Alabama Department of Environmental Management

Ecological Reference Reach

Rivers and Streams Monitoring Program

2015 Monitoring Summary

Excellent

Buck Creek at Autauga County Road 16 (32.59669/-86.86947)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected Buck Creek for water quality and biological monitoring as a verified Ecoregional Reference Site in 2015. Reference sites represent "best-attainable conditions" and provide background data used for comparison with streams in the same ecoregion. Buck Creek was selected as a reference for comparison with streams in the Fall Line Hills sub-ecoregion.

Figure 1. Buck Creek at BCKA-26, June 2, 2015.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Buck Creek at BCKA-26 is a *Fish and Wildlife* (*F&W*) stream that drains approximately 25 square miles in Autauga and Chilton counties. It is a tributary of Mulberry Creek. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (64%) and shrub/scrub. Population density is low. Percent urban is <6%. As of April 1, 2016, there are no active outfalls 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. Buck Creek at BCKA-26 is a mostly shaded, glide-pool stream (Figure 1). This black water stream is characterized predominantly by sandy substrate and a high percentage of organic matter. Overall habitat quality and availability was rated as *sub-optimal* for supporting the macroinvertebrate community.

BIOASSESSMENT RESULTS

The benthic macroinvertebrate community was 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. The final score indicated the biological community at BCKA-26 to be in *excellent* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Alabama River
Drainage Area (mi^2)		25
Ecoregion[a]		65I
% Landuse[b]		
Open water		<1%
Wetland	Woody	2%
Forest	Deciduous	20%
	Evergreen	29%
	Mixed	15%
Shrub/scrub		27%
Grassland/herbaceous		3%
Pasture/hay		2%
Cultivated crops		<1%
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
	High intensity	<1%
Population/km^2[c]		4

a. Fall Line Hills

b. 2011 National Land Cover Dataset

c. 2010 US Census

Table 2. Physical characteristics of Buck Creek at BCKA-26, June 18, 2015.

Physical Characteristics	
Width (ft)	15
Canopy Cover	Mostly Shaded
Depth (ft)	
Run	1.5
Pool	3.0
% of Reach	
Run	70
Pool	30
% Substrate	
Hard Pan Clay	3
Sand	62
Silt	10
Organic Matter	25

Table 3. Results of the habitat assessment conducted on Buck Creek at BCKA-26, June 18, 2015.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	45	Marginal (31-54)
Sediment Deposition	70	Sub-optimal (55-79)
Sinuosity	80	Optimal >79
Bank and Vegetative Stability	44	Marginal (31-57)
Riparian Buffer	90	Optimal >84
Habitat Assessment Score	**111**	
% Maximum Score	**61**	**Sub-optimal (57-80)**

Table 4. Results of macroinvertebrate assessment conducted in Buck Creek at BCKA-26, June 18, 2015.

Macroinvertebrate Assessment	
	Results
Taxa richness and diversity measures	
# EPT taxa	21
Taxonomic composition measures	
% Non-insect taxa	5
% Plecoptera	11
% Dominant taxon	10
Functional feeding group	
% Predators	12
Community tolerance	
Becks community tolerance index	24
% Nutrient tolerant individuals	11
WMB-I Assessment Score	**82**
WMB-I Assessment Rating	**Excellent (79-100)**

WATER CHEMISTRY

Results of water chemistry analyses are summarized in Table 5. In situ measurements and water samples were collected monthly, March through October 2015, to help define background conditions for this stream type. Additional in situ measurements were taken during the macroinvertebrate bioassessment and the 72 hour dissolved oxygen (DO) data collection event in June. Stream pH <6.0 s.u., which is typical of black water streams. There were no other measureable water quality concerns as compared to ecoregional reference reach data. No metals, organic or pathogen (e. coli) sampling was conducted.

SUMMARY

Landuse and population density categorize Buck Creek among the least-disturbed watersheds in the Alabama River Basin. Bioassessment results show the macroinvertebrate community to be in *excellent* condition, in spite of only *marginal* instream habitat quality and *marginal* riparian and vegetative stability. Stream pH was typical of black water streams in this region, ranging between 5.3 and 5.9 (s.u.).

Table 5. Summary of water quality data collected March-October, 2015. 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)	9	12.1	24.2	20.9	20.3	3.6	
Turbidity (NTU)	12	8.2	16.4	11.0	11.9	2.5	
Total Dissolved Solids (mg/L)	8	23.0	44.0	29.0	30.9	8.1	
Total Suspended Solids (mg/L)	8	3.0	17.0	5.0	6.6	4.4	
Specific Conductance (µmhos/cm)	9	13.7	20.5	17.6	17.9	2.3	
Alkalinity (mg/L)	8	2.3	5.8	5.1	4.6	1.3	
Monthly Stream Flow (cfs)	12	4.3	33.2	7.2	9.5	8.1	
Measured Stream Flow (cfs)	12	4.3	33.2	7.2	9.5	8.1	
Chemical							
Dissolved Oxygen (mg/L)	9	7.1	10.1	8.1	8.0	0.9	
pH (SU)	9	5.3 C	5.9	5.7	5.7	0.2	9
Ammonia Nitrogen (mg/L)	8	< 0.007	0.093	0.040	0.040	0.025	
J Nitrate+Nitrite Nitrogen (mg/L)	8	0.007	0.054	0.030	0.027	0.016	
Total Kjeldahl Nitrogen (mg/L)	8	< 0.064	0.404	0.292	0.240	0.142	
J Total Nitrogen (mg/L)	8	< 0.061	0.414	0.328	0.267	0.141	
J Dis Reactive Phosphorus (mg/L)	8	< 0.003	0.004	0.003	0.003	0.001	
J Total Phosphorus (mg/L)	8	0.009	0.016	0.012	0.012	0.003	
J CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	8	1.7	2.0	1.8	1.8	0.1	
Biological							
Chlorophyll a (mg/m³)	8	< 0.10	2.14	0.50	0.61	0.71	

C=*F&W* criterion exceeded.; E=# samples that exceeded criteria; J=estimate; N=# samples;

FOR MORE INFORMATION, CONTACT:
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