



Childers Creek at Alabama Highway 219 (Dallas County) 32.44200/-87.08343

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Childers Creek watershed for biological and water quality monitoring as part of the [2007 Assessment of the Cahaba and Black Warrior Basins](#). The objectives of the BWC Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the EMT basin group. Childers Creek stretches 18.79 miles from its source to the Cahaba River and has been on Alabama's Clean Water Act (CWA) §303(d) list of impaired waters since 2006. It was listed for siltation (habitat alteration), from pasture grazing. Water quality data were collected in 2007 in March and April. Drought conditions prevented collection of additional samples.



Figure 1. Childers Creek at CHLD-2 in August of 2007

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Childers Creek at CHLD-2 is a *Fish and Wildlife (F&W)* stream located right outside of Selma in Dallas County. Based on the 2000 National Landcover Dataset landuse within the watershed is mostly forest (39%) and pasture. As of February 23, 2011, ADEM has issued one NPDES permit for 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. Childers Creek at CHLD-2, pictured above in Figure 1, is a low gradient, glide-pool stream reach, with a primarily sand bottom. Overall habitat quality was categorized as *marginal*.

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. The final score indicated the biological community to be in *poor* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Cahaba River
Drainage Area (mi²)		6
Ecoregion^a		65a
% Landuse		
Open water		1
Wetland	Woody	7
	Emergent herbaceous	<1
Forest	Deciduous	16
	Evergreen	11
	Mixed	12
Shrub/scrub		13
Pasture/hay		27
Cultivated crops		8
Development	Open space	5
	Low intensity	<1
	Moderate intensity	<1
Population/km^{2b}		26
# NPDES Permits^c	TOTAL	1
Construction Stormwater		1

a.Blackland Prairie

b.2000 US Census

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

Table 2. Physical characteristics of Childers Creek at CHLD-2, May 03, 2007.

Physical Characteristics	
Canopy Cover	Mostly Shaded
Width (ft)	3.5
Depth (ft)	
	Run 0.4
	Pool 1.0
% of Reach	
	Run 80
	Pool 20
% Substrate	
	Gravel 2
	Sand 84
	Silt 5
	Organic Matter 9

Table 3. Results of the habitat assessment conducted on Childers Creek at CHLD-2, 5/3/2007.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	30	Poor (<40)
Sediment Deposition	46	Marginal (40-52)
Sinuosity	40	Poor (<45)
Bank and Vegetative Stability	51	Marginal (35-59)
Riparian Buffer	63	Marginal (50-69)
Habitat Assessment Score	98	
% Maximum Score	44	Marginal (40-52)

Table 4. Results of the macroinvertebrate bioassessment of Childers Creek on May 3, 2007.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures			
# EPT genera	2	8	Very Poor (<=18)
Taxonomic composition measures			
% Non-insect taxa	31	0.0	Very Poor (<=30.8)
% Plecoptera	5	24.9	Good (5.7-52.8)
% Dominant taxa	25	61.7	Fair (47.1-70.5)
Functional composition measures			
% Predators	13	45.1	Fair (30.2-45.2)
Tolerance measures			
Beck's community tolerance index	0	0.0	Very Poor (<=10.5)
% Nutrient tolerant organisms	23	78.7	Good (76.3-88.1)
WMB-I Assessment Score	--	31	Poor (19-37)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. *In situ* measurements and water samples were supposed to be collected monthly during March through October. However, due to a severe drought, the creek was only sampled in March and April. Field parameters were collected during the macroinvertebrate assessment. Flow during this station visit was 0.15 cfs. Median concentration of Ammonia Nitrogen were higher than expected for the Blackland Prairie ecoregion. Also, median specific conductance was higher than expected.

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data. Due to severe drought, the stream flowed March-May, but was dry, June-October. Low flow conditions may have affected results of the macroinvertebrate bioassessment. Additional monitoring may be required to fully assess biological conditions at the site.

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Table 5. Summary of water quality data collected March-April, 2007. 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	Med	Avg	SD
Physical						
Temperature (°C)	3	16.4	21.5	17.0	18.3	2.8
Turbidity (NTU)	7	0.0	46.8	0.0	12.4	18.6
Total Dissolved Solids (mg/L)	2	23.0	121.0	72.0	72.0	69.3
Total Suspended Solids (mg/L)	2	16.0	21.0	18.5	18.5	3.5
Specific Conductance (µmhos)	3	64.0	159.8	143.0 ^G	122.3	51.2
Alkalinity (mg/L)	2	17.9	67.7	42.8	42.8	35.2
Stream Flow (cfs)	3	0.2	1.7	0.2	0.7	0.9
Chemical						
Dissolved Oxygen (mg/L)	3	5.9	6.4	6.0	6.1	0.3
pH (su)	3	6.3	7.0	6.8	6.7	0.4
Ammonia Nitrogen (mg/L)	2	< 0.015	0.139	0.073 ^M	0.073	0.093
Nitrate+Nitrite Nitrogen (mg/L)	2	< 0.003	0.023	0.012	0.012	0.015
Total Kjeldahl Nitrogen (mg/L)	2	0.369	1.031	0.700	0.700	0.468
Total Nitrogen (mg/L)	2	< 0.370	1.054	0.712	0.712	0.483
Dissolved Reactive Phosphorus (mg/L)	2	0.018	0.045	0.032	0.032	0.019
Total Phosphorus (mg/L)	2	0.083	0.125	0.104	0.104	0.030
CBOD-5 (mg/L)	2	< 1.0	1.1	0.8	0.8	0.4
^J Chlorides (mg/L)	2	3.9	4.4	4.1	4.1	0.4
Biological						
^J Chlorophyll a (ug/L)	2	2.67	5.34	4.00	4.00	1.89
Fecal Coliform (col/100 mL)	2	45	51	48	48	4

J=estimate; N=# of samples; M = value higher than median concentration of all verified ecoregional reference data in the ecoregion 65a; G = value higher than median concentration of all verified ecoregional reference data in ecoregion 65a