

# 2006 Monitoring Summary



## Tuckabum Creek at Choctaw County Road 9 (32.17921/-88.27166)

### BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Tuckabum Creek watershed for biological and water quality monitoring as part of the 2006 Assessment of the Escatawpa, Mobile, and Lower 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. A habitat and macroinvertebrate assessment were conducted on Tuckabum Creek at TKBC-1 on May 30, 2006.



Figure 1. Tuckabum Creek at TKBC-1, February, 2010.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Lower Tombigbee	
Drainage Area (mi <sup>2</sup> )	32	
Ecoregion <sup>a</sup>	65d	
% Landuse		
Open water	<1	
Wetland	Woody	11
	Emergent herbaceous	<1
Forest	Deciduous	24
	Evergreen	25
	Mixed	17
Shrub/scrub	13	
Grassland/herbaceous	<1	
Pasture/hay	5	
Cultivated crops	1	
Development	Open space	4
Population/km <sup>2b</sup>	7	
# NPDES Permits <sup>c</sup>	<b>TOTAL</b>	1
	<b>Municipal Individual</b>	1

a. Southern Hilly Gulf Coastal Plain

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, 18 Sep 2009

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Tuckabum Creek is a *Fish & Wildlife (F&W)*, stream located in the Southern Hilly Gulf Coastal Plains ecoregion (65d). Landuse within the watershed is primarily forest (66%) with some areas of shrub/scrub, woody wetland, and pasture/hay. Population density is very low within the watershed. One NPDES permit has been issued in this watershed as of 18 September 2009.

### 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. Tuckabum Creek at TKBC-1 is a low-gradient, bedrock-bottomed stream in the Lower Tombigbee River basin (Figure 1). Overall habitat quality was categorized as *sub-optimal* due to a straight stream channel, marginal instream habitat due to a high percentage of bedrock and a relatively straight stream channel.

### 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 an average of the score for each metric. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4) for Tuckabum Creek at TKBC-1.

Table 2. Physical characteristics of Tuckabum Creek at TKBC-1, May 30, 2006.

Physical characteristics		
Canopy cover	Mostly Shaded	
Depth (ft)	Run	2.0
	Pool	3.0
% of Reach	Run	80
	Pool	20
% Substrate	Bedrock	70
	Cobble	5
	Gravel	2
	Sand	5
	Silt	15
	Organic Matter	3

**Table 3.** Results of the habitat assessment conducted on Tuckabum Creek at TKBC-1, May 30, 2006.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	51	Marginal (40-52)
Sediment deposition	59	Sub-optimal (53-65)
Sinuosity	33	Poor (<45)
Bank and vegetative stability	40	Marginal (35-59)
Riparian buffer	83	Sub-optimal (70-89)
<b>Habitat assessment score</b>	<b>119</b>	
<b>% Maximum score</b>	<b>54</b>	Sub-optimal (53-65)

**Table 4.** Results of the macroinvertebrate bioassessment of Tuckabum Creek at TKBC-1 conducted on May 30, 2006.

Macroinvertebrate Assessment			
	Results	Scores	Rating
<b>Taxa richness measures</b>			
# EPT genera	9	36	Poor (19-37)
<b>Taxonomic composition measures</b>			
% Non-insect taxa	10	77	Fair (61.8-92.7)
% Plecoptera	0	0	Very Poor (<1.86)
% Dominant taxa	17	83	Good (70.5-85.2)
<b>Functional composition measures</b>			
% Predators	17	59	Good (45.2-72.1)
<b>Tolerance measures</b>			
Beck's community tolerance index	4	18	Poor (10.6-21.2)
% Nutrient tolerant organisms	17	89	Excellent (>88.1)
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>52</b>	<b>Fair (37-56)</b>

## WATER CHEMISTRY

Results of water chemistry analyses are summarized in Table 5. When possible, in situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during March through October at Basin Assessment stations to help identify any stressors to the biological communities. Median concentrations of physical, chemical, biological, and total metals parameters were similar to the 90th percentile of data collected from reference reaches in the Southern Hilly Gulf Coastal Plains (65d) ecoregion. However, dissolved metals antimony, lead, manganese, and thallium were all above concentrations expected for a stream in the 65d ecoregion.

## SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data.

Bioassessment results indicated the macroinvertebrate community in Tuckabum Creek at TKBC-1 to be in *fair* condition. Overall habitat quality was categorized as *sub-optimal* due to a straight stream channel, marginal instream habitat quality, and unstable banks. Dissolved metals antimony, lead, manganese, and thallium were parameters of concern at this reach.

**Table 5.** Summary of water quality data collected March-October, 2006. Minimum (Min) and maximum (Max) values were calculated using minimum detection limits (MDL) when results were less than this value. Median, average (Avg), and standard deviation (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	15.0	28.2	23.7	22.9	3.9
Turbidity (NTU)	9	6.1	51.1	9.4	17.3	17.1
Total Dissolved Solids (mg/L)	5	64.0	105.0	83.0	83.8	15.4
Total Suspended Solids (mg/L)	5	1.0	39.0	4.0	15.4	17.4
Specific Conductance (µmhos)	9	46.6	169.5	117.2	113.3	44.2
Hardness (mg/L)	3	40.0	68.0	42.8	50.3	15.4
Alkalinity (mg/L)	5	9.0	58.2	47.3	37.3	22.9
Stream Flow (cfs)	6	2.4	10.2	5.4	5.6	3.2
<b>Chemical</b>						
Dissolved Oxygen (mg/L)	9	7.0	9.2	8.0	8.0	0.8
pH (su)	9	6.3	7.6	7.5	7.3	0.5
Ammonia Nitrogen (mg/L)	5	< 0.015	0.062	0.008	0.022	0.024
Nitrate+Nitrite Nitrogen (mg/L)	5	< 0.003	0.096	0.016	0.031	0.038
Total Kjeldahl Nitrogen (mg/L)	5	0.254	0.643	0.467	0.461	0.147
Total Nitrogen (mg/L)	5	< 0.284	0.659	0.552	0.492	0.148
Dissolved Reactive Phosphorus (mg/L)	5	< 0.004	0.009	0.006	0.006	0.002
Total Phosphorus (mg/L)	5	< 0.004	0.100	0.050	0.039	0.021
CBOD-5 (mg/L)	5	0.3	3.9	0.5	1.4	1.5
Chlorides (mg/L)	4	3.0	5.6	3.2	3.8	1.2
<b>Total Metals</b>						
Aluminum (mg/L)	3	0.062	0.24	0.230	0.177	0.100
Iron (mg/L)	3	0.914	1.08	0.966	0.987	0.085
Manganese (mg/L)	3	0.042	0.088	0.064	0.065	0.023
<b>Dissolved Metals</b>						
Aluminum (mg/L)	3	< 0.05	0.1	0.050	0.042	0.014
Antimony (µg/L)	3	< 7.5	10.0	3.8 <sup>M</sup>	4.2	0.7
Arsenic (µg/L)	3	< 5	10	3	3	1.0
Cadmium (mg/L)	3	< 0.000	0.015	0.000	0.003	0.004
Chromium (mg/L)	3	< 0.005	0.050	0.002	0.010	0.013
Copper (mg/L)	3	< 0.005	0.050	0.002	0.010	0.013
Iron (mg/L)	3	0.480	0.576	0.560	0.539	0.051
Lead (µg/L)	3	< 5	10	3 <sup>M</sup>	3	1.0
Manganese (mg/L)	3	0.038	0.073	0.055 <sup>M</sup>	0.055	0.018
Mercury (µg/L)	3	< 0.0	0.5	0.2	0.2	0.1
Nickel (mg/L)	3	< 0.005	0.05	0.005	0.011	0.012
Selenium (µg/L)	3	< 7.5	50.0	3.8	10.8	12.3
Silver (mg/L)	3	< 0.001	0.050	0.000	0.009	0.014
Thallium (µg/L)	3	< 2.5	10	4.5 <sup>M</sup>	3.6	2.0
Zinc (mg/L)	3	< 0.005	0.050	0.002	0.010	0.013
<b>Biological</b>						
Chlorophyll a (µg/L)	5	< 0.10	3.84	1.17	1.75	1.68
<sup>J</sup> Fecal Coliform (col/100 mL)	2	600	640	620	620	28

N=# of samples; J=estimate; M=value > 90th percent of ADEM's 65d reference reach samples.

FOR MORE INFORMATION, CONTACT:  
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