

# 2010 Monitoring Summary



Basin Assessment Site

## Chilatchee Creek at AL Hwy 5 in Dallas County (32.23676/-87.40904)

### BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Chilatchee Creek watershed for biological and water quality monitoring as part of the 2010 Alabama, Coosa, and Tallapoosa (ACT) Basin Assessment Monitoring. 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 basin.



Figure 1. Chilatchee Creek at CLTD-1, April, 13, 2010.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Chilatchee Creek from Alabama River to its source is a designated *Swimming/Fish & Wildlife (S/F&W)* stream located in Dallas County in the Flatwoods/Blackland Prairie Margins ecoregion (65b). Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (47%), with pasture, shrub/scrub, and woody wetlands. As of April 1, 2016, there are three NPDES permitted outfalls 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. Chilatchee Creek at CLTD-1 is an open, riffle-run stream dominated by a hard pan clay substrate (Figure 1). Overall habitat quality was categorized as *marginal*.

### BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). Measures of taxonomic richness, community composition, and community tolerance are used to assess the overall health of the macroinvertebrate community in comparison to conditions expected in coastal plain Alabama streams and rivers. Each site is placed in one of six levels, ranging from 1, or *natural* to 6, or *highly altered*. The macroinvertebrate survey conducted in Chilatchee Creek at CLTD-1 rated the site as *fair*. Relative abundance and numbers of pollution-sensitive taxa are lower than expected, while relative abundance and numbers of pollution-tolerant taxa have increased (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Alabama River
<b>Basin</b>		
<b>Drainage Area (mi<sup>2</sup>)</b>		90
<b>Ecoregion<sup>a</sup></b>		65B
<b>% Landuse<sup>b</sup></b>		
Open water		1%
Wetland	Woody	12%
	Emergent herbaceous	2%
Forest	Deciduous	18%
	Evergreen	21%
	Mixed	8%
Shrub/scrub		15%
Grassland/herbaceous		4%
Pasture/hay		15%
Cultivated crops		2%
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
	High intensity	<1%
Barren		<1%
<b>Population/km<sup>2c</sup></b>		5
<b># NPDES Permits<sup>d</sup></b>	<b>TOTAL</b>	3
Construction		3

a.Flatwoods/Blackland Prairie Margins

b.2011 National Land Cover Dataset

c.2010 US Census

d.#NPDES outfalls downloaded from ADEM's NPDES Management System database, April 1, 2016.

Table 2. Physical characteristics of Chilatchee Creek at CLTD-1, April 13, 2010.

Physical Characteristics		
<b>Canopy Cover</b>	Open	
<b>Width (ft)</b>	30	
<b>Depth (ft)</b>		
	Riffle	0.5
	Run	1.0
	Pool	1.0
<b>% of Reach</b>		
	Riffle	10
	Run	85
	Pool	5
<b>% Substrate</b>		
	Boulder	2
	Cobble	5
	Gravel	5
	Hard Pan Clay	75
	Sand	10
	Silt	1
	Organic Matter	2

**Table 3.** Results of the habitat assessment conducted on Chilatchee Creek at CLTD-1, April 13, 2010.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	57	Marginal (41-<59)
Sediment Deposition	70	Sub-Optimal (59-70)
Sinuosity	75	Sub-Optimal (65-<85)
Bank Vegetative Stability	38	Marginal (35-<59)
Riparian Buffer	53	Marginal (50-<70)
<b>Habitat Assessment Score</b>	<b>113</b>	
<b>% Maximum Score</b>	<b>57</b>	<b>Marginal (41-&lt;59)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted in Chilatchee Creek at CLTD-1, April 13, 2010.

Macroinvertebrate Assessment		Results
<b>Taxa richness and diversity measures</b>		
Total # Taxa		60
# EPT taxa		16
# Highly-sensitive and Specialized Taxa		3
<b>Taxonomic composition measures</b>		
% EPC taxa		22
% Trichoptera & Chironomidae Taxa		49
% EP Individuals		24
% Chironomidae Individuals		65
% Individuals in Dominant 5 Taxa		72
<b>Functional feeding group</b>		
% Collector-Filterer Individuals		9
% Tolerant Filterer Taxa		14
<b>Community tolerance</b>		
# Sensitive EPT		6
% Sensitive taxa		12
% Nutrient Tolerant individuals		56
<b>WMB-I Assessment Score</b>		<b>4</b>
<b>WMB-I Assessment Rating</b>		<b>Fair</b>

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were scheduled for collection, April through November, 2010 to help identify any stressors to the biological communities. However, samples were only collected April-August due to very low flow conditions. Water temperature exceeded the *F&W* criterion in July and August during the lowest flows sampled.

Median concentrations of specific conductivity and hardness were higher than the median concentration of all reference reach data collected in the ecoregion 65b. Total dissolved solids and alkalinity were also higher than expected in the ecoregion 65b. Arsenic and Thallium exceeded the Human Health (HH) criterion for water and fish consumption during April. ADEM criteria for Arsenic are expressed as dissolved trivalent arsenic (arsenite - As III). Presently studies are being conducted to provide a better understanding of the prevalence of and areal distribution of dissolved trivalent arsenic to total arsenic in the State of Alabama. Upon conclusion of the studies Chilatchee Creek will be reassessed for arsenic violations. Samples were analyzed for pesticides, semi-volatile organics, and atrazine and values were below detection limits.

## SUMMARY

As part of assessment process, ADEM will review the monitoring information presented in this report along with all other available data. Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Habitat was assessed as *marginal* for supporting macroinvertebrate communities. Water chemistry results indicated total dissolved solids, specific conductance, alkalinity and hardness to be higher than expected for streams located in this sub-ecoregion.

**Table 5.** Summary of water quality data collected April-August, 2010. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). 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	E
<b>Physical</b>							
Temperature (°C)	6	17.1	30.6 <sup>C</sup>	26.3	25.3	5.3	2
Turbidity (NTU)	6	2.5	34.1	4.4	9.4	12.3	
<sup>J</sup> Total Dissolved Solids (mg/L)	4	162.0	198.0	183.0 <sup>M</sup>	181.5	15.9	
Total Suspended Solids (mg/L)	4	< 1.0	39.0	3.5	11.6	18.3	
Specific Conductance (µmhos)	6	257.7	393.9	294.6 <sup>G</sup>	307.4	51.9	
Hardness (mg/L)	4	102.0	133.0	108.5 <sup>G</sup>	113.0	13.8	
Alkalinity (mg/L)	4	104.0	124.0	109.5 <sup>M</sup>	111.8	9.3	
Monthly Stream Flow (cfs)	6	0.1	42.3	5.1	11.2	15.8	
Stream Flow during sample collection (cfs)	5	1.8	42.3	5.9	13.4	16.6	
<b>Chemical</b>							
Dissolved Oxygen (mg/L)	6	8.4	10.1	9.4	9.3	0.6	
pH (su)	6	7.4	8.2	7.9	7.9	0.3	
Ammonia Nitrogen (mg/L)	4	< 0.021	< 0.021	0.010	0.010	0.000	
<sup>J</sup> Nitrate+Nitrite Nitrogen (mg/L)	4	0.004	0.626	0.044	0.180	0.300	
Total Kjeldahl Nitrogen (mg/L)	4	0.180	0.927	0.418	0.486	0.323	
<sup>J</sup> Total Nitrogen (mg/L)	4	0.184	1.132	0.672	0.665	0.443	
Dissolved Reactive Phosphorus (mg/L)	4	0.022	0.105	0.024	0.044	0.041	
Total Phosphorus (mg/L)	4	0.033	0.140	0.080	0.083	0.055	
CBOD-5 (mg/L)	4	< 2.0	5.9	1.7	2.6	2.3	
Chlorides (mg/L)	4	6.8	21.5	7.4	10.7	7.2	
Atrazine (µg/L)	3	< 0.02	< 0.02	0.01	0.01	0.00	
<b>Total Metals</b>							
<sup>J</sup> Aluminum (mg/L)	4	< 0.033	1.120	0.212	0.390	0.505	
Iron (mg/L)	4	0.231	1.670	0.398	0.674	0.670	
<sup>J</sup> Manganese (mg/L)	4	< 0.001	0.112	0.015	0.036	0.053	
<b>Dissolved Metals</b>							
Aluminum (mg/L)	4	< 0.033	< 0.033	0.016	0.016	0.000	
Antimony (µg/L)	4	< 0.7	1.9	0.9	0.8	0.3	
<sup>J</sup> Arsenic (µg/L)	4	< 2.1	2.3 <sup>H</sup>	1.0	1.3	0.6	1
Cadmium (mg/L)	4	< 0.003	0.014	0.004	0.004	0.003	
Chromium (mg/L)	4	< 0.013	< 0.013	0.006	0.006	0.000	
Copper (mg/L)	4	< 0.013	< 0.013	0.006	0.006	0.000	
<sup>J</sup> Iron (mg/L)	4	< 0.026	0.052	0.013	0.023	0.020	
Lead (µg/L)	4	< 1.0	1.7	0.8	0.8	0.2	
<sup>J</sup> Manganese (mg/L)	4	< 0.001	0.018	0.000	0.005	0.009	
<sup>J</sup> Mercury (µg/L)	4	< 0.1	< 0.1	0.0	0.0	0.0	
Nickel (mg/L)	4	< 0.019	< 0.019	0.010	0.010	0.000	
Selenium (µg/L)	4	< 0.4	1.7	0.8	0.7	0.3	
Silver (mg/L)	4	< 0.002	< 0.002	0.001	0.001	0.000	
<sup>J</sup> Thallium (µg/L)	4	< 0.4	0.6 <sup>H</sup>	0.3	0.3	0.1	1
Zinc (mg/L)	4	< 0.030	< 0.030	0.015	0.015	0.000	
<b>Biological</b>							
Chlorophyll a (ug/L)	4	0.27	8.01	0.74	2.44	3.72	
E. coli (col/100mL)	4	20	1414	43	380	689	

C=S/F&W criterion violated; E= # samples that exceeded criteria; G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65b; H= S/F&W human health criterion exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65b; N=# samples.

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