Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2007 Monitoring Summary

Fair

Hurricane Creek at Glasden Clark Road in Franklin County (34.32878/-88.16567)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Hurricane 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 this project were to assess the biological integrity of each monitoring site and to estimate overall water quality within the EMT basin group. While water quality data were collected in 2006, drought conditions prevented the completion of habitat and macroinvertebrate assessments until 2007.

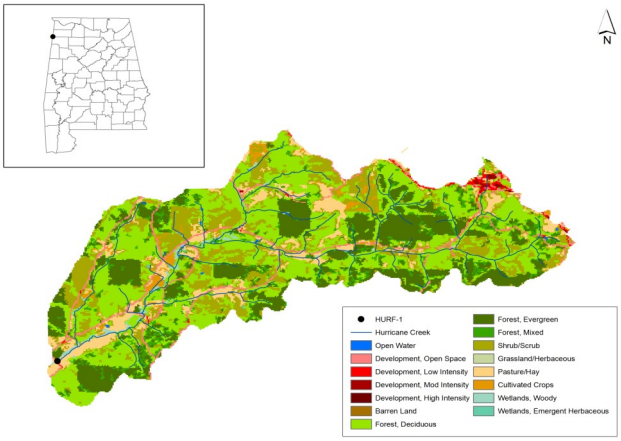

Figure 1. Sampling location and landuse within the Hurricane Creek watershed at HURF-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hurricane Creek at HURF-1 is a *Fish & Wildlife (F&W)* stream located in the Fall Line Hills ecoregion (65i). Landuse within the watershed is primarily forest (65%), with some shrub and pasture. Population density is relatively low in this area (Figure 1). As of February 23, 2011, the ADEM has issued two NPDES permits in this 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 and the quality and availability of habitat. Hurricane Creek at HURF-1 is a riffle-run stream characterized by gravel, sand, and cobble substrates. Overall habitat quality was rated as *sub-optimal*.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Upper Tombigbee River
Drainage Area (mi^2)		17
Ecoregion[a]		65i
% Landuse		
Open water		<1
Wetland	Woody	1
	Emergent herbaceous	<1
Forest	Deciduous	39
	Evergreen	20
	Mixed	6
Shrub/scrub		19
Pasture/hay		8
Cultivated crops		2
Development	Open space	4
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Population/km^2[b]		5
# NPDES Permits[c]	**TOTAL**	2
Construction Stormwater		2

a.Fall Line Hills
b.2000 US Census
c.#NPDES permits downloaded from ADEM's NPDES Management System database, 23 February 2011.

Table 2. Physical characteristics of Hurricane Creek at HURF-1, June 7, 2007.

Physical Characteristics		
Width (ft)		25
Canopy Cover		Mostly Open
Depth (ft)		
	Riffle	0.2
	Run	1.0
	Pool	2.0
% of Reach		
	Riffle	15
	Run	60
	Pool	25
% Substrate		
	Clay	1
	Cobble	15
	Gravel	59
	Sand	20
	Silt	2
	Organic Matter	3

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 the average of all individual metric scores. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

Table 3. Results of the habitat assessment conducted on Hurricane Creek at HURF-1, June 7, 2007.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	63	Sub-optimal (53-65)
Sediment Deposition	67	Optimal >65
Sinuosity	78	Sub-optimal (65-84)
Bank and Vegetative Stability	59	Marginal (35-59)
Riparian Buffer	61	Marginal (50-69)
Habitat Assessment Score	**151**	
% Maximum Score	**63**	**Sub-optimal (53-65)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Hurricane Creek at HURF-1 on June 7, 2007..

Macroinvertebrate Assessment			
	Results	**Scores**	**Rating**
Taxa richness measures		**(0-100)**	
# Ephemeroptera (mayfly) genera	8	67	Fair (47-70)
# Plecoptera (stonefly) genera	4	67	Good (50-75)
# Trichoptera (caddisfly) genera	7	58	Fair (45-66)mn
Taxonomic composition measures			
% Non-insect taxa	9	64.2	Fair (49.5-74.1)
% Non-insect organisms	3	92.2	Fair (62.8-93.9)
% Plecoptera	1	3.8	Very Poor (<=6.5)
Tolerance measures			
Beck's community tolerance index	15	53.6	Fair (40.8-60.7)
WMB-I Assessment Score	**--**	**58**	**Fair (49-72)**

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, atrazine and semi-volatile organics) during March through October of 2006 to help identify any stressors to the biological communities. *In situ* parameters suggest that Hurricane Creek at HURF-1 was meeting water quality criteria for its *F&W* use classification. The Stream flows ranged from 1.9 to 19.9 cfs.

SUMMARY

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality was categorized as *sub-optimal.*

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	Med	Avg	SD
Physical							
Temperature (°C)	8		12.6	26.6	19.7	20.1	4.5
Turbidity (NTU)	7		3.9	10.1	4.6	5.4	2.2
Total Dissolved Solids (mg/L)	8		22.0	64.0	31.5	35.1	13.8
Total Suspended Solids (mg/L)	8		1.0	28.0	2.0	6.0	9.1
Specific Conductance (µmhos)	8		24.0	26.0	25.0	25.2	0.7
Hardness (mg/L)	6		7.2	8.1	7.6	7.6	0.4
Alkalinity (mg/L)	8		5.6	6.9	6.3	6.3	0.4
Stream Flow (cfs)	8		1.9	19.8	4.6	8.7	7.9
Chemical							
Dissolved Oxygen (mg/L)	8		8.2	11.7	9.4	9.6	1.2
pH (su)	8		6.5	7.2	6.8	6.8	0.2
Ammonia Nitrogen (mg/L)	8	<	0.015	0.033	0.008	0.011	0.009
Nitrate+Nitrite Nitrogen (mg/L)	8		0.083	0.313	0.136	0.173	0.094
Total Kjeldahl Nitrogen (mg/L)	8	<	0.150	0.511	0.246	0.226	0.152
Total Nitrogen (mg/L)	8	<	0.158	0.777	0.378	0.399	0.202
Dissolved Reactive Phosphorus (mg/L)	8	<	0.004	0.010	0.006	0.006	0.002
Total Phosphorus (mg/L)	8	<	0.100	0.100	0.050	0.050	0.000
CBOD-5 (mg/L)	8	<	0.1	1.3	0.3	0.4	0.4
Chlorides (mg/L)	8		1.4	1.9	1.5	1.6	0.2
Atrazine (µg/L)	2	<	0.05	0.05	0.02	0.02	0.00
Total Metals							
Aluminum (mg/L)	4		0.086	0.347	0.164	0.190	0.119
Iron (mg/L)	4		0.154	1.210	0.558	0.620	0.438
Manganese (mg/L)	4	<	0.050	0.128	0.040	0.058	0.049
Dissolved Metals							
Aluminum (mg/L)	4	<	0.050	< 0.050	0.025	0.025	0.000
Antimony (µg/L)	4	<	10.0	< 10.0	5.0	5.0	0.0
Arsenic (µg/L)	4	<	10.0	< 10.0	5.0	5.0	0.0
Cadmium (mg/L)	4	<	0.015	< 0.015	0.008	0.008	0.000
Chromium (mg/L)	4	<	0.050	< 0.050	0.025	0.025	0.000
Copper (mg/L)	4	<	0.050	< 0.050	0.025	0.025	0.000
Iron (mg/L)	4	<	0.050	0.255	0.228	0.184	0.107
Lead (µg/L)	4	<	10.0	< 10.0	5.0	5.0	0.0
Manganese (mg/L)	4	<	0.020	< 0.020	0.010	0.010	0.000
Mercury (µg/L)	3	<	0.010	0.300	0.150	0.102	0.084
Nickel (mg/L)	4	<	0.050	< 0.050	0.025	0.025	0.000
Selenium (µg/L)	4	<	50.0	< 50.0	25.0	25.0	0.0
Silver (mg/L)	3	<	0.050	< 0.050	0.025	0.025	0.000
Thallium (µg/L)	3	<	10.0	< 10.0	5.0	5.0	0.0
Zinc (mg/L)	4	<	0.050	< 0.050	0.025	0.025	0.000
Biological							
Chlorophyll a (ug/L)	8	<	1.00	4.01	1.34	1.51	1.19
Fecal Coliform (col/100 mL)	7		10	320	57	93	104

J = estimate; M = value higher than median concentration of all verified ecoregional reference data in the ecoregion 65i; N = # of samples.