Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2009 Monitoring Summary

Rock Creek at Colbert County Road 7 (Sally Burns Road) (34.60930/-88.06323)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Rock Creek watershed for biological and water quality monitoring as part of the 2009 Assessment of the Tennessee (TN) River Basin. The objectives of the Tennessee River Basin Assessments were to assess the biological integrity of each monitoring location and to estimate overall water quality within the TN basin. However, Rock Creek at RCKC-2 was unwadeable, and the biological assessments could not be conducted at this location.

Figure 1. Rock Creek at RCKC-2, facing downstream.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tennessee R
Drainage Area (mi^2)		36
Ecoregion[a]		65j
% Landuse		
Open water		<1
Wetland	Woody	1
	Emergent herbaceous	<1
Forest	Deciduous	56
	Evergreen	7
	Mixed	2
Shrub/scrub		25
Grassland/herbaceous		4
Pasture/hay		2
Cultivated crops		1
Development	Open space	2
	Low intensity	<1
	Moderate intensity	<1
	High intensity	
Barren		<1
Population/km^2[b]		2
# NPDES Permits[c]	**TOTAL**	2
401 Water Quality Certification		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.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Rock Creek is a *Fish and Wildlife (F&W)* stream located in Colbert County (Figure 1). Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (64%) and shrub/scrub. Population density in the area is very low, and less than 4% of the watershed is developed. As of September 1, 2012, ADEM's NPDES management system shows a total of two permitted discharges in this watershed.

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 2. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, semi-volatile organics, atrazine) during March through October of 2009 to help identify any stressors to the biological communities. Stream flow was measured in March, but could not be measured April through October due to non-wadeable conditions. Dissolved arsenic exceeded the human health fish consumption criteria during one sampling event (Aug. 12th). Dissolved oxygen values were below water quality criteria for the stream's *F&W* use classification during two sampling events (Jul. 15th and Aug. 12th). Dissolved mercury exceeded both the chronic aquatic life use criterion and the human health fish consumption criterion during two sampling events. Median specific conductance, nutrients (total kjeldahl nitrogen, dissolved reactive phosphorus) and metals (total iron, dissolved manganese, and dissolved copper) exceeded values expected based on data collected at reference reaches in ecoregion 65j.

SUMMARY

Monthly water quality samples collected in Rock Creek at RCKC-2 indicated some nutrient and dissolved metals concentrations to be higher than background levels based on ADEM's reference reach data collected in ecoregion 65j. However, habitat and macroinvertebrate assessments were not conducted because the stream was unwadeable.

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Table 2. Summary of water quality data collected March-October, 2009. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median (Med), 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)	7	14.7	25.0	22.2	20.9	4.0	
Turbidity (NTU)	7	7.0	22.4	8.3	12.0	6.6	
Total Dissolved Solids (mg/L)	6	64.0	118.0	84.5	84.8	19.5	
J Total Suspended Solids (mg/L)	6	2.0	9.0	3.5	4.0	2.6	
Specific Conductance (µmhos)	7	111.0	125.2	115.2 G	117.3	5.2	
Hardness (mg/L)	3	51.5	54.1	52.7	52.8	1.3	
Alkalinity (mg/L)	6	45.9	65.1	49.4	52.8	8.2	
Stream Flow (cfs)	1				44.3		
Chemical							
Dissolved Oxygen (mg/L)	7	4.3 C	9.2	7.6	7.0	2.0	2
pH (su)	7	7.0	7.4	7.1	7.2	0.1	
Ammonia Nitrogen (mg/L)	6	< 0.006	< 0.014	0.005	0.005	0.001	
J Nitrate+Nitrite Nitrogen (mg/L)	6	0.028	2.964	0.116	0.593	1.165	
J Total Kjeldahl Nitrogen (mg/L)	6	0.250	1.460	0.598 M	0.680	0.437	
J Total Nitrogen (mg/L)	6	0.278	4.424	0.713	1.273	1.573	
J Dissolved Reactive Phosphorus (mg/L)	6	0.010	0.100	0.058 M	0.056	0.043	
J Total Phosphorus (mg/L)	6	0.007	0.041	0.018	0.019	0.012	
CBOD-5 (mg/L)	6	< 1.0	< 2.0	0.5	0.6	0.2	
J Chlorides (mg/L)	6	0.8	1.7	1.4	1.4	0.3	
Atrazine (µg/L)	1				< 0.06		
Total Metals							
J Aluminum (mg/L)	3	0.116	2.280	0.143	0.846	1.242	
Iron (mg/L)	3	0.638	1.560	0.892 M	1.030	0.476	
Manganese (mg/L)	3	0.065	0.164	0.078	0.102	0.054	
Dissolved Metals							
J Aluminum (mg/L)	3	< 0.060	0.073	0.030	0.044	0.025	
Antimony (µg/L)	3	< 6.0	< 6.0	3.0	3.0	0.0	
J Arsenic (µg/L)	3	< 0.4	0.9 H	0.2	0.4	0.4	1
Cadmium (mg/L)	3	< 0.002	< 0.002	0.001	0.001	0.000	
Chromium (mg/L)	3	< 0.007	< 0.007	0.004	0.004	0.000	
Copper (mg/L)	3	< 0.200	< 0.200	0.100 M	0.100	0.000	
J Iron (mg/L)	3	0.114	0.371	0.174	0.220	0.134	
Lead (µg/L)	3	< 1.5	< 1.5	0.8	0.8	0.0	
J Manganese (mg/L)	3	0.047	0.138	0.070 M	0.085	0.047	
J Mercury (µg/L)	3	< 0.1	0.8 AH	0.5	0.4	0.4	2
Nickel (mg/L)	3	< 0.008	< 0.008	0.004	0.004	0.000	
Selenium (µg/L)	3	< 0.4	< 0.4	0.2	0.2	0.0	
Silver (mg/L)	3	< 0.001	< 0.001	0.000	0.000	0.000	
Thallium (µg/L)	3	< 0.4	< 0.4	0.2	0.2	0.0	
Zinc (mg/L)	3	< 0.060	< 0.060	0.030	0.030	0.000	
Biological							
Chlorophyll a (ug/L)	6	< 1.00	1.07	0.78	0.78	0.31	
J Fecal Coliform (col/100 mL)	6	43	116	72	74	25	
J E. coli (col/100mL)	1				115		

J=estimate; N=# of samples; E=# of samples that exceed criterion; C=value exceeds established criteria for *F&W* water use classification; A=*F&W* aquatic life use criterion exceeded; H=*F&W* human health criterion exceeded; G=value greater than median concentration of all verified reference data collected in ecoregion 65j; M=value > 90% of all verified ecoregional reference reach data collected in the ecoregion 65j.