

2012 Monitoring Summary

Big Brush Creek at Hale County Road 21 (32.78504/-87.65406)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Big Brush Creek watershed for biological and water quality monitoring as part of the Assessment of the Black Warrior and Cahaba (BWC) River basins. The objectives of the Black Warrior and Cahaba River Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the BWC River basin. Habitat and macroinvertebrate assessments are normally conducted to accomplish these objectives. However, Big Brush Creek at BBRH-42D was not wadeable, and biological assessments could not be conducted.

Big Brush Creek at BBRH-42D was also selected by ADEM as a potential candidate reference reach station due to minimal disturbance within the watershed. If it is designated as a reference reach site, the water quality data collected will be used in determining future guidelines for other streams located within the same ecoregion.



Figure 1. Big Brush Creek at BBRH-42D, July 11, 2012.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Big Brush Creek at BBRH-42D is a *Fish & Wildlife (F&W)* stream in Hale County near Greensboro. According to the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (75%) with very limited development (Figure 1). Population density is low. As of September 1, 2012, ADEM has issued a total of four NPDES permits in the area.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi²)		132
Ecoregion^a		65i
% Landuse		
Open water		<1
Wetland	Woody	7
	Emergent herbaceous	<1
Forest	Deciduous	31
	Evergreen	25
	Mixed	19
Shrub/scrub		9
Grassland/herbaceous		<1
Pasture/hay		2
Cultivated crops		2
Development	Open space	3
	Low intensity	<1
	Moderate intensity	<1
Population/km^{2b}		22
# NPDES Permits^c	TOTAL	4
	Construction Stormwater	4

a.Fall Line Hills

b.2000 US Census

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

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 2. In situ measurements and water samples were collected monthly or semi-monthly (metals) during April through November of 2012 to help identify any stressors to the biological communities. Median specific conductance and hardness concentrations were higher than expected when compared to the median concentration of reference reach data collected within the same ecoregion. Dissolved iron concentrations were above the 90th percentile of all data collected within the Fall Line Hills ecoregion. One turbidity measurement (September) was greater than 50 NTU above the 90th percentile for all other turbidity measurements within the ecoregion. However, the flow during that site visit (21 cfs) was more than twice the average flow (8 cfs) for the year and may be the cause of the high turbidity measurement.

SUMMARY

The watershed of Big Brush Creek at BBRH-42D is characterized by low population density and minimal landuse disturbances. However, higher than expected conductivity, hardness, and dissolved iron, as well as incomplete macroinvertebrate collections and habitat assessments suggest that monitoring should continue to fully assess water quality and biological conditions.

Table 2. Summary of water quality data collected April-November, 2012. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). 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
Physical						
Temperature (°C)	8	13.2	27.1	22.5	21.5	4.8
Turbidity (NTU)	8	11.4	107.0 ^T	13.2	27.8	32.6
Total Dissolved Solids (mg/L)	8	18.0	88.0	55.0	58.0	22.1
^J Total Suspended Solids (mg/L)	8	< 1.0	59.0	4.5	11.9	20.1
Specific Conductance (µmhos)	8	20.3	72.6	48.9 ^G	48.0	16.0
Hardness (mg/L)	4	6.6	26.7	15.8 ^G	16.2	8.9
^J Alkalinity (mg/L)	8	3.5	32.1	14.9	16.8	9.1
Stream Flow (cfs)	5	1.3	21.9	6.7	8.9	7.8
Chemical						
Dissolved Oxygen (mg/L)	8	5.6	8.6	7.0	7.0	1.0
pH (su)	8	6.0	6.7	6.4	6.4	0.2
Ammonia Nitrogen (mg/L)	8	< 0.007	0.077	0.020	0.029	0.030
Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.005	0.186	0.046	0.061	0.057
^J Total Kjeldahl Nitrogen (mg/L)	8	0.127	0.370	0.252	0.252	0.080
^J Total Nitrogen (mg/L)	8	< 0.130	0.556	0.299	0.313	0.122
^J Dissolved Reactive Phosphorus (mg/L)	8	0.006	0.009	0.006	0.007	0.001
Total Phosphorus (mg/L)	8	0.041	0.105	0.044	0.053	0.022
^J CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0
Chlorides (mg/L)	8	0.7	3.1	2.5	2.4	0.8
Total Metals						
^J Aluminum (mg/L)	4	0.065	3.090	0.552	1.065	1.417
Iron (mg/L)	4	2.030	4.660	3.285	3.315	1.088
Manganese (mg/L)	4	0.196	0.683	0.353	0.396	0.232
Dissolved Metals						
^J Aluminum (mg/L)	4	< 0.043	0.139	0.022	0.051	0.059
Antimony (µg/L)	4	< 3.6	< 3.6	1.8	1.8	0.0
Arsenic (µg/L)	4	< 1.8	< 1.8	0.9	0.9	0.0
Cadmium (µg/L)	4	< 0.022	< 0.046	0.023	0.020	0.006
Chromium (µg/L)	4	< 9.000	< 9.000	4.500	4.500	0.000
Copper (mg/L)	4	< 0.020	< 0.020	0.010	0.010	0.000
Iron (mg/L)	4	0.299	1.170	0.757 ^M	0.746	0.479
Lead (µg/L)	4	< 0.9	< 0.9	0.4	0.4	0.0
Manganese (mg/L)	4	0.131	0.647	0.303	0.346	0.237
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 (µg/L)	4	< 0.015	< 0.215	0.108	0.082	0.050
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)	8	< 0.10	5.34	1.60	1.82	1.92
^J E. coli (col/100mL)	8	36	2420	116	422	813

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65i; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65i; N=# samples; T=value exceeds 50 NTU above the 90th percentile of all verified ecoregional reference reach data collected in the ecoregion 65i.

FOR MORE INFORMATION, CONTACT:
James Worley, ADEM Environmental Indicators Section
1350 Coliseum Blvd Montgomery, AL 36110
(334) 394-4343 jworley@adem.state.al.us