Alabama Department of Environmental Management

Ecological Reference Reach

Rivers and Streams Monitoring Program

2012 Monitoring Summary

Good™

Blevens Creek at Cullman County Road 1059 (34.26740/-87.07760)

BACKGROUND

Blevins 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 Southern Table Plateaus ecoregion.

Additionally, Blevens Creek was selected for biological and water quality monitoring as part of the 2012 assessment of the Black Warrior and Cahaba River Basins (BWC). The objectives of the BWC Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the BWC basin group.

Figure 1. Blevens Creek at BLVC-1, May 9, 2012.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi^2)		9
Ecoregion[a]		68d
% Landuse		
Open water		<1
Wetland	Woody	2
	Emergent herbaceous	<1
Forest	Deciduous	36
	Evergreen	14
	Mixed	14
Shrub/scrub		5
Grassland/herbaceous		3
Pasture/hay		23
Cultivated crops		1
Development	Open space	2
	Low intensity	<1
Barren		<1
Population/km^2[b]		14
# NPDES Permits[c]	**TOTAL**	1
Construction Stormwater		1

a. Southern Table Plateaus

b. 2000 US Census

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

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Blevens Creek at BLVC-1 is a *Fish & Wildlife (F&W)* stream located in Cullman County. Based on the 2006 National Land Cover Dataset, land cover within the watershed is approximately 64% forested. As of September 1, 2012 ADEM's NPDES Management System database showed one permitted discharge located 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. Blevens Creek at BLVC-1 is a high-gradient, riffle-run stream characterized mostly by bedrock and gravel (Figure 1). Overall habitat quality was rated as *optimal* for supporting macroinvertebrate communities.

BIOASSESSMENT RESULTS

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

Table 2. Physical characteristics of Blevens Creek at BLVC-1, May 9, 2012.

Physical Characteristics		
Canopy Cover		Mostly Shaded
Width (ft)		18
Depth (ft)		
	Riffle	0.5
	Run	0.8
	Pool	1.0
% of Reach		
	Riffle	25
	Run	70
	Pool	5
% Substrate		
	Bedrock	35
	Boulder	10
	Cobble	10
	Gravel	12
	Sand	15
	Silt	10
	Organic Matter	8

TM Graphics provided by Florida Dept. of Environmental Protection (FDEP); used with permission and in this report pertain only to the Macro invertebrate assessment results.

Table 3. Results of the habitat assessment conducted on Blevens Creek at BLVC-1, May 9, 2012.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	64	Sub-optimal (59-70)
Sediment Deposition	63	Sub-optimal (59-70)
Sinuosity	85	Optimal >84
Bank and Vegetative Stability	73	Sub-optimal (60-74)
Riparian Buffer	88	Sub-optimal (70-89)
Habitat Assessment Score	**171**	
% Maximum Score	**71**	**Optimal >70**

Table 4. Results of macroinvertebrate assessment conducted in Blevens Creek at BLVC-1, May 9, 2012.

Macroinvertebrate Assessment		
	Results	**Scores (0-100)**
Taxa richness measures		
# EPT taxa	20	70
Taxonomic composition measures		
% Non-insect taxa	8	72
% Dominant taxon	15	92
% EPC taxa	33	61
Functional feeding group measures		
% Predators	18	73
Tolerance measures		
% Taxa as Tolerant	28	61
WMB-I Assessment Score	**---**	**72**
WMB-I Assessment Rating		**Good (59-79)**

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals), during April through November of 2012 to help identify any stressors to the biological communities. *In situ* parameters indicated that Blevens Creek at BLVC-1 was meeting water quality criteria for its *Fish & Wildlife* use classification. Median values of dissolved copper and iron were higher than expected for the ecoregion, based on the 90th percentile of samples collected at least impaired reference reaches in the Southern Table Plateaus ecoregion. Dissolved lead exceeded *F&W* use classification criteria on September 25, 2012.

SUMMARY

Bioassessment results indicated the macroinvertebrate community to be in *good* condition. Overall habitat quality was catergorized as *optimal* for supporting the macroinvertebrate community. Median values for dissolved copper and iron were higher than expected based on reference reaches within the Southern Table Plateaus ecoregion. Dissolved lead exceeded *F&W* use classification criteria on September 25, 2012.

Table 5. Summary of water quality data collected April-November, 2012. 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	E
Physical							
Temperature (°C)	10	8.3	23.4	16.6	16.2	4.6	
Turbidity (NTU)	10	3.4	30.1	4.5	7.4	8.1	
J Total Dissolved Solids (mg/L)	8	27.0	113.0	35.5	47.9	29.2	
Total Suspended Solids (mg/L)	8	< 1.0	31.0	4.0	7.2	10.1	
Specific Conductance (µmhos)	10	39.9	56.0	46.0	47.8	5.4	
Hardness (mg/L)	4	11.4	15.8	13.1	13.4	2.0	
Alkalinity (mg/L)	7	2.0	11.3	6.6	7.5	3.3	
Stream Flow (cfs)	9	0.5	5.9	2.4	2.9	2.0	
Chemical							
Dissolved Oxygen (mg/L)	10	7.8	11.2	8.5	9.0	1.3	
pH (su)	10	6.8	8.2	7.0	7.2	0.5	
J Ammonia Nitrogen (mg/L)	8	< 0.010	0.053	0.014	0.020	0.015	
J Nitrate+Nitrite Nitrogen (mg/L)	8	0.164	0.606	0.415	0.391	0.186	
J Total Kjeldahl Nitrogen (mg/L)	8	0.036	0.560	0.290	0.299	0.182	
J Total Nitrogen (mg/L)	8	0.413	0.996	0.663	0.690	0.240	
J Dissolved Reactive Phosphorus (mg/L)	8	< 0.005	0.006	0.004	0.004	0.002	
J Total Phosphorus (mg/L)	8	0.008	0.053	0.010	0.017	0.015	
J CBOD-5 (mg/L)	8	< 1.0	< 2.0	1.0	0.9	0.2	
J Chlorides (mg/L)	8	2.2	2.9	2.4	2.4	0.3	
Total Metals							
J Aluminum (mg/L)	4	0.054	1.250	0.101	0.376	0.583	
Iron (mg/L)	4	0.375	1.280	0.589	0.708	0.396	
J Manganese (mg/L)	4	0.015	0.123	0.043	0.056	0.047	
Dissolved Metals							
J Aluminum (mg/L)	4	< 0.030	0.059	0.043	0.040	0.019	
J Antimony (µg/L)	4	< 0.8	1.4	0.4	0.7	0.5	
Arsenic (µg/L)	4	< 1.0	< 1.0	0.5	0.5	0.0	
J Cadmium (mg/L)	4	< 0.00009	< 0.00009	0.000	0.000	0.000	
Chromium (mg/L)	4	< 0.005	< 0.005	0.002	0.002	0.000	
Copper (mg/L)	4	< 0.100	< 0.300	0.100 M	0.100	0.058	
J Iron (mg/L)	4	0.187	0.239	0.214 M	0.214	0.024	
J Lead (µg/L)	4	< 1.6	2.3 S	0.8	1.2	0.8	1
J Manganese (mg/L)	4	0.013	0.042	0.026	0.027	0.012	
Nickel (mg/L)	4	< 0.010	< 0.010	0.005	0.005	0.000	
Selenium (µg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0	
J Silver (mg/L)	4	< 0.001	< 0.001	0.000	0.000	0.000	
Thallium (µg/L)	4	< 0.4	< 0.4	0.2	0.2	0.0	
J Zinc (mg/L)	4	< 0.009	< 0.020	0.010	0.009	0.003	
Biological							
J Chlorophyll a (µg/L)	8	< 1.00	23.50	1.07	3.79	7.98	
J E. coli (col/100mL)	8	50	2420	126	618	887	

J=estimate; N=number of samples. M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 68d. S=metals adjusted for hardness. E=# samples that exceeded criteria.

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