

2011 Monitoring Summary



Tuckabum Creek at AL Hwy 114 SW of Pennington in Choctaw County (32.17390/-88.06270)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Tuckabum Creek watershed for biological and water quality monitoring as part of the 2011 Assessment of the Escatawpa, Mobile, 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 basin group.



Figure 1. Tuckabum Creek at TKBC-20, May 18, 2011.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Tuckabum Creek from Tombigbee River to Alabama-Mississippi state line is designated as *Fish & Wildlife (F&W)* stream. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (63%), shrub/scrub and woody wetlands. Population density is relatively low in this area. As of April 1, 2016, eight outfalls are active in this 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.

Tuckabum Creek at TKBC-20 is a low gradient stream with sand substrate (Figure 1) which is typical of the Southeastern Floodplains & Low Terraces ecoregion. The stream is characterized by a straight channel with limited instream habitats. Over all habitat quality was rated as *sub-optimal*.

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. The final score indicated the biological community at TKBC-20 to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tombigbee River
Drainage Area (mi ²)		238
Ecoregion ^a		65P
% Landuse ^b		
Open water		<1%
Wetland	Woody	9%
	Emergent herbaceous	<1%
Forest	Deciduous	23%
	Evergreen	26%
	Mixed	14%
Shrub/scrub		15%
Grassland/herbaceous		8%
Pasture/hay		3%
Cultivated crops		<1%
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
	High intensity	<1%
Barren		<1%
Population/km ^{2c}		6
# NPDES Permits ^d	TOTAL	8
	Construction	3
	Industrial General	3
	Mining	1
	Municipal	1

a.Southeastern Floodplains & Low Terraces

b.2011 National Land Cover Dataset

c.2010 US Census

d.#NPDES outfalls downloaded from ADEM's NPDES Management System database, April 1, 2016.

Table 2. Physical characteristics of Tuckabum Creek at TKBC-20, September 13, 2011.

Physical Characteristics		
Canopy Cover		Mostly Open
Width (ft)		50
Depth (ft)		
	Run	1.5
	Pool	1.5
% of Reach		
	Run	85
	Pool	15
% Substrate		
	Gravel	1
	Sand	91
	Organic Matter	8

Table 3. Results of the habitat assessment conducted on Tuckabum Creek at TKBC-20, September 13, 2011.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	47	Marginal (40-<53)
Sediment Deposition	56	Sub-optimal (53-65)
Sinuosity	38	Poor (<45)
Bank and Vegetative Stability	40	Marginal (35-59)
Riparian Buffer	90	Sub-Optimal (70-90)
Habitat Assessment Score	110	
% Maximum Score	65	Sub-optimal (53-65)

Table 4. Results of the macroinvertebrate bioassessment conducted in Tuckabum Creek at TKBC-20, September 13, 2011.

Macroinvertebrate Assessment				
	Results	Scores	Rating	
Taxa richness measures				
# EPT genera	19	76	Good (57-78)	
Taxonomic composition measures				
% Non-insect taxa	18	36.3	Poor (30.9-61.8)	
% Plecoptera	0	0.0	Very Poor (<=1.85)	
% Dominant taxa	16	85.0	Good (70.6-85.2)	
Functional composition measures				
% Predators	18	60.4	Good (45.3-72.1)	
Tolerance measures				
Beck's community tolerance index	6	27.3	Fair (21.3-31.8)	
% Nutrient tolerant organisms	19	85.4	Good (76.3-88.1)	
WMB-I Assessment Score	--	53	Fair (38-56)	

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected during March, May, July, and September of 2011 to help identify any stressors to the biological communities. *In situ* parameters suggested that Tuckabum Creek at TKBC-20 was meeting *F&W* use classification. Most of the metals collected were below detection limits. Samples were collected on July 6, 2011 for analysis of pesticides, semi-volatile organics and atrazine. All concentrations were below detection limits.

SUMMARY

Tuckabum Creek at TKBC-20 was typical of other large streams in the Southeastern Floodplains & Low Terraces ecoregion, which are generally low-gradient streams with sand substrate (Griffith et al. 2001). Water quality data suggested the Tuckabum Creek at TKBC-20 was meeting its criteria for *F&W* use classification.

Overall habitat assessment was rated as *sub-optimal* with poor sinuosity, unstable banks and bad instream habitats. Bioassessment results showed the macroinvertebrate community to be in *fair* condition.

Table 5. Summary of water quality data collected March-September, 2011. 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	Med	Avg	SD	Q
Physical							
Temperature (°C)	3	22.6	28.6	23.0	24.8	3.3	
Turbidity (NTU)	5	14.2	389.0	28.2	95.9	164.1	
Total Dissolved Solids (mg/L)	4	36.0	94.0	82.0	73.5	25.8	
Total Suspended Solids (mg/L)	4	6.0	366.0	16.0	101.0	176.8	
Specific Conductance (µmhos)	3	58.7	136.9	100.1	98.6	39.1	
Hardness (mg/L)	4	11.6	26.1	19.4	19.1	6.6	
Alkalinity (mg/L)	4	2.9	52.1	23.9	25.7	21.7	
Monthly Stream Flow (cfs)	1				62.5		
Stream Flow during sample collection (cfs)	1				62.5		
Chemical							
Dissolved Oxygen (mg/L)	3	7.2	8.1	7.5	7.6	0.5	
pH (su)	3	6.7	7.2	6.8	6.9	0.3	
Ammonia Nitrogen (mg/L)	4	< 0.005	0.033	0.017	0.018	0.017	
Nitrate+Nitrite Nitrogen (mg/L)	4	0.025	0.126	0.030	0.053	0.049	
Total Kjeldahl Nitrogen (mg/L)	4	0.313	0.963	0.454	0.546	0.289	
Total Nitrogen (mg/L)	4	0.339	0.988	0.534	0.599	0.286	
Dissolved Reactive Phosphorus (mg/L)	4	0.009	0.013	0.010	0.011	0.002	J
Total Phosphorus (mg/L)	4	0.044	0.102	0.050	0.062	0.027	
CBOD-5 (mg/L)	4	< 2.0	2.2	1.0	1.3	0.6	J
Chlorides (mg/L)	4	1.3	6.4	3.8	3.8	2.3	
Atrazine (µg/L)	1			<	0.02		
Total Metals							
Aluminum (mg/L)	4	0.266	1.280	0.775	0.774	0.551	
Iron (mg/L)	4	1.720	3.010	2.425	2.395	0.554	
Manganese (mg/L)	4	0.051	0.267	0.104	0.131	0.094	
Dissolved Metals							
Aluminum (mg/L)	4	< 0.043	0.262	0.049	0.096	0.114	J
Antimony (µg/L)	4	< 1.9	< 1.9	0.9	0.9	0.0	
Arsenic (µg/L)	4	< 1.4	< 1.4	0.7	0.7	0.0	
Cadmium (mg/L)	4	< 0.000	< 0.000	0.000	0.000	0.000	J
Chromium (mg/L)	4	< 0.009	< 0.009	0.004	0.004	0.000	
Copper (mg/L)	4	< 0.020	< 0.020	0.010	0.010	0.000	
Iron (mg/L)	4	0.362	0.853	0.606	0.606	0.264	
Lead (µg/L)	4	< 0.9	< 0.9	0.5	0.5	0.0	
Manganese (mg/L)	4	0.017	0.101	0.080	0.070	0.039	J
Mercury (µg/L)	4	< 0.035	< 0.035	0.018	0.018	0.000	
Nickel (mg/L)	4	< 0.042	< 0.042	0.021	0.021	0.000	
Selenium (µg/L)	4	< 1.3	< 1.3	0.7	0.7	0.0	
Silver (mg/L)	4	< 0.000	< 0.000	0.000	0.000	0.000	
Thallium (µg/L)	4	< 1.1	< 1.1	0.5	0.5	0.0	
Zinc (mg/L)	4	< 0.012	< 0.012	0.006	0.006	0.000	
Biological							
Chlorophyll a (ug/L)	4	< 0.10	1.78	0.80	0.86	0.74	
E. coli (col/100mL)	4	46	1986	235	626	918	J

J=estimate; N=# samples; Q=qualifier.

FOR MORE INFORMATION, CONTACT:
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