

2006 Monitoring Summary



Basin Assessment Site

Harris Creek at Norris Road in Clarke County (31.77915/-87.98528)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected Harris Creek watershed for biological and water quality monitoring as part of the 2006 Assessment of the Escatawpa, Mobile, and Tombigbee (EMT) River Basins. The objectives of the EMT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the EMT basin group.

Additionally, Harris Creek is among the least-disturbed watersheds in the EMT basin group based on landuse, road density, and population density. These data will also be used to evaluate the use of Harris Creek as a “best attainable” condition reference watershed for comparison with other Coastal Plain streams.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Lower Tombigbee	
Drainage Area (mi ²)	30	
Ecoregion ^a	65q	
% Landuse		
Open water	<1	
Wetland	Woody	3
	Emergent herbaceous	<1
Forest	Deciduous	6
	Evergreen	51
	Mixed	25
Shrub/scrub	9	
Grassland/herbaceous	<1	
Pasture/hay	3	
Cultivated crops	1	
Development	Open space	2
	Low intensity	<1
Population/km ² ^b		
a. Buhrstone/Lime Hills		
b. 2000 US Census		

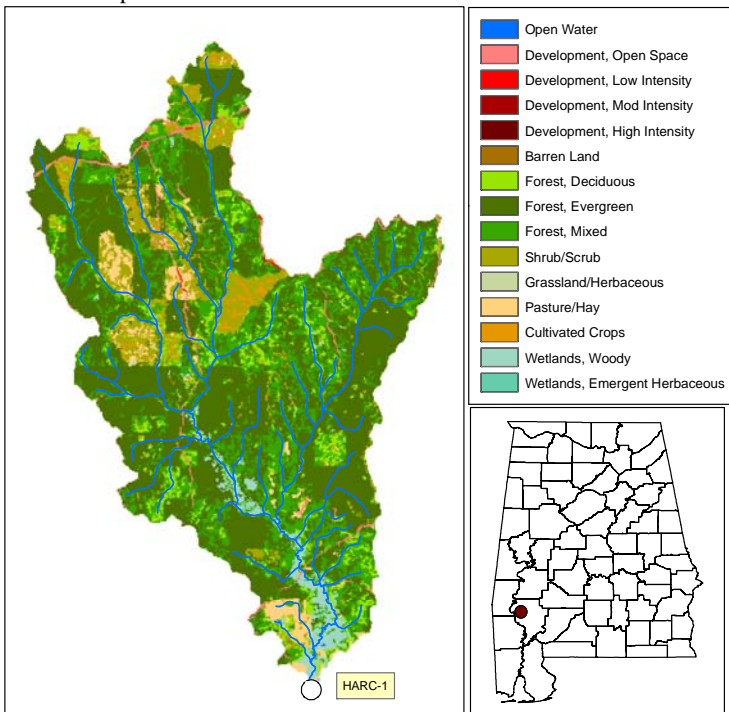


Table 2. Physical characteristics of Harris Creek at HARC-1, May 25, 2006.

Physical Characteristics		
Width (ft)	20	
Canopy cover	Mostly Shaded	
Depth (ft)	Run	1.0
	Pool	2.0
% of Reach	Run	60
	Pool	40
% Substrate	Sand	80
	Silt	10
	Organic Matter	10

Figure 1. Sampling location and landuse within the Harris Creek watershed at HARC-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Harris Creek at HARC-1 is a small *Fish & Wildlife (F&W)* stream located in the Buhrstone/Lime Hills ecoregion (65q) (Griffith et al. 2001). Landuse within the watershed is mainly forest (82%), shrub/scrub, and pasture/hay (Figure 1). No NPDES permits have been issued in the watershed as of September 18, 2009.

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 and the quality and availability of habitat. Harris Creek at HARC-1 is a low-gradient stream with primarily sand substrates (Figure 2). Overall habitat quality was rated as *marginal*.

Table 3. Results of the habitat assessment conducted on Harris Creek at HARC-1, May 25, 2006.

Habitat Assessment (% Maximum Score)	Score	Rating
Instream habitat quality	32	Poor (<40)
Sediment deposition	56	Sub-optimal (53-65)
Sinuosity	38	Poor (<45)
Bank and vegetative stability	33	Poor (<35)
Riparian buffer	68	Marginal (50-69)
Habitat assessment score	96	
% Maximum score	44	Marginal (40-52)

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 all individual metric scores. The final score indicated the biological community to be in *good* condition (Table 4).

Table 4. Results of the macroinvertebrate bioassessment conducted in Harris Creek at HARC-1, May 25, 2006.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures			
# EPT genera	20	80	Excellent (>78)
Taxonomic composition measures			
% Non-insect taxa	9	79	Fair (61.9-92.7)
% Plecoptera	1	5	Fair (3.8-5.6)
% Dominant taxa	18	79	Good (70.6-85.2)
Functional composition measures			
% Predators	22	76	Excellent (>72.1)
Tolerance measures			
Beck's community tolerance index	9	41	Good (31.9-65.9)
% Nutrient tolerant organisms	26	73	Fair (50.9-76.2)
WMB-I Assessment Score	---	62	Good (57-78)



Figure 2. Harris Creek at HARC-1, February 2, 2010.

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 2006 to help identify any stressors to the biological communities. Flows could not be measured after the June sampling event. Dissolved oxygen was lower than the established *F&W* criteria in October due in part to no flow conditions. The median concentrations of hardness, and dissolved metals (iron and manganese) were higher than expected based on the 90th percentile of reference reaches in ecoregion 65q.

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data.

Although overall habitat quality was rated as *marginal*, bioassessment and water quality data indicated the Harris Creek at HARC-1 to be in *good* condition.

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Table 5. Summary of water quality data collected March-October, 2006. 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)	9	14.0	25.0	22.0	20.7	3.9
Turbidity (NTU)	9	8.2	19.7	13.0	13.2	4.0
Total Dissolved Solids (mg/L)	8	71.0	167.0	109.5	115.6	29.2
Total Suspended Solids (mg/L)	8	< 1.0	10.0	6.5	5.6	3.1
Specific Conductance (µmhos)	9	74.3	213.0	118.4	131.9	52.6
Hardness (mg/L)	3	39.0	114.0	101.0 ^M	84.7	40.1
Alkalinity (mg/L)	8	24.0	94.0	37.5	51.4	27.6
Stream Flow (cfs)	5	0.5	18.7	4.2	6.2	7.3
Chemical						
Dissolved Oxygen (mg/L)	9	4.6 ^C	8.7	6.7	6.9	1.3
pH (su)	9	6.8	7.4	7.2	7.1	0.2
Ammonia Nitrogen (mg/L)	8	< 0.010	0.107	0.039	0.044	0.036
Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.003	0.870	0.017	0.127	0.301
Total Kjeldahl Nitrogen (mg/L)	8	0.228	0.930	0.448	0.480	0.233
Total Nitrogen (mg/L)	8	0.230	1.800	0.479	0.607	0.507
Dissolved Reactive Phosphorus (mg/L)	8	< 0.004	0.009	0.004	0.005	0.003
Total Phosphorus (mg/L)	8	< 0.004	0.054	0.035	0.032	0.017
CBOD-5 (mg/L)	8	< 1.0	2.6	1.2	1.4	0.9
Chlorides (mg/L)	8	< 1.4	6.2	3.0	3.7	1.9
Atrazine (µg/L)	1	< 0.05	0.05	0.05	0.05	
Total Metals						
Aluminum (mg/L)	3	< 0.1	0.55	0.110	0.237	0.273
Iron (mg/L)	3	1.85	3.41	2.92	2.727	0.798
Manganese (mg/L)	3	0.071	0.306	0.284	0.220	0.130
Dissolved Metals						
Aluminum (mg/L)	3	0.12	0.18	0.150	0.150	0.030
Antimony (µg/L)	3	< 7.5	< 7.5	3.8	3.8	0.0
Arsenic (µg/L)	3	< 5	< 5	2.5	2.5	0.0
Cadmium (mg/L)	3	< 0.0003	< 0.0003	0.0001	0.0001	0.000
Chromium (mg/L)	3	< 0.005	< 0.005	0.003	0.003	0.000
Copper (mg/L)	3	< 0.005	< 0.005	0.003	0.003	0.000
Iron (mg/L)	3	0.518	2.720	1.990 ^M	1.743	1.122
Lead (µg/L)	3	< 5	< 5	2.5	2.5	0.0
Manganese (mg/L)	3	0.054	0.304	0.285 ^M	0.214	0.139
Mercury (µg/L)	3	< 0.5	< 0.5	0.3	0.3	0.0
Nickel (mg/L)	3	< 0.005	0.023	0.007	0.0108	0.011
Selenium (µg/L)	3	< 7.5	< 7.5	3.8	3.8	0.0
Silver (mg/L)	3	< 0.001	< 0.001	0.0004	0.0004	0.0000
Thallium (µg/L)	3	< 2.5	9	4.5	3.4	1.9
Zinc (mg/L)	3	< 0.005	< 0.005	0.003	0.003	0.000
Biological						
Chlorophyll a (µg/L)	8	< 0.10	1.60	0.80	0.80	0.49
^J Fecal Coliform (col/100 mL)	5	53	180	87	102	53

J=estimate; N= # of samples; C=value exceeds established criteria for *Fish & Wildlife* water use classification; M=value>90% of all verified ecoregional reference reach data collected in the subcoregion/ecoregion 65q.