Alabama Department of Environmental Management

Use Support Assessment

Rivers and Streams Monitoring Program

2015 Monitoring Summary

TM

Fair

Little Indian Creek at Bullock County Road 61 (32.01559/-85.63617)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Little Indian Creek for biological and water quality monitoring as part of the 2015 Use Support Assessment Monitoring. Little Indian Creek was selected because available data and information were insufficient to determine if this water body was meeting its *F&W* use classification. Little Indian Creek was also selected for the 2015 Rivers and Streams Monitoring. Water quality samples were collected monthly March through October. A habitat and macroinvertebrate assessment were conducted on Little Indian Creek at LICB-1 on June 23, 2015.

Figure 1. Little Indian Creek at LICB-1, May 18, 2015.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Choctawhatchee R
Drainage Area (mi^2)		17
Ecoregion[a]		65D
Landuse[b]		
Open water		<1%
Wetland	Woody	5%
	Emergent herbaceous	<1%
Forest	Deciduous	12%
	Evergreen	45%
	Mixed	14%
Shrub/scrub		10%
Grassland/herbaceous		3%
Pasture/hay		4%
Cultivated crops		3%
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
Population/km^2[c]		5

a. Southern Hilly Gulf Coastal Plain

b. 2011 National Land Cover Dataset

c. 2010 US Census

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Indian Creek at LICB-1 is a *Fish and Wildlife* (*F&W*) stream located in Bullock County. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (71%). Less than five percent of the area is developed, and population density is low. As of April 1, 2016, there are no active outfalls in the watershed.

Table 2. Physical characteristics of Little Indian Creek at LICB-1, June 23, 2015.

Physical Characteristics	
Width (ft)	15
Canopy Cover	Mostly Shaded
Depth (ft)	
Run	1.0
Pool	3.0
% of Reach	
Run	50
Pool	50
% Substrate	
Mud/Muck	1
Sand	76
Silt	20
Organic Matter	3

REACH CHARACTRISTICS

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. Little Indian Creek at LICB-1 is a glide-pool stream located in the Southern Hilly Gulf Coastal Plains ecoregion (65d) (Figure 1). Benthic substrate in the reach consists primarily of sand with some silt. Overall habitat quality was rated as *marginal* for supporting macroinvertebrate communities.

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

Table 3. Results of the habitat assessment conducted on Little Indian Creek at LICB-1, June 23, 2015.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	33	Marginal (31-<55)
Sediment Deposition	45	Marginal (31-<55)
Sinuosity	33	Marginal (31-<55)
Bank Vegetative Stability	36	Marginal (31-<58)
Riparian Buffer	23	Poor (<31
Habitat Assessment Score	***59***	
% of Maximum Score	***35***	**Marginal (31-<57)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Little Indian Creek at LICB-1, June 23, 2015.

Macroinvertebrate Assessment	
	Results
Taxa richness and diversity measures	
# EPT taxa	11
Taxonomic composition measures	
% Non-insect taxa	18
% Plecoptera	0
% Dominant taxon	28
Functional feeding group	
% Predators	12
Community tolerance	
Becks community tolerance index	0
% Nutrient tolerant individuals	3
WMB-I Assessment Score	**39**
WMB-I Assessment Rating	**Fair (37-55)**

WATER CHEMISTRY

Results of water chemistry analyses are summarized in Table 5. In situ measurements and water samples were collected March through October 2015 to help identify any stressors to the biological communities. However, the creek was dry in September and no samples could be collected then. Organics were collected in April. All organics, with the exception of atrazine, were below the minimum detection limits. Dissolved oxygen concentrations were below *F&W* use classification criterion in all samples collected from June through October; however the stream flow at the time of sampling was described as "visible but not measureable". Summer E. coli counts exceeded *F&W* maximum single sample criteria during the August station visit. Median concentrations of specific conductance, hardness, total kjeldahl nitrogen, and dissolved iron, were higher than expected based on reference reach data for streams located in ecoregion 65a.

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Little Indian Creek at LICB-1 to be in *fair* condition. Overall habitat quality was categorized as *marginal* for supporting biological communities. Summer E. coli counts in August exceeded *F&W* criteria, and the dissolved oxygen was low in the summer. Median concentrations of specific conductance, hardness, total kjeldahl nitrogen, and dissolved iron, were higher than expected for the ecoregion. Monitoring should continue to ensure water quality and biological conditions meet current standards.

FOR MORE INFORMATION, CONTACT:
Rebekah Taylor ADEM Environmental Indicators Section
1350 Coliseum Boulevard Montgomery, AL 36110
(334) 260-2759 rebekah.taylor@adem.alabama.gov

Table 5. Summary of water quality data collected March-October, 2015. 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)	9	17.1	25.2	19.6	20.8	3.3		
Turbidity (NTU)	9	13.0	46.3	23.6	26.6	10.1		
Total Dissolved Solids (mg/L)	7	58.0	101.0	91.0	86.0	16.1		
Total Suspended Solids (mg/L)	7	6.0	53.0	8.0	18.8	17.4		
Specific Conductance (µmhos/cm@25C)	9	61.0	112.8	89.9 G	85.8	16.7		
Hardness (mg/L)	4	27.8	53.1	33.4 G	37.0	12.0		
Alkalinity (mg/L)	7	14.6	32.6	25.8	26.4	6.3		
Monthly Stream Flow (cfs)	10	0.0	7.5	0.5	2.0	2.6		
Stream Flow during Sample Collection (cfs)	6	0.3	7.5	2.9	3.2	2.7		
Chemical								
Dissolved Oxygen (mg/L)	9	0.0 C	8.7	7.3	5.4	3.2	4	
pH (SU)	9	6.3	7.0	6.6	6.6	0.2		
Ammonia Nitrogen (mg/L)	7	< 0.007	0.149	0.021	0.043	0.051		
J Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.002	0.063	0.029	0.029	0.022		
Total Kjeldahl Nitrogen (mg/L)	7	0.332	2.570	0.716 M	0.988	0.752		
J Total Nitrogen (mg/L)	7	< 0.395	2.599	0.720	1.017	0.750		
J Dissolved Reactive Phosphorus (mg/L)	7	0.006	0.011	0.010	0.009	0.002		
Total Phosphorus (mg/L)	7	0.036	0.097	0.048	0.062	0.023		
CBOD-5 (mg/L)	7	< 2.0	2.5	1.0	1.2	0.6		
Chlorides (mg/L)	7	3.0	7.6	4.5	5.2	1.8		
Atrazine (µg/L)	1				0.17			
Total Metals								
J Aluminum (mg/L)	4	0.144	1.320	0.762 M	0.747	0.482		
Iron (mg/L)	4	2.010	3.870	2.885	2.912	0.989		
J Manganese (mg/L)	4	< 0.004	0.198	0.121	0.110	0.084		
Dissolved Metals								
J Aluminum (mg/L)	4	< 0.106	0.232	0.124	0.133	0.094		
Antimony (µg/L)	4	< 0.3	< 0.3	0.2	0.2	0.0		
J Arsenic (µg/L)	4	0.9	1.8 H	1.5	1.4	0.5	4	
Cadmium (µg/L)	4	< 0.311	< 0.311	0.156	0.156	0.000		
J Chromium (µg/L)	4	0.413	0.866	0.606	0.623	0.211		
J Copper (µg/L)	4	0.230	0.508	0.476	0.422	0.131		
Iron (mg/L)	4	1.050	1.640	1.240 M	1.292	0.284		
Lead (µg/L)	4	< 0.4	< 0.4	0.2	0.2	0.0		
J Manganese (mg/L)	4	< 0.004	0.181	0.104	0.098	0.076		
J Nickel (µg/L)	4	< 0.460	0.510	0.357	0.364	0.154		
Selenium (µg/L)	4	< 0.4	< 0.4	0.2	0.2	0.0		
Silver (µg/L)	4	< 0.365	< 0.365	0.182	0.182	0.000		
Thallium (µg/L)	4	< 0.5	< 0.5	0.2	0.2	0.0		
J Zinc (µg/L)	4	< 0.522	1.762	0.947	0.979	0.614		
Biological								
Chlorophyll a (mg/m³)	7	< 1.00	4.30	1.60	2.05	1.41		
E. coli (MPN/DL)	7	49.6	2419.6 H	98.8	435.8	876.6	1	

C=criterion violated; E=# samples that exceeded criteria; G=value higher than median concentration of all verified ecoregional reference data collected in the ecoregion 65d; H=*F&W* human health criteria exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65a; N=# samples; Q=# of uncertain exceedances