Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2010 Monitoring Summary

Fair-Good™

Little Terrapin Creek at Cleburne County Road 49 (33.91508/-85.46559)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Little Terrapin Creek watershed for biological and water quality monitoring as part of the 2010 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River basins. The objectives of the ACT Basin Assessments were to assess the biological integrity of each monitoring location and to estimate overall water quality within the ACT basins. Macroinvertebrate and habitat assessments were conducted in Little Terrapin Creek on May 27, 2010.

Figure 1. Little Terrapin Creek at LTPC-1, September 9, 2010.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Coosa River
Drainage Area (mi^2)		15
Ecoregion[a]		67f
% Landuse		
Open water		<1
Wetland	Woody	1
Forest	Deciduous	56
	Evergreen	20
	Mixed	3
Shrub/scrub		3
Grassland/herbaceous		8
Pasture/hay		5
Cultivated crops		<1
Development	Open space	2
	Low intensity	<1
Barren		1
Population/km^2[b]		5
# NPDES Permits[c]	**TOTAL**	3
Construction Stormwater		1
Mining		2

a.Southern Limestone/Dolomite Valleys and Low Rolling Hills
b.2000 US Census
c.#NPDES permits downloaded from ADEM's NPDES Management System database, February 23, 2011

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Terrapin Creek is a small *Fish & Wildlife (F&W)* stream in Cleburne County. According to the 2000 National Land Cover Dataset, landuse within the watershed is primarily forest (79%). Population density is low. As of February 23, 2011, three NPDES outfalls are active within the watershed, two of which are mining permits.

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 and the quality and availability of habitat. Little Terrapin Creek at LTPC-1 is characterized by sand, gravel, and cobble substrates (Figure 1). Overall habitat was rated as *sub-optimal* for supporting macroinvertebrate communities, although sediment deposition was evident.

Table 2. Physical characteristics of Little Terrapin Creek at LTPC-1, May 27, 2010.

Physical Characteristics		
Width (ft)		35
Canopy Cover		Estimate 50/50
Depth (ft)		
	Riffle	0.5
	Run	1.0
	Pool	1.5
% of Reach		
	Riffle	5
	Run	90
	Pool	5
% Substrate		
	Boulder	1
	Cobble	20
	Gravel	25
	Sand	44
	Silt	5
	Organic Matter	5

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). Measures of taxonomic richness, community composition, and community tolerance are used to assess the overall health of the macroinvertebrate community in comparison to conditions expected in north Alabama streams and rivers. Each site is placed in one of six levels, ranging from 1, or *natural* to 6, or *highly altered*. The macroinvertebrate survey conducted in Little Terrapin Creek at LTPC-1 rated the site as *fair-good* (Table 4).

Table 3. Results of the habitat assessment conducted on Little Terrapin Ck at LTPC-1, May 27, 2010.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	62	Sub-Optimal (55-79)
Sediment Deposition	43	Marginal (31-<55)
Riffle frequency	77.5	Sub-Optimal (55-79)
Bank Vegetative Stability	79	Sub-Optimal (58-79)
Riparian Buffer	45	Marginal (31-<60)
Habitat Assessment Score	**119**	
% Maximum Score	**60**	**Sub-Optimal (57-80)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Little Terrapin Creek at LTPC-1, May 27, 2010.

Macroinvertebrate Assessment	
	Results
Taxa richness and diversity measures	
Total # Taxa	50
# EPT taxa	14
Shannon Diversity	4.01
# Highly-sensitive and Specialized Taxa	3
Taxonomic composition measures	
% EPT minus Baetidae and Hydropsychidae	31
% Non-insect taxa	16
Tolerance measures	
# Sensitive EPT	6
% Sensitive taxa	6
% Tolerant taxa	30
WMB-I Assessment Score	**4+**
WMB-I Assessment Rating	**Fair-Good**

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected in May, July, and November of 2010. Flow was variable at the site, ranging from 80.4 cfs in May to 1.5 cfs in November. In September, sampling could not be conducted due to dry streambed conditions. Total manganese and dissolved iron and manganese were higher than expected when compared to verified data of other reference reaches in the same ecoregion.

SUMMARY

Macroinvertebrate results indicated Little Terrapin Creek at LTPC-1 to be in *fair-good* condition. Flow conditions were variable at the site. Additionally, water chemistry results indicated some metals to be higher than expected for streams within the Southern Limestone/Dolomite Valleys and Low Rolling Hills eco-region. Sediment deposition was also evident within the reach.

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Table 5. Summary of water quality data collected May, July, and November 2010. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL) when results were less than this value. 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	Q
Physical								
Temperature (°C)	4		11.2	25.2	22.2	20.2	6.6	
Turbidity (NTU)	4		2.5	38.1	3.9	12.1	17.4	
Total Dissolved Solids (mg/L)	3		24.0	52.0	44.0	40.0	14.4	
Total Suspended Solids (mg/L)	3	<	1.0	17.0	1.0	6.2	9.4	J
Specific Conductance (µmhos)	4		30.1	88.4	54.6	56.9	25.8	
Hardness (mg/L)	3		10.3	33.1	24.6	22.7	11.5	
Alkalinity (mg/L)	3		7.7	39.2	31.8	26.2	16.5	
Stream Flow (cfs)	4		1.5	80.4	5.0	23.0	38.4	
Chemical								
Dissolved Oxygen (mg/L)	4		6.7	8.7	7.6	7.7	1.0	
pH (su)	4		6.4	7.1	6.9 M	6.8	0.3	
Ammonia Nitrogen (mg/L)	3	<	0.021	< 0.021	0.010	0.010	0.000	
Nitrate+Nitrite Nitrogen (mg/L)	3		0.043	0.156	0.063	0.087	0.060	
Total Kjeldahl Nitrogen (mg/L)	3	<	0.080	0.326	0.040	0.135	0.165	
Total Nitrogen (mg/L)	3	<	0.083	0.389	0.196	0.223	0.155	
Dissolved Reactive Phosphorus (mg/L)	3		0.004	0.015	0.009	0.009	0.006	J
Total Phosphorus (mg/L)	3		0.014	0.040	0.022	0.025	0.013	
CBOD-5 (mg/L)	3	<	2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	3		0.8	1.8	1.2	1.2	0.5	
Atrazine (µg/L)	2	<	0.02	0.05	0.03	0.03	0.03	
Total Metals								
Aluminum (mg/L)	3	<	0.033	0.767	0.022	0.268	0.432	
Iron (mg/L)	3		0.299	1.210	0.544	0.684	0.471	
Manganese (mg/L)	3		0.049	0.195	0.132 M	0.125	0.073	J
Dissolved Metals								
Aluminum (mg/L)	3	<	0.033	0.043	0.016	0.018	0.003	
Antimony (µg/L)	3	<	1.9	2.6	0.9	1.5	1.0	J
Arsenic (µg/L)	3	<	0.4	2.1	1.0	0.8	0.5	
Cadmium (mg/L)	3	<	0.000	0.014	0.002	0.003	0.004	
Chromium (mg/L)	3	<	0.009	0.013	0.006	0.006	0.001	
Copper (mg/L)	3	<	0.013	0.020	0.006	0.008	0.002	
Iron (mg/L)	3		0.119	0.278	0.154 M	0.184	0.084	J
Lead (µg/L)	3	<	1.7	< 1.7	0.8	0.8	0.0	
Manganese (mg/L)	3		0.047	0.153	0.060 M	0.087	0.058	J
Mercury (µg/L)	3	<	0.1	< 0.1	0.0	0.0	0.0	
Nickel (mg/L)	3	<	0.019	0.042	0.010	0.013	0.007	
Selenium (µg/L)	3	<	1.7	< 1.7	0.8	0.8	0.0	
Silver (mg/L)	3	<	0.000	0.002	0.001	0.001	0.001	
Thallium (µg/L)	3	<	0.6	< 0.6	0.3	0.3	0.0	
Zinc (mg/L)	3	<	0.012	0.030	0.015	0.012	0.005	
Biological								
Chlorophyll a (ug/L)	3		0.53	2.67	1.53	1.58	1.07	
E. coli (col/100mL)	3		40	816	99	319	432	

J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 67f; N=# samples;