Alabama Department of Environmental Management

Use Support Assessment

Rivers and Streams Monitoring Program

2012 Monitoring Summary

Big Yellow Creek at AL Highway 69 in Tuscaloosa County (33.57190/-87.40277)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Big Yellow Creek watershed for biological and water quality monitoring as part of the 2012 Basin-wide Screening Assessment of the Black Warrior and Cahaba (BWC) River Basins. The screening assessments were conducted at stream reaches where land use estimates and non-point source information from the local Soil and Water Conservation Districts indicated a moderate or high potential for impairment from nonpoint sources in non-urban areas.

Habitat and macroinvertebrate assessments could not be conducted at the site due to unwadeable conditions during the 2012 sampling season.

Figure 1. Big Yellow Creek at BYET-65A, May 8, 2012.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Big Yellow Creek at BYET-65A is a *Fish & Wildlife (F&W)* stream located within the Shale Hills ecoregion of Tuscaloosa County. Landuse within the watershed is primarily forested (86%). The Department has issued no NPDES permits in this watershed.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi^2)		154
Ecoregion[a]		68f
% Landuse		
Wetland	Woody	1
Forest	Deciduous	45
	Evergreen	31
	Mixed	10
Shrub/scrub		7
Grassland/herbaceous		5
Pasture/hay		1
Cultivated crops		<1
Development	Open space	1
Population/km^2[b]		78

a.Shale Hills
b.2000 US Census

WATER CHEMISTRY

Median values of water chemistry samples collected April, June, August & October of 2012 are presented in Table 2. *In situ* measurements indicated that Big Yellow Creek at BYET-65A generally met water quality criteria for its *F&W* water use classification. However, median concentrations of hardness and specific conductance were higher than expected as compared to ecoregion 68 reference conditions. Total aluminum values were greater than 90% of all verified ecoregional reference reach data collected in ecoregion 68. Also, the *F&W* human health criterion for arsenic appears to have been exceeded during the October sampling event.

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data.

Results from water quality sampling showed conductivity, and metals concentrations to be higher than expected based on the 90th percentile of data collected at least impaired reference reaches in the Shale Hills ecoregion. Due to unwadeable flow conditions, the impact of water quality conditions on biological communities could not be evaluated because habitat and macroinvertebrate assessments could not be conducted.

Table 2. Summary of water quality data collected April, June, August & October, 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.

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Parameter	N	Min	Max	Med	Avg	SD	Q
Physical							
Temperature (°C)	6	15.6	22.5	19.8	19.5	2.7	
Turbidity (NTU)	6	4.5	23.6	9.0	10.8	7.2	
Total Dissolved Solids (mg/L)	4	60.0	112.0	80.0	83.0	23.0	
Total Suspended Solids (mg/L)	4	<1.0	9.0	2.5	3.6	3.7	
Specific Conductance (µmhos)	6	64.6	80.8	73.9[G]	73.3	5.9	
Hardness (mg/L)	4	20.4	26.1	23.0[G]	23.1	2.8	
Alkalinity (mg/L)	4	10.7	11.1	11.0	10.9	0.2	
Stream Flow (cfs)	3	1.6	5.7	5.0	4.1	2.2	
Chemical							
Dissolved Oxygen (mg/L)	6	6.7	8.6	7.5	7.5	0.7	
pH (su)	6	6.4	7.0	6.8	6.7	0.2	
Ammonia Nitrogen (mg/L)	4	<0.007	<0.008	0.004	0.004	0.000	
[J]Nitrate+Nitrite Nitrogen (mg/L)	4	<0.003	0.054	0.008	0.018	0.024	
[J]Total Kjeldahl Nitrogen (mg/L)	4	<0.041	0.223	0.057	0.089	0.095	
Total Nitrogen (mg/L)	4	<0.023	0.277	0.065	0.108	0.117	
[J]Dissolved Reactive Phosphorus (mg/L)	4	<0.005	0.006	0.004	0.004	0.002	
Total Phosphorus (mg/L)	4	0.011	0.012	0.011	0.011	0.000	
[J]CBOD-5 (mg/L)	4	<2.0	<2.0	1.0	1.0	0.0	
Chlorides (mg/L)	4	2.2	5.3	2.7	3.2	1.4	
Total Metals							
[J]Aluminum (mg/L)	4	<0.043	0.775	0.310[M]	0.354	0.359	
Iron (mg/L)	4	0.648	1.390	0.829	0.924	0.333	
[J]Manganese (mg/L)	4	0.033	0.047	0.040	0.040	0.006	
Dissolved Metals							
[J]Aluminum (mg/L)	4	<0.043	0.109	0.034	0.050	0.041	
Antimony (µg/L)	4	<3.6	<3.6	1.8	1.8	0.0	
Arsenic (µg/L)	4	<1.8	3.8[H]	0.9	1.6	1.5	1
[J]Cadmium (mg/L)	4	<0.022	0.046	0.023	0.021	0.007	
Chromium (mg/L)	4	<0.009	<0.009	0.004	0.004	0.000	
Copper (mg/L)	4	<0.020	<0.020	0.010	0.010	0.000	
Iron (mg/L)	4	0.226	0.404	0.260	0.288	0.080	
Lead (µg/L)	4	<0.9	<0.9	0.4	0.4	0.0	
[J]Manganese (mg/L)	4	0.028	0.039	0.036	0.035	0.005	
Mercury (µg/L)	4	<0.035	<0.035	0.018	0.018	0.000	
Nickel (mg/L)	4	<0.042	<0.042	0.021	0.021	0.000	
Selenium (µg/L)	4	<2.5	<2.5	1.2	1.2	0.0	
Silver (mg/L)	4	<0.015	<0.215	0.058	0.058	0.058	
Thallium (µg/L)	4	<1.4	<1.4	0.7	0.7	0.0	
Zinc (mg/L)	4	<0.012	<0.012	0.006	0.006	0.000	
Biological							
Chlorophyll a (ug/L)	4	<0.10	0.53	0.42	0.36	0.22	
[J]E. coli (col/100mL)	4	29	77	58	56	22	

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 68; H= *F&W* human health criterion exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 68; N=# samples; Q=# of uncertain exceedances.