

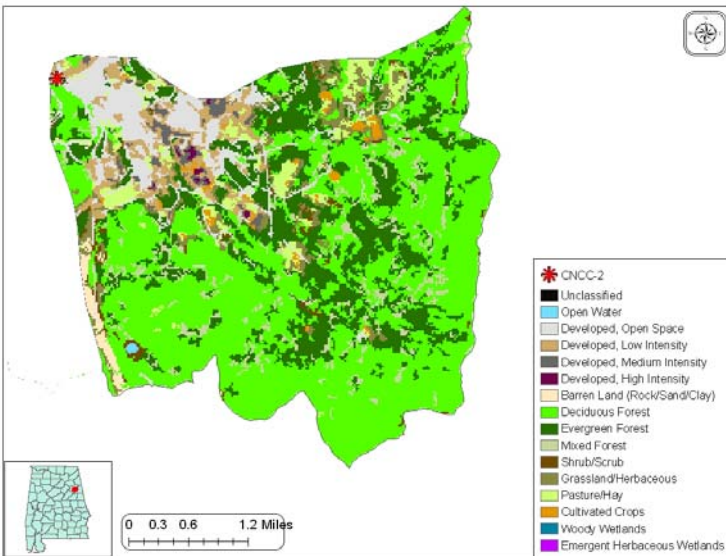
# 2005 monitoring Summary



## Cane Creek at U.S. Hwy 21 in Calhoun County (33.72671/-85.80883)

### BACKGROUND

The Alabama Department of Environmental (ADEM) selected the Cane 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 Cane Creek watershed at CNCC-2.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Cane Creek is a small *Fish and Wildlife (F&W)* stream located near the city of Anniston (Fig. 1). Landuse within the watershed is primarily forest, with some agricultural and development (13%) concentrated in the area upstream of the reach. The stream also flows through a golf course just above the reach.

### 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. Cane Creek at CNCC-2 is a moderate-gradient, bedrock-bottomed stream. Overall habitat quality was categorized as *optimal* due to bank stability and adequate instream 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 the score for each metric. Metric results indicated the macroinvertebrate community to be *poor* condition (Table 4).

**Table 1.** Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi <sup>2</sup> )		14
Ecoregion <sup>a</sup>		67f
% Landuse		
Open water		<1
Forest	Deciduous	50
	Evergreen	20
	Mixed	5
Shrub/scrub		1
Grassland/herbaceous		4
Pasture/hay		4
Cultivated crops		1
Development	Open space	8
	Low intensity	4
	Moderate intensity	1
	High intensity	<1
Barren		1
Population/km <sup>2b</sup>		2
# NPDES Permits <sup>c</sup>	<b>TOTAL</b>	10
	Construction Stormwater	4
	Mining General Permit (old)	4
	Municipal Individual	2

a. Southern Limestone/Dolomite Valleys and Low Rolling Hills

b. 2000 US Census

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

**Table 2.** Physical characteristics at CNCC-2, May 3, 2005.

Physical Characteristics		
Width (ft)		40
Canopy cover		Mostly Open
Depth (ft)		
	Riffle	0.5
	Run	1.2
	Pool	3.0
% of Reach		
	Riffle	20
	Run	60
	Pool	20
% Substrate		
	Bedrock	60
	Boulder	10
	Cobble	10
	Gravel	10
	Sand	5
	Silt	2
	Organic Matter	3

**Table 3.** Results of the habitat assessment conducted at CNCC-2, May 3,

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	82	Optimal (> 70)
Sediment deposition	85	Optimal (> 70)
Sinuosity	90	Optimal (≥85)
Bank and vegetative stability	88	Optimal (≥75)
Riparian buffer	61	Marginal (50-69)
Habitat assessment score	190	
<b>% Maximum score</b>	<b>79</b>	<b>Optimal (&gt; 70)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted at CNCC-2, May 3, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores	Rating
		(0-100)	
<b>Taxa richness measures</b>			
# Ephemeroptera (mayfly) genera	7	58	Fair (48-72)
# Plecoptera (stonefly) genera	1	17	Very Poor (<24)
# Trichoptera (caddisfly) genera	8	67	Fair (48-72)
<b>Taxonomic composition measures</b>			
% Non-insect taxa	10	61	Fair (48-72)
% Non-insect organisms	7	82	Good (72-86)
% Plecoptera	1	4	Very Poor (<24)
<b>Tolerance measures</b>			
Beck's community tolerance index	11	39	Poor (24-48)
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>47</b>	<b>Poor (24-48)</b>

## 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 values of all parameters were within values expected in this ecoregion.

## CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *poor* condition. Overall habitat quality was categorized as *optimal* due to bank stability and adequate instream habitat. Median values of all parameters were within values expected in this ecoregion.

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**Table 5.** Summary of water quality data collected at CNCC-2 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
<b>Physical</b>						
Temperature (°C)	8	9.4	27.0	18.5	18.3	5.8
Turbidity (NTU)	8	0.7	10.4	3.7	4.9	3.9
Total Dissolved Solids (mg/L)	7	52.0	148.0	72.0	93.4	42.0
Total Suspended Solids (mg/L)	7	2.0	17.0	5.0	6.4	4.9
Specific Conductance (µmhos)	8	77.0	189.3	134.8	130.8	35.8
Hardness (mg/L)	5	38.8	107.0	72.3	70.1	26.4
Alkalinity (mg/L)	7	30.4	94.9	58.8	60.4	23.3
Stream Flow (cfs)	6	6.4	61	34.2	35.3	---
<b>Chemical</b>						
Dissolved Oxygen (mg/L)	8	7.9	10.85	9.8	9.5	1.1
pH (su)	8	7.3	8.31	7.8	7.8	0.3
Ammonia Nitrogen (mg/L)	7	< 0.015	< 0.015	0.008	0.008	0.000
Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.003	0.063	0.035	0.032	0.019
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	< 0.150	0.075	0.075	0.000
Total Nitrogen (mg/L)	7	< 0.076	0.138	0.110	0.107	0.019
Dissolved Reactive Phosphorus (mg/L)	7	< 0.004	0.009	0.002	0.004	0.003
Total Phosphorus (mg/L)	7	< 0.004	0.043	0.034	0.028	0.015
CBOD-5 (mg/L)	7	< 1.0	2.6	1.8	1.6	0.7
Chlorides (mg/L)	7	3.6	4.4	3.8	3.9	0.3
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	---
<b>Total Metals</b>						
Aluminum (mg/L)	4	< 0.015	0.163	0.044	0.064	0.068
Iron (mg/L)	4	0.093	0.189	0.1285	0.135	0.041
Manganese (mg/L)	4	< 0.005	0.063	0.004	0.019	0.030
<b>Dissolved Metals</b>						
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	< 0.005	0.029	0.01475	0.015	0.015
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
<b>Biological</b>						
Chlorophyll a (µg/L)	7	0.27	2.67	1.60	1.35	0.98
Fecal Coliform (col/100 mL)	7	21	200	80	91	74

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