Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2005 Monitoring Summary

Fair™

Hurricane Creek at Cherokee County Road 33 (34.00280/-85.57900)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Hurricane 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.

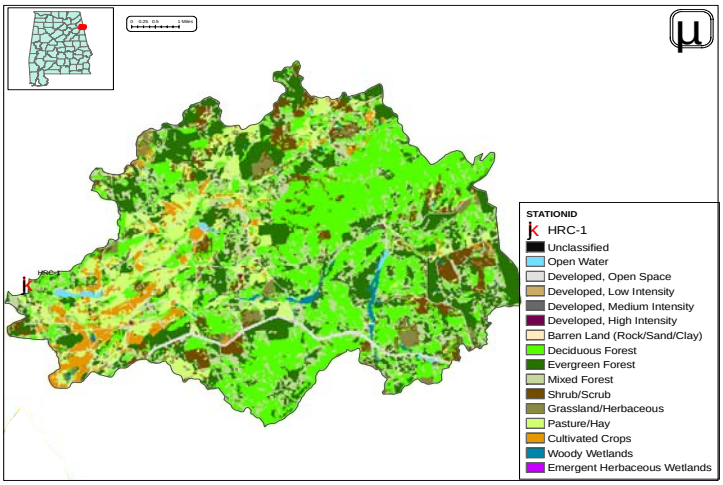

Figure 1. Sampling location and landuse within the Hurricane Creek watershed at HRC-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hurricane Creek is a small *Fish & Wildlife (F&W)* stream located near the city of Piedmont (Fig.1). This watershed is usually characterized by mid to low gradient streams with bedrock, cobble, gravel and sand substrates. Landuse within the watershed is primarily forest (69%), with some areas of pasture and hay.

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. Hurricane Creek at HRC-1 is a high-gradient, mostly gravel and sand- bottomed stream in the Coosa River basin. The presence of mixed forests and pasture/hay areas are characteristic of streams in this ecoregion (Table 1). Overall habitat quality was categorized as *optimal* however most parameters fell into the *marginal* category.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). The WMB-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 an average of the score for each metric. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi^2)		55
Ecoregion[a]		67f
% Landuse		
Open water		<1
Wetland	Woody	1
	Emergent herbaceous	<1
Forest	Deciduous	32
	Evergreen	21
	Mixed	16
Shrub/scrub		7
Grassland/herbaceous		3
Pasture/hay		11
Cultivated crops		4
Development	Open space	3
	Low intensity	<1
	Moderate intensity	<1
	High intensity	<1
Barren		<1
Population/km^2[b]		11
# NPDES Permits[c]	**TOTAL**	7
Construction Stormwater		2
Mining		2
Mining General Permit (old)		2
Industrial Individual		1

a. Southern Limestone/Dolomite Valleys and Low Rolling Hills
b. 2000 US census data
c. #NPDES permits downloaded from ADEM's NPDES Management System database, 9 Jun 2008

Table 2. Physical characteristics at HRC-1, May 4, 2005.

Physical Characteristics		
Width (ft)		35
Canopy cover		Est. 50/50
Depth (ft)		
	Riffle	0.75
	Run	1.5
	Pool	3.0
% of Reach		
	Riffle	5
	Run	45
	Pool	50
% Substrate		
	Boulder	2
	Cobble	15
	Gravel	35
	Sand	34
	Silt	5
	Organic Matter	9

Table 3. Results of the habitat assessment conducted on HRC-1, May 4 , 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	86	Optimal (> 70)
Sediment deposition	58	Marginal (41-58)
Sinuosity	55	Marginal (45-64)
Bank and vegetative stability	88	Optimal (≥75)
Riparian buffer	65	Marginal (50-69)
Habitat assessment score	182	
% Maximum score	**76**	**Optimal (> 70)**

Table 4. Results of the macroinvertebrate bioassessment conducted on HRC-1, May 4, 2005.

Macroinvertebrate Assessment Results			
	Results	**Scores (0-100)**	**Rating**
Taxa richness measures			
# Ephemeroptera (mayfly) genera	9	75	Good (71-85)
# Plecoptera (stonefly) genera	2	33	Fair (32-49)
# Trichoptera (caddisfly) genera	9	75	Good (67-83)
Taxonomic composition measures			
% Non-insect taxa	7	72	Fair (49.4-74.1)
% Non-insect organisms	7	81	Fair (62.7-93.9)
% Plecoptera	1	7	Poor (6.56-13.1)
Tolerance measures			
Beck's community tolerance index	11	39	Poor (20.2-40.7)
WMB-I Assessment Score	**---**	**55**	**Fair (48-72)**

WATER CHEMISTRY

Results of water chemistry analyses 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 total suspended solids, nitrate+nitrite-nitrogen and chlorophyll a were above values expected for this ecoregion. Metals concentrations were below detection limits. Pesticides and semi-volatiles were not detected in the one sample collected in June.

CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality was categorized as *optimal* due to good instream habitat quality and bank and vegetative stability. Nitrate+nitrite-nitrogen, total suspended solids, and chlorophyll a were parameters of concern.

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)	7	15.0	26.0	18.0	19.7	4.0
Turbidity (NTU)	7	5.0	24.9	7.9	10.1	6.9
Total dissolved solids (mg/L)	7	39.0	145.0	70.5	77.5	36.5
Total suspended solids (mg/L)	7	8.0	70.0	21.0[M]	26.7	23.0
Specific conductance (µmhos)	7	60.8	216.9	176.4	147.6	55.4
Hardness (mg/L)	5	24.2	123.0	67.1	64.9	35.9
Alkalinity (mg/L)	7	25.1	109.4	71.1	64.3	28.2
Stream Flow (cfs)	4	27.6	139.4	71.6	77.6	---
Chemical						
Dissolved oxygen (mg/L)	7	6.5	9.8	7.0	8.0	1.5
pH (su)	7	6.4	8.2	7.6	7.5	0.6
Ammonia Nitrogen (mg/L)	7	< 0.015	0.048	0.015	0.015	0.004
Nitrate+Nitrite Nitrogen (mg/L)	7	0.167	0.332	0.249[M]	0.248	0.053
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.488	0.075	0.170	0.168
Total nitrogen (mg/L)	7	< 0.308	0.734	0.366	0.418	0.160
Dissolved reactive phosphorus (mg/L)	7	0.007	0.020	0.010	0.011	0.005
Total phosphorus (mg/L)	7	0.018	0.066	0.046	0.045	0.019
[J] CBOD-5 (mg/L)	7	< 1.0	4.0	0.5	1.2	1.4
[J] Chlorides (mg/L)	6	3.6	4.6	4.1	4.1	0.4
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	
Total Metals						
Aluminum (mg/L)	4	< 0.015	0.102	0.028	0.050	0.0
Iron (mg/L)	4	0.026	0.355	0.353	0.329	0.044
Manganese (mg/L)	4	< 0.005	0.115	0.061	0.078	0.032
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	< 0.015	0.008	0.008	0.000
Antimony (µg/L)	4	< 2	< 2	1	1	0.0
Arsenic (µg/L)	3	< 10	< 10	5	5	0.0
Cadmium (mg/L)	4	< 0.005	< 0.005	0.003	0.003	0.000
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	0.000
Copper (mg/L)	4	< 0.005	< 0.005	0.003	0.003	0.000
Iron (mg/L)	4	< 0.005	0.084	0.075	0.054	0.045
Lead (µg/L)	4	< 2	< 2	1	1	0.0
Manganese (mg/L)	4	< 0.005	0.021	0.008	0.011	0.01
[J] Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.2	0.1
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Selenium (µg/L)	4	< 10	< 10	5	5	0.0
Silver (mg/L)	4	< 0.003	< 0.003	0.002	0.002	0.000
Thallium (µg/L)	4	< 1	< 1	0.5	0.5	0.0
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Biological						
[J] Chlorophyll a (µg/L)	7	0.71	3.47	3.03 [M]	2.42	1.2
[J] Fecal Coliform (col/100 mL)	7	5	510	150	223	186

J=estimate; N=# samples; M=value > 90th percentile of all data collected within ecoregion 67f

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