Alabama Department of Environmental Management

Ecological Reference Reach

Rivers and Streams Monitoring Program

2005 Monitoring Summary

Fair

Weogufka Creek at Coosa Co Rd 41 near Stewartville (33.07288/-86.24847)

BACKGROUND

Weogufka Creek is one of the streams the Alabama Department of Environmental Management (ADEM) monitors as a "best attainable condition" reference watershed for comparison with streams throughout the Piedmont ecoregion.

Additionally, Weogufka Creek was selected for biological and water quality monitoring as part of the 2005 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 basin group.

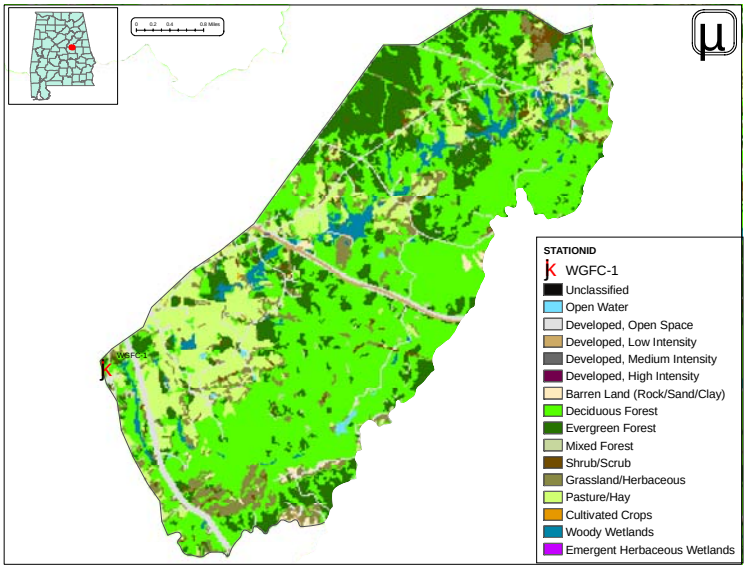

Figure 1. Sampling location and landuse within the Weogufka Creek at WGFC-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Weogufka Creek at WGFC-1 is a small *Fish & Wildlife (F&W)* stream located in the Southern Inner Piedmont ecoregion in Coosa County. Land cover within the watershed is mainly (71%) forest interspersed with pasture and grasslands. US Highways 231 and 280 transect the watershed. Two current construction/stormwater authorizations have been issued.

REACH CHARACTERISTICS

General observations (Table 2) and habitat assessments (Table 3) were completed during the macroinvertebrate assessment. In comparison with reference reaches in the same ecoregion, this information can give an indication of physical condition and the availability and quality of habitat. Weogufka Creek at WGFC-1 was a moderate-gradient, riffle-run stream with substrates dominated by gravel and sand. Overall habitat quality was categorized as *sub-optimal* due to heavy siltation and unstable banks.

BIOASSESSMENTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multihabitat 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 *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi^2)		19
Ecoregion[a]		45a
% Landuse		
Open water		<1
Wetland	Woody	3
Forest	Deciduous	49
	Evergreen	18
	Mixed	1
Shrub/scrub		1
Grassland/herbaceous		8
Pasture/hay		13
Cultivated crops		<1
Development	Open space	5
	Low intensity	1
	Moderate intensity	<1
Barren		1
Population/km^2 [b]		9
# NPDES Permits[c]	TOTAL	6
Construction Stormwater		2
Mining General Permit (old)		4

a. Southern Inner Piedmont
b. 2000 US Census data
c. #NPDES permints downloaded from ADEM's NPDES Management System database, 9 Jun 2009.

Table 2. Physical characteristics of Weogufka Creek at WGFC-1, June 23, 2005.

Physical characteristics		
Width (ft)		20
Canopy cover		Mostly Shaded
Depth (ft)		
	Riffle	0.3
	Run	1.0
	Pool	2.0
% of Reach		
	Riffle	25
	Run	65
	Pool	10
% Substrate		
	Bedrock	2
	Cobble	5
	Gravel	60
	Sand	25
	Silt	3
	Clay	2
	Organic Matter	3

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Table 3. Results of habitat assessment conducted on Weogufka Creek at WGFC-1, June 23, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	72	Optimal (> 70)
Sediment deposition	41	Marginal (41-58)
Sinuosity	73	Sub-optimal (65-84)
Bank and vegetative stability	36	Marginal (35-59)
Riparian buffer	81	Sub-optimal (70-90)
Habitat assessment score	145	
% Maximum score	**60**	**Sub-optimal (59-70)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Weogufka Creek at WGFC-1, June 23, 2005.

Macroinvertebrate Assessment Results			
	Results	**Scores**	**Rating**
Taxa richness measures		**(0-100)**	
# Ephemeroptera (mayfly) genera	7	58	Fair (47-70)
# Plecoptera (stonefly) genera	4	67	Good (50-75)
# Trichoptera (caddisfly) genera	10	83	Excellent (>83)
Taxonomic composition measures			
% Non-insect taxa	6	75	Good (74.1-87.1)
% Non-insect organisms	3	92	Fair (62.7-93.9)
% Plecoptera	11	53	Good (19.7-59.8)
Tolerance measures			
Beck's community tolerance index	12	43	Fair (40.7-60.7)
WMB-I Assessment Score	**---**	**67**	**Fair (48-72)**

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, atrazine, and semi-volatile organics) during March through October of 2005 to help identify any stressors to the biological communities. *In situ* parameters suggest that Weogufka Creek at WGFC-1 was meeting water quality criteria for its *F&W* use classification. Median concentrations of hardness and alkalinity were above concentrations in 90% of verified ecoregional reference reach samples.

CONCLUSIONS

Bioassessment data indicated the macroinvertebrate community in Weogufka Creek at WGFC-1 to be in *fair* condition. Results of intensive water quality sampling and a habitat assessment suggest sedimentation to be a potential cause of the degraded biological conditions. Hardness and alkalinity were also parameters of concern.

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Table 5. Summary of water quality data collected March-October, 2005. 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)	7	11.4	27.0	15.0	18.6	6.8
Turbidity (NTU)	8	6.3	12.6	7.2	8.2	2.4
Total dissolved solids (mg/L)	7	33.0	93.0	69.0	63.3	21.5
Total suspended solids (mg/L)	7	3.0	44.0	8.0	13.1	14.3
Specific conductance (µmhos)	8	46.3	63.8	59.5[M]	57.5	6.7
Hardness (mg/L)	6	17.4	26.2	21.1[M]	21.2	3.1
Alkalinity (mg/L)	7	17.3	30.1	24.7[M]	23.8	4.1
Stream Flow (cfs)	8	2.7	67.8	15.9	25.2	---
Chemical						
Dissolved oxygen (mg/L)	8	6.9	10.82	8.6	8.6	1.4
pH (su)	8	6.7	8.01	7.3	7.4	0.4
Ammonia Nitrogen (mg/L)	7	< 0.015	< 0.015	0.008	0.008	0.000
Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.003	0.149	0.078	0.063	0.052
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.853	0.160	0.281	0.284
Total nitrogen (mg/L)	7	0.076	1.002	0.238	0.344	0.326
Dissolved reactive phosphorus (mg/L)	7	< 0.004	0.009	0.002	0.004	0.003
Total phosphorus (mg/L)	7	< 0.004	0.074	0.029	0.039	0.027
CBOD-5 (mg/L)	7	1.3	5.0	1.7	2.1	1.3
COD (mg/L)	4	< 2.0	2.0	1.0	1.0	0.0
[J] Chlorides (mg/L)	7	3.9	2.0	4.2	4.3	0.3
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	0.00
Total Metals						
Aluminum (mg/L)	4	0.056	0.173	0.0955	0.105	0.1
Iron (mg/L)	4	0.557	0.886	0.755	0.738	0.1
Manganese (mg/L)	4	0.041	0.113	0.055	0.066	0.0
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	< 0.015	0.0075	0.008	0.0
Antimony (µg/L)	4	< 2	< 2	1	1	0.0
Arsenic (µg/L)	4	< 10	< 10	5	5	0.0
Cadmium (mg/L)	4	< 0.005	< 0.005	0.0025	0.0025	0.0
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	0.0
Copper (mg/L)	4	< 0.005	< 0.005	0.0025	0.003	0.0
Iron (mg/L)	4	0.113	0.396	0.2905	0.2725	0.1
Lead (µg/L)	4	< 2	< 2	1	1	0.0
Manganese (mg/L)	4	0.011	0.039	0.0265	0.026	0.0
Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.1875	0.1
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.0
Selenium (µg/L)	4	< 10	< 10	5	5	0.0
Silver (mg/L)	4	< 0.003	< 0.003	0.0015	0.0015	0.0
Thallium (µg/L)	4	< 1	< 1	0.5	0.500	0.0
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.0
Biological						
[J] Chlorophyll a (µg/L)	7	0.27	1.87	0.53	0.88	0.6
[J] Fecal Coliform (col/100 mL)	7	50	270	130	133	80

J=estimate; N= # samples; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion/subecoregion 45a.