

2010 Monitoring Summary



Tallapoosa River at Alabama Highway 77 in Randolph County (33.11801/-85.56015)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Tallapoosa River at TA-1 for 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.

The Tallapoosa River at TA-1 is also one of a network of 94 ambient sites monitored annually to identify long-term trends in water quality and to provide data for the development of Total Maximum Daily Loads (TMDLs) and water quality criteria.



Figure 1. Tallapoosa River at TA-1, July 20, 2010.

Table 2. Physical characteristics of Tallapoosa River at TA-1, July 13, 2010.

Physical Characteristics		
Width (ft)	240	
Canopy cover	Open	
Depth (ft)	Riffle	0.2
	Run	2.7
	Pool	3.2
% of Reach	Riffle	7
	Run	37
	Pool	56
% Substrate	Bedrock	10
	Boulder	7
	Cobble	33
	Gravel	27
	Sand	23

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tallapoosa R
Drainage Area (mi²)		1674
Ecoregion^a		45A
% Landuse^b		
Open water		2%
Wetland	Woody	2%
	Emergent herbaceous	<1%
	Deciduous	37%
Forest	Evergreen	22%
	Mixed	<1%
	Shrub/scrub	7%
Grassland/herbaceous		6%
Pasture/hay		17%
Cultivated crops		<1%
Development	Open space	5%
	Low intensity	2%
	Moderate intensity	<1%
	High intensity	<1%
Barren		<1%
Population/km^{2c}		29
# NPDES Permits^d	TOTAL	536
Construction		463
Industrial General		35
Industrial Individual		8
Mining		10
Municipal		5
Small Mining		3
Underground Injection Control		12

a.Southern Inner Piedmont

b.2011 National Land Cover Dataset

c.2010 US Census

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

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Tallapoosa River at TA-1 is a *Fish & Wildlife (F&W)* waterbody located in southwestern Randolph County in Wadley, AL. According to the 2011 National Land Cover Dataset, land use within the watershed is primarily forest (59%) with some pasture land. As of April 1, 2016, there were 536 outfalls active in the 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, they give an indication of the physical condition of the site and the quality and availability of habitat. The Tallapoosa River at TA-1 is a riffle-run stream located in the Southern Inner Piedmont ecoregion (Figure 1). Bottom substrate consists primarily of cobble, gravel, and sand. Overall habitat quality was rated as *sub-optimal* for supporting a diverse aquatic macroinvertebrate community.

Table 3. Results of the habitat assessment conducted in Tallapoosa River at TA-1, July 13, 2010.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	79	Sub-optimal (55-79)
Sediment Deposition	75	Sub-Optimal (55-79)
Bank and Vegetative Stability	66	Marginal (60-<74)
Riparian Zone Measurements	50	Marginal (31-<60)
Habitat Assessment Score	140	
% Maximum Score	70	Sub-optimal (57-82)

BIOASSESSMENT RESULTS

The benthic macroinvertebrate community was sampled using ADEM's Nonwadeable Multi-habitat Bioassessment methodology (NWM-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 at TA-1 rated the site as a 4-, or *Fair/Poor*. Relative abundance and numbers of pollution-sensitive taxa are lower than expected for this macroinvertebrate community (Table 4).

Table 4. Results of the macroinvertebrate bioassessment conducted in Tallapoosa River at TA-1, July 13, 2010.

Macroinvertebrate Assessment		Results
Taxa richness and diversity measures		
Total # Taxa		38
# EPT taxa		11
Shannon Diversity		3.59
# Highly-sensitive and Specialized Taxa		1
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae		9
% Non-insect taxa		16
Tolerance measures		
# Sensitive EPT		4
% Sensitive taxa		21
% Tolerant taxa		26
WMB-I Assessment Score		4-
WMB-I Assessment Rating		Fair/Poor

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected April through December of 2010 to help identify any stressors to the biological community. All parameters met *F&W* use classification criteria throughout the sampling season. However, water temperature, ammonia-nitrogen, and nitrate-nitrite nitrogen were higher than expected based on reference reach data collected in the Southern Inner Piedmont ecoregion. Turbidity was >50 NTU above ecoregional guidelines during the October sampling date. High flows at the time of collection were likely the cause of the increased turbidity.

SUMMARY

While the habitat assessment conducted in the Tallapoosa River at TA-1 indicated the reach to be *sub-optimal* for supporting a diverse biological community, bioassessment results indicated the macroinvertebrate community in the reach to be in *fair/poor* condition. Results of water chemistry analyses showed that water temperature, ammonia-nitrogen, and nitrate-nitrite nitrogen were higher than expected for ecoregion 45a. Monitoring should continue to ensure that conditions in the stream reach continue to meet current standards.

Table 5. Summary of water quality data collected April-December, 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)	10	12.6	29.2	25.0 ^M	22.8	6.0
Turbidity (NTU)	9	1.1	193.0 ^T	4.8	29.8	62.2
^J Total Dissolved Solids (mg/L)	8	16.0	58.0	37.0	37.5	14.8
Total Suspended Solids (mg/L)	8	< 1.0	103.0	3.5	18.9	35.4
Specific Conductance (µmhos)	10	29.6	43.2	39.7	37.7	4.6
Hardness (mg/L)	1				10.1	
Alkalinity (mg/L)	8	7.3	14.4	10.7	10.8	2.8
Monthly Stream Flow (cfs)	10	142.0	8350.0	300.5	1784.4	2740.6
Stream Flow during Sample Collection (cfs)	10	142.0	8350.0	300.5	1784.4	2740.6
Chemical						
Dissolved Oxygen (mg/L)	10	6.6	10.8	7.6	7.9	1.3
pH (su)	10	6.5	7.5	7.0	7.0	0.3
Ammonia Nitrogen (mg/L)	8	< 0.021	0.074	0.010 ^M	0.018	0.022
Nitrate+Nitrite Nitrogen (mg/L)	8	0.112	0.365	0.171 ^M	0.193	0.082
Total Kjeldahl Nitrogen (mg/L)	8	< 0.080	0.650	0.211	0.247	0.198
Total Nitrogen (mg/L)	8	< 0.152	1.015	0.419	0.440	0.266
^J Dissolved Reactive Phosphorus (mg/L)	8	0.003	0.014	0.008	0.008	0.003
^J Total Phosphorus (mg/L)	8	0.009	0.153	0.017	0.037	0.049
CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.1	0.4
Chlorides (mg/L)	8	1.6	3.0	2.4	2.3	0.5
Total Metals						
Aluminum (mg/L)	1			<	0.033	
Iron (mg/L)	1				0.268	
Manganese (mg/L)	1			<	0.001	
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			<	0.026	
Lead (µg/L)	1			<	1.7	
Manganese (mg/L)	1			<	0.001	
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	0.27	5.34	2.22	2.39	1.79
^J E. coli (col/100mL)	3	16	2420	29	821	1384

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

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