Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2009 Monitoring Summary

Chandelower Creek at Sally Burns Road (Colbert County) (34.62736/-88.06238)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Chandelower Creek watershed for biological and water quality monitoring as part of the 2009 Tennessee (TN) Basin Assessment Monitoring.

Habitat and macroinvertebrate assessments were conducted as part of this project to assess the biological integrity of each monitoring site and to estimate overall water quality within the TN basin. Assessments of habitat quality and macroinvertebrate community condition could not be conducted for Chandelower Creek at CHLC-1 (Figure 1) due to unwadeable site conditions.

Figure 1. Chandelower Creek at CHLC-1, June 23, 2009.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Chandelower Creek at CHLC-1 is a deep, low-gradient *Fish and Wildlife (F&W)* stream located in the Transition Hills ecoregion (65j). Based on the 2006 National Land Cover Dataset, land cover within the watershed is primarily forest (77%), with some shrub areas. As of September 1, 2012, ADEM's NPDES management database showed only one permitted discharge located within the watershed.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tennessee River
Drainage Area (mi^2)		9
Ecoregion[a]		65j
% Landuse		
Open water		<1
Wetland	Woody	<1
Forest	Deciduous	73
	Evergreen	3
	Mixed	1
Shrub/scrub		13
Pasture/hay		6
Cultivated crops		1
Development	Open space	2
	Low intensity	<1
Population/km^2[b]		2
# NPDES Permits[c]	**TOTAL**	1
Construction Stormwater		1

a.Transition 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. Generally, in situ measurements and water samples were collected monthly; metals were collected in March, May, and July. Median values for dissolved copper and dissolved manganese were above the 90th percentile of all reference reach data collected in the Transition Hills ecoregion (65j). Specific conductance was found to be above the median value of all reference reach data for this ecoregion. Fecal coliform levels exceeded use class criteria for *F&W* streams on October 12. However, stream flows at the time of this collection were documented to be above normal and may account for the elevated fecal coliform result. Arsenic exceeded human health criteria on July 15, and dissolved oxygen concentrations fell below minimum use class criteria on July 15 and August 12. Stream flows were lower than normal on these dates (0.5 cfs on July 15 and 0.4 cfs on August 12) and may account for the low dissolved oxygen concentrations, as well as the elevated arsenic levels.

Table 2. Summary of water quality data collected March-May, 2009. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL) when results were less than this value for non-metals parameters. Median, average (Avg), and standard deviations (SD) values were calculated by multiplying the MDL by 0.5 when results were less than this value for non-metals parameters.

Parameter	N	Min	Max	Median	Avg	SD	E	Q
Physical								
Temperature (oC)	7	14.5	26.1	22.1	21.2	4.2		
Turbidity (NTU)	7	6.5	31.0	11.0	14.0	8.6		
Total Dissolved Solids (mg/L)	7	36.0	81.0	71.0	66.4	15.2		
J Total Suspended Solids (mg/L)	7	3.0	18.0	5.0	7.0	5.1		
Specific Conductance (µmhos)	7	84.0	124.7	92.9 G	100.0	15.3		
Hardness (mg/L)	3	31.8	52.3	42.8	42.3	10.3		
Alkalinity (mg/L)	7	26.9	58.1	33.7	38.8	12.4		
Stream Flow (cfs)	6	0.4	24.2	3.4	6.6	9.1		
Chemical								
Dissolved Oxygen (mg/L)	7	3.2 C	9.7	8.0	7.3	2.8	2	
pH (su)	7	6.9	7.5	7.1	7.1	0.2		
CBOD-5 (mg/L)	7	< 1.0	< 2.0	0.5	0.6	0.2		
Chlorides (mg/L)	7	1.1	2.6	1.9	1.8	0.5		
Atrazine (µg/L)	1				0.06			
Total Metals								
J Aluminum (mg/L)	3	0.065	1.430	0.248	0.581	0.741		
Iron (mg/L)	3	0.408	0.898	0.608	0.638	0.246		
J Manganese (mg/L)	3	0.039	0.271	0.055	0.122	0.130		
Dissolved Metals								
J Aluminum (mg/L)	3	< 0.060	0.117	0.030	0.059	0.050		
Antimony (µg/L)	3	< 2.0	< 6.0	3.0	2.3	1.1		
J Arsenic (µg/L)	3	< 0.4	< 1.6 H	0.8	0.7	0.4		1
Cadmium (µg/L)	3	< 2.000	< 3.000	1.000	1.167	0.289		
Chromium (µg/L)	3	< 7.000	< 13.000	3.500	4.500	1.732		
Copper (mg/L)	3	< 0.013	< 0.200	0.100 M	0.069	0.054		
J Iron (mg/L)	3	0.077	0.171	0.081	0.110	0.053		
Lead (µg/L)	3	< 0.6	< 1.5	0.8	0.6	0.3		
J Manganese (mg/L)	3	0.034	0.227	0.048 M	0.103	0.108		
Nickel (mg/L)	3	< 0.004	< 0.008	0.004	0.003	0.001		
Selenium (µg/L)	3	< 0.4	< 1.5	0.2	0.4	0.3		
Silver (µg/L)	3	< 1.000	< 2.000	0.500	0.667	0.289		
Thallium (µg/L)	3	< 0.4	< 0.5	0.2	0.2	0.0		
Zinc (mg/L)	3	< 0.003	< 0.060	0.030	0.020	0.016		
Biological								
Chlorophyll a (mg/L)	7	< 0.53	3.74	0.53	1.21	1.19		
J Fecal Coliform (col/100 mL)	7	44	2300 C	440	562	793	1	

C=*F&W* criteria violated; E=# samples that exceeded criteria; G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65j; H=*F&W* human health criterion exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65j; N=# samples; Q=# samples with uncertain exceedances.

SUMMARY

Unwadeable conditions in Chandelower Creek at CHLC-1 prevented the completion of habitat and macroinvertebrate assessments. Dissolved copper, dissolved manganese, specific conductance, dissolved oxygen, and fecal coliform were all parameters of concern at this reach. Results may have been affected by stream flows during the sampling period. Additional monitoring will need to be conducted before biological conditions at this site can be assessed.

Although samples of total dissolved arsenic did exceed human health criteria in Chandelower Creek, ADEM criteria for arsenic are expressed as dissolved trivalent arsenic (arsenite – As III). Presently, studies are being conducted in order to provide a better understanding of the prevalence and areal distribution of dissolved trivalent arsenic to total arsenic in the State of Alabama. Upon conclusion of the studies, Chandelower Creek will be reassessed for arsenic violations.

FOR MORE INFORMATION, CONTACT:
Ruthie Perez, ADEM Aquatic Assessment Unit
1350 Coliseum Boulevard Montgomery, AL 36110
(334) 260-2762 ryperez@adem.state.al.us