

2010 Monitoring Summary



TM

Sandy Creek at Tallapoosa County Road 39 (32.80574/-85.77415)

BACKGROUND

Sandy Creek at SCC-5 was selected as a site for nutrient criteria development in the Tallapoosa River Basin in 2010. Data collected will be used to develop and implement nutrient criteria in wadeable, flowing streams in the Tallapoosa River Basin, as well as statewide.

Additionally, Sandy Creek is among the least-disturbed watersheds in the Piedmont Ecoregion, based on landuse, road density, and population. Therefore, these data will be used to evaluate the use of Sandy Creek as a “best attainable” condition reference watershed for comparison with other large Piedmont streams.



Figure 1. Sandy Creek at SCC-5, April 7, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Sandy Creek at SCC-5 is a *Fish & Wildlife (F&W)* stream located in Tallapoosa County near Dadeville. Based on the 2000 National Land Cover Dataset, landuse in the watershed is primarily forest (63%) with some pasture and grassland (25%). Population density in the area is low, and less than 7% of the watershed is developed. As of February 23, 2011, a total of 26 NPDES outfalls were active in the 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. Sandy Creek at SCC-5 is a glide-pool stream reach characterized by bedrock, boulder, and gravel substrates (Figure 1). Overall habitat quality and availability was categorized as *optimal* for supporting aquatic macroinvertebrate communities.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Tallapoosa River	
Drainage Area (mi²)	155	
Ecoregion^a	45b	
% Landuse		
Open water		<1
Wetland	Woody	3
Forest	Deciduous	32
	Evergreen	30
	Mixed	1
Shrub/scrub		4
Grassland/herbaceous		13
Pasture/hay		12
Cultivated crops		<1
Development	Open space	4
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Barren		1
Population/km²^b	13	
# NPDES Permits^c	TOTAL	26
	Construction Stormwater	23
	Municipal Individual	3

a. Southern Outer Piedmont

b. 2000 US Census

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

Table 2. Physical characteristics of Sandy Creek at SCC-5, May 18, 2010.

Physical Characteristics		
Width (ft)	70	
Canopy Cover	Estimate 50/50	
Depth (ft)		
	Run	3.5
	Pool	4.5
% of Reach		
	Run	60
	Pool	40
% Substrate		
	Bedrock	54
	Boulder	19
	Gravel	10
	Sand	5
	Silt	2
	Organic Matter	10

Table 3. Results of the habitat assessment conducted on Sandy Creek at SCC-5, May 18, 2010.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	83	Optimal >70
Sediment Deposition	73	Optimal >70
Sinuosity	30	Poor <45
Bank and Vegetative Stability	81	Optimal >74
Riparian Buffer	88	Sub-optimal (70-89)
Habitat Assessment Score	170	
% Maximum Score	77	Optimal >70

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 the macroinvertebrate community at SCC-5 to be in *good* condition (Table 4).

Table 4. Results of macroinvertebrate assessment conducted in Sandy Creek at SCC-5, May 18, 2010.

Macroinvertebrate Assessment	Results
Taxa richness and diversity measures	
Total # Taxa	61
# EPT taxa	25
Shannon Diversity	4.16
# Highly-sensitive and Specialized Taxa	3
Taxonomic composition measures	
% EPT minus Baetidae and Hydropsychidae	34
% Non-insect taxa	7
Tolerance measures	
# Sensitive EPT	13
% Sensitive taxa	40
% Tolerant taxa	25
WMB-I Assessment Score	77
WMB-I Assessment Rating	Good (70-85)

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected monthly during March through October of 2010 to help identify any stressors to the biological communities. Parameters measured focused primarily on indicators of nutrient enrichment. Median specific conductance was higher than background levels based on data from ADEM's established Wadeable Reference Reaches in ecoregion 45. Median concentrations of nitrate-nitrite nitrogen were also higher than expected for the area. Metals were not sampled at this stream reach.

Table 5. Summary of water quality data collected March-October, 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)	11	14.3	29.5	22.9	22.5	4.8
Turbidity (NTU)	10	7.4	24.8	11.0	12.9	5.5
Total Dissolved Solids (mg/L)	8	30.0	56.0	45.0	45.5	8.7
Total Suspended Solids (mg/L)	8	< 1.0	15.0	1.5	3.6	4.9
Specific Conductance (µmhos)	11	46.8	63.9	58.1 ^G	57.2	6.0
Alkalinity (mg/L)	8	17.1	29.7	21.9	23.5	4.2
Stream Flow (cfs)	9	9.4	242.2	139.0	114.8	96.0
Chemical						
Dissolved Oxygen (mg/L)	11	7.9	10.2	9.2	8.9	0.9
pH (su)	11	7.1	7.9	7.5	7.5	0.2
Ammonia Nitrogen (mg/L)	8	< 0.021	< 0.021	0.010	0.010	0.000
Nitrate+Nitrite Nitrogen (mg/L)	8	0.087	0.630	0.199 ^M	0.301	0.208
Total Kjeldahl Nitrogen (mg/L)	8	< 0.080	0.257	0.040	0.084	0.084
Total Nitrogen (mg/L)	8	< 0.172	0.670	0.351	0.385	0.181
^J Dissolved Reactive Phosphorus (mg/L)	8	0.005	0.038	0.018	0.022	0.011
^J Total Phosphorus (mg/L)	8	0.014	0.040	0.023	0.026	0.010
CBOD-5 (mg/L)	8	< 2.0	2.7	1.0	1.2	0.6
Chlorides (mg/L)	8	2.0	4.0	2.6	2.7	0.7
Biological						
Chlorophyll a (ug/L)	8	< 0.10	1.07	0.40	0.42	0.37

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

SUMMARY

Landuse, road density, and population categorized Sandy Creek as among the least-disturbed watersheds in the Piedmont ecoregion. Bioassessment results indicated the macroinvertebrate community in Sandy Creek at SCC-5 to be in *good* condition. However, water quality data collected in 2010 suggest elevated conductivity and nitrate-nitrite concentrations. Monitoring should continue to ensure that conditions remain stable.

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