Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2009 Monitoring Summary

Good

Indiancamp Creek at Indiancamp Festival Park (Lauderdale County) (34.92220/-87.62080)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Indiancamp Creek watershed for biological and water quality monitoring as part of the 2009 Assessment of the Tennessee River Basin. The objectives of the Tennessee Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the Tennessee basin group. A habitat and macroinvertebrate assessment were conducted at the site on July 1, 2009.

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

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Indiancamp Creek is a *Fish & Wildlife (F&W)* stream located at Indiancamp Festival Park, north of Florence. According to the 2006 National Land Cover Dataset, the watershed is primarily forest (46%) and pasture (Figure 1). As of June 9, 2008, ADEM has issued 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. Indiancamp Creek at INCL-1 is a high-gradient stream with an even combination of bedrock, boulder, cobble, gravel and sand substrates. Overall habitat quality was categorized as *optimal* for supporting 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. 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 each individual metric. Metric results indicated the macroinvertebrate community to be in *good* condition due to a large number of non-insect taxa being collected (Table 4).

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, 2009

Table 2. Physical characteristics of Indiancamp Creek at INCL-1, July 1, 2009.

Physical Characteristics	
Width (ft)	20.0
Canopy Cover	Estimate 50/50
Depth (ft)	
Riffle	0.5
Run	2.0
Pool	3.0
% of Reach	
Riffle	10
Run	70
Pool	20
% Substrate	
Bedrock	20
Boulder	20
Clay	2
Cobble	15
Gravel	20
Sand	15
Organic Matter	8

Table 3. Results of the habitat assessment conducted on Indiancamp Creek at INCL-1, July 1, 2009.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	87	Optimal >70
Sediment Deposition	78	Optimal >70
Sinuosity	85	Optimal >84
Bank and Vegetative Stability	65	Sub-optimal (60-74)
Riparian Buffer	68	Marginal (50-69)
Habitat Assessment Score	**185**	
% Maximum Score	**77**	**Optimal >70**

Table 4. Results of the macroinvertebrate bioassessment conducted on Indiancamp Creek at INCL-1, July 1, 2009.

Macroinvertebrate Assessment			
	Results	**Scores**	**Rating**
Taxa composition measures			
# Plecoptera taxa	62	67	Excellent (≥67)
Taxonomic composition measures			
% EPT taxa	37	98	Excellent (≥67)
% Non-insect taxa	14	55	Fair (45-67)
Habitat measures			
# Clinger taxa	22	85	Excellent (≥67)
Tolerance measures			
Beck's community tolerance index	10	74	Good (54-76)
% Tolerant taxa	25	62	Fair (58-87)
WMB-I Assessment Score	**--**	**74**	**Good (65-82)**

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during March through October of 2009 to help identify any stressors to the biological communities. Mercury and lead concentrations exceeded Aquatic Life Use criteria applicable to the *F&W* use classification. The median dissolved reactive phosphorus concentrations were greater than the 90th percentile of all ecoregional reference reach data collected in the Highland Rim ecoregion (71f).

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Indiancamp Creek at INCL-1 to be in *good* condition with *optimal* habitat conditions. Water chemistry results indicated elevated dissolved reactive phosphorus and metal concentrations. Monitoring should continue to ensure that biological and chemical conditions remain stable..

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Table 5. Summary of water quality data collected March-October, 2009. 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)	10	10.6	22.4	18.7	17.4	4.7		
Turbidity (NTU)	10	1.9	9.5	3.3	3.8	2.3		
Total Dissolved Solids (mg/L)	8	26.0	83.0	67.5	60.1	17.6		
Total Suspended Solids (mg/L)	8	< 0.3	11.0	2.5	3.3	3.4		
Specific Conductance (µmhos)	10	71.0	130.0	102.5	101.6	20.4		
Hardness (mg/L)	3	31.7	48.1	38.8	39.5	8.2		
Alkalinity (mg/L)	8	27.4	70.5	42.0	44.1	13.3		
Stream Flow (cfs)	10	4.0	23.8	9.5	11.2	6.9		
Chemical								
Dissolved Oxygen (mg/L)	10	7.9	11.4	9.1	9.6	1.2		
pH (su)	10	7.0	8.0	7.7	7.6	0.3		
Ammonia Nitrogen (mg/L)	2	< 0.006	<0.006	0.003	0.003	0.000	B	
Nitrate+Nitrite Nitrogen (mg/L)	5	0.313	1.359	0.380	0.680	0.481	BJ	
Total Kjeldahl Nitrogen (mg/L)	2	< 0.089	0.089	0.044	0.044	0.000	B	
Total Nitrogen (mg/L)	2	< 0.358	0.374	0.366	0.366	0.011	B	
Dissolved Reactive Phosphorus (mg/L)	8	0.015	0.106	0.033[M]	0.045	0.036	J	
Total Phosphorus (mg/L)	2	0.012	0.018	0.015	0.015	0.004	B	
CBOD-5 (mg/L)	8	< 1.0	1.0	0.5	0.5	0.0		
Chlorides (mg/L)	8	0.9	10.8	1.3	2.8	3.4		
Atrazine (µg/L)	1				0.38			
Total Metals								
Aluminum (mg/L)	4	< 0.046	0.090	0.053	0.056	0.025	J	
Iron (mg/L)	4	0.045	0.096	0.072	0.071	0.022	J	
Manganese (mg/L)	4	< 0.009	0.014	0.007	0.008	0.004	J	
Dissolved Metals								
Aluminum (mg/L)	4	< 0.060	0.060	0.030	0.030	0.000		
Antimony (µg/L)	4	< 0.5	6.0	3.0	2.3	1.4		
Arsenic (µg/L)	4	< 0.4	0.4	0.2	0.2	0.0		
Cadmium (mg/L)	4	< 0.000	0.002	0.001	0.001	0.000		
Chromium (mg/L)	4	< 0.007	0.007	0.004	0.004	0.000		
Copper (mg/L)	4	< 0.200	0.200	0.100	0.100	0.000		
Iron (mg/L)	4	< 0.020	0.025	0.010	0.014	0.008	J	
Lead (µg/L)	4	< 1.1	9.8	0.9	3.1	4.5	J	2
Manganese (mg/L)	4	< 0.009	0.009	0.004	0.004	0.000		
Mercury (µg/L)	1				0.262		J	1
Nickel (mg/L)	4	< 0.008	0.008	0.004	0.004	0.000		
Selenium (µg/L)	4	< 0.4	0.4	0.2	0.2	0.0		
Silver (mg/L)	4	< 0.001	0.001	0.000	0.000	0.000		
Thallium (µg/L)	4	< 0.4	0.4	0.2	0.2	0.0		
Zinc (mg/L)	4	< 0.060	0.060	0.030	0.030	0.000		
Biological								
Chlorophyll a (ug/L)	8	< 1.00	1.07	0.50	0.57	0.20		
Fecal Coliform (col/100 mL)	8	20	570	113	161	179	J	
E. coli (col/100mL)	2	365	1733	1,049	1049	967	J	

B=one or more samples excluded from calculations because they did not meet laboratory QC requirements; J=estimate; N=# samples; M=value > 90th percentile of all verified ecoregional reference reach data collected within eco-region 71f