

2005 Monitoring Summary

Hatchet Creek 0.5 Miles Northwest of Coosa County Road 111 (32.99980/-86.14250)

BACKGROUND

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

The Hatchet Creek watershed was selected for monitoring as a reference reach during the 2005 sampling season. The data collected will be used to develop a nutrient target for the Cahaba River TMDL, to monitor the health of Hatchet Creek, and to continue to refine ADEM’s nonwadeable, flowing biological assessment methods.

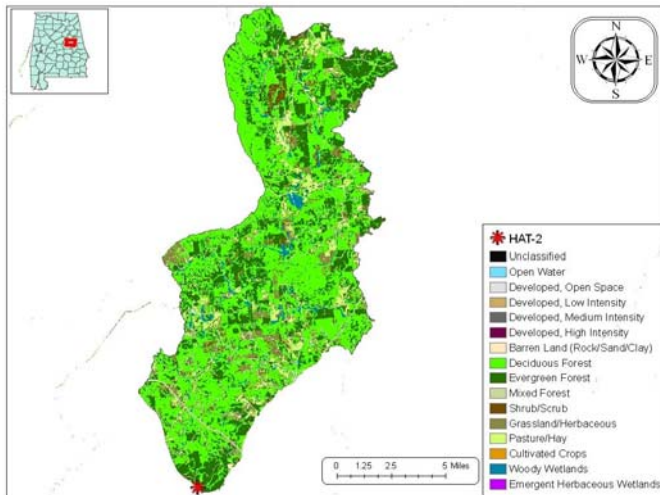


Figure 1. Sampling location and landuse within the Hatchet Creek watershed at HAT-2.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hatchet Creek at HAT-2 is a large, riffle-run stream located in the Southern Inner Piedmont ecoregion (45a) in Coosa County. Land cover within the watershed is approximately 77% forested, with the remainder being grassland, pasture, and a small amount of development. As of February 23, 2011, ADEM’s NPDES Management System database shows a total of twelve 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 HAT-2 is a riffle-run stream reach characterized by cobble, gravel, and boulder substrates. The presence of stable substrate and riffles within the stream reach categorized overall habitat quality as *optimal* for supporting macroinvertebrate communities.

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

Watershed Characteristics		
Basin	Coosa River	
Drainage Area (mi ²)	132	
Ecoregion ^a	45a	
% Landuse		
Open water		<1
Wetland	Woody	2
Forest	Deciduous	51
	Evergreen	25
	Mixed	3
Shrub/scrub		9
Grassland/herbaceous		8
Pasture/hay		5
Cultivated crops		<1
Development	Open space	3
	Low intensity	<1
Barren		<1
Population/km ^{2b}	39	
# NPDES Permits ^c	TOTAL	12
	Construction Stormwater	8
	Industrial General	1
	Industrial Individual	3

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 HAT-2 on October 11, 2005.

Physical Characteristics		
Width (ft)	83	
Canopy cover	Mostly Open (20-40%)	
Depth (ft)	Riffle	1.0
	Run	1.4
	Pool	2.0
% of Reach	Riffle	50
	Run	40
	Pool	10
% Substrate	Bedrock	5
	Boulder	25
	Cobble	30
	Gravel	22
	Sand	10
	Silt	5
	Organic Matter	3

Table 3. Results of the habitat assessment conducted on Hatchet Ck at HAT-2, Oct. 11, 2005.

Habitat Assessment	% Max Score	Rating
Instream habitat quality	88	Optimal > 70
Sediment deposition	82	Optimal > 70
Sinuosity	85	Optimal ≥ 85
Bank and vegetative stability	86	Optimal ≥ 75
Riparian buffer	90	Optimal ≥ 90
Habitat assessment score	207	
% Maximum score	86	Optimal > 70

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)	6	17.0	26.0	23.0	22.7	3.4
Turbidity (NTU)	6	4.2	34.8	7.4	13.7	12.7
Total Dissolved Solids (mg/L)	6	9.0	50.0	39.5	34.7	16.5
Total Suspended Solids (mg/L)	6	3.0	34.0	12.0	14.0	11.6
Specific Conductance (µmhos)	6	32.1	42.9	38.2	37.6	3.6
Hardness (mg/L)	3	9.0	14.1	12.8	12.0	2.7
Alkalinity (mg/L)	6	8.7	11.6	10.4	10.4	1.1
Stream Flow (cfs)	4	73.8	315.3	206.2	200.4	104.8
Chemical						
Dissolved Oxygen (mg/L)	6	8.0	9.9	9.2	9.0	0.8
pH (su)	6	7.0	7.9	7.3	7.4	0.4
Ammonia Nitrogen (mg/L)	6	< 0.015	< 0.015	0.008	0.008	0.0
Nitrate+Nitrite Nitrogen (mg/L)	6	0.014	0.110	0.050	0.054	0.032
Total Kjeldahl Nitrogen (mg/L)	6	0.150	0.364	0.206	0.212	0.093
Total Nitrogen (mg/L)	6	0.123	0.426	0.260	0.267	0.099
Dissolved Reactive Phosphorus (mg/L)	6	0.004	0.010	0.004	0.005	0.003
Total Phosphorus (mg/L)	6	0.018	0.044	0.036	0.034	0.009
CBOD-5 (mg/L)	6	1.0	2.8	1.6	1.6	0.7
COD (mg/L)	4	< 2.0	< 2.0	1.0	1.0	1.0
^J Chlorides (mg/L)	6	3.9	4.3	4.0	3.1	0.3
Biological						
^J Chlorophyll a (µg/L)	6	0.53	17.62	3.02	5.77	6.67
^J Fecal Coliform (col/100 mL)	6	20	1900	63	379	748

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

Table 4. Results of the macroinvertebrate bioassessment of Hatchet Creek at HAT-2 conducted Oct. 11, 2005.

Macroinvertebrate Assessment Results	
Taxa richness measures	
# Total Taxa	65
# Ephemeroptera (mayfly) genera	7
# Plecoptera (stonefly) genera	5
# Trichoptera (caddisfly) genera	12
# Clinger taxa	26
Taxonomic composition measures	
% Non-insect taxa	8
% Non-insect organisms	4
% Nutrient tolerant organisms	21
% Plecoptera	2
Tolerance measures	
Beck's community tolerance index	24

BIOASSESSMENT RESULTS

Macroinvertebrate bioassessment results from Hatchet Creek at HAT -2 will be used as a benchmark for least-impaired conditions in non-wadeable, flowing streams. Sixty-five total taxa and twelve 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 water chemistry are presented in Table 5. Samples were collected monthly during March through October of 2005. *In situ* measurements indicated that Hatchet Creek at HAT-2 was meeting requirements for its classification as an *OAW* stream reach during the 2005 sampling year. 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

Overall habitat quality was categorized as *optimal*. Median values of water chemistry parameters were within the range requirements of an *OAW* stream reach. These results show Hatchet Creek to be in good condition and support the use of the site to collect data to develop a nutrient target for the Cahaba River TMDL, to monitor the health of Hatchet Creek, and to continue to refine ADEM's nonwadeable, flowing biological assessment methods.

FOR MORE INFORMATION, CONTACT:
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