Alabama Department of Environmental Management

Ecological Reference Reach

Rivers and Streams Monitoring Program

2005 Monitoring Summary

Hatchet Creek at East Mill (Coosa County) (33.13050/-86.05500)

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 comparison with streams throughout the Southern Inner Piedmont ecoregion (45a), as well as large, riffle-run streams statewide.

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, monitor the health of Hatchet Creek, and to continue to refine ADEM's nonwadeable, flowing biological assessment methods. Hatchet Creek was also used as a reference reach for ecoregions 45 and 45a.

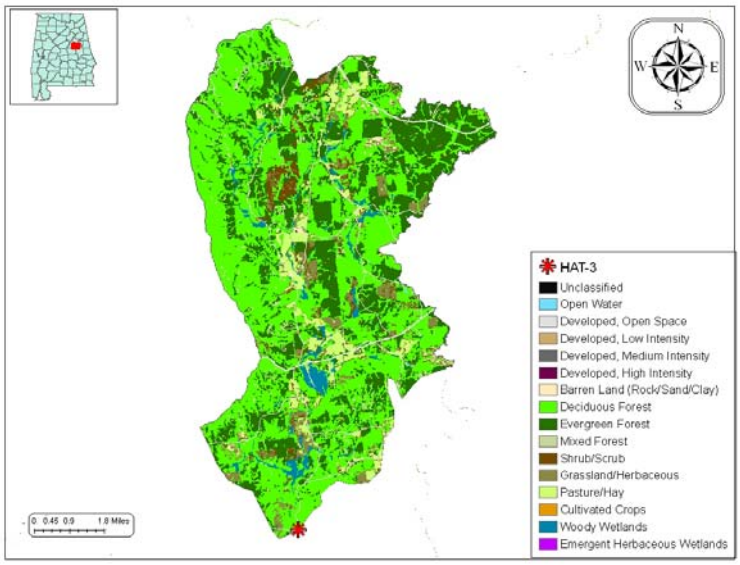

Figure 1. Hatchet Creek at HAT-3.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hatchet Creek at HAT-3 is a large riffle-run stream located in the Southern Inner Piedmont ecoregion (45a) in Coosa County. Based on the 2000 National Land Cover Dataset, land cover within the watershed is approximately 80% 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 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 HAT-3 is a high-gradient, riffle-run stream reach characterized by cobble and gravel substrates. The presence of stable substrate and riffles within the stream reach categorized overall habitat quality as *optimal* for supporting macroinvertebrate communities (Table 3).

Table 1. Summary of watershed characteristics based on the 2006

Watershed Characteristics		
Basin		Coosa River
Drainage Area (mi^2)		60
Ecoregion[a]		45a
% Landuse		
Open water		<1
Wetland	Woody	3
Forest	Deciduous	52
	Evergreen	27
	Mixed	1
Shrub/scrub		3
Grassland/herbaceous		7
Pasture/hay		4
Cultivated crops		<1
Development	Open space	2
Barren		<1
Population/km^2[b]		3
# NPDES Permits[c]	**TOTAL**	4
Construction Stormwater		4

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-3 on October 11, 2005.

Physical Characteristics		
Width (ft)		45
Canopy cover		Mostly Open (20-40%)
Depth (ft)	Riffle	0.7
	Run	1.5
	Pool	3.0
% of Reach	Riffle	45
	Run	20
	Pool	35
% Substrate	Bedrock	10
	Boulder	10
	Cobble	25
	Gravel	35
	Sand	8
	Silt	5
	Organic Matter	7

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

Habitat Assessment	(% Maximum Score)	Rating
Instream habitat quality	83	Optimal (> 70)
Sediment deposition	75	Optimal (> 70)
Sinuosity	83	Sub-optimal (65-84)
Bank and vegetative stability	70	Sub-optimal (60-74)
Riparian buffer	90	Optimal (> 70)
Habitat assessment score	191	
% Maximum score	**80**	**Optimal (> 70)**

Table 4. Results of the macroinvertebrate bioassessment of Hatchet Creek at HAT-3 conducted on October 11, 2005.

Macroinvertebrate Assessment Results	
Taxa richness measures	
# Total taxa	82
# Ephemeroptera (mayfly) genera	6
# Plecoptera (stonefly) genera	6
# Trichoptera (caddisfly) genera	12
# Clinger taxa	30
Taxonomic composition measures	
% Non-insect taxa	10
% Non-insect organisms	11
% Nutrient tolerant organisms	37
% Plecoptera	5
Tolerance measures	
Beck's community tolerance index	24

BIOASSESSMENT RESULTS

Macroinvertebrate bioassessment results from Hatchet Creek at HAT-3 will be used as a benchmark for least-impaired conditions in non-wadeable, flowing streams. Eighty-two total taxa and twelve caddisfly taxa were collected at the site. Becks Community Tolerance Index (BCTI) indicated the macroinvertebrate community to be healthy and diverse (Table 4).

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. Samples were collected monthly during March though October of 2005. *In situ* measurements indicated that Hatchet Creek at HAT-3 was meeting requirements for its classification as an *OAW* during the 2005 sampling year. Median values of physical and chemical parameters without established criteria, were within the range of values expected at ADEM's verified least-impaired ecoregional reference reaches.

CONCLUSION

Bioassessment results indicated the macroinvertebrate community in Hatchet Creek at HAT-3 to be in *fair* condition. Overall habitat quality was categorized as *optimal*. Median values of water chemistry parameters were within the range requirements of an *OAW* classified 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.

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)	8	15.0	26.0	22.5	21.5	4.2
Turbidity (NTU)	8	4.6	25.5	9.7	11.6	7.9
Total Dissolved Solids (mg/L)	7	2.0	137.0	42.0	51.0	41.2
Total Suspended Solids (mg/L)	7	3.0	19.0	11.0	11.3	5.1
Specific Conductance (µmhos)	8	31.4	47.1	38.1	38.3	4.8
Hardness (mg/L)	5	10.5	16.6	10.8	12.0	2.6
Alkalinity (mg/L)	7	7.9	21.8	9.9	11.8	4.7
Stream Flow (cfs)	7	19.9	117.5	59.7	55.4	36.6
Chemical						
Dissolved Oxygen (mg/L)	8	7.0	10.1	8.4	8.4	1.1
pH (su)	8	6.7	7.6	7.1	7.1	0.3
Ammonia Nitrogen (mg/L)	7	< 0.015	< 0.015	0.008	0.008	0.000
Nitrate+Nitrite Nitrogen (mg/L)	7	0.043	1.874	0.065	0.320	0.685
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.557	0.075	0.169	0.183
Total Nitrogen (mg/L)	7	0.129	1.949	0.148	0.489	0.668
Dissolved Reactive Phosphorus (mg/L)	7	< 0.004	0.009	0.004	0.004	0.002
Total Phosphorus (mg/L)	7	0.018	0.075	0.041	0.041	0.021
CBOD-5 (mg/L)	7	1.0	2.1	1.4	1.3	0.6
COD (mg/L)	3	< 2.0	< 2.0	1.0	1.0	0.0
[J] Chlorides (mg/L)	7	3.9	4.5	3.8	3.9	0.3
Biological						
[J] Chlorophyll a (µg/L)	7	0.27	14.95	2.14	4.01	5.13
[J] Fecal Coliform (col/100 mL)	7	37	8	62	185	289

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

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