

# 2010 Monitoring Summary



Special Study Site

## Tallapoosa River at Cleburne County Road 18 (33.62278/-85.51333)

### BACKGROUND

The Tallapoosa River was selected by the Alabama Department of Environmental Management (ADEM) for sampling related to nutrient criteria development in the Tallapoosa River Basin in 2010. Data collected will be used to develop and implement nutrient criteria in streams in the Tallapoosa River Basin, as well as statewide.



Figure 1. Tallapoosa River at TLRC-1, August 10, 2010.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Tallapoosa River from Cleburne County Road 19 to Alabama-Georgia State line is designated as a *Fish & Wildlife (F&W)* stream located in the Talladega Upland ecoregion (45d). Based on the 2000 National Land Cover Dataset, land cover within the watershed is mainly forest (63%), followed by pasture/hay and grassland. The Tallapoosa River watershed has a low population density. As of February 23, 2011, ten NPDES permits have been issued in this monitoring area.

### 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, this information can give an indication of physical condition and the availability and quality of habitat. The Tallapoosa River at TLRC-1 is a moderate-gradient stream with bedrock, boulder, cobble, gravel, and sand substrates lodged with adequate amounts of organic matter that provide a more or less stable habitat for biological communities. The reach is characterized by a narrow riparian zone. Overall habitat quality was categorized as *marginal* for supporting diverse biological communities.

### BIOASSESSMENTS

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. The final score indicated the biological community to be in *good* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
<b>Basin</b>		Tallapoosa River
<b>Drainage Area (mi<sup>2</sup>)</b>		448
<b>Ecoregion<sup>a</sup></b>		45d
<b>% Landuse</b>		
Open water		<1
Wetland	Woody	2
Forest	Deciduous	37
	Evergreen	26
	Mixed	<1
Shrub/scrub		3
Grassland/herbaceous		8
Pasture/hay		16
Cultivated crops		<1
Development	Open space	4
	Low intensity	2
	Moderate intensity	<1
	High intensity	<1
Barren		1
<b>Population/km<sup>2</sup><sup>b</sup></b>		26
<b># NPDES Permits<sup>c</sup></b>		10
Construction Stormwater		7
Municipal Individual		2
Underground Injection Control		1

a. Talladega Upland

b. 2000 US Census

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

Table 2. Physical characteristics of Tallapoosa River at TLRC-1, August 3, 2010.

Physical Characteristics		
<b>Width (ft)</b>		60
<b>Canopy Cover</b>		Open
<b>Depth (ft)</b>	Riffle	0.3
	Run	1.5
	Pool	4.5
<b>% of Reach</b>	Riffle	5
	Run	80
	Pool	15
<b>% Substrate</b>	Bedrock	5
	Boulder	2
	Clay	3
	Cobble	13
	Mud/Muck	15
	Gravel	10
	Sand	15
	Silt	12
	Organic Matter	15

**Table 3.** Results of the habitat assessment conducted on Tallapoosa River at TLRC-1, August 3, 2010.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	53	Marginal (41-58)
Sediment Deposition	54	Marginal (41-58)
Sinuosity	70	Sub-optimal (65-84)
Bank and Vegetative Stability	49	Marginal (35-59)
Riparian Buffer	49	Poor (<50)
<b>Habitat Assessment Score</b>	<b>132</b>	
<b>% Maximum Score</b>	<b>55</b>	<b>Marginal (41-58)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted in Tallapoosa River at TLRC-1, August 3, 2010.

Macroinvertebrate Assessment		
	Results	Scores (0-100)
<b>Taxa richness and diversity measures</b>		
# EPT taxa	21	74
Shannon Diversity	4.47	82
<b>Taxonomic composition measures</b>		
% EPT minus Baetidae and Hydropsychidae	44	97
% Non-insect taxa	10	62
<b>Tolerance measures</b>		
% Tolerant taxa	26	65
<b>WMB-I Assessment Score</b>	---	<b>76.0</b>
<b>WMB-I Assessment Rating</b>		<b>Good (70-85)</b>

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. *In situ* measurements and water samples were collected monthly from April through November, 2010 to help identify any stressors to the biological communities. *In situ* parameters suggest that the Tallapoosa River at TLRC-1 was meeting water quality criteria for its *F&W* use classification. Median concentrations of specific conductance and nutrients (nitrate+nitrite nitrogen, total Kjeldahl nitrogen, and total nitrogen) were higher than expected based on 90th percentile of all verified ecoregional reference data collected in the ecoregion 45d.

## SUMMARY

Bioassessment data indicated the macroinvertebrate community in Tallapoosa River at TLRC-1 to be in *good* condition. Overall habitat assessment was rated as *marginal* due to a narrow riparian zone. Results of intensive water quality sampling suggest elevated nutrient concentrations to be a potential cause for concern in the reach. Monitoring should continue to ensure that water quality standards and biological conditions continue to meet standards.

**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
<b>Physical</b>						
Temperature (°C)	9	12.2	28.7	25.0	21.7	6.2
Turbidity (NTU)	9	9.3	144.0	12.7	27.7	43.7
Total Dissolved Solids (mg/L)	8	14.0	78.0	37.0	37.8	19.0
Total Suspended Solids (mg/L)	8	1.0	151.0	7.5	24.1	51.4
Specific Conductance (µmhos)	9	29.7	49.2	45.2 <sup>G</sup>	42.9	6.1
Alkalinity (mg/L)	8	7.6	21.9	14.9	15.7	5.1
Stream Flow (cfs)	8	13.0	2590.0	152.0	495.9	873.4
<b>Chemical</b>						
Dissolved Oxygen (mg/L)	9	6.7	9.3	7.8	8.0	1.0
pH (su)	9	6.4	7.0	6.8	6.7	0.2
Ammonia Nitrogen (mg/L)	8	< 0.021	< 0.021	0.010	0.010	0.000
Nitrate+Nitrite Nitrogen (mg/L)	8	0.046	0.333	0.122 <sup>M</sup>	0.152	0.089
Total Kjeldahl Nitrogen (mg/L)	8	< 0.080	0.741	0.322 <sup>M</sup>	0.305	0.260
Total Nitrogen (mg/L)	8	< 0.086	0.870	0.442 <sup>M</sup>	0.457	0.241
<sup>J</sup> Dissolved Reactive Phosphorus (mg/L)	8	0.004	0.014	0.011	0.010	0.003
Total Phosphorus (mg/L)	8	0.022	0.120	0.024	0.037	0.034
CBOD-5 (mg/L)	8	< 2.0	2.8	1.0	1.2	0.6
Chlorides (mg/L)	8	1.5	4.5	2.4	2.7	0.9
<b>Biological</b>						
Chlorophyll a (ug/L)	8	< 0.53	5.34	1.07	1.80	1.72

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion (45d); J=estimate; M=value >90% all verified ecoregional reference reach data collected in the ecoregion 45d; N= # samples.

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