

# 2012 Monitoring Summary



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

### BACKGROUND

Childers Creek, from the Cahaba river to its source was on Alabama's 2012 Clean Water Act (CWA) §303(d) list of impaired waters. It was listed for siltation (habitat alteration), from pasture grazing. The Environmental Protection Agency (EPA) requires authorized states to develop Total Maximum Daily Loads (TMDL) for listed water bodies to reduce contaminant concentrations. A Draft TMDL for Childers Creek is scheduled for completion in 2019. This report summarizes the results of biological and water quality monitoring activities the Alabama Department of Environmental Management (ADEM) has conducted to support the TMDL process. Additionally, Childers Creek at CHLD-2 was monitored as part of the 2012 Assessment of the Black Warrior, Cahaba (BWC) river 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 BWC basin group.



Figure 1. Childers Creek at CHLD-2, April 24, 2012.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Childers Creek is a *Fish & Wildlife (F&W)* stream located outside of Selma in Dallas County. Based on the 2006 National Land Cover Dataset, landuse within the watershed is forest (39%) and pasture (Table 1). As of May 13, 2013, one NPDES permitted outfall is active 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. Childers Creek at CHLD-2 is a low gradient, glide pool stream characterized by sandy substrate (Figure 1). Overall habitat quality was rated 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. Low gradient metric results indicated the macroinvertebrate community to be in *very poor* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Cahaba River	
Drainage Area (mi <sup>2</sup> )	6	
Ecoregion <sup>a</sup>	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 <sup>2b</sup>	26	
# NPDES Permits <sup>c</sup>	TOTAL	1
	Construction Stormwater	1

a.Blackland Prairie

b.2000 US Census

c.#NPDES outfalls downloaded from ADEM's NPDES Management System database, May 13, 2012.

Table 2. Physical characteristics of Childers Creek at CHLD-2, April 24, 2012.

Physical Characteristics		
Width (ft)	10	
Canopy cover	Shaded	
Depth (ft)	Run	1.0
	Pool	1.0
% of Reach	Run	95
	Pool	5
% Substrate	Gravel	10
	Sand	80
	Silt	6
	Organic Matter	4

**Table 3.** Results of the habitat assessment conducted on Childers Creek at CHLD-2, April 24, 2012.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	29	Poor (<40)
Sediment Deposition	54	Sub-optimal (53-65)
Sinuosity	25	Poor (<45)
Bank and Vegetative Stability	48	Marginal (35-59)
Riparian Buffer	85	Sub-optimal (70-89)
<b>Habitat Assessment Score</b>	<b>113</b>	
<b>% Maximum Score</b>	<b>51</b>	<b>Marginal (40-52)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted in Childers Creek at CHLD-2, April 24, 2012.

Macroinvertebrate Assessment			
	Results	Scores	Rating
<b>Taxa richness measures</b>			
# EPT genera	1	4	Very Poor (<=18)
<b>Taxonomic composition measures</b>			
% Non-insect taxa	25	0.0	Very Poor (<=30.8)
% Plecoptera	0	1.1	Very Poor (<=1.85)
% Dominant taxa	42	21.0	Very Poor (<=23.4)
<b>Functional composition measures</b>			
% Predators	5	17.6	Poor (15.1-30.1)
<b>Tolerance measures</b>			
Beck's community tolerance index	1	4.5	Very Poor (<=10.5)
% Nutrient tolerant organisms	26	73.4	Fair (50.9-76.2)
<b>WMB-I Assessment Score</b>	-	<b>17</b>	<b>Very Poor (&lt;=18)</b>

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were supposed to be collected monthly, or quarterly (metals, pesticides, herbicides (atrazine), and semi-volatile organics) during April through November to help identify any stressors to the biological communities. However, due to prevailing drought conditions, Childers Creek at CHLD-2 could only be sampled in April, September, and October. Field parameters and a flow measurement were collected during the macroinvertebrate assessment in April. Median pH values were lower than expected for the Blackland Prairie ecoregion. No organic samples were collected.

## SUMMARY

Childers Creek has been listed for siltation since 2006. In 2007, Childers Creek at CHLD-2 was severely impacted by drought conditions and allowed sampling only in March, April, and May. In 2012, water quality samples could only be collected in April, September, and October. A macroinvertebrate bioassessment was conducted in April and results indicated the macroinvertebrate community in Childers Creek at CHLD-2 to be in *very poor* condition. Overall habitat quality was rated as *marginal*. A Draft TMDL is scheduled for completion by 2019.

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**Table 5.** Summary of water quality data collected April, September and October 2012. 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
<b>Physical</b>						
Temperature (°C)	3	14.0	24.1	20.2	19.4	5.1
Turbidity (NTU)	4	27.2	43.5	30.3	32.8	7.4
J Total Dissolved Solids (mg/L)	3	32.0	66.0	54.0	50.7	17.2
J Total Suspended Solids (mg/L)	3	5.0	22.0	18.0	15.0	8.9
Specific Conductance (µmhos)	3	44.9	90.4	71.0	68.8	22.8
Hardness (mg/L)	1				14.1	
Alkalinity (mg/L)	3	7.9	36.5	24.0	22.8	14.3
Stream Flow (cfs)	4	0.2	27.3	1.7	7.7	13.1
<b>Chemical</b>						
Dissolved Oxygen (mg/L)	3	6.1	6.6	6.6	6.4	0.3
pH (su)	3	6.0	6.7	6.5 <sup>M</sup>	6.4	0.3
Ammonia Nitrogen (mg/L)	3	0.022	0.167	0.028	0.072	0.082
Nitrate+Nitrite Nitrogen (mg/L)	3	0.033	0.179	0.049	0.087	0.080
Total Kjeldahl Nitrogen (mg/L)	3	0.489	1.780	0.666	0.978	0.700
Total Nitrogen (mg/L)	3	0.522	1.829	0.845	1.065	0.681
Dissolved Reactive Phosphorus (mg/L)	3	0.014	0.023	0.015	0.017	0.005
Total Phosphorus (mg/L)	3	0.099	0.189	0.133	0.140	0.045
CBOD-5 (mg/L)	3	< 2.0	< 2.0	1.0	1.0	0.0
Chlorides (mg/L)	3	3.5	5.7	4.6	4.6	1.1
<b>Total Metals</b>						
Aluminum (mg/L)	1				1.840	
Iron (mg/L)	1				2.180	
Manganese (mg/L)	1				0.135	
<b>Dissolved Metals</b>						
Aluminum (mg/L)	1				0.270	
Antimony (µg/L)	1			<	3.6	
Arsenic (µg/L)	1			<	1.8	
Cadmium (µg/L)	1			<	0.046	
Chromium (mg/L)	1			<	0.009	
Copper (mg/L)	1			<	0.020	
Iron (mg/L)	1				0.238	
Lead (µg/L)	1			<	0.9	
Manganese (mg/L)	1				0.079	
Mercury (µg/L)	1			<	0.035	
Nickel (mg/L)	1			<	0.042	
Selenium (µg/L)	1			<	2.5	
Silver (µg/L)	1			<	0.215	
Thallium (µg/L)	1			<	1.4	
Zinc (mg/L)	1			<	0.012	
<b>Biological</b>						
Chlorophyll a (ug/L)	1				5.34	
E. coli (col/100mL)	1				866	

J=estimate; M=value >90th percentile of all verified reference data collected in ecoregion 65a; N= # of samples.