

2007 Monitoring Summary



Blubber Creek at AL Hwy 14 in Pickens Co. (33.14725/-88.17053)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Blubber 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 Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the EMT basin group. Due to drought conditions prevalent in 2006, this station was sampled in 2007 for water quality and biological data.



Figure 1. Blubber Creek at BLBP-1, March 31, 2011.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Blubber Creek is a [Fish & Wildlife \(F&W\)](#) stream located in the Fall Line Hills ecoregion. Based on the 2000 National Land Cover Dataset, landuse within the watershed is primarily forested (71%). Population density is relatively low in this area. As of February 23, 2011, the Department has issued no NPDES permits in this watershed.

REACH CHARACTERISTICS

[General observations](#) (Table 2) and a [habitat assessment](#) (Table 3) were completed at BLBP-1 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. Blubber Creek at BLBP-1 (Figure 1) is a moderately deep, low-gradient stream reach with a predominantly sand substrate. Conditions at the reach were disrupted by bridge construction, June through October of 2007.

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 the score for each individual metric. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Upper Tombigbee River	
Drainage Area (mi ²)	17	
Ecoregion ^a	65i	
% Landuse		
Open water	<1	
Wetland	Woody	4
	Emergent herbaceous	<1
Forest	Deciduous	38
	Evergreen	16
	Mixed	17
Shrub/scrub	10	
Grassland/herbaceous	<1	
Pasture/hay	4	
Cultivated crops	6	
Development	Open space	4
	Low intensity	<1
Population/km ^{2b}	11	

a. Fall Line Hills

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, Feb 23, 2011.

Table 2. Physical characteristics of Blubber Ck at BLBP-1, July 19, 2007.

Physical Characteristics		
Width (ft)	20	
Canopy Cover	Mostly Shaded	
Depth (Ft)		
	Riffle	0.4
	Run	1.5
	Pool	2.5
% of Reach		
	Riffle	2
	Run	60
	Pool	38
% Substrate		
	Gravel	5
	Sand	70
	Silt	10
	Organic Matter	15

Table 3. Results of the habitat assessment conducted on Blubber Creek at BLBP-1, May 8, 2007.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	44	Marginal (40-52)
Sediment Deposition	58	Sub-optimal (53-65)
Sinuosity	40	Poor <45
Bank and Vegetative Stability	64	Sub-optimal (60-74)
Riparian Buffer	85	Sub-optimal (70-89)
Habitat Assessment Score	127	
% Maximum Score	58	Sub-optimal (53-65)

Table 4. Results of the macroinvertebrate bioassessment conducted in Blubber Creek at BLBP-1, May 8, 2007.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures		(0-100)	
# EPT genera	8	32	Poor (19-37)
Taxonomic composition measures			
% Non-insect taxa	18	36	Poor (30.9-61.8)
% Plecoptera	1	5	Fair (3.8-5.6)
% Dominant taxa	28	55	Fair (47.1-70.5)
Functional composition measures			
% Predators	17	58	Good (45.3-72.1)
Tolerance measures			
Beck's community tolerance index	6	27	Fair (21.3-31.8)
% Nutrient tolerant organisms	16	91	Excellent (>88.1)
WMB-I Assessment Score	--	43	Fair (38-56)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. When possible, [in situ measurements](#) and [water samples](#) are collected monthly, semi-monthly (metals), or quarterly (pesticides, atrazine, and semi-volatile organics) during March through October to help identify any stressors to the biological communities.

Dissolved oxygen values fell below the 5.0 mg/L use classification criteria during low flow conditions in June and mid-July. Median specific conductance, hardness, total Kjeldahl nitrogen, and dissolved metals (aluminum, iron and zinc) concentrations were elevated for a Fall Line Hills stream based on the 90th percentile of reference reaches in this ecoregion. Dissolved zinc concentrations were also elevated. The fecal coliform count was >11,000 colonies/100 mL during a high flow event in early July.

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Blubber Creek at BLBP-1 to be in *fair* condition. Chemical and physical conditions within the reach may have been impacted by the extreme high and low flows and bridge construction that occurred within the reach during the sampling period. Further monitoring is recommended to re-evaluate conditions within the reach.

Table 5. Summary of water quality data collected March-October, 2007. 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	E
Physical							
Temperature (°C)	8	11.4	24.5	20.6	19.9	4.6	
Turbidity (NTU)	8	9.2	41.1	18.5	22.5	11.8	
Total Dissolved Solids (mg/L)	6	30.0	89.0	62.5	58.7	21.6	
Total Suspended Solids (mg/L)	6	7.0	46.8	18.5	22.8	16.7	
Specific Conductance (µmhos)	8	31.9	102.2	50.8 ^G	57.8	25.5	
Hardness (mg/L)	3	6.4	20.0	12.0 ^G	12.8	6.9	
Alkalinity (mg/L)	6	5.0	41.3	17.0	21.7	16.1	
Stream Flow (cfs)	4	1.0	9.1	2.9	4.0	3.6	
Chemical							
Dissolved Oxygen (mg/L)	8	3.19 ^C	9.4	6.4	6.5	2.1	2
pH (su)	8	6.1	7.6	6.7	6.7	0.5	
Ammonia Nitrogen (mg/L)	6	<0.015	0.155	0.036	0.062	0.066	
Nitrate+Nitrite Nitrogen (mg/L)	6	<0.003	0.137	0.052	0.054	0.050	
Total Kjeldahl Nitrogen (mg/L)	6	0.264	0.816	0.714 ^M	0.598	0.249	
Total Nitrogen (mg/L)	6	<0.266	0.855	0.818	0.653	0.285	
Dissolved Reactive Phosphorus (mg/L)	6	0.015	0.087	0.022	0.037	0.030	
^J Total Phosphorus (mg/L)	6	0.038	0.108	0.060	0.062	0.026	
CBOD-5 (mg/L)	6	<1.0	4.4	1.2	1.6	1.5	
^J Chlorides (mg/L)	6	1.0	3.4	2.8	2.7	0.6	
Atrazine (µg/L)	1				<0.05		
Total Metals							
Aluminum (mg/L)	3	<0.467	0.500	0.467	0.396	0.126	
Iron (mg/L)	3	2.000	4.100	2.560	2.887	1.087	
Manganese (mg/L)	3	0.276	1.400	0.701	0.792	0.568	
Dissolved Metals							
^J Aluminum (mg/L)	3	<0.100	0.500	0.190 ^M	0.180	0.076	
Antimony (µg/L)	3	<2.0	<7.5	2.5	2.4	1.4	
Arsenic (µg/L)	3	<2.2	<5.0	2.5	2.0	0.8	
Cadmium (mg/L)	3	<0.0002	<0.005	0.0003	0.0010	0.0010	
Chromium (mg/L)	3	0.004	<0.010	0.002	0.003	0.002	
Copper (mg/L)	3	<0.005	<0.010	0.002	0.003	0.001	
^J Iron (mg/L)	3	0.520	0.960	0.647 ^M	0.709	0.226	
Lead (µg/L)	3	<1.5	<5.0	2.5	1.9	1.0	
^J Manganese (mg/L)	3	0.241	1.300	0.533	0.691	0.547	
Mercury (µg/L)	3	<0.3	<0.5	0.2	0.2	0.1	
Nickel (mg/L)	3	<0.005	<0.010	0.003	0.004	0.001	
Selenium (µg/L)	3	<1.6	<7.5	2.5	2.4	1.5	
Silver (mg/L)	3	<0.001	<0.003	0.001	0.002	0.001	
Thallium (µg/L)	3	<0.6	<9.0	1.2	2.0	2.2	
Zinc (mg/L)	3	<0.006	0.070 ^A	0.049 ^M	0.041	0.034	2
Biological							
^J Chlorophyll a (ug/L)	6	1.07	10.70	4.27	4.33	3.52	
^J Fecal Coliform (col/100 mL)	6	32	>11000 ^C	240	2,093	4,377	1

A=F&W aquatic life use criterion exceeded; C=F&W criterion violated; E=# samples that exceeded criteria; G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65i; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65i; N=# samples.

FOR MORE INFORMATION, CONTACT:
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