

2010 Monitoring Summary



Robinson Creek in Monroe County at State Road 47 (31.68341/-87.21802)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Robinson Creek watershed for biological and water quality monitoring as part of the 2010 Assessment of the Alabama, Coosa, and Tallapoosa River Basins. The objectives of the project were to assess the biological integrity of each monitoring site and to estimate overall water quality within the basins.

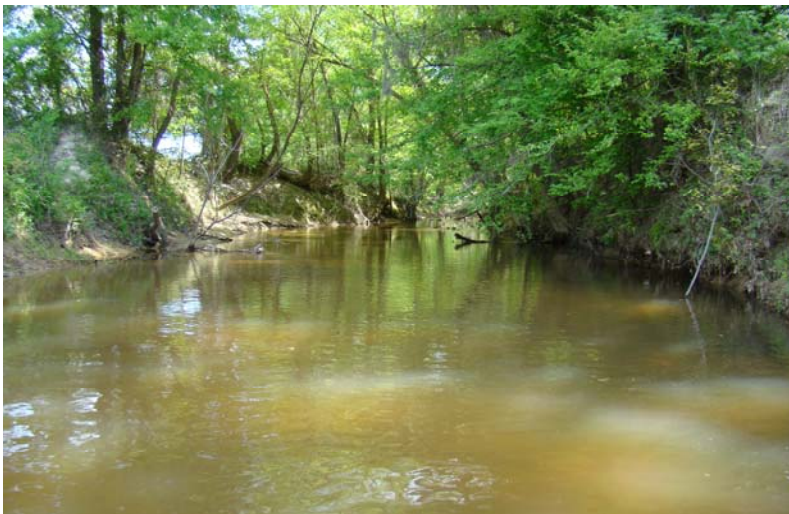


Figure 1. Robinson Creek at ROB-M-2, April 14, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Robinson Creek is a *Fish & Wildlife (F&W)* stream located northeast of Monroeville, Alabama. Based on the 2011 National Land Cover Dataset, landuse within the watershed is 72% forested. Population is low with little development in the area. As of April 1, 2016, ten outfalls are active in this 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. Robinson Creek at ROB-M-2 is a low-gradient, glide-pool stream with substrate composed primarily of sand (Figure 1). Overall habitat quality and availability was rated as *mar-*

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-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. The overall WMB-I scored ROB-M-2 with a *fair* community condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Alabama R
Drainage Area (mi²)		38
Ecoregion^a		65D
% Landuse^b		
Open water		<1%
Wetland	Woody	7%
	Emergent herbaceous	<1%
Forest	Deciduous	39%
	Evergreen	26%
	Mixed	7%
Shrub/scrub		10%
Grassland/herbaceous		4%
Pasture/hay		3%
Cultivated crops		1%
Development	Open space	2%
	Low intensity	<1%
	Moderate intensity	<1%
Population/km^{2c}		4
# NPDES Permits^d	TOTAL	10
	Construction	10

a.Southern Hilly Gulf Coastal Plain

b.2011 National Land Cover Dataset

c.2010 US Census

d.#NPDES outfalls downloaded from ADEM's NPDES Management System database, April 1, 2016.

Table 2. Physical characteristics of Robinson Creek at ROB-M-2, May 11, 2010.

Physical Characteristics		
Width (ft)		30
Canopy Cover		Shaded
Depth (ft)	Run	2.0
	Pool	4.0
% of Reach		
	Run	50
	Pool	50
% Substrate		
	Clay	5
	Gravel	3
	Sand	80
	Silt	2
	Organic Matter	10

Table 3. Results of the habitat assessment conducted on Robinson Creek at ROBM-2, May 11, 2010.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	48	Marginal (40-<53)
Sediment Deposition	55	Sub-Optimal (53-65)
Sinuosity	48	Marginal (45-<65)
Bank Vegetative Stability	31	Poor (<35)
Riparian Buffer	45	Poor (<50)
Habitat Assessment Score	90	
%f Maximum Score	41	Marginal (40-<53)

Table 4. Results of the macroinvertebrate bioassessment conducted in Robinson Creek at ROBM-2, May 11, 2010.

Macroinvertebrate Assessment		
	Results	Scores (0-100)
Taxa richness and diversity measures		
% EPC taxa	29	48
% Dominant Taxon	34	37
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	8	14
Functional feeding group		
# Collector Taxa	20	65
Community tolerance		
% Nutrient Tolerant individuals	59	10
WMB-I Assessment Score	---	35
WMB-I Assessment Rating		Fair (32-47)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements were collected each visit, water samples (nutrients and metals) semi-monthly, or twice (pesticides, atrazine, and semi-volatile organics) during April through October of 2010 to help identify any stressors to the biological communities. Median concentration of specific conductance was higher than expected based on the median concentration of all verified reference reach data collected in ecoregion 65d. Organics samples were collected at ROBM-2 on April 14 and October 19 and all parameters were below detection limits.

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report along with all other available data. Bioassessment results in Robinson Creek at ROBM-2 indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality and availability was assessed as *marginal* for supporting macroinvertebrate communities. Specific conductance was higher than expected. Monitoring should continue to ensure that water quality and biological conditions remain stable.

Table 5. Summary of water quality data collected March-October, 2010. 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	O
Physical							
Temperature (°C)	5	15.3	25.2	18.4	20.1	4.7	
Turbidity (NTU)	5	7.2	36.6	17.4	18.0	11.4	
Total Dissolved Solids (mg/L)	4	55.0	83.0	63.0	66.0	13.2	
Total Suspended Solids (mg/L)	4	6.0	21.0	9.5	11.5	6.6	
Specific Conductance (µmhos)	5	49.0	77.0 ^G	73.5	65.9	12.9	
Hardness (mg/L)	4	13.8	25.2	20.1	19.8	5.6	
Alkalinity (mg/L)	4	11.0	22.0	16.0	16.2	4.6	
Stream Flow (cfs)	5	1.7	18.6	8.1	10.9	7.3	
Chemical							
Dissolved Oxygen (mg/L)	5	6.8	9.0	8.1	7.9	1.1	
pH (su)	5	6.1	7.4	6.8	6.8	0.5	
Ammonia Nitrogen (mg/L)	4	< 0.029	0.030	0.022	0.022	0.009	
^J Nitrate+Nitrite Nitrogen (mg/L)	4	0.039	0.344	0.192	0.192	0.129	
Total Kjeldahl Nitrogen (mg/L)	4	< 0.070	0.810	0.405	0.414	0.354	
^J Total Nitrogen (mg/L)	4	< 0.074	1.154	0.596	0.605	0.458	
^J Dissolved Reactive Phosphorus (mg/L)	4	0.004	0.013	0.010	0.009	0.004	
Total Phosphorus (mg/L)	4	0.027	0.070	0.047	0.048	0.018	
CBOD-5 (mg/L)	4	< 1.0	< 1.0	0.5	0.5	0.0	
Chlorides (mg/L)	4	< 0.6	< 0.6	0.3	0.3	0.0	
Atrazine (µg/L)	2	< 0.02	< 0.02	0.01	0.01	0.00	
Total Metals							
^J Aluminum (mg/L)	4	0.045	1.980	0.399	0.706	0.867	
^J Iron (mg/L)	4	0.937	2.720	1.705	1.767	0.770	
^J Manganese (mg/L)	4	0.021	0.060	0.046	0.043	0.017	
Dissolved Metals							
^J Aluminum (mg/L)	4	< 0.033	0.212	0.086	0.100	0.089	
^J Antimony (µg/L)	4	< 1.9	< 2.3	1.0	1.0	0.1	
^J Arsenic (µg/L)	4	< 1.9	2.7 ^H	1.0	1.4	0.9	1
^J Cadmium (µg/L)	4	< 0.014	< 0.060	0.022	0.020	0.012	
^J Chromium (µg/L)	4	< 13.000	< 15.000	7.000	7.000	0.577	
Copper (mg/L)	4	< 0.013	< 0.014	0.007	0.007	0.000	
Iron (mg/L)	4	0.272	0.483	0.402	0.390	0.088	
^J Lead (µg/L)	4	< 1.7	< 2.6	1.1	1.1	0.3	
^J Manganese (mg/L)	4	0.019	0.041	0.036	0.033	0.010	
^J Mercury (µg/L)	4	< 0.080	0.226 ^{AH}	0.046	0.090	0.091	1
^J Nickel (mg/L)	4	< 0.009	< 0.019	0.007	0.007	0.003	
^J Selenium (µg/L)	4	< 0.8	< 1.7	0.6	0.6	0.2	
Silver (µg/L)	4	< 0.015	< 0.200	0.054	0.054	0.053	
^J Thallium (µg/L)	4	< 0.6	< 1.2	0.4	0.4	0.2	
^J Zinc (mg/L)	4	< 0.002	< 0.030	0.008	0.008	0.008	
Biological							
Chlorophyll a (ug/L)	4	< 1.00	1.30	0.50	0.70	0.40	
^J E. coli (col/100mL)	4	4	23	16	15	9	

A=F&W aquatic life use criterion exceeded; E=# samples that exceeded criteria; H=F&W human health criteria exceeded; G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65d; J=estimate; N=# samples.

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