

2005 Monitoring Summary



Little Emuckfaw Creek at Tallapoosa County (33.03963/-85.71341)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Little Emuckfaw 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.

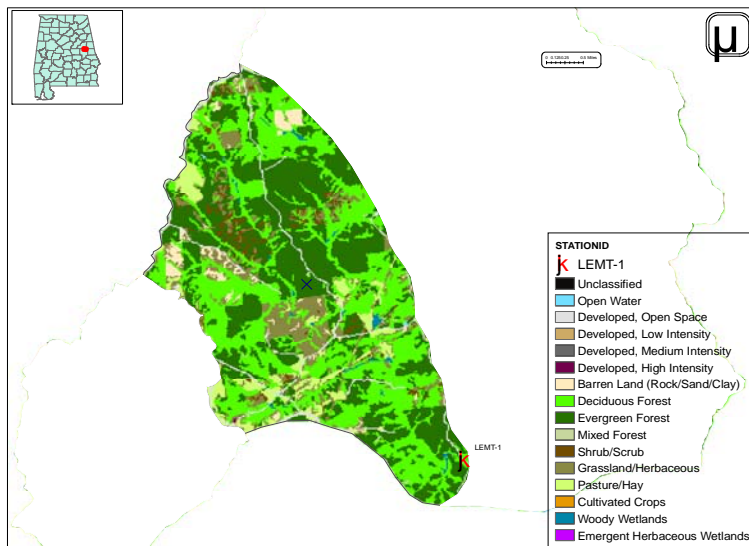


Figure 1. Sampling location and landuse within the Little Emuckfaw Creek watershed at LEMT-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Emuckfaw Creek is a small [Fish & Wildlife \(F&W\)](#) stream located near the city of Zana (Fig. 1). Landuse within the watershed is primarily forest (75%), with some grassland. According to ADEM's NPDES Management System database, no NPDES permits were issued within this watershed as of June 9, 2008.

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 Emuckfaw Creek at LEMT-1 is a low-gradient, gravel and sand-bottomed stream in the Tallapoosa River basin. The presence of forested areas are characteristic of streams in the Southern Inner Piedmont (Table 1). Overall habitat quality was categorized as *sub-optimal* due to sediment deposition and bank erosion.

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 *good* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi ²)		15
Ecoregion ^a		45a
% Landuse		
Open water		<1
Wetland	Woody	1
Forest	Deciduous	39
	Evergreen	36
	Mixed	<1
Shrub/scrub		2
Grassland/herbaceous		10
Pasture/hay		5
Development	Open space	3
	Low intensity	<1
	Moderate intensity	<1
	High intensity	<1
Barren		2
Population/km ^{2b}		7

a.Southern Inner Piedmont
b.2000 US Census Data

Table 2. Physical characteristics at LEMT-1, May 9, 2005.

Physical Characteristics		
Width (ft)		25
Canopy cover		Mostly Open
Depth (ft)	Riffle	0.3
	Run	1.0
	Pool	2.0
% of Reach	Riffle	10
	Run	80
	Pool	10
% Substrate	Boulder	1
	Cobble	20
	Gravel	30
	Sand	39
	Silt	5
	Organic Matter	5

Table 3. Results of the habitat assessment conducted May 9, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	75	Optimal (> 70)
Sediment deposition	39	Poor (<41)
Sinuosity	88	Optimal (≥85)
Bank and vegetative stability	49	Marginal (35-59)
Riparian buffer	93	Optimal (>90)
Habitat assessment score	166	
% Maximum score	69	Sub-optimal (59-70)

Table 4. Results of the macroinvertebrate bioassessment conducted May 9, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores	Rating
Taxa richness measures		(0-100)	
# Ephemeroptera (mayfly) genera	12	100	Excellent (>85)
# Plecoptera (stonefly) genera	6	100	Excellent (>75)
# Trichoptera (caddisfly) genera	7	58	Fair (45-66)
Taxonomic composition measures			
% Non-insect taxa	8	69	Fair (49.4-74.1)
% Non-insect organisms	1	96	Good (93.9-97.0)
% Plecoptera	6	32	Good (19.7-59.8)
Tolerance measures			
Beck's community tolerance index	26	93	Excellent (>80.4)
WMB-I Assessment Score	---	78	Good (72-86)

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. Median concentrations of metals (total and dissolved) and nutrients were well within the expected values for streams in the Southern Inner Piedmont based on the 90th percentile of data from reference reaches in this ecoregion. The fecal coliform counts were within the guidelines expected in this ecoregion.

CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *good* condition. However, overall habitat quality was categorized as *sub-optimal* due to sedimentation and unstable banks.

FOR MORE INFORMATION, CONTACT:

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Table 5. 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)	8	14.0	28.0	21.0	20.6	4.5
Turbidity (NTU)	8	2.9	6.0	4.6	4.5	1.1
Total dissolved solids (mg/L)	7	15.0	51.0	32.0	31.7	13.5
Total suspended solids (mg/L)	7	3.0	12.0	6.5	6.8	3.1
Specific conductance (µmhos)	7	15.5	29.5	27.8	26.3	4.9
Hardness (mg/L)	4	6.8	8.5	6.8	6.9	0.2
Alkalinity (mg/L)	7	7.1	24.3	8.1	10.7	6.7
Stream Flow (cfs)	8	11.8	38.5	23.9	24.4	---
Chemical						
Dissolved oxygen (mg/L)	8	7.7	10.2	9.5	9.2	0.9
pH (su)	8	7.0	7.42	7.1	7.1	0.2
Ammonia nitrogen (mg/L)	7	< 0.015	< 0.015	0.008	0.010	0.004
Nitrate+nitrite nitrogen (mg/L)	7	0.063	0.108	0.089	0.087	0.015
Total Kjeldahl nitrogen (mg/L)	7	< 0.150	0.227	0.113	0.130	0.065
Total nitrogen (mg/L)	7	0.006	0.274	0.150	0.166	0.065
Dissolved reactive phosphorus (mg/L)	7	< 0.004	0.008	0.005	0.005	0.002
Total phosphorus (mg/L)	7	0.010	0.083	0.035	0.040	0.026
CBOD-5 (mg/L)	7	1.0	3.9	1.4	1.3	0.8
Chlorides (mg/L)	7	3.9	19.4	4.1	6.8	6.2
Atrazine (µg/L)	2	< 0.05	0.06	0.03	0.03	0.0
Total Metals						
Aluminum (mg/L)	4	0.015	0.125	0.052	0.062	0.059
Iron (mg/L)	4	0.298	0.423	0.356	0.375	0.042
Manganese (mg/L)	4	0.005	0.005	0.002	0.002	0.000
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	0.127	0.0075	0.047	0.069
Antimony (µg/L)	4	< 2	< 2	1	1	0
Arsenic (µg/L)	4	< 10	< 10	5	5	0
Cadmium (mg/L)	4	< 0.005	< 0.005	0.002	0.002	0.000
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	0.000
Copper (mg/L)	4	< 0.005	< 0.005	0.002	0.002	0.000
Iron (mg/L)	4	< 0.005	0.115	0.103	0.074	0.062
Lead (µg/L)	4	< 2	< 2	1	1	0
Manganese (mg/L)	4	< 0.005	< 0.005	0.002	0.002	0.000
Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.15	0.00
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Selenium (µg/L)	4	< 10	< 10	5	5	0
Silver (mg/L)	4	< 0.003	< 0.003	0.002	0.002	0.000
Thallium (µg/L)	4	< 1	< 1	0.5	0.5	0.0
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Biological						
† Chlorophyll a (mg/L)	7	0.53	16.02	2.14	4.18	5.88
† Fecal Coliform (col/100 mL)	7	7	240	90	97	66

E=estimate; N=# samples; M=value > 90% percentile of all data collected within ecoregion 45a.