

2005 Monitoring Summary



Unnamed tributary to Loblackee Creek at the junction of Lee County Roads 188 and 80 (32.65546/-85.57525)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected an unnamed tributary to Loblackee Creek 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.

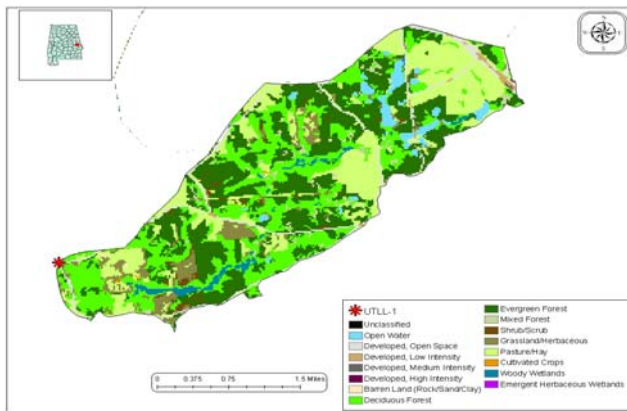


Figure 1. Sampling location and landuse within the unnamed tributary to Little Loblackee Creek watershed at UTLL-1.

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

Watershed Characteristics	
Drainage Area (mi ²)	8
Ecoregion ^a	45b
% Landuse	
Open water	3
Wetland	Woody 2
Forest	Deciduous 27
	Evergreen 31
	Mixed 2
Shrub/scrub	1
Grassland/herbaceous	6
Pasture/hay	23
Cultivated crops	<1
Development	Open space 4
	Low intensity 1
	Moderate intensity <1
Barren	<1
Population/km ^{2b}	10
# NPDES Permits ^c	TOTAL 26
401 Water Quality Certification	4
Construction Stormwater	20
Mining General Permit (old)	2

a. Southern Lower Piedmont

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, 9 June 2008

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. This unnamed tributary to Loblackee Creek is a first order stream located near Auburn, AL. It is designated as a *Fish and Wildlife (F&W)* stream. Landuse within the watershed is primarily forest (60%) and pasture. It is located in 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. This unnamed tributary to Loblackee Creek at UTLL-1 is a high gradient, bedrock bottomed stream in the Tallapoosa River watershed. Overall habitat quality was categorized as *optimal*.

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 in *fair* condition (Table 4) due to a lack of mayfly and caddisfly genera.

Table 2. Physical characteristics at UTLL-1, May 11, 2005.

Physical characteristics	
Width (ft)	22
Canopy cover	Est. 50/50
Depth (ft)	
	Riffle 1.0
	Run 2.0
	Pool 3.0
% of Reach	
	Riffle 40
	Run 30
	Pool 30
% Substrate	
	Bedrock 35
	Boulder 20
	Cobble 22
	Gravel 14
	Sand 3
	Silt 1
	Organic Matter 5

Table 3. Habitat assessment results at UTLL-1 conducted May 11, 2005.

Habitat Assessment (% Maximum Score)	Rating
Instream habitat quality	88 Optimal (> 70)
Sediment deposition	78 Optimal (> 70)
Sinuosity	85 Optimal (≥85)
Bank and vegetative stability	74 Sub-optimal (60-74)
Riparian buffer	66 Marginal (50-69)
Habitat assessment score	191
% Maximum score	80 Optimal (> 70)

Table 4. Macroinvertebrate bioassessment results at UTLL-1 conducted May 11, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores	Rating
Taxa richness measures		(0-100)	
# Ephemeroptera (mayfly) genera	7	58	Fair (47-70)
# Plecoptera (stonefly) genera	5	83	Excellent (>75)
# Trichoptera (caddisfly) genera	4	33	Poor (22-44)
Taxonomic composition measures			
% Non-insect taxa	9	66	Fair (49.4-74.1)
% Non-insect organisms	2	94	Fair (62.7-93.9)
% Plecoptera	7	35	Good (19.7-59.8)
Tolerance measures			
Beck's community tolerance index	12	43	Fair (40.7-60.7)
WMB-I Assessment Score	---	59	Fair (48-72)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. 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. One of seven fecal coliform counts, recorded during a high flow event, was >2,000 colonies/100 mL exceeding the water quality criteria for F&W use classification. Median concentrations of nitrate+nitrite-nitrogen, total Kjeldahl nitrogen, chlorides, total iron and total and dissolved manganese were above values expected in this ecoregion based on the 90th percentile of all least impaired reference reach data in ecoregion 45.

CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. However, overall habitat quality was categorized as *optimal*. Median nutrient (nitrate+nitrite-nitrogen, total Kjeldahl nitrogen and total nitrogen), metals (total iron and total and dissolved manganese) and chloride concentrations were above values expected in this ecoregion. The fecal coliform water quality criteria for F&W use classification was exceeded during one of seven sampling events recorded during a high flow event.

Table 5. Summary of water quality data collected March-October, 2005 at UTLL-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.

Parameter	N	Min	Max	Median	Avg	SD
Physical						
Temperature (°C)	8	9.8	24.0	18.4	18.1	5.3
Turbidity (NTU)	8	7.0	57.1	13.9	25.2	19.4
Total Dissolved Solids (mg/L)	7	33.0	61.0	44.0	46.0	10.2
Total Suspended Solids (mg/L)	7	5.0	39.0	10.0	15.9	12.5
Specific Conductance (µmhos)	8	40.3	51.5	46.4	45.8	3.7
Hardness (mg/L)	6	10.5	16.3	12.8	13.1	2.4
Alkalinity (mg/L)	7	9.1	22.8	13.2	14.3	5.3
Stream Flow (cfs)	4	5.4	16.6	10.0	10.5	---
Chemical						
Dissolved Oxygen (mg/L)	8	8.2	10.5	9.0	9.2	0.9
pH (su)	8	6.7	8.74	7.2	7.5	0.7
Ammonia Nitrogen (mg/L)	7	< 0.015	0.169	0.008	0.042	0.059
Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.003	0.250	0.175 ^M	0.143	0.082
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.907	0.329 ^M	0.404	0.315
Total Nitrogen (mg/L)	7	0.076	1.082	0.436	0.547	0.376
Dissolved Reactive Phosphorus (mg/L)	7	< 0.004	0.015	0.007	0.007	0.005
^J Total Phosphorus (mg/L)	7	0.004	0.092	0.047	0.053	0.031
CBOD-5 (mg/L)	7	< 1.0	4.8	2.0	2.1	1.6
^J Chlorides (mg/L)	7	4.4	6.2	5.3 ^M	5.3	0.7
Atrazine (µg/L)	2	< 0.05	0.08	0.05	0.05	---
Total Metals						
Aluminum (mg/L)	4	< 0.015	0.49	0.029	0.139	0.235
Iron (mg/L)	4	0.191	2.82	1.49 ^M	1.498	1.096
Manganese (mg/L)	4	0.129	0.274	0.177 ^M	0.189	0.061
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	0.02	0.008	0.011	0.006
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	0.000
Chromium (mg/L)	4	< 0.004	< 0.005	0.002	0.002	0.000
Copper (mg/L)	4	< 0.004	< 0.005	0.003	0.002	0.000
Iron (mg/L)	4	0.145	0.455	0.258	0.279	0.138
Lead (µg/L)	4	< 2	< 2	1	1	0.0
Manganese (mg/L)	4	0.085	0.189	0.133 ^M	0.135	0.043
^J Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.15	0.0
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	< 1	0.5	0.5	0.0
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.0
Biological						
^J Chlorophyll a (µg/L)	7	1.07	9.35	2.14	2.86	2.95
^J Fecal Coliform (col/100 mL)	7	60	> 2300 ^C	200	744	887

^J=estimate; N=# samples; M=value > 25th percentile of all data collected within ecoregion 45.

FOR MORE INFORMATION, CONTACT:
 Michael Len, ADEM Aquatic Assessment Unit
 1350 Coliseum Boulevard Montgomery, AL 36110
 (334) 260-2787 mlen@adem.state.al.us