue to refine ADEM’s nonwadeable, flowing biological assessment methods.



Figure 1. Hatchet Creek at HATC-4, 28 July 2006.

WATERSHED CHARACTERISTIC

Watershed characteristics are summarized in Table 1. Hatchet Creek at HATC-4 is a large riffle-run stream located in the Southern Inner Piedmont ecoregion (45a) in Coosa County. Land cover within the watershed is approximately 76% forested with the remainder being grassland, pasture, and a small amount of development. As of February 23, 2011, ADEM’s NPDES Management System database showed a total of thirty-four 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, as well as the quality and availability of habitat. Hatchet Creek at HATC-4 is a moderate-gradient, riffle-run stream characterized by sand, bedrock and gravel substrates. Because of the abundance and diversity of stable instream habitat and a large riparian buffer zone, overall habitat quality was categorized as *optimal* for supporting macroinvertebrate communities (Table 3).

Table 1. Summary of watershed characteristics based on the 2006 National Land Cover Dataset.

Watershed Characteristics		
Basin		Coosa River
Drainage Area (mi ²)		237
Ecoregion ^a		45a
% Landuse		
Open water		<1
Wetland	Woody	2
Forest	Deciduous	48
	Evergreen	27
	Mixed	1
Shrub/scrub		4
Grassland/herbaceous		10
Pasture/hay		4
Cultivated crops		<1
Development	Open space	4
	Low 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, 23 Feb 2011

Table 2. Physical characteristics of Hatchet Creek at HATC-4 on October 12, 2005.

Physical Characteristics		
Width (ft)		170
Canopy cover		Open (0-20%)
Depth (ft)	Riffle	0.7
	Run	1.8
	Pool	3.5
% of Reach	Riffle	3
	Run	50
	Pool	47
% Substrate	Bedrock	30
	Boulder	2
	Clay	2
	Cobble	1
	Mud/Muck	1
	Gravel	10
	Sand	50
	Silt	2
	Organic Matter	2

Table 3. Results of the habitat assessment conducted on Hatchet Creek at HATC-4 on October 12, 2005.

Habitat Assessment	% Max Score	Rating
Instream habitat quality	123	Optimal (> 70)
Sediment deposition	76	Optimal (> 70)
Sinuosity	75	Sub-optimal (65-84)
Bank and vegetative stability	69	Sub-optimal (60-74)
Riparian buffer	90	Optimal \geq 90
Habitat assessment score	214	
% Maximum score	89	Optimal (> 70)

Table 4. Results of the macroinvertebrate bioassessment conducted in Hatchet Creek at HATC-4 on October 12, 2005.

Macroinvertebrate Assessment Results		
Taxa richness measures		
Total # taxa		79
# Ephemeroptera (mayfly) genera		8
# Plecoptera (stonefly) genera		4
# Trichoptera (caddisfly) genera		14
# Clinger taxa		30
Taxonomic composition measures		
% Non-insect taxa		8
% Non-insect organisms		14
% Nutrient tolerant organisms		9
% Plecoptera		1
Tolerance measures		
Beck's community tolerance index		27

BIOASSESSMENT RESULTS

Macroinvertebrate bioassessment results from Hatchet Creek at HATC-4 will be used as a benchmark for least-impaired conditions in non-wadeable, flowing streams. Seventy-nine total taxa and fourteen caddisfly taxa were collected at the site. Becks Community Tolerance Index (BCTI) indicated the macroinvertebrate community to be healthy and intolerant of pollution (Table 4).

WATER CHEMISTRY

Results of monthly water quality data collected March through October are presented in Table 5. *In situ* measurements indicated that Hatchet Creek at HATC-4 was meeting its OAW use classification during each site visit. Median values of physical and chemical parameters without established criteria were similar to background levels as based on the 90th percentile of data collected in ecoregion 45a.

SUMMARY

Results of the 2005 macroinvertebrate and habitat assessments and monthly water quality data show Hatchet Creek at HATC-4 to be in good condition supporting the use of the site to collect data to develop a nutrient target for the Cahaba River TMDL, monitor the health of Hatchet Creek, and to continue to refine ADEM's nonwadeable, flowing biological assessment methods.

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
Physical						
Temperature (°C)	12	13.0	28.0	24.0	22.4	4.4
Turbidity (NTU)	12	4.3	350.0	7.0	37.4	98.6
Total dissolved solids (mg/L)	7	31.0	69.0	56.0	51.0	13.4
Total suspended solids (mg/L)	7	2.0	14.0	7.0	7.6	4.9
Specific conductance (µmhos)	12	32.8	47.5	39.0	40.5	5.0
Hardness (mg/L)	5	8.9	14.4	12.3	11.9	2.5
Alkalinity (mg/L)	7	9.6	16.1	11.8	12.5	2.5
Stream Flow (cfs)	9	64.0	263	189.6	170.6	65.4
Chemical						
Dissolved oxygen (mg/L)	12	6.8	9.4	7.6	7.9	0.8
pH (su)	12	6.2	8.3	6.9	7.0	0.5
Ammonia Nitrogen (mg/L)	7	< 0.015	0.021	0.008	0.010	0.005
Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.003	0.095	0.049	0.042	0.033
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.450	0.075	0.162	0.154
Total nitrogen (mg/L)	7	< 0.076	0.506	0.124	0.203	0.162
Dissolved reactive phosphorus (mg/L)	7	< 0.004	0.007	0.002	0.004	0.002
Total phosphorus (mg/L)	7	0.018	0.111	0.036	0.048	0.032
CBOD-5 (mg/L)	7	< 1.0	2.2	1.1	1.1	0.7
COD (mg/L)	3	< 2.0	< 2.0	1.0	1.0	0.0
^F Chlorides (mg/L)	7	3.8	4.6	4.0	4.1	0.4
Biological						
^J Chlorophyll a (µg/L)	7	0.36	4.27	0.53	1.86	1.4
^J Fecal Coliform (col/100 mL)	7	20	320	10	90	103

N=# of samples; J= estimate; M=value > 90th percent of ADEM's 45a reference reach samples.

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