

# 2007 Monitoring Summary



## Woods Creek at Marion County Road 90 (34.10575/-87.96485)

### BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Woods Creek watershed for biological and water quality monitoring as part of the 2006 Assessment of the Escatawpa, Mobile, and Tombigbee (EMT) River Basins. The objectives of the EMT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the EMT basin group. While water quality data were collected in 2006, drought conditions prevented the completion of habitat and macroinvertebrate assessments until 2007.

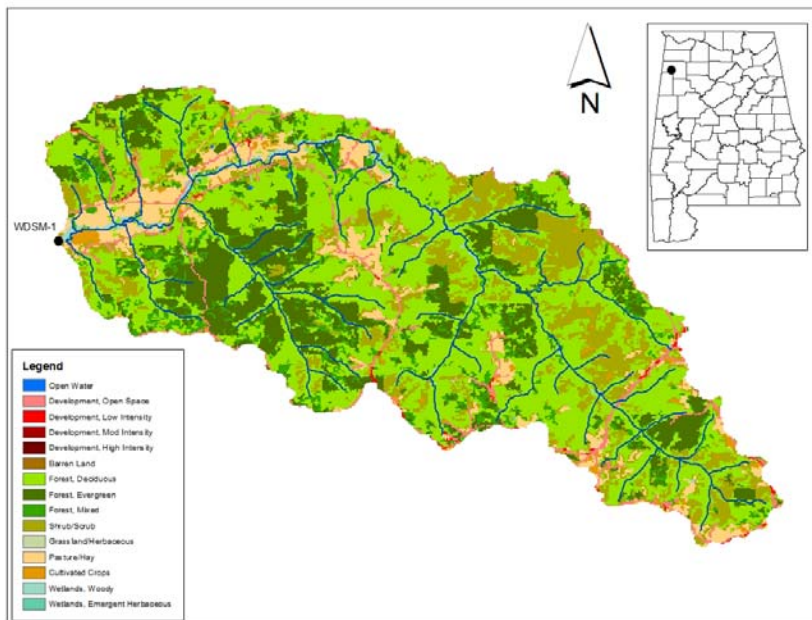


Figure 1. Sampling location and landuse within the Woods Creek watershed at WDSM-1.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Woods Creek at WDSM-1 is a *Fish & Wildlife (F&W)* stream located in the Fall Line Hills ecoregion (65i). Based on the 2000 National Land Cover Dataset, land cover within the watershed is primarily forest (70%), with some shrub/scrub. The small amount of pasture and cropland is concentrated upstream of the monitoring reach (Figure 1). As of February 23, 2011, ADEM's NPDES Management System database shows one permitted discharge 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. Woods Creek at WDSM-1 is a low-gradient stream characterized by cobble, gravel and sand substrates. Overall habitat quality was categorized as *sub-optimal* with marginal bank and vegetative stability.

### 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 in Woods Creek at WDSM-1 to be in *good* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
<b>Basin</b>	Upper Tombigbee	
<b>Drainage Area (mi<sup>2</sup>)</b>	26	
<b>Ecoregion<sup>a</sup></b>	65i	
<b>% Landuse</b>		
Open water	<1	
Wetland	Woody	1
	Emergent herbaceous	<1
Forest	Deciduous	46
	Evergreen	17
	Mixed	7
Shrub/scrub	17	
Grassland/herbaceous	<1	
Pasture/hay	7	
Cultivated crops	1	
Development	Open space	3
	Low intensity	<1
<b>Population/km<sup>2b</sup></b>	9	
<b># NPDES Permits<sup>c</sup></b>	<b>TOTAL</b>	1
	Construction Stormwater	1

a. Fall Line Hills

b. 2000 US Census

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

Table 2. Physical characteristics of Woods Creek at WDSM-1, June 6, 2007.

Physical Characteristics		
<b>Width (ft)</b>	15	
<b>Canopy cover</b>	Estimate 50/50	
<b>Depth (ft)</b>	Riffle	0.2
	Run	1.0
	Pool	2.5
<b>% of Reach</b>	Riffle	15
	Run	40
	Pool	45
<b>% Substrate</b>	Cobble	20
	Gravel	52
	Sand	20
	Silt	5
	Organic Matter	3

**Table 3.** Results of the habitat assessment conducted in Woods Creek at WDSM-1, June 6, 2007.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	56	Sub-optimal (53-65)
Sediment Deposition	58	Sub-optimal (53-65)
Sinuosity	73	Sub-optimal (65-84)
Bank and Vegetative Stability	43	Marginal (35-59)
Riparian Buffer	70	Sub-Optimal (70-89)
<b>Habitat Assessment Score</b>	<b>137</b>	
<b>% Maximum score</b>	<b>57</b>	<b>Sub-optimal (53-65)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted in Woods Creek at WDSM-1, June 6, 2007.

Macroinvertebrate Assessment			
	Results	Scores	Rating
<b>Taxa richness measures</b>			
# EPT genera	17	68	Good (57-78)
<b>Taxonomic composition measures</b>			
% Non-insect taxa	5	100	Excellent (>96.3)
% Plecoptera	4	20	Good (5.7-52.8)
% Dominant taxa	24	64	Fair (47.1-70.5)
<b>Functional composition measures</b>			
% Predators	12	41	Fair (30.2-45.2)
<b>Tolerance measures</b>			
Beck's community tolerance index	12	55	Good (31.9-65.9)
% Nutrient tolerant organisms	35	58	Fair (50.9-76.2)
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>58</b>	<b>Good (57-78)</b>

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, atrazine, and semi-volatile organics) during March through October of 2006 to help identify any stressors to the biological communities. Organics were collected in May and September of 2006. Due to a state-wide drought in 2006, macroinvertebrates could not be collected until 2007; therefore, one set of field parameters was taken during the macroinvertebrate and bioassessment conducted in June of 2007. Median values of physical and chemical parameters did not exceed established criteria and were similar to background levels based on the 90th percentile of data collected from reference reach streams within ecoregion 65i.

## SUMMARY

Bioassessment results indicated the macroinvertebrate community in Woods Creek at WDSM-1 to be in *good* condition. Monitoring should continue to ensure that biological and water quality conditions remain stable.

**Table 5.** Summary of water quality data collected March-October, 2006. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). 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	Median	Avg	SD
<b>Physical</b>						
Temperature (°C)	9	10.3	26.6	22.2	20.2	5.6
Turbidity (NTU)	9	6.1	33.3	8.2	11.5	8.5
Total Dissolved Solids (mg/L)	8	25.0	74.0	45.5	45.2	16.2
Total Suspended Solids (mg/L)	8	3.0	14.0	4.5	6.1	4.1
Specific Conductance (µmhos)	9	22.0	25.0	24.0	23.5	1.2
Hardness (mg/L)	4	5.3	7.1	6.3	6.2	0.8
Alkalinity (mg/L)	8	2.6	5.6	4.4	4.4	1.0
Stream Flow (cfs)	9	2.4	30.4	5.8	10.6	10.2
<b>Chemical</b>						
Dissolved Oxygen (mg/L)	9	7.4	11.9	8.2	8.8	1.6
pH (su)	9	6.3	6.7	6.4	6.4	0.1
Ammonia Nitrogen (mg/L)	8	< 0.015	0.063	0.008	0.018	0.021
Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.003	2.130	0.198	0.416	0.699
Total Kjeldahl Nitrogen (mg/L)	8	< 0.150	0.426	0.229	0.239	0.131
Total Nitrogen (mg/L)	8	< 0.192	2.363	0.456	0.654	0.708
Dissolved Reactive Phosphorus (mg/L)	8	< 0.004	0.010	0.003	0.004	0.003
Total Phosphorus (mg/L)	8	< 0.100	< 0.100	0.050	0.050	0.000
CBOD-5 (mg/L)	8	0.3	1.0	0.4	0.5	0.3
Chlorides (mg/L)	8	1.2	1.9	1.6	1.6	0.2
Atrazine (µg/L)	2	< 0.05	< 0.05	0.02	0.02	0.00
<b>Total Metals</b>						
Aluminum (mg/L)	4	0.078	1.100	0.162	0.376	0.485
Iron (mg/L)	4	0.439	1.770	0.997	1.051	0.585
Manganese (mg/L)	4	0.074	0.143	0.106	0.108	0.034
<b>Dissolved Metals</b>						
Aluminum (mg/L)	4	< 0.050	< 0.050	0.025	0.025	0.000
Antimony (µg/L)	4	< 10.0	< 10.0	5.0	5.0	0.0
Arsenic (µg/L)	4	< 10.0	< 10.0	5.0	5.0	0.0
Cadmium (mg/L)	4	< 0.015	< 0.015	0.008	0.008	0.000
Chromium (mg/L)	4	< 0.050	< 0.050	0.025	0.025	0.000
Copper (mg/L)	4	< 0.050	< 0.050	0.025	0.025	0.000
Iron (mg/L)	4	0.052	0.158	0.104	0.104	0.043
Lead (µg/L)	4	< 10.0	< 10.0	5.0	5.0	0.0
Manganese (mg/L)	4	< 0.020	0.129	0.051	0.060	0.060
Mercury (µg/L)	3	< 0.0	0.3	0.2	0.1	0.1
Nickel (mg/L)	4	< 0.050	< 0.050	0.025	0.025	0.000
Selenium (µg/L)	4	< 50.0	< 50.0	25.0	25.0	0.0
Silver (mg/L)	3	< 0.050	0.081	0.025	0.044	0.032
Thallium (µg/L)	3	< 10.0	< 10.0	5.0	5.0	0.0
Zinc (mg/L)	4	< 0.050	< 0.050	0.025	0.025	0.000
<b>Biological</b>						
Chlorophyll a (µg/L)	7	< 1.00	14.40	1.14	3.27	4.97
Fecal Coliform (col/100 mL)	8	4	600	90	164	187

N= # samples; J= estimate

FOR MORE INFORMATION, CONTACT:  
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