Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2013 Monitoring Summary

Good

Hurricane Creek at the end of Jackson County Road 9 (34.98214/-86.09607)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Hurricane Creek watershed for biological and water quality monitoring as part of the 2013 Assessment of the Tennessee (TN) River Basin. The Hurricane Creek watershed was also requested for reference reach monitoring. The objectives of the Tennessee River Basin Assessments were to assess the biological integrity of each monitoring location and to estimate overall water quality within the TN basin. A habitat and macroinvertebrate assessment were conducted on Hurricane Creek at HURR-2 on June 25, 2013.

Figure 1. Hurricane Creek at HURR-2 on June 20, 2013.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tennessee River
Drainage Area (mi^2)		30
Ecoregion[a]		68c
% Landuse		
Open water		<1
Wetland	Woody	<1
Forest	Deciduous	95
	Evergreen	<1
	Mixed	1
Shrub/scrub		1
Grassland/herbaceous		1
Pasture/hay		1
Cultivated crops		<1
Development	Open space	1
	Low intensity	<1
Population/km^2[b]		<1

a. Plateau Escarpment
b. 2000 US Census

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hurricane Creek is a *Fish and Wildlife (F&W)* stream located near of the city of Estill Fork, Alabama, and flows into Paint Rock River. At HURR-2, the stream drains approximately 30 square miles and has very little disturbance within the watershed. Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (>96%) areas. As of May 13, 2013, no NPDES permits have been issued in this watershed.

Table 2. Physical characteristics of Hurricane Creek at HURR-2, June 25, 2013.

Physical Characteristics		
Width (ft)		40
Canopy Cover		Estimate 50/50
Depth (ft)		
	Riffle	0.5
	Run	1.5
	Pool	2.5
% of Reach		
	Riffle	30
	Run	60
	Pool	10
% Substrate		
	Boulder	2
	Cobble	42
	Gravel	43
	Sand	10
	Organic Matter	3

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. Hurricane Creek at HURR-2 is a riffle-run stream characterized primarily by gravel and cobble (Figure 1). Overall habitat quality was categorized as *optimal* due to good channel morphology, bank stability, and instream habitat quality.

BIOASSESSMENT RESULTS

The benthic macroinvertebrate community was sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). Measures of taxonomic richness, community composition, and community tolerance are used to assess the overall health of the macroinvertebrate community in comparison to conditions expected in south Alabama streams and rivers. Each site is placed in one of six levels, ranging from 1, or *natural* to 6, or *highly altered.* The macroinvertebrate survey conducted at HURR-2 rated the site as a *3*, or *Good* (Table 4).

Table 3. Results of the habitat assessment conducted on Hurricane Creek at HURR-2, June 25, 2013.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	94	Optimal (>70)
Sediment Deposition	93	Optimal (>70)
Sinuosity	95	Optimal (>84)
Bank and Vegetative Stability	81	Optimal (>74)
Riparian Buffer	78	Sub-optimal (70-89)
Habitat Assessment Score	**211**	
% Maximum Score	**88**	**Optimal (>70)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Hurricane Creek at HURR-2, June 25, 2013.

Macroinvertebrate Assessment	
	Results
Taxa richness measures	
Total # Taxa	70
# EPT taxa	21
# Highly-sensitive and Specialized Taxa	5
Taxonomic composition measures	
% EPC taxa	33
% Non-insect taxa	9
% Dominant taxon	46
% Individuals in Dominant 5 Taxa	73
Functional feeding group measures	
% Predators	10
Tolerance measures	
# Sensitive EPT	14
% Sensitive taxa	40
% Taxa as Tolerant	20
WMB-I Assessment Score	**3**
WMB-I Assessment Rating	**Good**

WATER CHEMISTRY

Results of water chemistry samples 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 May through September of 2013 to help identify any stressors to the biological communities. Median concentrations of specific conductance, hardness, total dissolved solids and alkalinity were higher than values expected based on data collected at reference reaches within the Southwestern Appalachians ecoregion (68). Plateau Escarpment ecoregion (68c) is a level IV ecoregion within the level III Southwestern Appalachians ecoregion (68).

SUMMARY

Results of ADEM's 2013 macroinvertebrate bioassessment indicated the macroinvertebrate community to be in *fair* condition. Hurricane Creek at HURR-2 had little sedimentation and good instream habitat quality, resulting in an *optimal* habitat quality score. However, intensive water chemistry results indicated median concentrations of physical parameters were higher than expected for streams within the reach.

Table 5. Summary of water quality data collected May-September, 2013. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median (Med), 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
Physical						
Temperature (°C)	5	13.3	19.4	18.2	17.0	2.8
Turbidity (NTU)	5	2.0	7.6	6.1	5.3	2.5
Total Dissolved Solids (mg/L)	4	110.0	162.0	152.0 M	144.0	23.2
Total Suspended Solids (mg/L)	4	< 1.0	5.0	1.8	2.2	2.2
Specific Conductance (µmhos)	5	182.5	308.8	250.8 G	250.5	45.1
Hardness (mg/L)	4	92.2	159.0	121.5 G	123.8	28.2
Alkalinity (mg/L)	4	92.4	155.1	125.5 M	124.8	25.6
Stream Flow (cfs)	5	2.9	158.6	6.4	35.6	67.7
Chemical						
Dissolved Oxygen (mg/L)	5	9.0	10.4	9.8	9.8	0.5
pH (su)	5	7.4	7.9	7.8	7.7	0.2
Ammonia Nitrogen (mg/L)	4	< 0.018	< 0.018	0.009	0.009	0.000
Nitrate+Nitrite Nitrogen (mg/L)	4	0.044	0.144	0.105	0.100	0.045
J Total Kjeldahl Nitrogen (mg/L)	4	0.132	0.326	0.226	0.227	0.091
J Total Nitrogen (mg/L)	4	0.214	0.470	0.312	0.327	0.132
J Dissolved Reactive Phosphorus (mg/L)	4	0.003	0.005	0.004	0.004	0.001
J Total Phosphorus (mg/L)	4	0.006	0.011	0.010	0.009	0.002
CBOD-5 (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0
COD (mg/L)	4	7.9	15.9	12.4	12.2	3.3
TOC (mg/L)	4	1.0	2.6	1.2	1.5	0.7
Chlorides (mg/L)	4	1.1	1.8	1.5	1.4	0.3
Total Metals						
J Aluminum (mg/L)	4	< 0.076	0.325	0.216	0.198	0.132
J Iron (mg/L)	4	0.074	0.270	0.194	0.183	0.086
J Manganese (mg/L)	4	< 0.009	0.018	0.008	0.010	0.006
Dissolved Metals						
Aluminum (mg/L)	4	< 0.076	< 0.076	0.038	0.038	0.000
Antimony (µg/L)	4	< 0.1	< 2.6	0.1	0.4	0.8
Arsenic (µg/L)	3	< 0.2	< 1.4	0.1	0.3	0.4
Cadmium (µg/L)	3	< 0.048	< 0.170	0.085	0.064	0.038
J Chromium (mg/L)	3	0.001	< 0.032	0.001	0.008	0.009
Copper (mg/L)	3	< 0.0003	< 0.031	0.0003	0.005	0.009
J Iron (mg/L)	4	< 0.018	0.064	0.020	0.028	0.026
Lead (µg/L)	3	< 0.1	< 1.1	0.1	0.2	0.3
J Manganese (mg/L)	3	< 0.009	0.014	0.004	0.008	0.005
Nickel (mg/L)	2	< 0.0002	< 0.0002	0.0002	0.0002	0.0000
Selenium (µg/L)	3	< 0.2	< 1.4	0.1	0.3	0.3
Silver (µg/L)	3	< 0.215	< 2.120	1.060	0.742	0.550
Thallium (µg/L)	3	< 0.1	< 1.1	0.1	0.2	0.3
Zinc (mg/L)	3	< 0.002	< 0.017	0.001	0.003	0.004
Biological						
Chlorophyll a (µg/L)	4	< 0.10	0.53	0.16	0.22	0.23
E. coli (col/100mL)	4	29	276	93	123	115

J=estimate; N=# samples; G=value greater than median concentration of all verified reference data collected in ecoregion 68; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 68.

FOR MORE INFORMATION, CONTACT:
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