

2014 Monitoring Summary



Long Creek at AL Highway 106, Butler County (31.67609/-86.83646)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Long Creek watershed for biological and water quality monitoring as part of the 2014 Assessment of Southeast Alabama. The objectives of the Southeast Alabama Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within Southeast Alabama.



Figure 1. Long Creek at LNGB-2, May 6, 2014.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Long Creek is a *Fish & Wildlife (F&W)* stream located approximately 6 miles west of Georgiana in the Conecuh River basin. Based on the 2011 National Land Cover Dataset, land use within the watershed is primarily forest (68%). As of April 1, 2016, there were five NPDES outfalls active in the area.

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. Long Creek at LNGB-2 is characterized by a clay bottom, typical of creeks in the 65d ecoregion (Figure 1). Overall habitat quality was categorized as *marginal* due to unstable banks and a limited riparian buffer.

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. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Conecuh River	
Drainage Area (mi ²)	14	
Ecoregion ^a	65D	
% Landuse ^b		
Open water	1%	
Wetland	Woody	4%
	Emergent herbaceous	<1%
Forest	Deciduous	22%
	Evergreen	39%
	Mixed	7%
Shrub/scrub	12%	
Grassland/herbaceous	2%	
Pasture/hay	8%	
Cultivated crops	<1%	
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
Population/km ^{2c}	6	
# NPDES Permits ^d	TOTAL	5
Construction	5	

a. Southern Hilly Gulf Coastal Plain

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 Long Creek at LNGB-2, July 2, 2014.

Physical Characteristics		
Width (ft)	15	
Canopy cover	Mostly Shaded	
Depth (ft)	Run	0.5
	Pool	1
% of Reach	Run	70
	Pool	30
% Substrate	Clay	20
	Gravel	3
	Hard Pan Clay	60
	Sand	10
	Silt	2
	Organic Matter	5

Table 3. Results of the habitat assessment conducted on Long Creek at LNGB-2, July 2, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	35	Marginal (31-<55)
Sediment Deposition	40	Marginal (31-<55)
Sinuosity	40	Marginal (31-<55)
Bank Vegetative Stability	45	Marginal (31-<58)
Riparian Buffer	29	Poor (<31)
Habitat Assessment Score	67	
% Maximum Score	39	Marginal (31-<57)

Table 4. Results of the macroinvertebrate bioassessment conducted in Long Creek at LNGB-2, July 2, 2014.

Macroinvertebrate Assessment	Results
Taxa richness and diversity measures	
# EPT taxa	18
Taxonomic composition measures	
% Non-insect taxa	11
% Plecoptera	0
% Dominant taxon	19
Functional feeding group	
% Predators	19
Community tolerance	
Becks community tolerance index	6
% Nutrient tolerant individuals	30
WMB-I Assessment Score	54
WMB-I Assessment Rating	Fair (37-55)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals) during March through October of 2014 to help identify any stressors to the biological communities. On August 8, 2014 dissolved oxygen was below Long Creek's *F&W* use classification. However, flow was 0.2 cfs. Samples could not be collected in September or October due to no flow conditions.

SUMMARY

Macroinvertebrate sampling indicated the macroinvertebrate community to be in *fair* condition. Results of the habitat assessment indicated LNGB-2 to be in *marginal* condition, due to sediment deposition, bank erosion, and limited instream habitat and riparian buffers. Monitoring should continue to ensure that biological conditions remain stable.

Table 5. Summary of water quality data collected March through October, 2014. 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	Med	Avg	SD	E	Q
Physical								
Temperature (°C)	7	13.7	27.0	23.9	20.8	5.4		
Turbidity (NTU)	7	7.8	38.8	21.7	21.4	13.0		
Total Dissolved Solids (mg/L)	6	55.0	87.0	65.0	68.8	14.9		
Total Suspended Solids (mg/L)	6	< 1.0	10.0	5.5	5.1	3.4		
Specific Conductance (µmhos)	7	30.2	70.6	43.8	50.4	16.8		
Hardness (mg/L)	3	10.4	23.2	12.1	15.2	7.0		
Alkalinity (mg/L)	6	5.2	27.0	10.7	14.1	9.4		
Monthly Stream Flow (cfs)	7	0.1	45.8	5.0	13.1	18.7		
Stream Flow during Sample Collection (cfs)	7	0.1	45.8	5.0	13.1	18.7		
Chemical								
Dissolved Oxygen (mg/L)	7	4.5 ^c	10.3	7.9	7.8	2.2	1	
pH (su)	7	6.1	7.3	6.7	6.8	0.4		
Ammonia Nitrogen (mg/L)	6	< 0.008	0.017	0.003	0.006	0.006		
Nitrate+Nitrite Nitrogen (mg/L)	6	0.008	0.038	0.017	0.020	0.011		
Total Kjeldahl Nitrogen (mg/L)	6	0.320	0.775	0.513	0.532	0.174		
Total Nitrogen (mg/L)	6	0.331	0.792	0.534	0.552	0.181		
Dissolved Reactive Phosphorus (mg/L)	6	0.005	0.011	0.006	0.007	0.003		
Total Phosphorus (mg/L)	6	0.030	0.068	0.034	0.040	0.014		
CBOD-5 (mg/L)	6	< 2.0	< 2.0	1.0	1.0	0.0		
Chlorides (mg/L)	6	2.5	3.8	3.2	3.2	0.5		
Total Metals								
Aluminum (mg/L)	3	0.082	0.980	0.295	0.452	0.469		
Iron (mg/L)	3	1.180	1.630	1.630	1.480	0.260		
Manganese (mg/L)	3	0.018	0.043	0.023	0.028	0.013		
Dissolved Metals								
Aluminum (mg/L)	3	< 0.050	< 0.188	0.112	0.108	0.082		
Antimony (µg/L)	3	< 0.2	< 0.2	0.1	0.1	0.0		
Arsenic (µg/L)	3	0.4	1.0 ^d	0.6	0.7	0.3	3	
Cadmium (µg/L)	3	< 0.246	< 0.246	0.123	0.123	0.000		
Chromium (µg/L)	3	0.650	1.939	0.680	1.090	0.736		
Copper (mg/L)	3	0.0005	0.0010	0.0005	0.001	0.000		
Iron (mg/L)	3	0.492	1.130	0.902	0.841	0.323		
Lead (µg/L)	3	0.2	0.4 ^e	0.4	0.3	0.1	2	
Manganese (mg/L)	3	0.015	0.030	0.017	0.021	0.008		
Nickel (mg/L)	3	0.001	0.001	0.001	0.001	0.000		
Selenium (µg/L)	3	< 0.4	< 0.4	0.2	0.2	0.0		
Silver (µg/L)	3	< 0.252	< 0.252	0.126	0.126	0.000		
Thallium (µg/L)	3	< 0.2	< 0.2	0.1	0.1	0.0		
Zinc (mg/L)	3	0.005	0.008	0.006	0.006	0.002		
Biological								
Chlorophyll a (µg/L)	6	1.07	11.75	1.78	3.20	4.20		
E. coli (col:100mL)	6	88	345	164	177	92		

C= *F&W* criterion violated; E=# of samples that exceeded criteria; H=*F&W* human health criterion exceeded; S= *F&W* hardness-adjusted aquatic life use criteria exceeded; J=estimate; N= # samples; Q=# of samples that it is uncertain if criteria was exceeded

FOR MORE INFORMATION, CONTACT:

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