

2010 Monitoring Summary



Channahatchee Creek at Elmore County Road 357 (Deer Track Rd) near Eclectic (32.65024/-85.95085)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) monitors Channahatchee Creek as a “best attainable condition” reference watershed for comparison with streams throughout the Piedmont ecoregion. It was selected for sampling to collect data that can be used to develop nutrient criteria in wadeable, flowing streams in the Tallapoosa River basin and to develop a method of developing and implementing nutrient criteria statewide.



Figure 1. Channahatchee Creek at CHNE-18, April 7, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Channahatchee Creek is a *Fish & Wildlife (F&W)* stream, located in the Southern Inner Piedmont ecoregion (45a) in the Tallapoosa River basin. Based on the 2006 National Land Cover Dataset, land cover within the watershed is mainly forest (68%), followed by pasture/hay and grassland. Population density is relatively high in the watershed. As of September 1, 2012, five NPDES permits have been issued 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, this information can give an indication of physical condition and the availability and quality of habitat. Channahatchee Creek at CHNE-18 (Figure 1) is a riffle-run stream with sand, cobble, and gravel substrates. Overall habitat quality was categorized as *optimal*.

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 in comparison to least-impaired reference reaches in the same ecoregion. The final score is the average of all individual metric scores. The final score indicated the biological community to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tallapoosa River
Drainage Area (mi²)		25
Ecoregion^a		45a
% Landuse		
Open water		<1
Wetland	Woody	2
	Emergent herbaceous	<1
Forest	Deciduous	36
	Evergreen	26
	Mixed	6
Shrub/scrub		6
Grassland/herbaceous		8
Pasture/hay		9
Cultivated crops		1
Development	Open space	4
	Low intensity	<1
	Moderate intensity	<1
	High intensity	<1
Barren		1
Population/km²^b		117
# NPDES Permits^c	TOTAL	5
Construction Stormwater		5

a.Southern Inner Piedmont

b.2000 US Census

c.#NPDES permits downloaded from ADEM’s NPDES Management System database, September 1, 2012.

Table 2. Physical characteristics of Channahatchee Creek at CHNE-18, May 13, 2010.

Physical Characteristics		
Canopy Cover		Mostly Shaded
Width (ft)		25
Depth (ft)	Riffle	0.5
	Run	1.0
	Pool	1.5
% of Reach	Riffle	30
	Run	35
	Pool	25
% Substrate	Bedrock	5
	Boulder	5
	Cobble	25
	Gravel	15
	Sand	38
	Silt	2
	Organic Matter	10

Table 3. Results of the habitat assessment conducted on Channahatchee Creek at CHNE-18, May 13, 2010.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	82	Optimal >70
Sediment Deposition	74	Optimal >70
Sinuosity	93	Optimal >84
Bank and Vegetative Stability	43	Marginal (35-59)
Riparian Buffer	90	Optimal >89
Habitat Assessment Score	175	
% Maximum Score	73	Optimal >70

Table 4. Results of the macroinvertebrate bioassessment conducted in Channahatchee Creek at CHNE-18, May 13, 2010.

Macroinvertebrate Assessment		
	Results	Scores
Taxa richness and diversity measures		(0-100)
# EPT taxa	19	65
Shannon Diversity	3.86	54
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	19	19
% Non-insect taxa	5	88
Tolerance measures		
% Tolerant taxa	21	81
WMB-I Assessment Score	---	61
WMB-I Assessment Rating		Fair (47-69)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. *In situ* measurements and water samples were collected monthly from April through November, 2010 to help identify any stressors to the biological communities. *In situ* parameters suggest that Channahatchee Creek at CHNE-18 was meeting water quality criteria for its *F&W* use classification. Stream pH was below the criterion on September 7, 2010 during an extreme low flow event. Median concentrations of specific conductance and ammonia nitrogen were slightly above background concentrations, based on reference reach data collected in the Southern Inner Piedmont ecoregion.

SUMMARY

Channahatchee Creek at CHNE-18 was selected as a least-impaired reference reach in 2000, based on road side reconnaissance and the 1994 National Land Cover Dataset. The reach is typical of streams in the Southern Inner Piedmont. Bioassessment results indicated the biological community to be in *fair* condition. Although there was abundant in-stream habitat, fine sediments comprised 40% of the bottom substrate. Five NPDES discharges were also located within the watershed, and specific conductivity and ammonia nitrogen concentrations were slightly elevated. Monitoring should continue to ensure that water quality and biological conditions remain stable.

Table 5. Summary of water quality data collected March-October, 2010. 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	Q	E
Physical								
Temperature (°C)	7	13.7	24.8	19.6	18.8	3.8		
Turbidity (NTU)	7	6.0	27.5	8.2	11.7	7.7		
Total Dissolved Solids (mg/L)	6	42.0	56.0	49.0	49.3	5.2		
Total Suspended Solids (mg/L)	6	< 1.0	20.0	2.5	5.8	7.5		
Specific Conductance (µmhos)	7	41.8	55.6	45.9 ^G	47.0	5.2		
Alkalinity (mg/L)	6	14.5	27.5	18.2	19.8	5.7		
Stream Flow (cfs)	7	0.4	25.6	14.1	12.9	9.1		
Chemical								
Dissolved Oxygen (mg/L)	7	6.8	9.2	8.7	8.4	0.9		
pH (su)	7	5.7 ^C	6.9	6.6	6.5	0.4		1
Ammonia Nitrogen (mg/L)	6	< 0.021	< 0.021	0.010 ^M	0.010	0.000		
Nitrate+Nitrite Nitrogen (mg/L)	6	< 0.002	0.108	0.080	0.064	0.041		
Total Kjeldahl Nitrogen (mg/L)	6	< 0.080	0.352	0.258	0.242	0.108		
Total Nitrogen (mg/L)	6	< 0.129	0.429	0.322	0.305	0.104		
Dissolved Reactive Phosphorus (mg/L)	6	0.005	0.022	0.017	0.016	0.006 ^J		
Total Phosphorus (mg/L)	6	0.016	0.037	0.024	0.024	0.008		
CBOD-5 (mg/L)	6	< 2.0	2.4	1.0	1.2	0.6		
Chlorides (mg/L)	6	2.2	2.6	2.5	2.4	0.1		
Biological								
Chlorophyll a (ug/L)	6	< 0.10	2.67	0.78	0.98	0.90		

C= (*F&W*) criterion exceeded; E=# samples that exceeded criterion; G=value higher than median concentration of all verified ecoregional reference data collected in the ecoregion 45a; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 45a; N= # samples; Q=qualifier.

FOR MORE INFORMATION, CONTACT:
 Sreeletha Prem Kumar ADEM Environmental Indicators Section
 1350 Coliseum Boulevard Montgomery, AL 36110
 (334) 260-2782 skumar@adem.state.al.us