

# 2009 Monitoring Summary

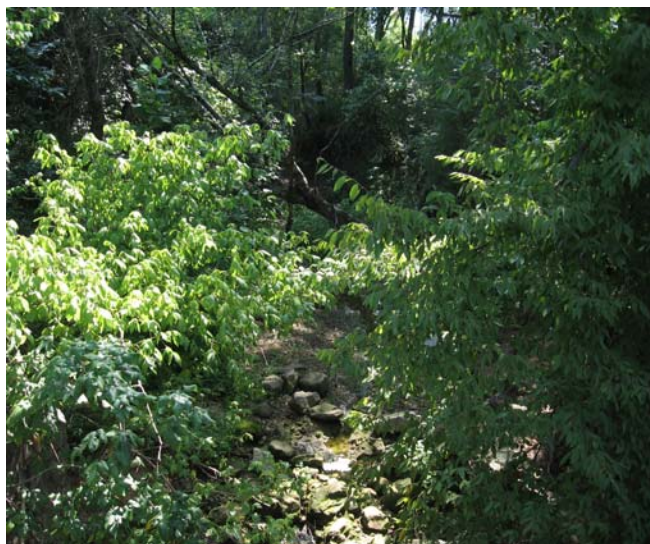
## Goose Creek at Cherry Tree Road (Madison County) (34.63486/-86.40368)

### BACKGROUND

Goose Creek, from the Flint River to its source (approximately 9 miles), is identified on the 1998 and 2002 CWA Section 303(d) lists of impaired waterbodies as not supporting its water use classification of *Fish and Wildlife (F&W)* due to organic enrichment and low dissolved oxygen. A final TMDL was approved in April 2003 while a TMDL for unknown toxicity is scheduled for 2010.

As part of the Goose Creek Watershed Management Plan (WMP), several Best Management Practices (BMP's) have been implemented, including watering facility installations, more than two miles of livestock fence installations, increased soil testing, the decommissioning of one poultry lagoon, and hundreds of acres of crop and pastureland improvement using either conservation tillage methods or permanent vegetation.

Goose Creek at GOOM-2 was monitored to evaluate the effectiveness of the BMPs and to provide data for TMDL development. A habitat assessment and macroinvertebrate sampling were requested, but were unable to be completed due to low flow or dry stream bed conditions.



**Figure 1.** Photo of Goose Creek at GOOM-2 taken August 13, 2009.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Goose Creek, located in Madison County, is approximately 15 miles southeast of Huntsville, Alabama. The watershed lies within the Wheeler Lake sub-basin of the Tennessee River Basin. Based on the 2000 National Land Cover Dataset, landuse within the watershed is primarily forest (75%) with some pasture and cultivated crops. As of February 23, 2011, the Alabama Department of Environmental Management has not issued any NPDES permits within this watershed.

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

Watershed Characteristics		
Basin	Tennessee River	
Drainage Area (mi <sup>2</sup> )	7	
Ecoregion <sup>a</sup>	71g	
% Landuse		
Open water		<1
Forest	Deciduous	71
	Evergreen	1
	Mixed	3
Shrub/scrub		3
Grassland/herbaceous		1
Pasture/hay		11
Cultivated crops		6
Development	Open space	3
	Low intensity	<1
Population/km <sup>2b</sup>	37	

a. Eastern Highland Rim

b. 2000 US Census

### WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 2. When possible, water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, atrazine, and semi-volatile organics) during March through October of 2009 to identify any stressors to the biological communities. Dissolved arsenic concentrations exceeded the *F&W* use classification Human Health criterion. Specific conductance, hardness, total nitrogen, and chloride concentrations were also elevated as compared to verified reference reach data in the Eastern Highland Rim (71g). It should be noted, however, that the flow never exceeded 0.5 cubic feet per second (cfs) during any of the sampling events.

Although samples of total dissolved arsenic did exceed human health criteria in Goose Creek, ADEM criteria for arsenic are expressed as dissolved trivalent arsenic (arsenite – As III). Presently studies are being conducted in order to provide a better understanding of the prevalence and areal distribution of dissolved trivalent arsenic to total arsenic in the State of Alabama. Upon conclusion of the studies Goose Creek will be reassessed for arsenic violations.

## SUMMARY

Due to low flow conditions throughout the sampling season, an accurate overall condition of Goose Creek at GOOM-2 is very difficult to ascertain. The site will be re-sampled in 2013 to assess water quality conditions within the reach.

**Table 2.** Summary of water quality data collected March-October, 2009. 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	Q	E
<b>Physical</b>								
Temperature (°C)	4	16.0	22.6	19.3	19.3	3.4		
Turbidity (NTU)	5	3.2	47.9	7.5	15.0	18.7		
Total Dissolved Solids (mg/L)	5	46.0	204.0	148.0	139.6	59.7		
Total Suspended Solids (mg/L)	5	< 1.0	5.0	2.0	2.7	2.2		
Specific Conductance (µmhos)	4	231.0	301.9	267.4 <sup>G</sup>	266.9	38.1		
Hardness (mg/L)	5	75.6	142.0	111.0 <sup>G</sup>	114.3	27.7		
Alkalinity (mg/L)	5	66.0	131.0	85.4	98.2	30.3		
Stream Flow (cfs)	4	-2.0	0.5	0.2	0.2	0.2		
<b>Chemical</b>								
Dissolved Oxygen (mg/L)	4	7.7	13.9	9.0	9.9	2.7		
pH (su)	4	7.6	8.5	8.0	8.0	0.4		
Ammonia Nitrogen (mg/L)	3	< 0.014	< 0.014	0.007	0.007	0.000	BJ	
Nitrate+Nitrite Nitrogen (mg/L)	3	0.042	2.685	0.834	1.187	1.356	BJ	
Total Kjeldahl Nitrogen (mg/L)	3	< 0.141	0.280	0.070	0.140	0.121	BJ	
Total Nitrogen (mg/L)	3	< 0.322	2.756	0.904	1.327	1.271	BJ	
Dissolved Reactive Phosphorus (mg/L)	3	0.015	0.022	0.016 <sup>M</sup>	0.018	0.004	BJ	
Total Phosphorus (mg/L)	3	0.018	0.023	0.019	0.020	0.003	BJ	
CBOD-5 (mg/L)	5	< 1.0	< 2.0	1.0	1.0	0.3	J	
Chlorides (mg/L)	5	3.1	16.5	8.8 <sup>M</sup>	9.2	4.9		
Atrazine (µg/L)	5	< 0.06	1.21	0.03	0.26	0.53		
<b>Total Metals</b>								
Aluminum (mg/L)	5	0.037	1.850	0.053	0.427	0.797	J	
Iron (mg/L)	5	0.040	1.280	0.060	0.300	0.548	J	
Manganese (mg/L)	5	0.012	0.068	0.015	0.025	0.024	J	
<b>Dissolved Metals</b>								
Aluminum (mg/L)	5	< 0.014	0.100	0.024	0.035	0.037	J	
Antimony (µg/L)	5	< 0.7	6.0	0.4	1.4	1.4		
Arsenic (µg/L)	5	< 0.4	1.2 <sup>H</sup>	0.2	0.4	0.4	J	1
Cadmium (mg/L)	5	< 0.002	< 0.003	0.002	0.001	0.000		
Chromium (mg/L)	5	< 0.007	< 0.013	0.006	0.005	0.002		
Copper (mg/L)	5	< 0.013	< 0.200	0.006	0.044	0.051		
Iron (mg/L)	5	< 0.014	0.095	0.007	0.025	0.039	J	
Lead (µg/L)	5	< 0.5	< 1.5	0.5	0.5	0.2		
Manganese (mg/L)	5	< 0.004	0.027	0.006	0.010	0.010	J	
Mercury (µg/L)	3	< 0.1	< 0.1	0.0	0.0	0.0	BJ	
Nickel (mg/L)	5	< 0.004	< 0.008	0.004	0.004	0.002	J	
Selenium (µg/L)	5	< 0.4	< 0.4	0.2	0.2	0.0		
Silver (mg/L)	5	< 0.001	< 0.002	0.001	0.001	0.000		
Thallium (µg/L)	5	< 0.4	< 0.4	0.2	0.2	0.0		
Zinc (mg/L)	5	< 0.003	< 0.060	0.010	0.015	0.014	J	
<b>Biological</b>								
Chlorophyll a (ug/L)	2	< 0.10	1.00	0.28	0.28	0.32		
Fecal Coliform (col/100 mL)	1				136		J	

B=data not meeting laboratory QC requirements was excluded from calculations; E=# samples that exceeded criteria; G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 71g; H= F&W human health criterion exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 71g; N=# samples; Q=qualifier codes

### FOR MORE INFORMATION, CONTACT:

James W. Worley, III, ADEM Aquatic Assessment Unit  
1350 Coliseum Boulevard Montgomery, AL 36110  
(334) 394-4343 jworley@adem.state.al.us