

2005 Monitoring Summary



Leak Creek at Barbour Co Rd 79 (31.93182/-85.34417)

BACKGROUND

Barbour Creek is on Alabama's 2006 Clean Water Act (CWA) §303 (d) list of impaired waters for not meeting its *Swimming* (S) and *Fish and Wildlife* (F&W) water use classifications. It is listed for siltation from agricultural runoff (ADEM 2007).

The Alabama Department of Environmental Management (ADEM) monitored Leak Creek, a tributary of Barbour Creek, to verify and document impairment from siltation at this site (LCKB-1) and to investigate the tributary as a source of the siltation impacts to Barbour Creek (Fig.1). Macroinvertebrate and habitat assessments at the site were conducted to evaluate the impacts to aquatic communities. Monthly water chemistry samples were collected to identify the potential sources of impairment. Results from these data may also be used in determination of Total Maximum Daily Load needs and priorities.



Figure 1. Leak Creek at LCKB-1, March 24, 2005.

REACH CHARACTERISTICS

General observations (Table 1) and habitat assessments (Table 2) 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. Leak Creek at LCKB-1 is a small, mostly-shaded stream reach characterized by sand. Overall habitat quality was rated as *marginal* due to sedimentation, bank erosion, and a lack of stable in-stream habitat.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Multi-habitat Bioassessment EPT methodology (MB-EPT). The method uses the number of families in three pollution-sensitive aquatic insect orders as an indicator of biological conditions. The results were compared to existing assessment thresholds for the Southern Hilly Gulf Coastal Plains ecoregion (65d) where Leak Creek is located to evaluate the community's health. Nine EPT families collected from Leak Creek at LCKB-1, indicating the community to be in *good* condition.

Table 1. Summary of physical characteristics observed June 15, 2005.

Physical Characteristics	
Ecoregion ^a	65d
Width (ft)	25
Canopy cover	Mostly Shaded
Depth (ft)	
	Run 0.8
	Pool 3
% of Reach	
	Run 75
	Pool 25
% Substrate	
	Gravel 3
	Sand 80
	Silt 5
	Clay 4
	Organic Silt 8

a. Southern Hilly Gulf Coastal Plains

Table 2. Results of the habitat assessment conducted on Leak Creek at LCKB-1, June 15, 2005.

Habitat Assessment (% Maximum Score)	Rating
Instream habitat quality 38	Poor (<41)
Sediment deposition 59	Marginal (41-58)
Sinuosity 40	Poor (<45)
Bank and vegetative stability 31	Poor (<35)
Riparian buffer 88	Sub-optimal (70-90)
Habitat assessment score 111	
% Maximum score 50	Marginal (41-58)

Table 3. Summary of water quality data collected March-October, 2005. 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	Median	Avg	SD
Physical						
Temperature (°C)	7	9.7	25.0	23.0	19.0	6.0
Turbidity (NTU)	7	13.6	74.6	22.9	28.7	21.1
Total dissolved solids (mg/L)	6	68.0	166.0	87.0	103.3	37.6
Total suspended solids (mg/L)	6	5.0	61.0	22.0	25.7	19.9
Specific conductance (µmhos)	7	92.5	115.8	103.4	105.3	9.2
Hardness (mg/L)	3	41.5	48.8	43.8	44.7	3.7
Alkalinity (mg/L)	6	30.2	42.8	38.1	37.0	5.2
Stream Flow (cfs)	5	6.7	23.7	11.1	14.0	---
Chemical						
Dissolved oxygen (mg/L)	7	6.9	11.47	8.7	8.7	1.5
pH (su)	7	6.6	8.5	7.5	7.6	0.7
Ammonia Nitrogen (mg/L)	6	< 0.015	0.049	0.021	0.025	0.020
Nitrate+Nitrite Nitrogen (mg/L)	6	< 0.003	0.344	0.054	0.086	0.129
Total Kjeldahl Nitrogen (mg/L)	6	< 0.150	0.749	0.281	0.359	0.257
Total nitrogen (mg/L)	6	0.123	0.809	0.424	0.445	0.302
Dissolved reactive phosphorus (mg/L)	6	< 0.004	0.035	0.006	0.011	0.012
Total phosphorus (mg/L)	6	0.010	0.065	0.029	0.030	0.021
CBOD-5 (mg/L)	6	< 1.0	3.0	1.8	1.9	0.9
Chemical Oxygen Demand(mg/L)	1	< 2.0	2.0	1.0	1.0	---
Chlorides (mg/L)	3	5.4	6.3	6.2	6.0	0.5
Biological						
Fecal Coliform (col/100 mL)	6	97	660	245	308	195

N= # samples.

WATER CHEMISTRY

Results of water chemistry are presented in Table 3. In situ measurements and water samples were collected monthly during April through November of 2005 to help identify any stressors to the biological communities. Median concentrations of all parameters analyzed were similar to 90th percentile of data collected at least- impaired reference reaches in ecoregion 65d.

CONCLUSIONS

Results of EPT screening-level assessments suggested aquatic macroinvertebrate community to be in *good* condition. However, sedimentation was an issue within the reach.

FOR MORE INFORMATION, CONTACT:
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