

2005 Monitoring Summary



Pinchoulee Creek at Coosa County Road 27 (32.78768326/-86.35787672)

BACKGROUND

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

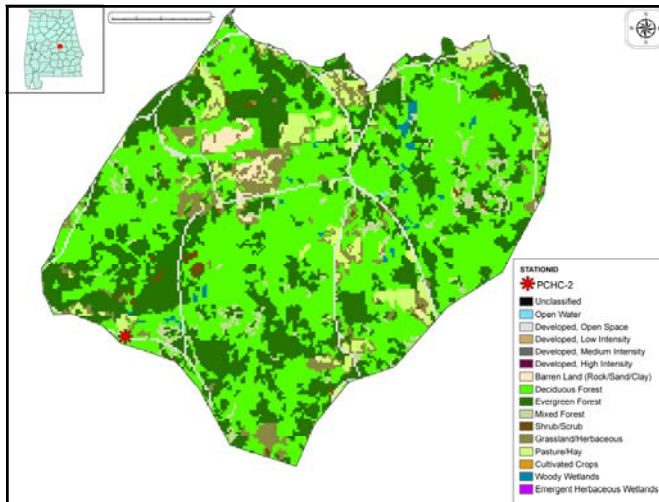


Figure 1. Sampling location and land use within the Pinchoulee Creek watershed at PCHC-2.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Pinchoulee Creek at PCHC-2 is a small *Fish and Wildlife (F&W)* stream on the border of Coosa, Elmore and Chilton counties (Fig. 1). It is within the Southern Inner Piedmont (45a) ecoregion, just southwest of Rockford, AL. Streams in ecoregion 45a are generally low to medium gradient with mostly cobble, gravel and sandy substrates. Landuse in the watershed is primarily forest (83%), interspersed with small patches of residential areas and barren lands. As of June 9, 2008, the watershed has no permitted NPDES discharges.

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. Pinchoulee Creek at PCHC-2 is a low-gradient, glide-pool stream with a bottom substrate dominated by sand (85%). 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 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 all individual metric scores. The final score indicated the biological community to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics	
Drainage Area (mi ²)	9
Ecoregion ^a	45a
% Landuse	
Open water	<1
Wetland	Woody 1
Forest	Deciduous 51
	Evergreen 29
	Mixed 3
Shrub/scrub	1
Grassland/herbaceous	6
Pasture/hay	5
Development	Open space 3
Barren	1
Population/km ^{2b}	12

a. Southern Inner Piedmont

b. U.S. 2000 Census Report

Table 2. Physical characteristics at PCHC-2.

Physical Characteristics	
Width (ft)	25
Canopy cover	Open
Depth (ft)	
Run	0.5
Pool	2.5
% of Reach	
Run	80
Pool	20
% Substrate	
Boulder	2
Cobble	1
Gravel	4
Sand	85
Silt	5
Clay	1
Organic Matter	2

Table 3. Results of the habitat assessment conducted on Pinchoulee Creek at PCHC-2, June 23, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	41	Poor (<41)
Sediment deposition	51	Marginal (41-58)
Sinuosity	38	Poor (<45)
Bank and vegetative stability	69	Sub-optimal (60-74)
Riparian buffer	36	Poor (<50)
Habitat assessment score	104	
% Maximum score	47	Marginal (41-58)

Table 4. Results of the macroinvertebrate bioassessment of Pinchoulee Creek at PCHC-2 conducted on June 23, 2005.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures			
# EPT genera	21	84	Excellent (>78)
Taxonomic composition measures			
% Non-insect taxa	4	100	Excellent (>78)
% Plecoptera	2	5	Very Poor (<19)
% Dominant taxa	30	49	Fair (37-56)
Functional composition measures			
% Predators	8	4	Very Poor (<19)
Tolerance measures			
Beck's community tolerance index	10	45	Fair (37-56)
% Nutrient tolerant organisms	17	88	Excellent (>78)
WMB-I Assessment Score	---	54	Fair (37-56)

WATER CHEMISTRY

Results of water chemistry 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. *In situ* parameters suggested that Pinchoulee Creek at PCHC-2 was meeting water quality criteria for its *F* & *W* use classification. Median concentrations of nutrients, total and dissolved solids, and chlorides were within the expected ranges for Southern Inner Piedmont streams based on the 90% of verified ecoregional reference reach samples.

CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality was categorized as *marginal* due to sedimentation, bank erosion, and a lack of stable in-stream habitat.

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)	7	11.0	25.0	20.0	19.4	5.4
Turbidity (NTU)	7	8.8	33.0	13.6	14.9	8.4
Total dissolved solids (mg/L)	7	9.0	89.0	47.0	45.4	28.5
Total suspended solids (mg/L)	7	3.0	30.0	9.0	11.0	8.9
Specific conductance (µmhos)	7	33.9	42.7	39.5	38.8	2.8
Hardness (mg/L)	5	6.2	8.9	7.2	7.5	1.3
Alkalinity (mg/L)	7	7.5	20.9	13.8	13.9	4.0
Stream Flow (cfs)	6	5.5	39.6	14.3	16.6	0.0
Chemical						
Dissolved oxygen (mg/L)	7	8.0	10.1	8.9	9.0	0.9
pH (su)	7	6.7	7.7	7.0	7.1	0.3
Ammonia Nitrogen (mg/L)	7	< 0.015	0.082	0.008	0.020	0.028
Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.003	0.048	0.021	0.019	0.018
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.222	0.075	0.122	0.062
Total nitrogen (mg/L)	7	0.076	0.243	0.180	0.184	0.032
Dissolved reactive phosphorus (mg/L)	7	0.006	0.014	0.008	0.009	0.003
Total phosphorus (mg/L)	7	< 0.004	0.065	0.044	0.042	0.020
CBOD-5 (mg/L)	7	< 1.0	2.8	1.5	1.5	0.9
^J Chlorides (mg/L)	6	4.0	4.64	4.4	4.4	0.3
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	0.0
Total Metals						
Aluminum (mg/L)	4	0.015	0.611	0.168	0.238	0.3
Iron (mg/L)	4	0.479	0.977	0.945	0.837	0.2
Manganese (mg/L)	4	< 0.005	0.031	0.001	0.013	0.0
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	0.052	0.008	0.019	0.0
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	0.0025	0.003	0.0
Iron (mg/L)	4	0.099	0.256	0.164	0.171	0.1
Lead (µg/L)	4	< 2	< 2	1	1	0.0
Manganese (mg/L)	4	< 0.005	0.018	0.003	0.006	0.0
^J Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.188	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	< 1	0.5	0.500	0.0
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.0
Biological						
^J Chlorophyll a (µg/L)	6	0.27	5.87	1.07	1.74	2.1
^J Fecal Coliform (col/100 mL)	7	63	340	130	146	92

J = estimate; N=# samples;

FOR MORE INFORMATION, CONTACT:
 Aaron L. Goar, ADEM Aquatic Assessment Unit
 1350 Coliseum Boulevard Montgomery, AL 36110
 (334) 260-2755 agoar@adem.state.al.us