Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2009 Monitoring Summary

Fair

Buzzard Roost Creek at Colbert County Road 21 (34.69831/-87.98914)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Buzzard Roost Creek watershed for biological and water quality monitoring as part of the 2009 Assessment of the Tennessee (TN) River Basin. The objectives of the TN Basin Assessment were to assess the biological integrity of each monitoring site and to estimate overall water quality within the Tennessee River basin.

Figure 1. Buzzard Roost Creek facing downstream at BZDC-1, June 17, 2009.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tennessee River
Drainage Area (mi^2)		26
Ecoregion[a]		65j
% Landuse		
Open water		<1
Wetland	Woody	<1
	Emergent herbaceous	<1
Forest	Deciduous	65
	Evergreen	10
	Mixed	5
Shrub/scrub		15
Pasture/hay		1
Cultivated crops		1
Development	Open space	2
	Low intensity	<1
	Moderate intensity	<1
Population/km^2[b]		2
# NPDES Permits[c]	**TOTAL**	5
Construction Stormwater		2
Industrial General		1
Industrial Individual		2

a.Transition Hills

b.2000 US Census

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

Table 2. Physical characteristics at Buzzard Roost Creek at BZDC-1, June 23, 2009.

Physical Characteristics		
Width (ft)		25
Canopy cover		Est. 50/50
Depth (ft)		
	Riffle	1.0
	Run	1.5
	Pool	2.0
% of Reach		
	Riffle	10
	Run	70
	Pool	20
% Substrate		
	Cobble	26
	Gravel	50
	Sand	10
	Silt	2
	Clay	5
	Organic Matter	7

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Buzzard Roost Creek at BZDC-1 is a *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 (80%), with some shrub/scrub. As of September 1, 2012, ADEM's NPDES Management System database shows five permitted discharges located within the 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.

Buzzard Roost Creek at BZDC-1 is a high-gradient stream characterized by gravel and cobble substrates (Figure 1). Overall habitat quality was categorized as *sub-optimal* as a result of a poor riparian buffer zone, and a lack of riffle areas within the stream reach.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WBM-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 in comparison to least-impaired reference reaches in the same ecoregion. The final score is the average of all individual metric scores. Metric results indicated the macroinvertebrate community in Buzzard Roost Creek at BZDC-1 to be characterized by non-insect taxa groups, indicating *fair* community condition (Table 4).

Table 3. Results of the habitat assessment conducted on Buzzard Roost Creek at BZDC-1, June 23, 2009.

Habitat Assessment	(% Maximum Score)	Rating
Instream habitat quality	74	Optimal >65
Sediment deposition	68	Optimal >65
Sinuosity	63	Marginal (45-64)
Bank and vegetative stability	60	Sub-optimal (60-74)
Riparian buffer	31	Poor <50
Habitat assessment score	**150**	
% Maximum score	**62**	**Sub-optimal (53-65)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Buzzard Roost Creek at BZDC-1, June 23, 2009.

Macroinvertebrate Assessment		
	Results	**Scores**
Taxa richness and diversity measures		**(0-100)**
# EPT taxa	21	74
Shannon Diversity	5.03	108
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	8	17
% Non-insect taxa	19	0
Functional feeding group		
% Predator Individuals	7	24
Community tolerance		
% Tolerant taxa	23	75
WMB-I Assessment Score	**---**	**32**
WMB-I Assessment Rating		**Fair (29-43)**

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, atrazine, and semi-volatile organics) during March through October of 2009 to help identify any stressors to the biological communities.

The median value of specific conductance was above the median value of reference reach data collected in the Transition Hills ecoregion (65j). Dissolved arsenic levels exceeded Human Health criteria on July 17, and the median dissolved manganese value was above the 90th percentile of all verified reference data collected in this ecoregion.

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Buzzard Roost Creek at BZDC-1 to be in *fair* condition. Specific conductance was higher than expected based on data collected at ADEm's least-impaired ecoregional reference reaches. Median dissolved manganese was also slightly higher than expected. Monitoring should continue to ensure that biological conditions remain stable.

Table 5. Summary of water quality data collected March-October, 2009. 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	Median	Avg	SD	E
Physical							
Temperature (°C)	9	14.7	28.7	23.8	22.9	4.8	
Turbidity (NTU)	9	4.1	29.2	5.5	9.2	8.1	
J Total Dissolved Solids (mg/L)	8	36.0	94.0	75.5	71.1	17.0	
J Total Suspended Solids (mg/L)	8	< 1.0	15.0	1.5	3.9	5.1	
Specific Conductance (µmhos)	9	86.5	119.9	110.4 G	106.7	12.0	
Hardness (mg/L)	4	38.7	53.9	48.6	47.4	6.4	
Alkalinity (mg/L)	8	32.9	64.8	43.0	46.7	11.5	
Stream Flow (cfs)	8	1.4	29.2	6.1	11.0	12.2	
Chemical							
Dissolved Oxygen (mg/L)	9	6.3	9.4	8.2	7.9	1.2	
pH (su)	9	7.2	7.6	7.4	7.4	0.1	
CBOD-5 (mg/L)	8	< 1.0	2.4	0.5	0.9	0.7	
Chlorides (mg/L)	8	1.2	3.8	1.6	2.0	0.9	
Atrazine (µg/L)	1				0.11		
Total Metals							
J Aluminum (mg/L)	4	< 0.060	0.520	0.078	0.176	0.230	
Iron (mg/L)	4	0.431	0.595	0.476	0.494	0.074	
J Manganese (mg/L)	4	0.032	0.081	0.044	0.050	0.023	
Dissolved Metals							
J Aluminum (mg/L)	4	< 0.033	< 0.060	0.030	0.033	0.016	
Antimony (µg/L)	4	< 0.7	< 6.0	2.0	1.8	1.4	
J Arsenic (µg/L)	4	< 0.4	< 1.6 H	0.5	0.5	0.4	1
Cadmium (mg/L)	4	< 0.002	< 0.003	0.001	0.001	0.000	
Chromium (mg/L)	4	< 0.007	< 0.013	0.005	0.005	0.002	
Copper (mg/L)	4	< 0.013	< 0.200	0.053	0.053	0.054	
J Iron (mg/L)	4	< 0.026	< 0.326	0.112	0.140	0.139	
Lead (µg/L)	4	< 0.6	< 1.5	0.6	0.6	0.2	
J Manganese (mg/L)	4	0.005	0.042	0.028 M	0.026	0.015	
Nickel (mg/L)	4	< 0.004	< 0.019	0.004	0.005	0.003	
Selenium (µg/L)	4	< 0.4	< 1.5	0.2	0.3	0.3	
Silver (mg/L)	4	< 0.001	< 0.002	0.001	0.001	0.000	
Thallium (µg/L)	4	< 0.4	< 0.5	0.2	0.2	0.0	
Zinc (mg/L)	4	< 0.003	< 0.060	0.016	0.016	0.016	
Biological							
Chlorophyll a (mg/L)	8	< 0.27	< 1.00	0.50	0.51	0.14	
J Fecal Coliform (col/100 mL)	8	38	600	84	193	233	

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 criteria exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65j; N=# samples

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