

# 2012 Monitoring Summary



**Tater Hill Creek** in Tuscaloosa County at Old Columbus Road next to power relay station (33.22788/-87.62260)

## BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Tater Hill Creek watershed for biological and water quality monitoring in response to complaints from stakeholders concerned about the impact of development and road construction on conditions within the stream.



**Figure 1.** Tater Hill Creek at THT-2, May 2, 2012.

## WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Tater Hill Creek at THT-2 is a small *Fish & Wildlife (F&W)* stream located in city of Tuscaloosa in the Black Warrior River basin. According to the 2006 Nation Land Cover Database, landuse within the watershed is primarily development (65%). As of September 1, 2012, ADEM's NPDES Management System database showed two permitted discharges located within 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. Tater Hill Creek at THT-2 is a low-gradient, sand-bottomed stream (Figure 1). Overall habitat quality was categorized as *marginal* due to poor instream habitat, low sinuosity and limited riparian buffers.

## 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 to be in *poor* condition (Table 4).

**Table 1.** Summary of watershed characteristics.

Watershed Characteristics		
<b>Basin</b>		Black Warrior River
<b>Drainage Area (mi<sup>2</sup>)</b>		1
<b>Ecoregion<sup>a</sup></b>		65i
<b>% Landuse</b>		
Wetland	Woody	10
Forest	Deciduous	4
	Evergreen	4
	Mixed	4
Shrub/scrub		3
Pasture/hay		6
Cultivated crops		3
Development	Open space	25
	Low intensity	25
	Moderate intensity	12
	High intensity	3
<b>Population/km<sup>2b</sup></b>		394
<b># NPDES Permits<sup>c</sup></b>	<b>TOTAL</b>	2
	401 Water Quality Certification	1
	Construction Stormwater	1

a. Fall Line Hills

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, September 1, 2012.

**Table 2.** Physical characteristics of Tater Hill Creek at THT-2, May 2, 2012.

Physical Characteristics		
<b>Canopy Cover</b>		Mostly Shaded
<b>Width (ft)</b>		18
<b>Depth (ft)</b>	Run	1.5
	Pool	2.0
<b>% of Reach</b>	Run	20
	Pool	80
<b>% Substrate</b>	Boulder	1
	Mud/Muck	3
	Gravel	2
	Sand	69
	Silt	10
	Organic Matter	15

**Table 3.** Results of the habitat assessment conducted on Tater Hill Creek at TTHT-2, May 2, 2012.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	38	Poor (<40)
Sediment Deposition	58	Sub-optimal (53-65)
Sinuosity	38	Poor (<45)
Bank and Vegetative Stability	54	Marginal (35-59)
Riparian Buffer	38	Poor (<50)
<b>Habitat Assessment Score</b>	<b>105</b>	
<b>% Maximum score</b>	<b>48</b>	<b>Marginal (40-52)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted in Tater Hill Creek, at TTHT-2 May 2, 2012.

Macroinvertebrate Assessment		
	Results	Scores
<b>Taxa richness and diversity measures</b>		<b>(0-100)</b>
% EPC taxa	14	3
% Dominant Taxon	31	44
<b>Taxonomic composition measures</b>		
% EPT minus Baetidae and Hydropsychidae	0	0
<b>Functional feeding group</b>		
# Collector Taxa	13	30
<b>Community tolerance</b>		
% Nutrient Tolerant individuals	61	7
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>17</b>
<b>WMB-I Assessment Rating</b>		<b>Poor (16-31)</b>

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected semi-monthly during May through October of 2012 to help identify any stressors to the biological communities. Median values of total dissolved solids, specific conductance, hardness, alkalinity nitrate+nitrite-nitrogen, chlorides were above concentrations expected in this ecoregion. The median values of pH were below values expected in this ecoregion. Dissolved oxygen exceeded the criterion applicable to Tater Hill Creek's *F&W* use classifications in the May, July and September station visits. pH exceeded the criterion applicable to Tater Hill Creek's *F&W* use classifications in the May, July and October station visits.

## SUMMARY

The habitat assessment results indicate the habitat to be in *marginal* condition, and the bioassessment results indicated the macroinvertebrate community to be in *poor* condition. Water chemistry analysis suggest the elevated levels total dissolved solids, specific conductance, hardness, alkalinity nitrate+nitrite-nitrogen, chlorides along with the lower levels of dissolved oxygen and pH could be impacting the macroinvertebrate communities. These results indicate the need for further sampling.

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**Table 5.** Summary of water quality data collected May-October, 2012. 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	E
<b>Physical</b>							
Temperature (°C)	5	15.7	25.0	20.5	20.7	3.3	
Turbidity (NTU)	5	5.8	88.5	12.9	28.6	34.4	
Total Dissolved Solids (mg/L)	4	60.0	116.0	80.0 <sup>M</sup>	84.0	24.2	
Total Suspended Solids (mg/L)	4	< 1.0	35.0	6.5	12.1	15.9	
Specific Conductance (µmhos)	5	80.7	128.4	94.3 <sup>G</sup>	100.2	20.4	
Hardness (mg/L)	4	28.0	50.8	39.8 <sup>G</sup>	39.6	12.2	
Alkalinity (mg/L)	4	17.7	44.3	27.2 <sup>M</sup>	29.1	11.4	
Stream Flow (cfs)	4	0.1	5.2	0.9	1.8	2.3	
<b>Chemical</b>							
Dissolved Oxygen (mg/L)	5	2.4 <sup>C</sup>	5.8	4.0	3.9	1.6	3
pH (su)	5	5.4 <sup>C</sup>	6.4	5.8 <sup>M</sup>	5.9	0.4	3
Ammonia Nitrogen (mg/L)	4	< 0.007	< 0.008	0.004	0.004	0.000	
Nitrate+Nitrite Nitrogen (mg/L)	4	0.343	0.491	0.368 <sup>M</sup>	0.392	0.067	
<sup>J</sup> Total Kjeldahl Nitrogen (mg/L)	4	< 0.041	0.424	0.208	0.215	0.173	
<sup>J</sup> Total Nitrogen (mg/L)	4	< 0.512	0.781	0.568	0.607	0.124	
<sup>J</sup> Dissolved Reactive Phosphorus (mg/L)	4	< 0.004	0.067	0.018	0.026	0.030	
Total Phosphorus (mg/L)	4	0.018	0.144	0.050	0.065	0.056	
CBOD-5 (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	4	2.4	6.6	4.9 <sup>M</sup>	4.7	2.0	
<b>Total Metals</b>							
<sup>J</sup> Aluminum (mg/L)	4	0.072	3.410	0.322	1.032	1.592	
Iron (mg/L)	4	0.527	2.160	0.770	1.057	0.765	
Manganese (mg/L)	4	0.059	0.162	0.082	0.096	0.046	
<b>Dissolved Metals</b>							
Aluminum (mg/L)	4	< 0.043	< 0.043	0.022	0.022	0.000	
Antimony (µg/L)	4	< 3.6	< 3.6	1.8	1.8	0.0	
Arsenic (µg/L)	4	< 1.8	< 1.8	0.9	0.9	0.0	
Cadmium (µg/L)	4	< 0.022	< 0.046	0.023	0.020	0.006	
Chromium (mg/L)	4	< 0.009	< 0.009	0.004	0.004	0.000	
Copper (mg/L)	4	< 0.020	< 0.020	0.010	0.010	0.000	
<sup>J</sup> Iron (mg/L)	4	0.060	0.120	0.072	0.081	0.027	
Lead (µg/L)	4	< 0.9	< 0.9	0.4	0.4	0.0	
<sup>J</sup> Manganese (mg/L)	4	0.042	0.154	0.074	0.086	0.050	
Mercury (µg/L)	4	< 0.035	< 0.035	0.018	0.018	0.000	
Nickel (mg/L)	4	< 0.042	< 0.042	0.021	0.021	0.000	
Selenium (µg/L)	4	< 2.5	< 2.5	1.2	1.2	0.0	
Silver (µg/L)	4	< 0.015	< 0.215	0.108	0.082	0.050	
Thallium (µg/L)	4	< 1.4	< 1.4	0.7	0.7	0.0	
Zinc (mg/L)	4	< 0.012	< 0.012	0.006	0.006	0.000	
<b>Biological</b>							
Chlorophyll a (ug/L)	4	< 0.10	1.78	0.56	0.74	0.84	
<sup>J</sup> E. coli (col/100mL)	4	166	> 2420	1,573	1433	1162	

<sup>J</sup>=estimate; N= # samples; E=# of samples that exceeded criteria; M=value>90% of all verified ecoregional reference reach data collected in the sub-ecoregion 65i; G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65i; C=*F&W* criterion violated.