

2006 Monitoring Summary



Yantley Creek at Choctaw County Road 7 (32.22062/-88.27242)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Yantley 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 Assessment were to assess each monitoring site's biological integrity and to estimate overall water quality within the EMT basin group.

Additionally, Yantley Creek is among the least-disturbed watersheds in the EMT based on landuse, road density, and population density. These data will be used to evaluate the use of Yantley Creek as a "best attainable" condition reference watershed for comparison with other coastal plain streams.

Habitat and macroinvertebrate assessments were conducted on Yantley Creek at YNTC-1 May 30, 2006.



Figure 1. Yantley Creek at YNTC-1, February 11, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Yantley Creek at YNTC-1 is located near the town of Cromwell in Choctaw County. Land cover within the watershed was 71% forested. Silviculture was noted as a predominant land use. Watershed erosion was estimated as *moderate*. As of June 8, 2008, one NPDES permit has been issued in 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. Yantley Creek at YNTC-1 is a low-gradient, sand-bottomed stream located in the Southern Hilly Gulf Coastal Plain ecoregion (Figure 1). Overall habitat quality was rated as *marginal*.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). The WMB-I measures taxonomic richness, community composition, and community tolerance to assess the overall health of the macroinvertebrate community. Metric results indicated that the macroinvertebrate community of Yantley Creek at YNTC-1 to be in *poor* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		L. Tombigbee R.
Drainage Area (mi ²)		28
Ecoregion ^a		65d
% Landuse		
Open water		<1
Wetland	Woody	8
	Emergent herbaceous	<1
Forest	Deciduous	24
	Evergreen	28
	Mixed	19
Shrub/scrub		14
Grassland/herbaceous		<1
Pasture/hay		3
Cultivated crops		1
Development	Open space	2
	Low intensity	<1
Barren		
Population/km ^{2b}		4
# NPDES Permits ^c		1
TOTAL		1
Construction Stormwater		1

a. Southern Hilly Gulf Coastal Plain

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, 9 Jun 2008

Table 2. Physical characteristics at Yantley Creek at YNTC-1 on May 30, 2006

Physical Characteristics		
Width (ft)		20
Canopy cover		Mostly Shaded
Depth (ft)		
	Run	1.5
	Pool	3.0
% of Reach		
	Run	70
	Pool	30
% Substrate		
	Sand	83
	Silt	5
	Organic Matter	12

Table 3. Results of the habitat assessment of Yantley Creek at YNTC-1 on May 30, 2006.

Habitat Assessment	% Max Score	Rating
Instream habitat quality	49	Marginal (40-52)
Sediment deposition	51	Marginal (40-52)
Sinuosity	43	Poor (<45)
Bank and vegetative stability	39	Marginal (35-59)
Riparian buffer	66	Marginal (50-69)
Habitat assessment score	110	
% Maximum score	50	Marginal (40-52)

Table 4. Results of the macroinvertebrate bioassessment of Yantley Creek at YNTC-1 on May 30, 2006.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures			
# EPT genera	7	28	Poor (19-37)
Taxonomic composition measures			
% Non-insect taxa	20	27	Very Poor (<30.9)
% Plecoptera	0	0	Very Poor (<1.86)
% Dominant taxa	17	82	Good (70.6-85.2)
Functional composition measures			
% Predators	12	41	Fair (30.2-45.2)
Tolerance measures			
Beck's community tolerance index	2	9	Very Poor (<10.6)
% Nutrient tolerant organisms	43	44	Poor (25.4-50.8)
WMB-I Assessment Score	--	33	Poor (19-37)

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) to help identify any stressors to the biological communities. Data collected at YNTC-1 during the 2006 sampling season were similar to the 90th percentile of reference reach data collected in Southern Hilly Gulf Coastal Plain 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 to be in *poor* condition. Sedimentation and erosion were issues of concern within the YNTC-1 stream reach and the Yantley Creek watershed.

FOR MORE INFORMATION, CONTACT:
 Aaron Goar, ADEM Aquatic Assessment Unit
 1350 Coliseum Boulevard Montgomery, AL 36110
 (334) 260-2755 agoar@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. Metals results were compared to ADEM's chronic aquatic life use criteria adjusted for hardness.

Parameter	N	Min	Max	Med	Avg	SD	Q
Physical							
Temperature °C	8	17.0	27.2	23.6	22.1	3.4	
Turbidity (NTU)	8	12.6	63.2	18.0	24.7	16.8	
Total Dissolved Solids (mg/L)	6	76.0	135.0	96.5	100.5	20.5	
Total Suspended Solids (mg/L)	6	4.0	52.0	8.5	17.3	18.8	
Specific Conductance (µmhos)	8	51.3	127.4	109.0	97.6	29.8	
Hardness (mg/L)	1				58.0		
Alkalinity (mg/L)	6	10.3	56.4	35.4	33.4	18.8	
Stream Flow (cfs)	5	1.6	47.7	5.4	12.9	19.6	
Chemical							
Dissolved Oxygen (mg/L)	8	5.5	9.6	7.0	7.1	1.4	
pH (su)	8	6.3	7.2	7.1	7.0	0.3	
Ammonia Nitrogen (mg/L)	6	< 0.015	0.036	0.015	0.018	0.012	
Nitrate+Nitrite Nitrogen (mg/L)	6	< 0.003	0.305	0.022	0.066	0.118	
Total Kjeldahl Nitrogen (mg/L)	6	< 0.150	0.577	0.473	0.391	0.218	
Total Nitrogen	6	< 0.076	0.876	0.504	0.457	0.294	
Dissolved Reactive Phosphorus (mg/L)	6	< 0.004	0.016	0.006	0.008	0.006	
Total Phosphorus (mg/L)	6	< 0.049	0.100	0.054	0.056	0.007	
CBOD-5 (mg/L)	6	0.6	4.0	1.2	1.6	1.2	
COD (mg/L)	1	<		<	2.0		
TOC (mg/L)	1				6.3		
Chlorides (mg/L)	5	2.0	5.7	3.0	3.2	1.5	
Total Metals							
Aluminum (mg/L)	1				0.200		
Iron (mg/L)	1				2.100		
Manganese (mg/L)	1				0.208		
Dissolved Metals							
Aluminum (mg/L)	1				0.100		
Antimony (µg/L)	1	<		<	7.5		
Arsenic (µg/L)	1	<		<	5		
Cadmium (mg/L)	1	<		<	0.000		
Chromium (mg/L)	1	<		<	0.005		
Copper (mg/L)	1	<		<	0.005		
Iron (mg/L)	1				1.980		
Lead (µg/L)	1	<		<	5		
Manganese (mg/L)	1				0.214		
Mercury (µg/L)	1	<		<	0.5		
Nickel (mg/L)	1				0.005		
Selenium (µg/L)	1	<		<	7.5		
Silver (mg/L)	1	<		<	0.001		
Thallium (µg/L)	1	<		<	9.0		
Zinc (mg/L)	1	<		<	0.005		
Biological							
Chlorophyll a (µg/L)	6	2.67	5.34	2.99	3.52	1.13	
Fecal Coliform (col/100 mL)	5	90	630	190	306	244	J

J=estimate; N= # of samples; M=value >90% of collected samples in ecoregion 65d