Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2011 Monitoring Summary

Good

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

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Harris Creek watershed for biological and water quality monitoring as part of the 2011 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. As a candidate for the ADEM Reference Reach Program, data collected at Harris Creek will also be used to determine if Harris Creek meets the "best attainable condition" for the 65q ecoregion

Figure 1. Harris Creek at HARC-1, June 1, 2011.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Harris Creek at HARC-1 is categorized as a *Fish & Wildlife* (*F&W*) stream and drains approximately 30 mi^2 of the Buhrstone/Lime Hills ecoregion (65q) (Griffith et al. 2001). Based on the 2006 National Land Cover dataset, landuse within the watershed is mainly forest (82%), shrub/scrub, and pasture/hay (Figure 1). No NPDES permits have been issued in this watershed as of February 23, 2011.

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. Overall habitat quality was rated as *marginal* due to poor instream habitat quality and bank stability.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Lower Tombigbee River
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]		1

a. Buhrstone/Lime Hills
b. 2000 US Census

Table 2. Physical characteristics of Harris Creek at HARC-1, May 17, 2011.

Physical Characteristics		
Canopy Cover		Mostly Shaded
Width (ft)		12
Depth (ft)		
	Run	0.5
	Pool	2.0
% of Reach		
	Run	85
	Pool	15
% Substrate		
	Clay	1
	Sand	83
	Silt	3
	Organic Matter	13

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 3. Results of the habitat assessment conducted on Harris Creek at HARC-1, May 17, 2011.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	34	Poor <40
Sediment Deposition	61	Sub-optimal (53-65)
Sinuosity	45	Marginal (45-64)
Bank and Vegetative Stability	31	Poor <35
Riparian Buffer	88	Sub-optimal (70-89)
Habitat Assessment Score	**111**	
% Maximum Score	**50**	**Marginal (40-52)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Harris Creek at HARC-1, May 17, 2011.

Macroinvertebrate Assessment		
	Results	**Scores**
Taxa richness and diversity measures		**(0-100)**
% EPC taxa	42	89
% Dominant Taxon	21	74
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	0	0
Functional feeding group		
# Collector Taxa	14	35
Community tolerance		
% Nutrient Tolerant individuals	37	49
WMB-I Assessment Score	**---**	**49**
WMB-I Assessment Rating		**Good (48-74)**

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were scheduled for collection during April, June, August and October of 2011 to help identify any stressors to the biological communities. Due to lack of flow, samples were not collected during the October site visit. The median concentrations of specific conductance and hardness were higher than all verified ecoregional reference reach data collected in ecoregion 65q. Median dissolved arsenic exceeded the *F&W* use class human health criterion. Median total dissolved solids, alkalinity, total iron and manganese were higher than expected based on the 90th percentile of reference reaches in ecoregion 65q. Organics were collected twice during the sampling period, with all parameters below detection limit.

SUMMARY

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

Although overall habitat quality was rated as *marginal*, results of the 2011 bioassessment data indicated that the macroinvertebrate community in Harris Creek at HARC-1 to be in *good* condition. Median dissolved arsenic exceeded *F&W* human health criteria during the sampling period.

FOR MORE INFORMATION, CONTACT:
Ransom Williams, Jr. ADEM Environmental Indicators Section
1350 Coliseum Boulevard Montgomery, AL 36110
(334) 260-2715 rw@adem.state.al.us

Table 5. Summary of water quality data collected in April, June, August and October, 2011. 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	Med	Avg	SD	E
Physical							
Temperature (°C)	4	16.3	26.0	20.9	21.0	5.2	
Turbidity (NTU)	4	6.5	44.9	11.2	18.4	17.8	
Total Dissolved Solids (mg/L)	3	98.0	154.0	130.0 M	127.3	28.1	
J Total Suspended Solids (mg/L)	3	1.0	11.0	10.0	7.3	5.5	
Specific Conductance (µmhos)	4	37.8	266.1	127.0 G	139.4	98.4	
Hardness (mg/L)	3	13.5	138.0	68.6 G	73.4	62.4	
Alkalinity (mg/L)	3	7.4	129.0	71.9 M	69.4	60.8	
Stream Flow (cfs)	2	0.5	4.2	2.4	2.4	2.6	
Chemical							
Dissolved Oxygen (mg/L)	4	5.6	9.0	7.8	7.5	1.6	
pH (su)	4	6.1	7.4	7.2	7.0	0.6	
Ammonia Nitrogen (mg/L)	3 <	0.005	0.023	0.002	0.009	0.012	
J Nitrate+Nitrite Nitrogen (mg/L)	3	0.016	0.046	0.020	0.027	0.016	
Total Kjeldahl Nitrogen (mg/L)	3	0.317	0.905	0.458	0.560	0.307	
J Total Nitrogen (mg/L)	3	0.337	0.921	0.504	0.587	0.301	
J Dissolved Reactive Phosphorus (mg/L)	3	0.005	0.009	0.007	0.007	0.002	
Total Phosphorus (mg/L)	3	0.015	0.020	0.019	0.018	0.003	
CBOD-5 (mg/L)	3 <	2.0	<2.0	1.0	1.0	0.0	
COD (mg/L)	3	11.2	39.9	14.6	21.9	15.7	
J TOC (mg/L)	3	2.2	9.4	5.2	5.6	3.6	
Chlorides (mg/L)	3	2.2	3.3	3.0	2.8	0.6	
Atrazine (µg/L)	1			<	0.02		
Total Metals							
J Aluminum (mg/L)	3	0.157	0.495	0.358	0.337	0.170	
Iron (mg/L)	3	0.905	4.300	2.760 M	2.655	1.700	
Manganese (mg/L)	3	0.077	0.541	0.182 M	0.267	0.243	
Dissolved Metals							
J Aluminum (mg/L)	3 <	0.043	0.202	0.047	0.090	0.098	
Antimony (µg/L)	3 <	1.9	<1.9	0.9	0.9	0.0	
J Arsenic (µg/L)	3 <	1.4	1.6	0.7 H	1.0	0.5	1
Cadmium (mg/L)	3 <	0.00002	<0.00002	0.00001	0.00001	0.000	
Chromium (mg/L)	3 <	0.009	<0.009	0.004	0.004	0.000	
Copper (mg/L)	3 <	0.020	<0.020	0.010	0.010	0.000	
Iron (mg/L)	3	0.345	2.220	0.398	0.988	1.068	
Lead (µg/L)	3 <	0.9	<0.9	0.5	0.5	0.0	
Manganese (mg/L)	3	0.063	0.163	0.139 M	0.122	0.052	
Mercury (µg/L)	3 <	0.035	<0.035	0.018	0.018	0.000	
Nickel (mg/L)	3 <	0.042	<0.042	0.021	0.021	0.000	
J Selenium (µg/L)	3 <	1.3	1.9	0.7	1.1	0.7	
Silver (mg/L)	3 <	0.000	<0.000	0.000	0.000	0.000	
Thallium (µg/L)	3 <	1.09	<1.09	0.5	0.5	0.0	
Zinc (mg/L)	3 <	0.012	<0.012	0.006	0.006	0.000	
Biological							
Chlorophyll a (ug/L)	3 <	0.10	1.07	0.05	0.39	0.59	
J E. coli (col/100mL)	3	81	1414	1,203	899	716	

E=# of samples that exceeded criteria; G=value higher than median concentration of all verified ecoregional reference reach data collected in ecoregion 65q; H=*F&W* human health criterion exceeded; J=estimate; M=value>90% of all verified ecoregional reference reach data collected in the subecoregion/ ecoregion 65q; N= # of samples.