

2010 Monitoring Summary



Cane Creek at Cleburne County Road 18 (33.62982/-85.53546)

BACKGROUND

Cane Creek was selected by the Alabama Department of Environmental Management (ADEM) as part of the 2010 Tallapoosa Nutrient Criteria Project. The objectives of the project were to collect data that could be used in the development of nutrient criteria in wadeable streams throughout the Tallapoosa River basin. The results of the project might further be used to develop and implement nutrient criteria statewide.



Figure 1. Sampling location within Cane Creek at CNCL-1, taken June 16, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Cane Creek at CNCL-1 is a *Fish & Wildlife (F&W)* stream in Cleburne County. According to the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (77%). Satellite imagery taken September 28, 2012 indicated clear-cutting near stream banks on several stretches of the stream. Population density within the watershed is relatively high. As of September 1, 2012, ADEM has issued a total of 19 NPDES permits within the 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. Cane Creek at CNCL-1 is a low-gradient stream characterized by sand, gravel, and silt substrates (Figure 1). Overall habitat quality was categorized as *marginal* due to channelization, eroding banks, and limited riparian buffers.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tallapoosa River
Drainage Area (mi ²)		61
Ecoregion ^a		45d
% Landuse		
Open water		<1
Wetland	Woody	1
Forest	Deciduous	44
	Evergreen	33
	Mixed	<1
Shrub/scrub		3
Grassland/herbaceous		8
Pasture/hay		5
Development	Open space	4
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Barren		1
Population/km ^{2b}		26
# NPDES Permits ^c	TOTAL	19
	401 Water Quality Certification	1
	Construction Stormwater	15
	Industrial General	2
	Municipal Individual	1

a. Talladega Upland

b. 2000 US Census

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

Table 2. Physical characteristics of Cane Creek at CNCL-1, June 16, 2010.

Physical Characteristics		
Width (ft)		35
Canopy Cover		Estimate 50/50
Depth (ft)	Run	1.5
	Pool	3.0
% of Reach	Run	70
	Pool	30
% Substrate	Boulder	1
	Clay	2
	Cobble	2
	Mud/muck	7
	Gravel	17
	Sand	45
	Silt	15
Organic Matter	11	

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. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

Table 3. Results of the habitat assessment conducted in Cane Creek at CNCL-1, June 16, 2010.

Habitat Assessment	%Max Score	Rating
Instream Habitat Quality	63	Sub-optimal (59-70)
Sediment Deposition	63	Sub-optimal (59-70)
Sinuosity	55	Marginal (45-64)
Bank and Vegetative Stability	54	Marginal (35-59)
Riparian Buffer	41	Poor <50
Habitat Assessment Score	126	
% Maximum Score	57	Marginal (41-58)

Table 4. Results of macroinvertebrate assessment conducted in Cane Creek at CNCL-1, June 16, 2010.

Macroinvertebrate Assessment		
	Results	Scores (0-100)
Taxa richness and diversity measures		
# EPT taxa	18	61
Shannon Diversity	4.49	83
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	18	18
% Non-insect taxa	13	49
Tolerance measures		
% Tolerant taxa	31	53
WMB-I Assessment Score	---	53
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 of 2010 to identify any potential stressors to the biological communities. Stream flow was <0.1 cfs in September, causing the dissolved oxygen concentration to drop to 4.7 mg/L. Stream pH was below the F&W use classification criterion in November; stream flow was 20.5 cfs. Median specific conductance and total suspended solids were higher than expected based on reference reach data collected in the same ecoregion.

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 for non-metals parameters. 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
Physical							
Temperature (°C)	11	11.7	27.0	21.1	20.2	5.2	
Turbidity (NTU)	8	7.8	109.0 ^T	18.6	30.7	33.3	
^J Total Dissolved Solids (mg/L)	8	18.0	144.0	38.0	50.0	39.1	
^J Total Suspended Solids (mg/L)	8	1.0	63.0	14.0 ^M	19.5	20.6	
Specific Conductance (µmhos)	11	29.5	48.4	40.9 ^G	41.2	5.7	
Alkalinity (mg/L)	8	8.7	23.5	20.8	18.4	5.6	
Stream Flow (cfs)	9	0.0	189.0	11.6	37.2	62.1	
Chemical							
Dissolved Oxygen (mg/L)	11	4.7 ^C	8.8	6.8	6.9	1.4	1
pH (su)	11	5.8 ^C	6.9	6.6	6.5	0.3	1
Ammonia Nitrogen (mg/L)	8	< 0.021	0.021	0.010	0.010	0.000	
^J Nitrate+Nitrite Nitrogen (mg/L)	8	0.007	0.259	0.072 ^M	0.087	0.080	
Total Kjeldahl Nitrogen (mg/L)	8	< 0.080	0.816	0.250	0.265	0.245	
^J Total Nitrogen (mg/L)	8	< 0.047	0.926	0.302	0.352	0.279	
^J Dissolved Reactive Phosphorus (mg/L)	8	0.006	0.015	0.014	0.012	0.003	
Total Phosphorus (mg/L)	8	0.027	0.228	0.040	0.062	0.067	
CBOD-5 (mg/L)	8	< 2.0	2.1	1.0	1.1	0.4	
Chlorides (mg/L)	8	1.0	2.3	1.7	1.7	0.4	
Biological							
Chlorophyll a (ug/L)	8	< 0.10	7.48	0.60	1.74	2.51	

C= 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 45d; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 45d; N=# samples; T=value exceeds 50 NTU above the 90th percentile of all verified ecoregional reference reach data collected in the ecoregion 45d.

SUMMARY

Data collected during the 2010 Tallapoosa Nutrient Criteria Project will help develop nutrient criteria for streams and rivers in the Tallapoosa R. basin. Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality was categorized as *marginal* due to eroding banks and limited riparian buffers. September 2012 satellite imagery shows clear cut land up to the banks on several stretches of stream. Flow measured <0.1 cfs in September, possibly causing the dissolved oxygen concentration to dip down to 4.7 mg/L. Stream pH was below the F&W use classification criterion in November. Water chemistry analyses indicate specific conductance and dissolved solids to be elevated in comparison to data collected from least-impaired ecoregional reference reaches. Monitoring should continue to ensure that water quality and biological conditions remain stable.

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