

2006 Monitoring Summary



Tallilaba Creek at Bethlehem Road in Clark County (31.6133/-87.97998)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Tallilaba 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 Tallilaba Creek at TLBC-1 on May 24, 2006.

Additionally, Tallilaba Creek is among the least-disturbed watersheds in the EMT basin group based on landuse, road density, and population density. Therefore, these data will also be used to evaluate the use of Tallilaba Creek as a “best attainable” condition reference watershed for comparison with other Coastal Plain streams.

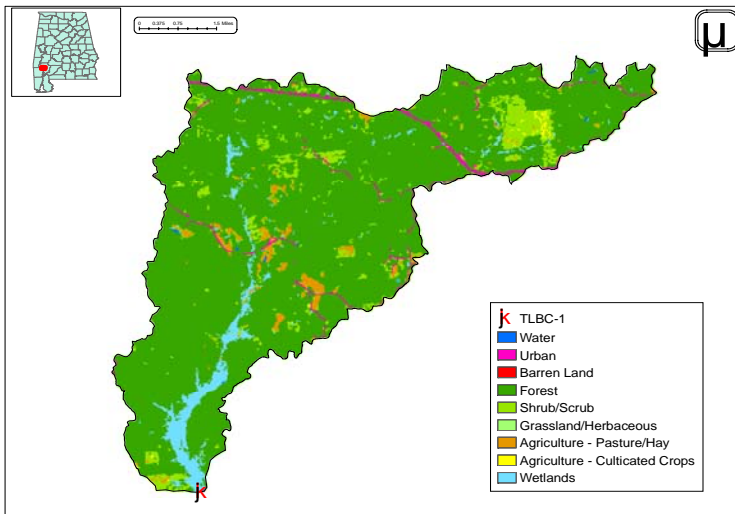


Figure 1. Sampling location and landuse within the Tallilaba Creek watershed at TLBC-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Tallilaba Creek is a *Fish & Wildlife (F&W)*, stream located in the Buhrstone/ Lime Hills ecoregion (65q). Landuse within the watershed is forest (85%) with some areas of shrub/scrub, woody wetland, and pasture/hay (Fig. 1). Population density is low within the watershed. No NPDES permits have 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, as well as the quality and availability of habitat. Tallilaba Creek at TLBC-1 is a low-gradient, sand-bottomed stream in the Lower Tombigbee River basin. Habitat quality and availability within the reach were categorized as *marginal* due to poor instream habitat quality, a straight stream channel, and unstable banks.

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 Tallilaba Creek at TLBC-1.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Lower Tombigbee
Drainage Area (mi ²)		39
Ecoregion ^a		65q
% Landuse		
Open water		<1
Wetland	Woody	4
	Emergent herbaceous	<1
Forest	Deciduous	17
	Evergreen	36
	Mixed	32
Shrub/scrub		6
Grassland/herbaceous		<1
Pasture/hay		2
Cultivated crops		<1
Development	Open space	2
	Low intensity	<1
Population/km ^{2b}		4
# NPDES Permits ^c	TOTAL	0

a. Buhrstone/Lime Hills

b. 2000 US Census

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

Table 2. Physical characteristics of Tallilaba Creek at TLBC-1, May 24, 2006.

Physical characteristics		
Width (ft)		20
Canopy cover		Est. 50/50
Depth (ft)	Run	1.2
	Pool	2.5
% of Reach	Run	75
	Pool	25
% Substrate	Gravel	2
	Sand	74
	Silt	15
	Organic Matter	9

Table 3. Results of the habitat assessment conducted on Tallilaba Creek at TLBC-1, May 24, 2006.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	37	Poor (<40)
Sediment deposition	60	Sub-optimal (53-65)
Sinuosity	50	Marginal (45-64)
Bank and vegetative stability	36	Marginal (35-59)
Riparian buffer	85	Sub-optimal (70-90)
Habitat assessment score	112	
% Maximum score	51	Marginal (40-52)

Table 4. Results of the macroinvertebrate bioassessment of Tallilaba Creek at TLBC-1 conducted on May 24, 2006.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures			
# EPT genera	18	72	Good (57-78)
Taxonomic composition measures			
% Non-insect taxa	15	50	Poor (30.9-61.8)
% Plecoptera	3	14	Good (5.7-52.8)
% Dominant taxa	30	49	Fair (47.1-70.5)
Functional composition measures			
% Predators	11	37	Fair (30.2-45.2)
Tolerance measures			
Beck's community tolerance index	12	55	Good (31.9-65.9)
% Nutrient tolerant organisms	57	22	Very Poor (<25.4)
WMB-I Assessment Score	---	43	Fair (38-56)

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 to help identify any stressors to the biological communities. In situ measurements and water samples were not taken at TLBC-1 during the months of July and August due to no flow conditions. Median concentrations of nutrients, total and dissolved solids, and chlorides were similar to the 90th percentile of data collected from reference reaches in the Burhstone/Lime Hills ecoregion. Metals were generally below detection limits.

CONCLUSIONS

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 Tallilaba Creek at TLBC-1 to be in *fair* condition. Results of other data collected during 2006 suggest a lack of in stream habitat and sediment deposition to be potential causes of biological impairment at TLBC-1. Low flow conditions in July and August may have also negatively affected the biological conditions within this reach.

FOR MORE INFORMATION, CONTACT:
Ruth Young, ADEM Aquatic Assessment Unit
1350 Coliseum Boulevard Montgomery, AL 36110
(334) 260-2762 ryoung@adem.state.al.us

Table 5. Summary of water quality data collected March-October, 2006. 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	Median	Avg	SD
Physical						
Temperature (°C)	6	15.0	25.6	21.3	20.5	4.4
Turbidity (NTU)	6	6.3	11.3	9.2	9.1	1.8
Total Dissolved Solids (mg/L)	5	82.0	137.0	113.0	114.2	22.9
Total Suspended Solids (mg/L)	5	1.0	13.0	5.0	6.2	4.5
Specific Conductance (µmhos)	6	118.5	194.5	177.5	166.4	30.2
Hardness (mg/L)	1	68.0	68.0 ^M	68.0	68.0	—
Alkalinity (mg/L)	5	55.1	92.1	67.0	72.9	15.4
Stream Flow (cfs)	4	5.6	29.7	9.1	13.4	11.0
Chemical						
Dissolved Oxygen (mg/L)	6	7.4	8.9	7.9	8.0	0.6
pH (su)	6	7.3	7.9	7.6	7.6	0.2
Ammonia Nitrogen (mg/L)	5	< 0.010	0.026	0.008	0.013	0.009
Nitrate+Nitrite Nitrogen (mg/L)	5	< 0.003	0.082	0.028	0.032	0.034
Total Kjeldahl Nitrogen (mg/L)	5	< 0.150	0.720	0.228	0.277	0.265
Total Nitrogen (mg/L)	5	0.077	0.748	0.230	0.309	0.270
Dissolved Reactive Phosphorus (mg/L)	5	< 0.004	0.008	0.002	0.004	0.003
Total Phosphorus (mg/L)	5	< 0.004	0.054	0.042	0.032	0.023
CBOD-5 (mg/L)	5	< 1.0	3.0	1.1	1.4	1.1
Chlorides (mg/L)	5	1.4	7.5	3.0	4.1	3.0
Atrazine (µg/L)	1	0.05	0.05	0.03	0.03	—
Total Metals						
Aluminum (mg/L)	1	0.28	0.28	0.280	0.280	—
Iron (mg/L)	1	1.27	1.27	1.27	1.270	—
Manganese (mg/L)	1	0.087	0.087	0.087	0.087	—
Dissolved Metals						
Aluminum (mg/L)	1	0.07	0.07	0.070	0.070	—
Antimony (µg/L)	1	< 7.5	< 7.5	3.8	3.8	—
Arsenic (µg/L)	1	< 5	< 5	2.5	2.5	—
Cadmium (mg/L)	1	< 0.0003	< 0.0003	0.0002	0.0002	—
Chromium (mg/L)	1	< 0.005	< 0.005	0.003	0.003	—
Copper (mg/L)	1	< 0.005	< 0.005	0.003	0.003	—
Iron (mg/L)	1	0.380	0.380	0.380	0.380	—
Lead (µg/L)	1	< 5	< 5	2.5	2.5	—
Manganese (mg/L)	1	0.068	0.068	0.068	0.068	—
Mercury (µg/L)	1	< 0.5	< 0.5	0.3	0.3	—
Nickel (mg/L)	1	< 0.005	< 0.005	0.0025	0.0025	—
Selenium (µg/L)	1	< 7.5	< 7.5	3.8	3.8	—
Silver (mg/L)	1	< 0.001	< 0.001	0.000	0.000	—
Thallium (µg/L)	1	< 2.5	< 2.5	1.25	1.3	—
Zinc (mg/L)	1	< 0.005	< 0.005	0.003	0.003	—
Biological						
Chlorophyll a (µg/L)	5	< 1.00	3.20	1.07	1.38	1.05
^H Fecal Coliform (col/100 mL)	4	57	120	70	79	30

N=# of samples; J=estimate; H=analytical holding time exceeded; M=value > 90th percent of