

2010 Monitoring Summary



Little Tallapoosa River at Randolph County Road 49 (33.49466/-85.33788)

BACKGROUND

Little Tallapoosa River at LTRR-1 is one of a network of 103 ambient trend sites the Alabama Department of Environmental Management uses to identify long-term trends in water quality statewide and to provide data to develop TMDLs and water quality criteria.

In 2010, this site was also selected for a special study to develop and implement nutrient criteria in wadeable, flowing streams in the Tallapoosa River Basin, as well as statewide.



Figure 1. Little Tallapoosa River at LTRR-1, April 6, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Tallapoosa River is a *Fish & Wildlife (F&W)* river located in Randolph County. Based on the 2000 National Land Cover Dataset, landuse in the watershed is primarily forest (48%) and pasture/hay. Population density in the area is low. Thirteen percent of the watershed is developed. As of February 23, 2011, ADEM has issued two NPDES permits 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. Little Tallapoosa River is a riffle-run waterbody with a bottom substrate that consists primarily of organic matter, mud, and muck (Figure 1). Overall habitat quality was categorized as *sub-optimal* for supporting macroinvertebrate communities.

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. The final score is the average of all individual metric scores. Metric results indicated that the biological community at LTRR-1 was in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Tallapoosa River
Basin		Tallapoosa River
Drainage Area (mi²)		325
Ecoregion^a		45a
% Landuse		
Open water		1
Wetland	Woody	3
Forest	Deciduous	28
	Evergreen	19
	Mixed	1
Shrub/scrub		2
Grassland/herbaceous		4
Pasture/hay		29
Cultivated crops		<1
Development	Open space	7
	Low intensity	4
	Moderate intensity	1
	High intensity	1
Barren		1
Population/km^{2b}		80
# NPDES Permits^c	TOTAL	2
Construction Stormwater		2

a.Southern Inner Piedmont

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, February 23, 2011

Table 2. Physical characteristics of Little Tallapoosa River at LTRR-1 on August 3, 2010.

Physical Characteristics	
Width (ft)	60
Canopy cover	Mostly Open
Depth (ft)	
	Riffle 0.3
	Run 1.5
	Pool 4.0
% of Reach	
	Riffle 3
	Run 47
	Pool 50
% Substrate	
	Boulder 5
	Cobble 10
	Gravel 15
	Sand 10
	Silt 15
	Organic Matter 25
	Mud/Muck 20

Table 3. Results of the habitat assessment conducted in Little Tallapoosa River at LTRR-1 on August 3, 2010.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	59	Sub-optimal (59-70)
Sediment Deposition	61	Sub-optimal (59-70)
Sinuosity	65	Sub-optimal (65-84)
Bank and Vegetative Stability	50	Marginal (35-59)
Riparian Buffer	73	Sub-optimal (70-89)
Habitat Assessment Score	151	
% Maximum score	63	Sub-optimal (59-70)

Table 4. Results of the macroinvertebrate bioassessment conducted in Little Tallapoosa River at LTRR-1 on August 3, 2010.

Macroinvertebrate Assessment		
	Results	Scores
Taxa richness and diversity measures		(0-100)
# EPT taxa	19	65
Shannon Diversity	4.08	64
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	23	49
% Non-insect taxa	8	72
Tolerance measures		
% Tolerant taxa	28	61
WMB-I Assessment Score	---	62.3
WMB-I Assessment Rating		Fair (47-69)

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected April through November of 2010 to help identify any stressors to the biological communities. Turbidity was 425 NTU on October 27th and 199 NTU on November 30th, both above ecoregional guidelines. However, high stream flow conditions caused by large rain events at the times of sampling may be the cause of the elevated turbidity readings. Median concentrations of ammonium nitrogen, nitrate+nitrite nitrogen, total Kjeldahl nitrogen, total nitrogen, and chlorides were above the 90th percentile of data collected from reference reach streams in the Southern Inner Piedmont ecoregion (45a). Additionally, the median value for specific conductivity was above the median value of data collected from reference reach streams in the ecoregion 45a.

SUMMARY

Bioassessment results indicated the macroinvertebrate community at LTRR-1 to be in *fair* condition. However, concentrations of ammonium nitrogen, nitrate+nitrite nitrogen, total Kjeldahl nitrogen, total nitrogen, chlorides, and specific conductivity values were elevated as compared to data from other reference reaches in ecoregion 45a. Monitoring should continue to ensure that water quality and biological conditions remain stable. Data collected at this site may be useful in establishing nutrient criteria for streams in the Tallapoosa River Basin and statewide.

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Table 5. Summary of water quality data collected April-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
Physical						
Temperature (°C)	9	11.8	27.3	24.9	22.6	5.0
Turbidity (NTU)	9	10.7	425.0 ^T	17.9	84.1	141.2
^J Total Dissolved Solids (mg/L)	8	28.0	118.0	54.0	61.2	30.0
Total Suspended Solids (mg/L)	8	6.0	231.0	11.0	60.4	90.7
Specific Conductance (µmhos)	9	46.4	81.5	61.0 ^G	63.1	12.9
Hardness (mg/L)	1				15.8	
Alkalinity (mg/L)	8	12.4	23.4	19.2	18.6	4.7
Stream Flow (cfs)	9	18.0	1470.0	272.0	418.7	464.0
Chemical						
Dissolved Oxygen (mg/L)	9	6.5	9.8	7.0	7.5	1.3
pH (su)	9	6.5	7.2	6.9	6.9	0.2
Ammonia Nitrogen (mg/L)	8	< 0.021	0.225	0.010 ^M	0.045	0.074
Nitrate+Nitrite Nitrogen (mg/L)	8	0.276	0.541	0.348 ^M	0.369	0.082
Total Kjeldahl Nitrogen (mg/L)	8	0.178	0.772	0.408 ^M	0.430	0.199
Total Nitrogen (mg/L)	8	0.526	1.313	0.742 ^M	0.798	0.237
^J Dissolved Reactive Phosphorus (mg/L)	8	0.006	0.149	0.017	0.034	0.047
Total Phosphorus (mg/L)	8	0.032	0.381	0.054	0.113	0.126
CBOD-5 (mg/L)	8	< 2.0	6.1	1.0	1.6	1.8
Chlorides (mg/L)	8	3.0	8.9	5.2	5.6	2.2
Total Metals						
Aluminum (mg/L)	1				0.329	
Iron (mg/L)	1				1.390	
Manganese (mg/L)	1				0.151	
Dissolved Metals						
Aluminum (mg/L)	1			<	0.033	
Antimony (µg/L)	1			<	1.9	
Arsenic (µg/L)	1			<	2.1	
Cadmium (µg/L)	1			<	14.000	
Chromium (µg/L)	1			<	13.000	
Copper (mg/L)	1			<	0.013	
Iron (mg/L)	1				0.567	
Lead (µg/L)	1			<	1.7	
Manganese (mg/L)	1				0.085	
Mercury (µg/L)	1			<	0.080	
Nickel (mg/L)	1			<	0.019	
Selenium (µg/L)	1			<	1.7	
Silver (µg/L)	1			<	2.000	
Thallium (µg/L)	1			<	0.6	
Zinc (mg/L)	1			<	0.030	
Biological						
Chlorophyll a (ug/L)	8	< 0.10	7.12	2.67	3.48	2.67
^J E. coli (col/100mL)	3	194	2420	291	968	1258

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 45a; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 45a; N=# samples; T=value exceeds 50 NTU above the 90th percentile of all verified ecoregional reference reach data collected in the ecoregion 45a.