

2005 Monitoring Summary

Cubahatchee Creek at U.S. Highway 80 in Macon County (32.34640/-85.89020)

BACKGROUND

Cubahatchee Creek, from the Tallapoosa River to its source, was on Alabama's 2004 Clean Water Act (CWA) §303(d) list of impaired waters for not meeting its *Swimming* (S) and *Fish and Wildlife* (F&W) water use classifications due to siltation (habitat alteration) from agriculture and surface mining. The 2006 CWA §303(d) list added pathogens as a cause of impairment of the segment of Cubahatchee Creek from Coon Hop Creek to the Tallapoosa river. This report summarizes sampling activities undertaken for that stream segment.

The Alabama Department of Environmental Management (ADEM) collected water chemistry samples monthly, quarterly (COD), and annually (atrazine) at Cubahatchee Creek at CUBM-4 to assess impairment and estimate overall water quality. Habitat assessment and benthic macroinvertebrate community assessments were requested to assess the impact of siltation on the biological communities. However, they could not be conducted due to un-wadeable conditions at this reach.

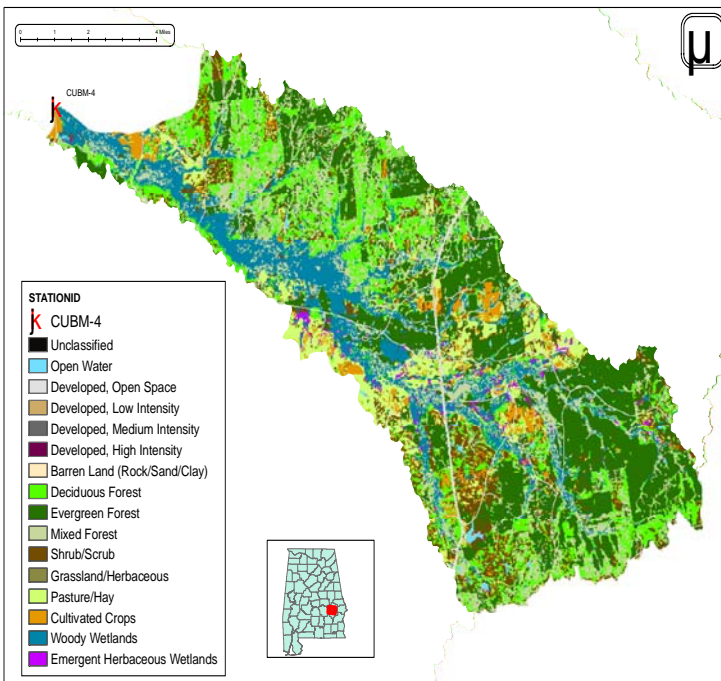


Figure 1. Sampling location and watershed of Cubahatchee Creek at CUBM-4

Table 1. Summary of watershed characteristics.

Watershed Characteristics	
Drainage Area (mi ²)	98
Ecoregion ^a	65b
% Landuse	
Open water	<1
Wetland	Woody 17
	Emergent herbaceous <1
Forest	Deciduous 20
	Evergreen 22
	Mixed 21
Shrub/scrub	7
Grassland/herbaceous	<1
Pasture/hay	6
Cultivated crops	4
Development	Open space 3
	Low intensity <1
Population/km ^{2b}	10
# NPDES Permits ^c	
TOTAL	3
Construction Stormwater	3

a. Flatwood/Blackland Prairie Margins

b. 2000 U.S. Census Data

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

WATERSHED CHARACTERISTICS

The Cubahatchee Creek watershed at CUBM-4 drains approximately 98 mi² of the Flatwood/Blackland Prairie Margins Ecoregion (65b) (Fig. 1). Pine, deciduous and mixed forest characterize the majority of this watershed (63%). Areas of woody wetland, pasture and hay also occur within the watershed (Table 1).

WATER CHEMISTRY

Results of monthly water chemistry samples collected March through October of 2005 are presented in Table 2. Fecal coliform counts were >2000 colonies/100ml during two sampling events (April 7, and July 7), exceeding the criteria for S/ F&W use classification. Turbidity exceeded ecoregional guidelines during the April 7, July 7, and August 4 site visits. These values were possibly due to high flow from heavy rain events on or before the site visits. Dissolved oxygen was <5.0 mg/L during the June 1 and September 26 site visits. However, flows were visible but not detectable on these dates. All other parameters were typical of the 65b ecoregion based on comparison with 90th percentile of least impaired reference data collected in this ecoregion.

CONCLUSIONS

Cubahatchee Creek at CUBM-4 was not wadeable, therefore, habitat and macroinvertebrate assessments could not be conducted. Fecal coliform counts exceeded the ≤ 2000 colonies/100mL criteria for *S/F&W* use classifications during the April 7 and July site visits. Turbidity was elevated during the April 7, July 7, and August 4 site visits. High flow conditions may have contributed to high fecal coliform counts and turbidity measured on April 7, July 7, and August 4. The normally low flow conditions may have caused the low dissolved oxygen concentrations measured in June and October.

Table 2. 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	12.0	25.0	20.6	19.9	4.6
Turbidity (NTU)	7	6.2	141.0	40.4	54.4	48.0
Total Dissolved Solids (mg/L)	8	< 1.0	214.0	95.5	92.4	63.1
Total Suspended Solids (mg/L)	8	< 1.0	184.0	25.5	50.4	62.0
Specific Conductance (µmhos)	7	51.7	176	92.9	101.2	44.6
Hardness (mg/L)	8	< 1.0	64.4	36.8	36.3	19.5
Alkalinity (mg/L)	8	< 1.0	58.1	28.2	27.4	18.8
Chemical						
Dissolved Oxygen (mg/L)	6	0.0	8.4	5.9	4.8	3.2
pH (su)	7	6.0	7.67	7.1	6.9	0.5
Ammonia Nitrogen (mg/L)	8	< 0.015	0.056	0.016	0.024	0.020
Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.003	0.180	0.024	0.036	0.062
Total Kjeldahl Nitrogen (mg/L)	8	< 0.150	1.478	0.896	0.834	0.471
Total Nitrogen (mg/L)	8	0.283	1.536	0.907	0.853	0.482
Dissolved Reactive Phosphorus (mg/L)	8	0.013	0.046	0.019	0.023	0.012
^J Total Phosphorus (mg/L)	8	0.008	0.134	0.109	0.094	0.046
CBOD-5 (mg/L)	8	< 1.0	8.0	2.8	3.5	2.3
COD (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.00
^J Chlorides (mg/L)	8	< 1.0	10.0	6.3	6.3	2.9
Atrazine (µg/L)	1	< 0.05	< 0.05	0.03	0.03	0.00
Total Metals						
Aluminum (mg/L)	8	0.052	3.29	0.600	1.085	1.314
Iron (mg/L)	8	< 0.005	3.61	2.34	2.195	1.253
Manganese (mg/L)	8	< 0.005	0.24	0.085	0.103	0.081
Dissolved Metals						
Aluminum (mg/L)	8	< 0.015	0.2	0.095	0.103	0.065
Antimony (µg/L)	8	< 2	< 2	1	1	0
Arsenic (µg/L)	8	< 10	< 10	5	5	0
Cadmium (mg/L)	8	< 0.005	0.01	0.003	0.003	0.000
Chromium (mg/L)	8	< 0.004	0.01	0.002	0.002	0.000
Copper (mg/L)	8	< 0.004	0.01	0.003	0.002	<0.001
Iron (mg/L)	8	< 0.005	1.46	0.432	0.490	0.433
Lead (µg/L)	8	< 2	< 2	1	1	0
Manganese (mg/L)	8	< 0.005	0.204	0.010	0.059	0.084
^J Mercury (µg/L)	8	< 0.3	< 0.3	0.15	0.15	0.00
Nickel (mg/L)	8	< 0.006	< 0.006	0.003	0.003	0.000
Selenium (µg/L)	8	< 10	< 10	5	5	0
Silver (mg/L)	8	< 0.003	0.003	0.002	0.002	0.000
Thallium (µg/L)	8	< 1	< 1	0.5	0.5	0.0
Zinc (mg/L)	8	< 0.006	< 0.006	0.003	0.003	0.000
Biological						
^J Chlorophyll a (µg/L)	6	1.07	6.41	3.47	3.47	2.23
^J Fecal Coliform (col/100 mL)	7	10	6300 ^C	400	1423	2312

N=# samples; J=estimate; M=value > 90% of all verified ecological reference reach data collected in ecoregion 65b; C=value exceeds established criteria for S and F&W water use classifications.

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