

2014 Monitoring Summary



Little Cedar Creek at Conecuh County Road 6 (31.28388/-86.91262)

BACKGROUND

Little Cedar Creek was monitored as part of the 2014 assessment of the Southeast Alabama River Basins. The objectives of the project were to fully assess each monitoring site and to estimate overall water quality within the basins.

A previous survey of biological conditions within Little Cedar Creek conducted by the Alabama Rivers and Streams Network (ARSN) indicated the fish community to be in *good* condition. The reach is among the least-disturbed watersheds in the Southern Pine Plains and Hills (65f) ecoregion based on landuse, road density, and population density. The 2014 data will be used to evaluate the use of Little Cedar Creek as a “*best attainable*” condition reference watershed for comparison with other streams in ecoregion 65f.



Figure 1. Little Cedar Creek at LCEC-1, March 11, 2014.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Cedar Creek at LCEC-1 is a *Fish & Wildlife (F&W)* stream approximately 6.5 miles east of Castleberry. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (78%). As of April 1, 2016, no outfalls were active 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. Little Cedar Creek at LCEC-1 is a glide-pool stream with a bottom substrate dominated by sand, organic matter, and gravel (Figure 1). Although bank stability was noted as a concern within the reach, Habitat quality and availability were rated *sub-optimal* for supporting diverse aquatic macroinvertebrate communities.

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 in comparison to conditions expected in Alabama Coastal Plain 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 at LCEC-1 rated the site as a 3, or *good* (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Conecuh River	
Drainage Area (mi²)	8	
Ecoregion^a	65F	
% Landuse^b		
Wetland	Woody	2%
	Emergent herbaceous	<1%
Forest	Deciduous	12%
	Evergreen	42%
	Mixed	24%
Shrub/scrub		9%
Grassland/herbaceous		7%
Pasture/hay		2%
Cultivated crops		<1%
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
	High intensity	<1%
Barren		<1%
Population/km^{2c}	3	

a.Southern Pine Plains & Hills

b.2011 National Land Cover Dataset

c.2010 US Census

Table 2. Physical characteristics of Little Cedar Creek at LCEC-1, May 6, 2014.

Physical Characteristics	
Width (ft)	12
Canopy Cover	Mostly Shaded
Depth (ft)	
Run	0.7
Pool	4.0
% of Reach	
Run	70
Pool	30
% Substrate	
Gravel	27
Sand	40
Silt	3
Organic Matter	30

Table 3. Results of the habitat assessment conducted on Little Cedar Creek at LCEC-1, May 6, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	83	Optimal (>79)
Sediment Deposition	73	Sub-Optimal (55-79)
Sinuosity	50	Marginal (31-<55)
Bank Vegetative Stability	50	Marginal (31-<58)
Riparian Buffer	95	Optimal (>84)
Habitat Assessment Score	133	
% Maximum Score	78	Sub-Optimal (57-80)

Table 4. Results of the macroinvertebrate bioassessment conducted in Little Cedar Creek at LCEC-1, May 6, 2014.

Macroinvertebrate Assessment		Results
Taxa richness and diversity measures		
	Total # Taxa	55
	# EPT taxa	15
	# Highly-sensitive and Specialized Taxa	6
Taxonomic composition measures		
	% EPC taxa	33
	% Trichoptera & Chironomidae Taxa	38
	% EP Individuals	17
	% Chironomidae Individuals	28
	% Individuals in Dominant 5 Taxa	63
Functional feeding group		
	% Collector-Filterer Individuals	8
	% Tolerant Filterer Taxa	15
Community tolerance		
	# Sensitive EPT	9
	% Sensitive taxa	31
	% Nutrient Tolerant individuals	49
	WMB-I Assessment Score	3
	WMB-I Assessment Rating	Good

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected monthly, March through June of 2014, to help identify any stressors to the biological communities. Little Cedar Creek was not flowing July through October, so samples were not collected during these months. Median values for total dissolved solids, specific conductance, hardness, and alkalinity were higher than background levels for ecoregion 65f.

SUMMARY

To be used for comparison with other streams, “best-attainable” reference reaches must be representative of other streams in the ecoregion. Little Cedar Creek was typical of other streams in the Southern Pine Plains and Hills ecoregion, and in-stream habitat quality was rated as *sub-optimal*. The macroinvertebrate community was characterized by pollution-intolerant taxa groups, indicating *good* community condition. With the exception of some physical parameters, water quality results are within normal ranges for this stream type. Monitoring should continue to ensure that water quality and biological conditions remain stable.

Table 5. Summary of water quality data collected March-June, 2014. 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
Physical							
Temperature (°C)	5	14.5	20.6	17.0	17.7	2.7	
Turbidity (NTU)	5	4.0	8.5	5.7	5.7	1.7	
Total Dissolved Solids (mg/L)	4	101.0	130.0	117.5 ^M	116.5	14.2	
Total Suspended Solids (mg/L)	4	1.0	3.0	1.5	1.8	1.0	
Specific Conductance (µmhos)	5	132.6	172.7	152.9 ^G	154.5	17.1	
Hardness (mg/L)	2	60.0	70.2	65.1 ^G	65.1	7.2	
Alkalinity (mg/L)	4	63.0	87.6	73.5 ^M	74.4	10.5	
Monthly Stream Flow (cfs)	5	4.9	8.7	5.8	6.4	1.4	
Stream Flow during sample collection(cfs)	5	4.9	8.7	5.8	6.4	1.4	
Chemical							
Dissolved Oxygen (mg/L)	5	7.7	9.5	8.4	8.6	0.8	
pH (su)	5	7.4	7.8	7.5	7.5	0.2	
Ammonia Nitrogen (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000	
^J Nitrate+Nitrite Nitrogen (mg/L)	4	0.015	0.032	0.022	0.022	0.008	
Total Kjeldahl Nitrogen (mg/L)	4	0.274	0.784	0.294	0.412	0.248	
^J Total Nitrogen (mg/L)	4	0.289	0.801	0.323	0.434	0.245	
^J Dissolved Reactive Phosphorus (mg/L)	4	< 0.003	0.006	0.003	0.003	0.002	
^J Total Phosphorus (mg/L)	4	0.009	0.016	0.013	0.013	0.003	
^J CBOD-5 (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0	
COD (mg/L)	4	3.0	12.6	7.1	7.4	5.1	
TOC (mg/L)	4	4.1	6.8	6.1	5.8	1.2	
Chlorides (mg/L)	4	3.2	3.4	3.2	3.2	0.1	
Total Metals							
Aluminum (mg/L)	2	0.267	0.346	0.306	0.306	0.056	
Iron (mg/L)	2	0.363	0.582	0.472	0.472	0.155	
^J Manganese (mg/L)	2	0.014	0.019	0.016	0.016	0.004	
Dissolved Metals							
^J Aluminum (mg/L)	2	0.187	0.196	0.192	0.192	0.006	
Antimony (µg/L)	2	< 0.2	< 0.2	0.1	0.1	0.0	
^J Arsenic (µg/L)	2	0.3	0.5 ^H	0.4	0.4	0.1	1
Cadmium (µg/L)	2	< 0.246	< 0.250	0.124	0.124	0.001	
^J Chromium (mg/L)	2	0.001	0.001	0.001	0.001	0.000	
^J Copper (mg/L)	2	< 0.0003	0.0003	0.0003	0.0003	0.000	
Iron (mg/L)	2	0.201	0.406	0.304	0.304	0.145	
Lead (µg/L)	2	< 0.2	< 0.2	0.1	0.1	0.0	
^J Manganese (mg/L)	2	0.009	0.017	0.013	0.013	0.006	
^J Nickel (mg/L)	2	0.0003	0.0004	0.0003	0.0003	0.000	
Selenium (µg/L)	2	< 0.4	< 0.4	0.2	0.2	0.0	
Silver (µg/L)	2	< 0.252	< 0.252	0.126	0.126	0.000	
Thallium (µg/L)	2	< 0.2	< 0.2	0.1	0.1	0.0	
^J Zinc (mg/L)	2	0.002	0.010	0.006	0.006	0.005	
Biological							
Chlorophyll a (ug/L)	4	< 0.10	0.67	0.22	0.29	0.30	
^J E. coli (col/100mL)	4	50	152	66	83	47	

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65f; H=F&W human health criteria exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65f; N=# samples Q=# samples with uncertain exceedances.

FOR MORE INFORMATION, CONTACT:
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