Alabama Department of Environmental Management

Ecological Reference Site

Rivers and Streams Monitoring Program

2013 Monitoring Summary

Good™

Indian Camp Creek at Lauderdale County Road 135 (34.92220/-87.62080)

BACKGROUND

Indian Camp Creek is one of the streams the Alabama Department of Environmental Management (ADEM) monitors as a "best attainable" condition reference watershed for comparison with other streams throughout the Western Highland Rim ecoregion.

Additionally, Indian Camp Creek was selected for biological and water quality monitoring as part of the 2013 Assessment of the Tennessee River Basin. The objectives of the Tennessee Basin Assessment were to assess the biological integrity of each monitoring site and to estimate overall water quality within the basin.

Figure 1. Indian Camp Creek at INCL-1, April 3, 2013.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Indian Camp Creek at INCL-1 is a small *Fish & Wildlife (F&W)* stream in Lauderdale County. It drains approximately 8 mi^2 within the Western Highland Rim ecoregion. According to the 2011 National Land Cover Dataset, landuse within the watershed consists of mostly forest (46%) and pasture/hay. As of September 1, 2012, ADEM's has issued a total of three NPDES permits 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. Indian Camp Creek at INCL-1 is a riffle-run stream characterized by gravel, bedrock, and cobble substrates. The presence of stable substrate within the stream reach provides suitable habitat for macroinvertebrates. However, the overall habitat quality was categorized as *sub-optimal* for supporting macroinvertebrate communities due to bank erosion and limited riparian buffer.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tennessee River
Drainage Area (mi^2)		8
Ecoregion[a]		71f
% Landuse		
Open water		<1
Wetland	Woody	<1
Forest	Deciduous	41
	Evergreen	3
	Mixed	2
Shrub/scrub		9
Grassland/herbaceous		2
Pasture/hay		31
Cultivated crops		5
Development	Open space	6
	Low intensity	<1
	Moderate intensity	<1
Population/km^2[b]		48
# NPDES Permits[c]	**TOTAL**	3
Construction Stormwater		3

a.Western Highland Rim

b.2000 US Census

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

Table 2. Physical characteristics of Indian Camp Creek at INCL-1, May 22, 2013.

Physical Characteristics		
Width (ft)		35
Canopy cover		Mostly Open
Depth (ft)		
	Riffle	0.5
	Run	1.0
	Pool	3.0
% of Reach		
	Riffle	5
	Run	85
	Pool	10
% Substrate		
	Bedrock	30
	Boulder	5
	Cobble	30
	Gravel	20
	Sand	8
	Silt	2
	Organic Matter	3
	Woody Debris	2

Table 3. Results of habitat assessment conducted in Indian Camp Creek at INCL-1, May 22, 2013.

Habitat Assessment	% Max Score	Rating
Instream habitat quality	68	Sub-optimal (59-70)
Sediment deposition	68	Sub-optimal (59-70)
Sinuosity	73	Sub-optimal (65-84)
Bank and vegetative stability	58	Marginal (35-59)
Riparian buffer	55	Marginal (50-69)
Habitat assessment score	**123**	
% Maximum score	**67**	**Sub-optimal (59-70)**

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. The final score indicated the biological community to be in *good* condition (Table 4).

Table 4. Results of macroinvertebrate assessment conducted in Indian Camp Creek at INCL-1, May 22, 2013.

Macroinvertebrate Assessment		
	Results	**Scores**
Taxa richness and diversity measures		**(0-100)**
# EPT taxa	22	78
Shannon Diversity	4.21	70
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	19	42
% Non-insect taxa	4	94
Functional feeding group		
% Predator Individuals	7	23
Community tolerance		
% Tolerant taxa	21	82
WMB-I Assessment Score	**---**	**65**
WMB-I Assessment Rating		**Good (44-72)**

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WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. When possible, in situ measurements and water samples were collected monthly March through October of 2013 to help identify any stressors to the biological communities. Median specific conductance was slightly higher than the median concentration of all verified ecoregional reference reach data collected in the 71f ecoregion. However, all other parameters were within expected limits and did not exceed criteria applicable to Indian Camp Creek's *Fish & Wildlife* use classification.

Table 5. Summary of water quality data collected March-October, 2013 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 for each parameter.

Parameter	N	Min	Max	Med	Avg	SD
Physical						
Temperature (°C)	5	9.8	21.1	17.5	16.8	4.5
Turbidity (NTU)	9	1.3	5.3	3.2	3.0	1.2
J Total Dissolved Solids (mg/L)	4	50.0	82.0	71.0	68.5	13.4
Total Suspended Solids (mg/L)	4	< 1.0	4.0	0.5	1.4	1.8
Specific Conductance (µmhos)	5	77.3	125.7	103.3G	104.3	19.7
Alkalinity (mg/L)	4	33.1	60.5	51.9	49.4	12.3
Stream Flow (cfs)	9	3.0	18.0	4.5	6.4	4.6
Chemical						
Dissolved Oxygen (mg/L)	5	8.4	11.6	8.8	9.2	1.4
pH (su)	5	7.0	7.7	7.1	7.2	0.3
Ammonia Nitrogen (mg/L)	4	< 0.008	< 0.018	0.009	0.008	0.002
Nitrate+Nitrite Nitrogen (mg/L)	4	0.256	0.404	0.323	0.326	0.067
J Total Kjeldahl Nitrogen (mg/L)	4	< 0.058	0.377	0.184	0.194	0.147
J Total Nitrogen (mg/L)	4	< 0.318	0.781	0.490	0.520	0.192
J Dissolved Reactive Phosphorus (mg/L)	4	0.005	0.017	0.012	0.012	0.005
J Total Phosphorus (mg/L)	4	0.009	0.024	0.014	0.016	0.006
CBOD-5 (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0
Chlorides (mg/L)	4	1.8	1.9	1.8	1.8	0.0
Biological						
J E. coli (col/100mL)	4	179	980	261	420	377

G=value higher than median concentration of all verified ecoregional reference reach data collected in ecoregion 71f; J=estimate; N=# samples

SUMMARY

Bioassessment results indicate the macroinvertebrate community to be in *good* condition and the habitat assessment categorized the stream to be *sub-optimal* for supporting macroinvertebrate communities. Results of intensive water quality sampling suggest that Indian Camp Creek is meeting its *Fish & Wildlife* use classification.