

2008 Monitoring Summary



Middle Fork Cowikee Creek at Reeves Road (Russell County) (32.17127/-85.37829)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Middle Fork Cowikee Creek watershed for biological and water quality monitoring as part of the [2008 Assessment of the Southeastern Alabama \(SE AL\) River Basins](#). The objectives of these monitoring activities were to assess the biological integrity of each monitoring location and to estimate overall water quality within the SE AL basins. A habitat and macroinvertebrate assessment was conducted on Middle Fork Cowikee Creek at MFCR-1 on June 5, 2008.

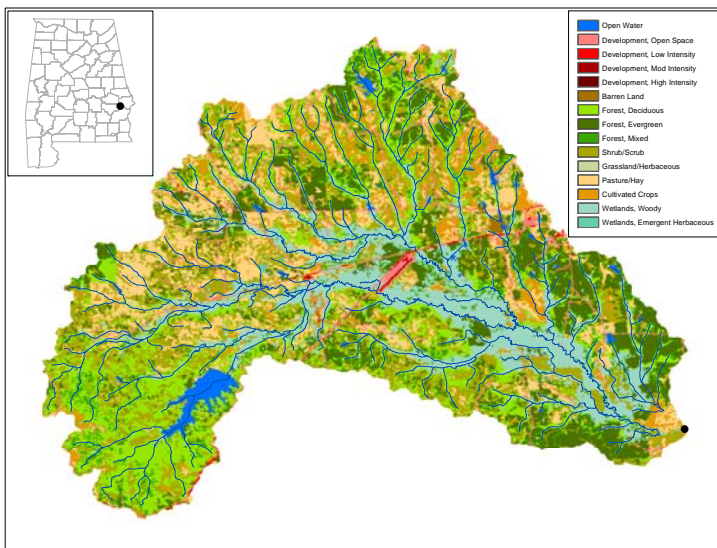


Figure 1. Watershed Characteristics in the Middle Fork Cowikee Creek at MFCR-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Middle Fork Cowikee Creek is a *Swimming/Fish and Wildlife (S/F&W)* stream located in the Chattahoochee River basin. Based on the 2000 National Land Cover Dataset, landuse within the watershed is primarily forest (38%) with some shrub/scrub and pasture/hay. As of February 23, 2011, ADEM's NPDES management system shows a total of six permitted discharges in this watershed.

REACH CHARACTERISTICS

[General observations](#) (Table 2) and a [habitat assessment](#) (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. Middle Fork Cowikee Creek at MFCR-1 is a low-gradient stream characterized primarily by a sand bottom substrate (Figure 1). Overall habitat quality was categorized as *marginal* due to poor instream habitat as well as the presence of eroding banks.

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 the average of all individual metric scores. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Chattahoochee River
Basin		Chattahoochee River
Drainage Area (mi²)		70
Ecoregion^a		65b
% Landuse		
Open water		<1
Wetland	Woody	15
	Emergent herbaceous	<1
Forest	Deciduous	18
	Evergreen	14
	Mixed	6
Shrub/scrub		22
Grassland/herbaceous		<1
Pasture/hay		13
Cultivated crops		5
Development	Open space	3
	Low intensity	<1
	Moderate intensity	<1
Barren		<1
Population/km^{2b}		39
# NPDES Permits^c	TOTAL	6
	Construction Stormwater	3
	Mining	2
	Industrial General	1

a.Flatwoods/Blackland Prairie Margins

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, 23 Feb 2011

Table 2. Physical characteristics of Middle Fork Cowikee Creek at MFCR-1, June 5, 2008.

Physical Characteristics	
Width (ft)	25
Canopy Cover	Estimate 50/50
Depth (ft)	
	Run 1.0
	Pool 3.5
% of Reach	
	Run 20
	Pool 80
% Substrate	
	Sand 90
	Silt 7
	Organic Matter 3

Table 3. Results of the habitat assessment conducted on Middle Fork Cowikee Creek at MFCR-1, June 5, 2008.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	37	Poor <40
Sediment Deposition	68	Optimal >65
Sinuosity	53	Marginal (45-64)
Bank and Vegetative Stability	30	Poor <35
Riparian Buffer	75	Sub-optimal (70-89)
Habitat Assessment Score	110	
% Maximum Score	50	Marginal (40-52)

Table 4. Results of macroinvertebrate bioassessment conducted in Middle Fork Cowikee Creek at MFCR-1, June 5, 2008.

Macroinvertebrate Assessment			
	Results	Scores	Rating
		(0-100)	
Taxa richness measures			
# EPT genera	13	52	Fair (38-56)
Taxonomic composition measures			
% Non-insect taxa	10	77	Fair (61.9-92.7)
% Plecoptera	0	1	Very Poor (<1.86)
% Dominant taxa	25	64	Fair (47.1-70.5)
Functional composition measures			
% Predators	12	43	Fair (30.2-45.2)
Tolerance measures			
Beck's community tolerance index	8	36	Good (31.9-65.9)
% Nutrient tolerant organisms	12	96	Excellent (>88.1)
WMB-I Assessment Score	--	53	Fair (38-56)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. [In situ measurements](#) and [water samples](#) were scheduled to be collected during April through November of 2008 to help identify any stressors to the biological communities; however due to low flow conditions it was sampled during months June and October. During two of three site visits, dissolved oxygen concentrations were below the F&W use classification criteria of at least 5.0 mg/L, but it may have been caused by low flow conditions (0.3 cfs). Additionally, median concentrations of total and dissolved manganese and dissolved iron were greater than the 90th percentile of all reference reach data collected in the Flatwoods/Blackland Prairie Margins ecoregion (65b).

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Middle Fork Cowikee Creek at MFCR-1 to be in *fair* condition. Monitoring should continue to ensure that conditions remain stable.

Table 5. Summary of water quality data collected April-November, 2008. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median (Med), 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	Med	Avg	SD	E
Physical							
Temperature (°C)	3	14.2	27.1	25.0	22.1	6.9	
Turbidity (NTU)	3	17.1	18.8	17.9	17.9	0.8	
Total Dissolved Solids (mg/L)	2	12.0	80.0	46.0	46.0	48.1	
Total Suspended Solids (mg/L)	2	< 1.0	1.0	0.5	0.5	0.0	
Specific Conductance (µmhos)	3	73.9	102.8	99.5	92.1	15.8	
Hardness (mg/L)	2	28.8	34.6	31.7	31.7	4.1	
Alkalinity (mg/L)	2	21.0	35.1	28.0	28.0	10.0	
Stream Flow (cfs)	1				0.3		
Chemical							
Dissolved Oxygen (mg/L)	3	2.8 ^C	7.6	3.2	4.5	2.7	2
pH (su)	3	6.5	6.7	6.6	6.6	0.1	
Ammonia Nitrogen (mg/L)	2	< 0.015	< 0.015	0.008	0.008	0.000	
Nitrate+Nitrite Nitrogen (mg/L)	2	0.011	0.018	0.014	0.014	0.005	
Total Kjeldahl Nitrogen (mg/L)	2	0.345	0.802	0.574	0.574	0.323	
Total Nitrogen (mg/L)	2	0.356	0.820	0.588	0.588	0.328	
Dissolved Reactive Phosphorus (mg/L)	2	0.009	0.009	0.009	0.009	0.000	
Total Phosphorus (mg/L)	2	0.036	0.051	0.044	0.044	0.011	
CBOD-5 (mg/L)	2	1.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	2	4.5	4.9	4.7	4.7	0.3	
Total Metals							
^J Aluminum (mg/L)	2	0.181	0.228	0.204	0.204	0.033	
Iron (mg/L)	2	1.790	2.900	2.345	2.345	0.785	
Manganese (mg/L)	2	0.048	0.449	0.248 ^M	0.248	0.284	
Dissolved Metals							
^J Aluminum (mg/L)	2	< 0.015	0.110	0.059	0.059	0.072	
Antimony (µg/L)	2	< 2.0	< 2.0	1.0	1.0	0.0	
Arsenic (µg/L)	2	< 1.6	< 2.2	1.0	1.0	0.2	
Cadmium (mg/L)	2	< 0.003	< 0.005	0.002	0.002	0.001	
Chromium (mg/L)	2	< 0.004	< 0.013	0.004	0.004	0.003	
Copper (mg/L)	2	< 0.005	< 0.013	0.004	0.004	0.003	
Iron (mg/L)	2	0.635	0.984	0.810 ^M	0.810	0.247	
Lead (µg/L)	2	< 0.6	< 1.5	0.5	0.5	0.3	
Manganese (mg/L)	2	0.040	0.443	0.242 ^M	0.242	0.285	
Mercury (µg/L)	2	< 0.030	< 0.030	< 0.015	< 0.015	0.0	
Nickel (mg/L)	2	< 0.004	< 0.006	0.002	0.002	0.001	
Selenium (µg/L)	2	< 1.5	< 1.6	0.8	0.8	0.0	
Silver (mg/L)	2	< 0.002	< 0.003	0.001	0.001	0.000	
Thallium (µg/L)	2	< 0.5	< 0.6	0.3	0.3	0.0	
Zinc (mg/L)	2	< 0.003	< 0.006	0.002	0.002	0.001	
Biological							
Chlorophyll a (µg/L)	2	0.53	0.76	0.64	0.64	0.16	
Fecal Coliform (col/100 mL)	2	35	250	143	143	152	

^J=estimate; N=# samples; E=# of samples that exceed criterion; C=S/F&W criterion exceeded; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65b.

FOR MORE INFORMATION, CONTACT:

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