

2010 Monitoring Summary



Blue Creek at North Thornton Road in Tallapoosa County (32.73845/-85.74006)

The Alabama Department of Environmental Management (ADEM) selected the Blue Creek watershed for biological and water quality monitoring as part of the 2010 Assessment of the Alabama, Coosa, Tallapoosa (ACT) 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 basins.

Blue Creek at BLCT-1 is among the least-disturbed watersheds in the Alabama, Coosa, Tallapoosa (ACT) basin group, based on landuse, road density, and population density and is an ecoreference candidate station. The 2010 data will be used to evaluate Blue Creek as a best attainable condition reference watershed for comparison with other stations in the same ecoregion.



Figure 1. Blue Creek at BLCT-1, April 7, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Blue Creek is a *Fish & Wildlife (F&W)* stream, located in the Southern Outer Piedmont ecoregion (45b). It drains twenty nine square miles in Tallapoosa County. Based on the 2006 National Land Cover Dataset, land cover within the watershed is mainly forest (70%), followed by grassland and pasture/hay. As of September 1, 2012, two NPDES permits have been issued 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, this information can give an indication of physical condition and the availability and quality of habitat. Streams in this subecoregion are generally lower gradient than other areas of the Piedmont, but are characterized by cobble, gravel, and sandy substrates. Sand and gravel substrates were dominant in Blue Creek at BLCT-1, and the reach lacked riffle habitat (Figure 1). The most productive habitats in the reach were woody debris, leaf packs, and rootbank areas. Overall habitat quality was categorized as *marginal*.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tallapoosa River
Drainage Area (mi ²)		29
Ecoregion ^a		45b
% Landuse		
Open water		<1
Wetland	Woody	1
Forest	Deciduous	35
	Evergreen	34
	Mixed	1
Shrub/scrub		4
Grassland/herbaceous		14
Pasture/hay		7
Development	Open space	3
	Low intensity	<1
Barren		1
Population/km ² ^b		41
# NPDES Permits ^c	TOTAL	2
	401 Water Quality Certification	1
	Construction Stormwater	1

a.Southern Outer Piedmont

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, September 1, 2012.

Table 2. Physical characteristics of Blue Creek at BLCT-1, May 18, 2010.

Physical Characteristics		
Canopy Cover	Shaded	
Width (ft)	35	
Depth (ft)	Run	1.5
	Pool	2.5
% of Reach		
	Run	85
	Pool	15
% Substrate		
	Gravel	15
	Sand	62
	Silt	3
	Organic Matter	20

BIOASSESSMENTS

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 in comparison to least-impaired reference reaches in the same ecoregion. The final score is the average of all individual metric scores. The final score indicated the biological community to be in *fair* condition (Table 4).

Table 3. Results of the habitat assessment conducted on Blue Creek at BLCT-1, May 18, 2010.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	40	Poor (<41)
Sediment Deposition	63	Sub-optimal (59-70)
Sinuosity	38	Poor (<45)
Bank and Vegetative Stability	39	Marginal (35-59)
Riparian Buffer	88	Sub-optimal (70-89)
Habitat Assessment Score	123	
% Maximum Score	56	Marginal (41-58)

Table 4. Results of the macroinvertebrate bioassessment conducted in Blue Creek at BLCT-1, May 18, 2010.

Macroinvertebrate Assessment		
	Results	Scores
Taxa richness and diversity measures		(0-100)
# EPT taxa	12	35
Shannon Diversity	3.19	23
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	12	11
% Non-insect taxa	3	98
Tolerance measures		
% Tolerant taxa	20	84
WMB-I Assessment Score	---	50
WMB-I Assessment Rating		Fair (47-69)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. *In situ* measurements and water samples were collected monthly from April through November, 2010 to help identify any stressors to the biological communities. *In situ* parameters suggest that Blue Creek at BLCT-1 was meeting water quality criteria for its *F&W* use classification. Specific conductance and alkalinity were slightly higher than expected for Piedmont streams, based on reference reach data collected in ecoregion 45.

Table 5. Summary of water quality data collected April-November, 2010. 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	Q
Physical							
Temperature (°C)	11	15.7	26.6	21.0	21.1	3.9	
Turbidity (NTU)	10	5.9	16.1	9.6	10.0	2.8	
Total Dissolved Solids (mg/L)	8	4.0	78.0	52.0	49.0	20.5	J
Total Suspended Solids (mg/L)	8	<	1.0	5.0	3.5	3.0	2.2 J
Specific Conductance (µmhos)	11	43.3	60.1	54.5 ^G	53.0	5.5	
Alkalinity (mg/L)	8	16.1	30.7	25.8 ^M	24.8	5.0	
Stream Flow (cfs)	10	3.9	50.8	13.8	19.9	16.8	
Chemical							
Dissolved Oxygen (mg/L)	11	7.2	8.9	8.1	8.1	0.6	
pH (su)	11	6.8	7.8	7.1	7.1	0.3	
Ammonia Nitrogen (mg/L)	8	<	0.021	<	0.021	0.010	0.010 0.000
Nitrate+Nitrite Nitrogen (mg/L)	8	0.016	0.111	0.092	0.076	0.037	J
Total Kjeldahl Nitrogen (mg/L)	8	<	0.080	0.238	0.111	0.125	0.092
Total Nitrogen (mg/L)	8	<	0.056	0.324	0.221	0.201	0.119 J
Dissolved Reactive Phosphorus (mg/L)	8	0.004	0.021	0.018	0.015	0.007	J
Total Phosphorus (mg/L)	5	0.006	0.028	0.016	0.017	0.009	J
CBOD-5 (mg/L)	8	<	2.0	2.5	1.0	1.2	0.5
Chlorides (mg/L)	8	1.7	2.3	2.0	2.0	0.2	
Biological							
Chlorophyll a (ug/L)	8	<	0.10	1.00	0.50	0.34	0.24

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 45; J=estimate; M=value >90% all verified ecoregional reference reach data collected in the ecoregion 45; N= # samples; Q=qualifier.

SUMMARY

Blue Creek at BLCT-1 is among the least-disturbed watersheds in the Alabama, Coosa, Tallapoosa (ACT) basin group, based on landuse, road density, and population density. The 2010 bioassessment results indicated the macroinvertebrate community in Blue Creek at BLCT-1 to be in *fair* condition. Specific conductivity and alkalinity were slightly elevated. Other water quality parameters were similar to data collected from reference reaches in the Piedmont ecoregion. However, habitat within the reach was limited, and bank erosion was noted as an issue at the site.

FOR MORE INFORMATION, CONTACT:
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