

2006 Monitoring Summary



Kinterbish Creek at Sumter County Road 9 (32.34627/-88.26527)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Kinterbish Creek watershed for biological and water quality monitoring as part of the 2006 Assessment of the Escatawpa, Mobile, 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. Kinterbish Creek is also an ecoreference candidate station, based on landuse information and population density. The 2006 data will be used to evaluate Kinterbish Creek as a “best attainable” condition reference watershed for comparison with other Coastal Plain streams.



Figure 1. Kinterbish Creek at KNBS-1, March 21, 2011.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Kinterbish Creek from Tombigbee River to its source is a *Swimming /Fish & Wildlife (S/F&W)* stream located in Sumter County near Ward, Alabama. Landuse within the watershed is primarily forest (67%), with some shrub/scrub and woody areas (Figure 1). As of June 9, 2008, no NPDES permits have 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. Kinterbish Creek at KNBS-1 was a low-gradient, sand-bottomed stream of typical of ecoregion 65d (Figure 1). The length of the reach was abbreviated from 300 ft. to 200 ft. because of nonwadeable pools upstream. The reach itself was also characterized by slow-moving water in relatively deep pools and runs. Overall habitat quality was rated as *sub-optimal* due to lack of instream habitats and poor bank 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 an average of the score for each metric. Metric results indicated the macroinvertebrate community to be characterized by pollution-tolerant taxa groups, indicating *poor* community condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Lower Tombigbee River	
Drainage Area (mi ²)	28	
Ecoregion ^a	65d	
% Landuse		
Open water		<1
Wetland	Woody	9
	Emergent herbaceous	<1
Forest	Deciduous	24
	Evergreen	27
	Mixed	16
Shrub/scrub		16
Grassland/herbaceous		<1
Pasture/hay		3
Cultivated crops		1
Development	Open space	3
	Low intensity	<1
Population/km ² ^b	7	

a. Southern Hilly Gulf Coastal Plain

b. 2000 US Census

Table 2. Physical characteristics of Kinterbish Creek at KNBS-1, June 1, 2006.

Physical Characteristics	
Width (Ft.)	25
Canopy Cover	Mostly Shaded
Depth (Ft)	
	Run 3.0
	Pool 4.0
% of Reach	
	Run 40
	Pool 60
% Substrate	
	Mud/Muck 2
	Sand 81
	Silt 10
	Organic Matter 7

Table 3. Results of the habitat assessment conducted on Kinterbish Ck at KNBS-1, June 1, 2006.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	44	Marginal (40-52)
Sediment Deposition	60	Sub-optimal (53-65)
Sinuosity	55	Marginal (45-64)
Bank and Vegetative Stability	31	Poor <35
Riparian Buffer	79	Sub-optimal (70-89)
Habitat Assessment Score	118	
% Maximum Score	54	Sub-optimal (53-65)

Table 4. Results of the macroinvertebrate bioassessment conducted in Kinterbish Creek at KNBS-1, June 1, 2006.

Macroinvertebrate Assessment			
	Results Scores		Rating
Taxa richness measures			
# EPT genera	7	28	Poor (19-37)
Taxonomic composition measures			
% Non-insect taxa	12	65	Fair (61.9-92.7)
% Plecoptera	0	0	Very Poor (<1.86)
% Dominant taxa	33	44	Poor (23.5-47.0)
Functional composition measures			
% Predators	12	42	Fair (30.2-45.2)
Tolerance measures			
Beck's community tolerance index	2	9	Very Poor (<10.6)
% Nutrient tolerant organisms	44	44	Poor (25.4-50.8)
WMB-I Assessment Score	--	33	Poor (19-37)

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, herbicides (atrazine), and semi-volatile organics) during March through October of 2006 to help identify any stressors to the biological communities. Median concentrations of physical, chemical, and biological parameters were similar to the 90th percentile of data collected from reference reaches in the Southern Hilly Gulf Coastal Plains(65d) ecoregion. Median concentrations of total and dissolved manganese were higher expected for a stream in this 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. Biological community conditions may have been affected by the lack of instream habitat.

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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)	9	16.0	24.5	22.0	21.5	2.6	
Turbidity (NTU)	9	8.7	50.3	13.5	18.5	13.5	
Total Dissolved Solids (mg/L)	8	48.0	100.0	64.5	68.5	18.5	
Total Suspended Solids (mg/L)	8	4.0	46.0	9.0	13.8	14.0	
Specific Conductance (µmhos)	9	40.4	68.7	62.9	59.6	9.5	
Hardness (mg/L)	3	22.9	48.0	28.0	33.0	13.3	
Alkalinity (mg/L)	8	8.0	45.0	25.9	24.8	12.1	
Stream Flow (cfs)	6	2.8	10.1	5.6	5.9	3.1	
Chemical							
Dissolved Oxygen (mg/L)	9	6.3	9.8	7.0	7.3	1.1	
pH (su)	9	6.7	7.1	6.9	6.9	0.1	
Ammonia Nitrogen (mg/L)	8	0.015	0.093	0.022	0.036	0.031	
Nitrate+Nitrite Nitrogen (mg/L)	8	0.003	0.109	0.038	0.039	0.038	
Total Kjeldahl Nitrogen (mg/L)	8	0.189	0.545	0.338	0.368	0.120	
Total Nitrogen (mg/L)	8	< 0.190	0.654	0.402	0.407	0.148	
Dissolved Reactive Phosphorus (mg/L)	8	< 0.004	0.012	0.003	0.005	0.004	
Total Phosphorus (mg/L)	8	< 0.004	0.100	0.050	0.041	0.018	
CBOD-5 (mg/L)	8	< 0.3	3.3	1.1	1.4	1.1	
COD (mg/L)	2	< 2.0	< 2.0	1.0	1.0	0.0	
TOC (mg/L)	2	3.2	7.3	5.2	5.2	2.9	
Chlorides (mg/L)	6	2.0	5.6	2.3	2.8	1.4	
Atrazine (µg/L)	1				< 0.05		
Total Metals							
Aluminum (mg/L)	3	0.132	0.340	0.290	0.254	0.109	
Iron (mg/L)	3	1.660	1.840	1.690	1.730	0.096	
Manganese (mg/L)	3	0.076	0.126	0.100 ^M	0.101	0.025	
Dissolved Metals							
Aluminum (mg/L)	3	< 0.050	0.210	0.130	0.122	0.093	
Antimony (µg/L)	3	< 7.5	< 10.0	3.8	4.2	0.7	
Arsenic (µg/L)	3	< 5.0	< 10.0	2.5	3.3	1.4	
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	0.505	0.600	0.507	0.537	0.054	
Lead (µg/L)	3	< 5.0	< 10.0	2.5	3.3	1.4	
Manganese (mg/L)	3	0.066	0.108	0.093 ^M	0.089	0.021	
Mercury (µg/L)	3	< 0.0	< 0.5	0.2	0.2	0.1	
Nickel (mg/L)	3	< 0.005	< 0.050	0.002	0.010	0.013	
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	< 10.0	4.5	3.6	2.0	
Zinc (mg/L)	3	< 0.005	< 0.050	0.002	0.010	0.013	
Biological							
Chlorophyll a (ug/L)	8	< 0.10	5.34	1.32	1.81	2.00	
Fecal Coliform (col/100 mL)	6	20	540	205	235	190	J

J = Estimate; N = Number of Samples; M = Value > 90th percentile of verified ecoregional reference reach samples within eco-region 65d