

2005 Monitoring Summary



Cornhouse Creek at Randolph County Road 33 (33.21195/-85.51806)

BACKGROUND

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

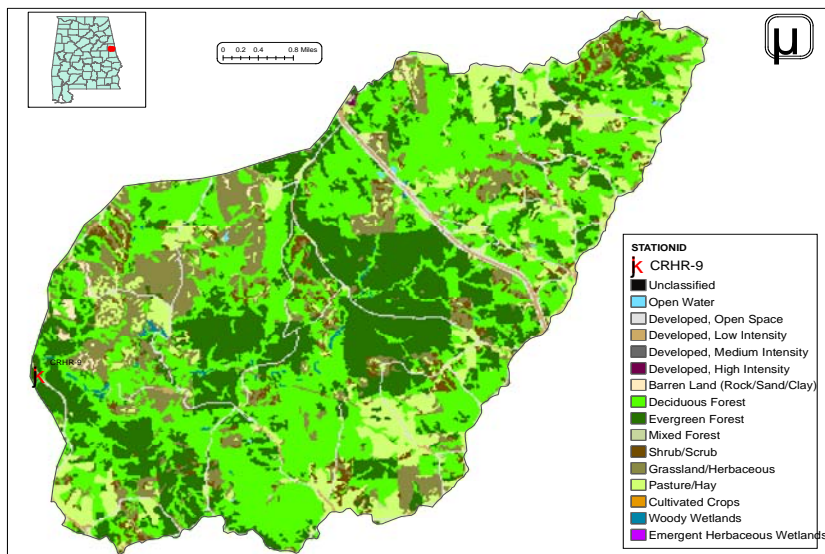


Figure 1. Sampling location and land use within the Cornhouse Creek watershed at CRHR-9.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Cornhouse Creek at CRHR-9 is a [Fish & Wildlife \(F&W\)](#) stream located in the Southern Inner Piedmont Ecoregion of the Tallapoosa River basin. Land cover within the watershed is approximately 66% forested and 25% grassland and pasture (Fig. 1). As of June 9, 2008, ADEM's NPDES Management System database did not show any permitted discharges located within the watershed.

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. Cornhouse Creek at CRHR-9 is a medium-gradient, riffle-run stream characterized by cobble, gravel, and sand substrates. Overall habitat quality was categorized as *optimal*. However, there were indications of unstable banks 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 all individual metric scores. The final score indicated the biological community to be in *good* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi ²)		30
Ecoregion ^a		45a
% Landuse		
Open water		<1
Wetland	Woody	<1
	Emergent herbaceous	
Forest	Deciduous	41
	Evergreen	25
	Mixed	<1
Shrub/scrub		4
Grassland/herbaceous		13
Pasture/hay		12
Development	Open space	3
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Barren		<1
Population/km ^{2b}		11

a.Southern Inner Piedmont
b.2000 US Census Data

Table 2. Physical characteristics at CRHR-9, May 10, 2005.

Physical Characteristics		
Width (ft)		35
Canopy cover		Mostly Shaded
Depth (ft)	Riffle	0.75
	Run	1.5
	Pool	2.0
% of Reach	Riffle	45
	Run	25
	Pool	30
% Substrate	Boulder	5
	Cobble	20
	Gravel	30
	Sand	33
	Silt	7
	Organic Matter	5

Table 3. Results of habitat assessment conducted at CRHR-9, May 10, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	85	Optimal (> 70)
Sediment deposition	63	Sub-optimal (59-70)
Sinuosity	90	Optimal (≥85)
Bank and vegetative stability	43	Marginal (35-59)
Riparian buffer	88	Sub-optimal (70-90)
Habitat assessment score	180	
% Maximum score	75	Optimal (> 70)

Table 4. Results of macroinvertebrate assessment conducted at CRHR-9, May 10, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores	Rating
		(0-100)	
Taxa richness measures			
# Ephemeroptera (mayfly) genera	15	100	Excellent (>85)
# Plecoptera (stonefly) genera	6	100	Excellent (>75)
# Trichoptera (caddisfly) genera	6	50	Fair (45-66)
Taxonomic composition measures			
% Non-insect taxa	5	78	Good (74.1-87.1)
% Non-insect organisms	0	99	Excellent (>97)
% Plecoptera	4	19	Fair (13.1-19.7)
Tolerance measures			
Beck's community tolerance index	28	100	Excellent (>80.4)
WMB-I Assessment Score	---	78	Good (72-86)

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 Cornhouse Creek at CRHR-9 to be meeting water quality criteria for its *F&W* water use classification. Median concentrations of other parameters were similar to background levels in ecoregion 45a as based on the 90th percentile of least impaired reference reach data collected in this ecoregion.

CONCLUSIONS

Bioassessment results showed the macroinvertebrate community to be in *good* condition. However, bank erosion was a concern within the reach.

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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	13.0	25.0	21.3	19.8	4.4
Turbidity (NTU)	8	4.0	27.8	5.8	11.5	10.1
Total dissolved solids (mg/L)	6	14.0	55.0	43.0	39.2	15.8
Total suspended solids (mg/L)	6	6.0	15.0	9.5	9.7	3.6
Specific conductance (µmhos)	8	31.3	44.7	36.7	37.8	5.2
Hardness (mg/L)	4	9.7	17.2	11.3	12.4	3.4
Alkalinity (mg/L)	6	10.3	25.6	13.1	15.1	5.8
Stream Flow (cfs)	7	8.3	48.7	46.4	36.6	---
Chemical						
Dissolved oxygen (mg/L)	8	7.7	10.65	9.2	9.2	1.0
pH (su)	8	6.1	8.07	7.2	7.2	0.6
Ammonia Nitrogen (mg/L)	6	< 0.015	< 0.015	0.008	0.009	0.003
Nitrate+Nitrite Nitrogen (mg/L)	6	< 0.003	0.152	0.092	0.089	0.057
Total Kjeldahl Nitrogen (mg/L)	6	< 0.150	0.378	0.075	0.154	0.129
Total nitrogen (mg/L)	6	0.076	0.450	0.126	0.192	0.139
Dissolved reactive phosphorus (mg/L)	6	< 0.004	0.077	0.006	0.017	0.030
Total phosphorus (mg/L)	6	0.017	0.110	0.050	0.057	0.039
CBOD-5 (mg/L)	6	< 1.0	4.5	1.5	2.0	1.6
COD (mg/L)	3	< 2.0	< 2.0	1.0	1.0	0.0
^J Chlorides (mg/L)	6	4.1	2.0	4.7	9.2	11.1
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	0.00
Total Metals						
Aluminum (mg/L)	4	< 0.015	0.222	0.046	0.080	0.098
Iron (mg/L)	4	0.505	1.780	0.600	0.871	0.613
Manganese (mg/L)	4	< 0.005	0.031	0.002	0.010	0.014
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	0.14	0.008	0.041	0.066
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	0.063	0.292	0.131	0.154	0.105
Lead (µg/L)	4	< 2	< 2	1	1	0
Manganese (mg/L)	4	< 0.005	0.019	0.002	0.007	0.008
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						
^J Chlorophyll a (mg/L)	6	0.53	12.28	1.60	3.11	4.51
^J Fecal Coliform (col/100 mL)	6	14	660	90	165	245

^J=estimate; N=# samples; M=value > 90% of all verified ecoregional reference reach data collected in sub ecoregional/ ecoregional 45a.