

2005 Monitoring Summary



Cheaha Creek near Clay/Talladega County line (33.45275/-85.90273)

BACKGROUND

Cheaha Creek is among the least-disturbed watersheds in the ACT basin group based on landuse, road density, and population density. It has been monitored as a “best attainable” condition reference watershed by the Alabama Department of Environmental Management (ADEM) since 2000 for comparison with other streams in the Talladega Upland (45d) ecoregion.

Additionally, the ADEM selected the Cheaha 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.

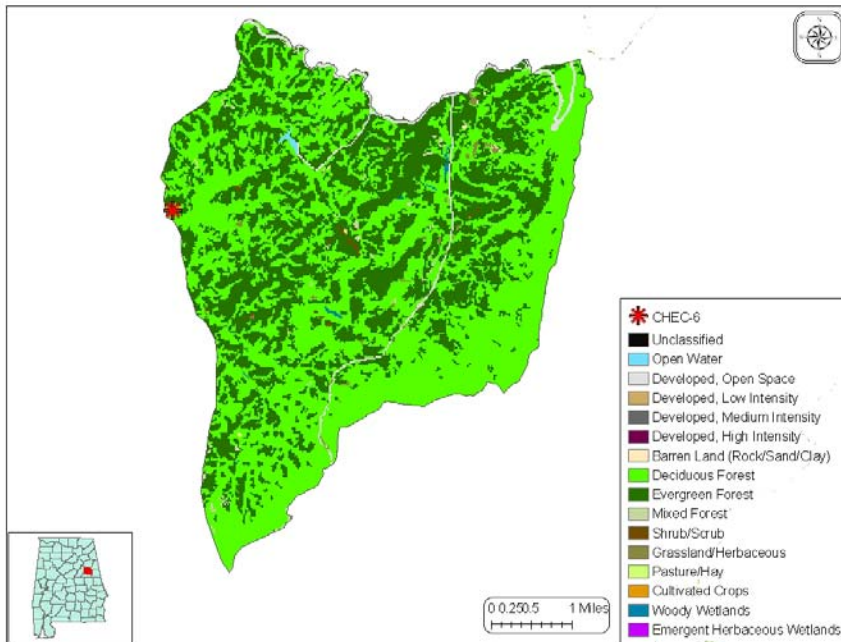


Figure 1. Sampling location and landuse within the Cheaha Creek watershed at CHEC-6.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Cheaha Creek is a tributary of the Coosa River in ecoregion 45d. This ecoregion is characterized by moderate to high gradient streams with bedrock, boulder, cobble, gravel, and sand substrate (*Griffith et al. 2001*). Located within the Talladega National Forest, ninety-seven percent of landuse within the watershed is forest (Fig. 1). As of June 9, 2008, ADEM’s NPDES Management System database did not show any permitted discharges located within the

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi ²)		21
Ecoregion ^a		45d
% Landuse		
Open water		<1
Wetland	Woody	<1
Forest	Deciduous	58
	Evergreen	39
	Mixed	<1
Shrub/scrub		<1
Grassland/herbaceous		<1
Pasture/hay		<1
Development	Open space	2
Barren		<1
Population/km ² ^b		10

a. Talladega Upland

b. 2000 U.S. Census Data

Table 2. Physical characteristics at CHEC-6, June 28, 2005.

Physical Characteristics		
Width (ft)		30
Canopy cover		Est. 50/50
Depth (ft)	Riffle	0.6
	Run	1.2
	Pool	3.0
% of Reach	Riffle	85
	Run	10
	Pool	5
% Substrate	Bedrock	10
	Boulder	40
	Cobble	20
	Gravel	18
	Sand	5
	Silt	5
	Organic Matter	2

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. Typical of ecoregion 45d, Cheaha Creek at CHEC-6 is a high-gradient stream with mixed stable substrate in the Coosa River drainage located within ecoregion 45d. There is a low head dam present below the reach. 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 *good* condition (Table 4).

Table 3. Results of the habitat assessment conducted on Cheaha Creek at CHEC-6, June 28, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	92	Optimal (> 70)
Sediment deposition	85	Optimal (> 70)
Sinuosity	90	Optimal (≥85)
Bank and vegetative stability	84	Optimal (≥75)
Riparian buffer	93	Optimal (>90)
Habitat assessment score	211	
% Maximum score	88	Optimal (> 70)

Table 4. Results of the macroinvertebrate bioassessment conducted on Cheaha Creek at CHEC-6, June 28, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores	Rating
Taxa richness measures		(0-100)	
# Ephemeroptera (mayfly) genera	8	67	Fair (48-72)
# Plecoptera (stonefly) genera	4	67	Fair (48-72)
# Trichoptera (caddisfly) genera	14	100	Excellent (>86)
Taxonomic composition measures			
% Non-insect taxa	8	67	Fair (48-72)
% Non-insect organisms	2	95	Excellent (>86)
% Plecoptera	5	24	Poor (24-48)
Tolerance measures			
Beck's community tolerance index	28	100	Excellent (>86)
WMB-I Assessment Score	---	74	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. *In situ* parameters, which were measured during each site visit, suggested that Cheaha Creek at CHEC-6 was meeting its *Fish & Wildlife* water use classification. Median concentrations of all parameters were within ranges characteristic of the Talladega Upland ecoregion.

CONCLUSIONS

Physical characteristics of Cheaha Creek at CHEC-6 were typical of other streams in the Talladega Upland ecoregion and provided *optimal* habitat quality. Bioassessment results indicated the macroinvertebrate community to be in *good* condition. All parameters sampled were within expected results in this ecoregion.

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. 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	11.0	28.0	21.0	20.2	6.2
Turbidity (NTU)	8	1.0	6.5	2.7	3.0	1.7
Total Dissolved Solids (mg/L)	7	8.0	59.0	34.0	33.2	19.7
Total Suspended Solids (mg/L)	7	4.0	67.0	8.0	17.0	24.6
Specific Conductance (µmhos)	8	23.2	29.8	26.7	26.6	2.3
Hardness (mg/L)	5	4.3	9.2	6.4	6.4	1.8
Alkalinity (mg/L)	7	5.2	11.1	6.5	6.5	1.4
Stream Flow (cfs)	7	12.4	55.3	29.3	31.0	---
Chemical						
Dissolved Oxygen (mg/L)	8	7.9	10.5	9.0	9.1	1.1
pH (su)	8	6.5	7.39	7.0	7.0	0.3
Ammonia Nitrogen (mg/L)	7	< 0.015	0.036	0.008	0.012	0.011
^J Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.003	< 0.015	0.006	0.006	0.004
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.215	0.075	0.126	0.066
Total Nitrogen (mg/L)	7	0.076	0.217	0.090	0.133	0.064
Dissolved Reactive Phosphorus (mg/L)	7	< 0.004	0.014	0.005	0.006	0.005
Total Phosphorus (mg/L)	7	< 0.004	0.047	0.029	0.027	0.017
CBOD-5 (mg/L)	7	< 1.0	2.5	1.6	1.6	0.7
COD (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0
^J Chlorides (mg/L)	6	3.7	4.1	3.8	3.8	0.2
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	---
Total Metals						
Aluminum (mg/L)	4	< 0.015	0.097	0.016	0.040	0.049
Iron (mg/L)	4	0.088	0.321	0.229	0.213	0.117
Manganese (mg/L)	4	< 0.005	0.057	0.006	0.022	0.031
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	< 0.015	0.008	0.008	0.000
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	< 0.004	0.002	0.002	0.000
Copper (mg/L)	4	< 0.005	< 0.005	0.003	0.003	0.000
Iron (mg/L)	4	0.022	0.146	0.047	0.054	0.037
Lead (µg/L)	4	< 2	< 2	1	1	0.0
Manganese (mg/L)	4	< 0.005	< 0.005	0.003	0.003	0.000
Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.15	0.000
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Selenium (µg/L)	4	< 10	< 10	5	5	0.0
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 (µg/L)	7	0.27	2.14	0.94	1.11	0.64
^J Fecal Coliform (col/100 mL)	7	4	160	12	35	61

^J=Reported value is an estimate; N=# samples;

FOR MORE INFORMATION, CONTACT:
 Dusty Miller, ADEM Aquatic Assessment Unit
 1350 Coliseum Boulevard Montgomery, AL 36110
 (334) 260-2712 jmiller@adem.state.al.us