

2010 Monitoring Summary



Whitewater Creek at Unnamed Autauga County Road (32.47868 \ -86.63593)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Whitewater Creek watershed for biological and water quality monitoring as part of the 2010 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 River basins.

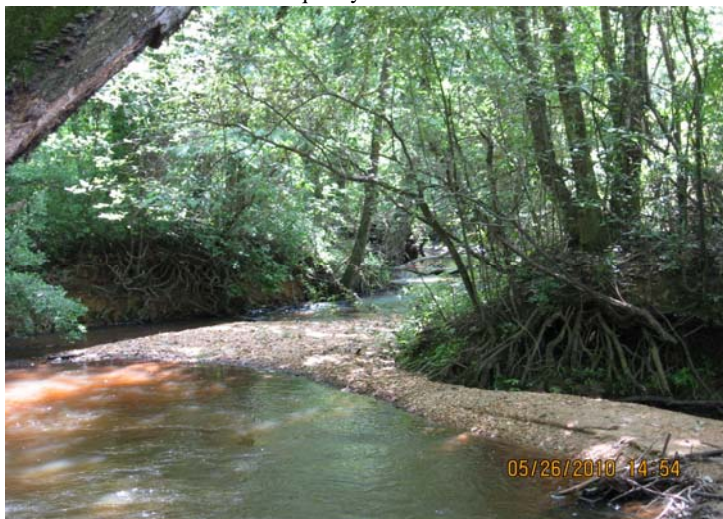


Figure 1. Whitewater Creek facing upstream at WWMA-2, May 26, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Whitewater Creek at WWMA-2 is a *Fish and Wildlife (F&W)* stream located in the Fall Line Hills ecoregion (65i). Based on the 2011 National Land Cover Dataset, land cover within the watershed is primarily forest (70%), with some shrub/scrub. No NPDES outfalls were active within the 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. Whitewater at WWMA-2 is a riffle-run stream characterized by sand and gravel substrates (Figure 1). Overall habitat quality was categorized as *optimal*.

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 WWMA-2 rated the site as a 3-, or *Good/Fair*. While many pollution-sensitive taxa are still present in the reach, over half on the individuals identified were nutrient tolerant (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Alabama River
Drainage Area (mi²)		10
Ecoregion^a		65i
% Landuse		
Open water		<1
Wetland	Woody	1
Forest	Deciduous	20
	Evergreen	29
	Mixed	21
Shrub/scrub		18
Pasture/hay		3
Cultivated crops		<1
Development	Open space	4
	Low intensity	<1
	Moderate intensity	<1
Barren		<1
Population/km^{2b}	TOTAL	17

a.Fall Line Hills

b.2000 US Census

Table 2. Physical characteristics of Whitewater Creek at WWMA-2, May 11, 2010.

Physical Characteristics	
Canopy Cover	Mostly Shaded
Width (ft)	15
Depth (ft)	
	Riffle
	Run
	Pool
	0.7
	1.2
	4.0
% of Reach	
	Riffle
	Run
	Pool
	45
	30
	25
% Substrate	
	Cobble
	Gravel
	Sand
	Silt
	Organic Matter
	3
	57
	25
	2
	13

Table 3. Results of the habitat assessment conducted in Whitewater Creek at WWMA-2, May 11, 2010.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	83	Optimal (>70)
Sediment Deposition	76	Optimal (>70)
Sinuosity	57.5	Marginal (45-<65) Sub-Optimal (60-<75)
Bank Vegetative Stability	70	
Riparian Buffer	90	Sub-Optimal (70-90)
Habitat Assessment Score	156	
% Maximum Score	72	Optimal (>70)

Table 4. Results of the macroinvertebrate bioassessment conducted in Whitewater Creek at WWMA-2, May 11, 2010.

Macroinvertebrate Assessment		Results
Taxa richness and diversity measures		
Total # Taxa		50
# EPT taxa		14
# Highly-sensitive and Specialized Taxa		5
Taxonomic composition measures		
% EPC taxa		29
% EPT minus Baetidae and Hydropsychidae		8
% Chironomidae Individuals		53
% Dominant Taxon		42
% Individuals in Dominant 5 Taxa		74
Functional feeding group		
# Collector Taxa		18
% Tolerant Filterer Taxa		11
Community tolerance		
# Sensitive EPT		6
% Sensitive taxa		34
% Nutrient Tolerant individuals		55
WMB-I Assessment Score		3-
WMB-I Assessment Rating		Good/Fair

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected bi-monthly during April through November of 2010 to help identify any stressors to the biological communities.

Five of seven stream pH measurements did not meet the *F&W* criterion. Thallium concentrations appear to be above the human health criterion applicable to Whitewater Creek's *F&W* use classification for one out of three sampling events.

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Whitewater Creek at WWMA-2 to be in *poor* condition although overall habitat quality was categorized as *optimal*. Low pH and high thallium levels may be causes of the *poor* macroinvertebrate community score.

Table 5. Summary of water quality data collected April-November, 2010. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). 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	Q
Physical								
Temperature (°C)	7	14.1	25.7	18.0	20.0	4.5		
Turbidity (NTU)	7	8.8	22.4	12.3	13.9	5.2		
Total Dissolved Solids (mg/L)	4	< 1.0	38.0	18.0	17.6	16.2		
J Total Suspended Solids (mg/L)	4	3.0	13.0	3.0	5.5	5.0		
Specific Conductance (µmhos)	7	18.8	22.7	20.8	20.7	1.3		
Hardness (mg/L)	3	4.4	7.9	4.8	5.8	1.9		
Alkalinity (mg/L)	4	4.7	8.4	5.0	5.2	0.8		
Monthly Stream Flow (cfs)	8	8.8	19.0	9.8	10.7	4.5		
Chemical								
Dissolved Oxygen (mg/L)	7	6.5	8.7	7.9	7.7	0.8		
pH (su)	7	5.1	8.5	5.2	5.8	0.5	5	
Ammonia Nitrogen (mg/L)	4	< 0.021	0.021	0.010	0.010	0.000		
Nitrate+Nitrite Nitrogen (mg/L)	4	0.023	0.059	0.038	0.039	0.015		
Total Kjeldahl Nitrogen (mg/L)	4	< 0.080	0.385	0.174	0.168	0.185		
Total Nitrogen (mg/L)	4	< 0.063	0.444	0.160	0.207	0.178		
J Dissolved Reactive Phosphorus (mg/L)	4	0.005	0.011	0.008	0.008	0.003		
Total Phosphorus (mg/L)	4	0.014	0.033	0.020	0.022	0.009		
J CBOD-5 (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0		
Chlorides (mg/L)	4	1.5	1.9	1.7	1.7	0.2		
Atrazine (µg/L)	2	< 0.02	< 0.02	0.01	0.01	0.00		
Total Metals								
J Aluminum (mg/L)	3	< 0.033	0.073	0.022	0.037	0.031		
Iron (mg/L)	3	2.700	3.900	2.720	3.107	0.887		
Manganese (mg/L)	3	0.178	0.496	0.252	0.309	0.188		
Dissolved Metals								
J Aluminum (mg/L)	3	< 0.033	0.043	0.022	0.028	0.012		
Antimony (µg/L)	3	< 1.9	< 1.9	0.9	0.9	0.0		
Arsenic (µg/L)	3	< 2.1	< 2.1	1.0	1.0	0.0		
Cadmium (µg/L)	3	< 0.014	< 0.014	0.007	0.007	0.000		
Chromium (µg/L)	3	< 9.000	< 13.000	6.500	5.833	1.155		
Copper (mg/L)	3	< 0.013	< 0.020	0.006	0.008	0.002		
J Iron (mg/L)	3	< 0.026	0.271	0.197	0.160	0.133		
Lead (µg/L)	3	< 1.7	< 1.7	0.8	0.8	0.0		
Manganese (mg/L)	3	0.152	0.324	0.233	0.238	0.086		
Mercury (µg/L)	3	< 0.080	< 0.080	0.040	0.040	0.000		
Nickel (mg/L)	3	< 0.019	< 0.042	0.010	0.013	0.007		
J Selenium (µg/L)	3	< 1.7	3.1	0.8	1.6	1.3		
Silver (µg/L)	3	< 0.015	< 0.015	0.008	0.008	0.000		
J Thallium (µg/L)	3	< 0.6	0.8	0.3	0.4	0.2		1
Zinc (mg/L)	3	< 0.012	< 0.030	0.015	0.012	0.005		
Biological								
Chlorophyll a (µg/L)	4	< 0.10	1.34	0.58	0.63	0.68		
J E coli (col/100ml)	4	76	548	262	287	195		

C = sample exceeded *F&W* use class criteria; E = # of samples that exceeded criteria; H = *F&W* Human Health Criterion exceeded; J = estimate; N = # of samples; Q = # of uncertain exceedances.

FOR MORE INFORMATION, CONTACT:
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