Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2005 Monitoring Summary

Good

Little Loblockee Creek at Lee County Road 86 (32.68528/-85.56038)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Little Loblockee Creek watershed for biological and water quality monitoring as part of the 2005 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River Basins. The objectives of the ACT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the ACT basin group.

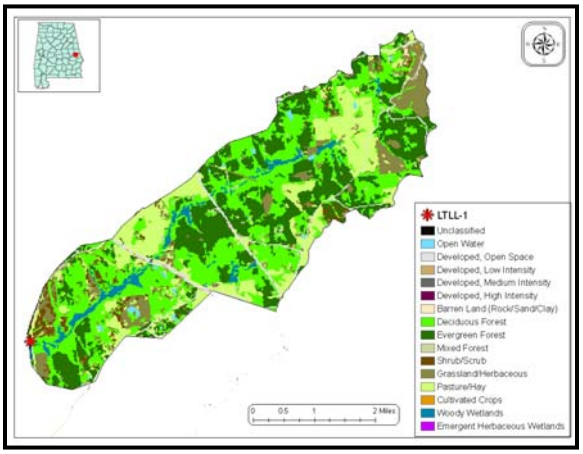

Figure 1. Sampling location and landuse within the Little Loblockee Creek watershed at LTLL-1, 2005.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Loblockee Creek at Lee Co. Rd. 86 is a second order stream located near Waverly, AL and is designated as a *Fish & Wildlife* (*F&W*) stream [ADEM Use Classification]. Landuse within the watershed is primarily forest and agriculture (grasslands and hay) (Figure 1). The Little Loblockee Creek watershed is within the Southern Lower Piedmont ecoregion, which is characterized by low to moderate gradient streams with cobble, gravel and sandy substrates.

REACH CHARACTERISTICS

General observations (Table 2) and habitat assessments (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 Loblockee Creek at LTLL-1 is a low gradient, sand bottomed stream within the Tallapoosa River watershed. Overall habitat quality was categorized as *marginal* due to *marginal* in-stream habitat, and bank and vegetative stability, *sub-optimal* sediment deposition and riparian buffer, and *poor* sinuosity.

Table 1. Summary of watershed characteristics at LTLL-1, 2005.

Watershed Characteristics		
Drainage Area (mi^2)		15
Ecoregion[a]		45b
% Landuse		
Open water		1
Wetland	Woody	3
Forest	Deciduous	35
	Evergreen	27
	Mixed	1
Shrub/scrub		3
Grassland/herbaceous		10
Pasture/hay		18
Cultivated crops		<1
Development	Open space	3
	Low intensity	<1
	Moderate intensity	<1
Barren		<1
Population/km^2 [b]		10
# NPDES Permits[c]	**TOTAL**	8
401 Water Quality Certification		1
Construction Stormwater		6
Mining General Permit (old)		1

a.Southern Lower Piedmont
b.2000 U.S. Census Data
c.#NPDES permits downloaded from ADEM's NPDES Management System database, 9 Jun 2008

Table 2. Physical characteristics at LTLL-1 conducted June 22, 2005.

Physical Characteristics		
Width (ft)		30
Canopy cover		Mostly Shaded
Depth (ft)		
	Run	1.5
	Pool	2.5
% of Reach		
	Run	80
	Pool	20
% Substrate		
	Gravel	2
	Sand	60
	Silt	8
	Clay	10
	Organic Matter	20

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 lacking predator species. However the overall macroinvertebrate community was rated *good* (Table 4).

Table 3. Habitat assessment results at LTLL-1 conducted June 22, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	42	Marginal (41-58)
Sediment deposition	63	Sub-optimal (59-70)
Sinuosity	38	Poor (<45)
Bank and vegetative stability	41	Marginal (35-59)
Riparian buffer	88	Sub-optimal (70-90)
Habitat assessment score	122	
% Maximum score	**55**	**Marginal (41-58)**

Table 4. Macroinvertebrate bioassessment results at LTLL-1 conducted June 22, 2005.

	Results	Scores	Rating
Taxa richness measures		**(0-100)**	
# EPT genera	10	40	Fair (37-56)
Taxonomic composition measures			
% Non-insect taxa	8	83	Excellent (>78)
% Plecoptera	2	50	Fair (37-56)
% Dominant taxa	13	93	Excellent (>78)
Functional composition measures			
% Predators	24	34	Poor (19-37)
Tolerance measures			
Beck's community tolerance index	7	32	Poor (19-37)
% Nutrient tolerant organisms	20	84	Excellent (>78)
WMB-I Assessment Score	**---**	**59**	**Good (56-78)**

WATER CHEMISTRY

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 2005 to help identify any stressors to the biological communities. Two of eight measures of turbidity, recorded during high flow events, were >50 NTU higher than background levels in ecoregion 45 as based on the 90th percentile of all least impaired reference reach data in ecoregion 45. Median concentrations of alkalinity, total aluminum, iron, and manganese, and dissolved iron and manganese were above values expected in this ecoregion (Table 5).

CONCLUSIONS

The bioassessment results indicated the macroinvertebrate community to be in *good* condition. However, overall habitat quality was categorized as *marginal* due to sedimentation and a lack of stable instream habitat. Median nutrient (nitrate+nitrite-nitrogen) and metals (total aluminum, total iron, and total manganese and dissolved iron and manganese) concentrations were also above values expected in this ecoregion.

Table 5. Summary of water quality data collected March-October, 2005 at LTLL-1. 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	Median	Avg	SD
Physical						
Temperature (°C)	8	10.3	24.0	19.0	18.0	5.5
Turbidity (NTU)	8	12.0	166.0	37.0M	53.5	51.8
Total dissolved solids (mg/L)	7	9.0	79.0	47.0	47.4	25.8
Total suspended solids (mg/L)	7	4.0	37.0	12.0	18.7	14.3
Specific conductance (µmhos)	8	36.4	68.7	57.9M	56.7	11.4
Hardness (mg/L)	6	11.3	26.3	17.5	18.6	6.4
Alkalinity (mg/L)	7	13.5	37.9	22.8M	24.4	9.1
Stream Flow (cfs)	2	9.6	40.0	24.8	24.8	---
Chemical						
Dissolved oxygen (mg/L)	8	7.3	10.2	8.0	8.4	1.1
pH (su)	8	7.0	8.19	7.3	7.4	0.5
Ammonia Nitrogen (mg/L)	7	< 0.015	0.021	0.008	0.012	0.005
Nitrate+Nitrite Nitrogen (mg/L)	7	0.022	0.168	0.094	0.099	0.051
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.728	0.232	0.262	0.220
Total nitrogen (mg/L)	7	0.169	0.839	0.296	0.361	0.225
Dissolved reactive phosphorus (mg/L)	7	< 0.004	0.017	0.005	0.007	0.006
J Total phosphorus (mg/L)	7	0.004	0.081	0.044	0.047	0.027
CBOD-5 (mg/L)	7	< 1.0	4.3	2.0	2.1	1.2
J Chlorides (mg/L)	7	3.8	5.5	4.4	4.6	0.6
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	0.00
Total Metals						
Aluminum (mg/L)	4	< 0.03	0.817	0.271	0.347	0.4
Iron (mg/L)	4	1.69	3.29	1.83M	2.16	0.8
Manganese (mg/L)	4	0.143	0.365	0.309M	0.282	0.1
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	0.354	0.008	0.094	0.2
Antimony (µg/L)	4	< 2	< 2	1	1	0.0
Arsenic (µg/L)	4	< 10	< 10	5	5	0.0
Cadmium (mg/L)	4	< 0.005	< 0.005	0.003	0.003	0.0
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	0.0
Copper (mg/L)	4	< 0.005	< 0.005	0.003	0.003	0.0
Iron (mg/L)	4	0.291	1.490	0.457M	0.674	0.6
Lead (µg/L)	4	< 2	< 2	1	1	0.0
Manganese (mg/L)	4	0.138	0.276	0.237M	0.222	0.1
J Mercury (µg/L)	4	< 0.3	0.3	0.2	0.2	0.1
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.0
Selenium (µg/L)	4	< 10	< 10	5	5	0.0
Silver (mg/L)	4	< 0.003	< 0.003	0.002	0.002	0.0
Thallium (µg/L)	4	< 1.0	< 1.0	0.5	0.5	0.0
Zinc (mg/L)	4	< 0.006	0.112	0.003	0.030	0.1
Biological						
J Chlorophyll a (µg/L)	7	0.53	8.90	1.07	2.49	3.00
J Fecal Coliform (col/100 mL)	7	20	1500	130	456	555

J = estimate; N = # samples; M = value > 90th percentile of all data collected within ecoregion 45b.

FOR MORE INFORMATION, CONTACT:
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