

2010 Monitoring Summary



Pinchony Creek at Montgomery County Road 24 (32.17642/-86.38552)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Pinchony Creek watershed for biological and water quality monitoring as part of the 2010 Assessment of the Alabama Coosa and Tallapoosa (ACT) River Basins. The objectives of the ACT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the ACT basin group.



Figure 1. Upstream-view of Pinchony Creek at PNCM-8A, April 15, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Pinchony Creek is a *Fish & Wildlife (F&W)* stream in Lowndes and Montgomery Counties. It combines with Pintlala Creek and adds to the waters of the Alabama River. Based on the 2000 National Land Cover Dataset, land use within the watershed is mostly forest (45%), cultivated crops, pasture and some shrub/scrub. As of May 13, 2013, there are 13 NPDES permitted outfalls active 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. Pinchony Creek at PNCM-8A is a moderate gradient, riffle-run stream (Figure 1). Instream substrates are largely hardpan clay, and sand. Overall habitat quality was categorized as *sub-optimal* for supporting macroinvertebrate communities. Bank and vegetative stability were concerns at the site.

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

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Alabama River
Drainage Area (mi²)		76
Ecoregion^a		65a
% Landuse		
Open water		<1
Wetland	Woody	10
	Emergent herbaceous	1
Forest	Deciduous	25
	Evergreen	17
	Mixed	3
Shrub/scrub		14
Grassland/herbaceous		<1
Pasture/hay		12
Cultivated crops		13
Development	Open space	3
	Low intensity	<1
	Moderate intensity	<1
Barren		1
Population/km^{2b}		15
# NPDES Permits^c	TOTAL	13
	Construction Stormwater	8
	Mining	3
	Industrial General	2

a.Blackland Prairie

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, May 13, 2013

Table 2. Physical characteristics of Pinchony Creek at PNCM-8A, April 15, 2010.

Physical Characteristics		
Width (ft)		30
Canopy Cover		Mostly Shaded
Depth (ft)	Riffle	0.6
	Run	1.0
	Pool	0.8
% of Reach	Riffle	5
	Run	85
	Pool	10
% Substrate	Hardpan Clay	45
	Cobble	3
	Gravel	5
	Sand	40
	Silt	2
	Organic Matter	5

Table 3. Results of the habitat assessment conducted in Pinchony Creek at PNCM-8A, April 15, 2010.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	57	Sub-optimal (53-65)
Sediment Deposition	62	Sub-optimal (53-65)
Sinuosity	65	Sub-optimal (65-84)
Bank and Vegetative Stability	35	Marginal (35-59)
Riparian Buffer	80	Sub-optimal (70-89)
Habitat Assessment Score	142	
% Maximum Score	59	Sub-optimal (53-65)

Table 4. Results of the macroinvertebrate bioassessment conducted in Pinchony Creek at PNCM-8A, April 15, 2010.

Macroinvertebrate Assessment		Results
Taxa richness and diversity measures		
# Ephemeroptera (mayfly) taxa		12
# Plecoptera (stonefly) taxa		2
# Trichoptera (caddisfly) taxa		4
Taxonomic composition measures		
% Non-insect taxa		14
% Non-insect organisms		8
% Plecoptera		3
Community tolerance measures		
Beck's community tolerance index		9
WMB-I Assessment Score		49
WMB-I Assessment Rating		Fair (48-71)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. *In situ* measurements and water samples were collected in April, May, June and July 2010, to help identify any stressors to the biological communities. In situ parameters were also measured during the macroinvertebrate assessment. Values for specific conductance, hardness, and alkalinity were higher than expected for the ecoregion. Pinchony Creek met *F&W* use classification criteria for temperature, pH, turbidity, dissolved oxygen and pathogens. Dissolved metals results were mostly non-detect, except for manganese and iron. Organics results were less than detection limit, including atrazine.

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data. Bioassessment results indicated the macroinvertebrate community in Pinchony Creek at PNCM-8A to be in *fair* condition, however, taxa richness and diversity are relatively high for this ecoregion. Unstable banks were noted during the habitat assessment but other than that habitat was adequate. Monitoring of Pinchony Creek should continue to ensure that conditions remain stable at the site.

Table 5. Summary of water quality data collected April-July, 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
Physical							
Temperature (°C)	5	16.3	25.2	22.4	21.2		
Turbidity (NTU)	5	9.0	38.6	18.2	20.2		
Total Dissolved Solids (mg/L)	4	96.0	162.0	139.0	134.0		J
Total Suspended Solids (mg/L)	4	1.0	23.0	8.0	10.0		J
Specific Conductance (µmhos)	5	196.1	253.6	240.7 ^G	226.2		
Hardness (mg/L)	4	83.0	110.0	96.8 ^G	96.7		
Alkalinity (mg/L)	4	79.0	101.0	94.6 ^M	92.3		
Stream Flow (cfs)	5	0.6	26.3	10.8	11.0		
Chemical							
Dissolved Oxygen (mg/L)	5	5.7	8.3	6.7	7.0		1.1
pH (su)	5	7.4	7.6	7.5	7.5		0.1
Ammonia Nitrogen (mg/L)	4	< 0.021	< 0.021	0.010	0.010		0.000
Nitrate+Nitrite Nitrogen (mg/L)	4	0.016	0.164	0.109	0.100		0.071 J
Total Kjeldahl Nitrogen (mg/L)	4	< 0.080	0.452	0.388	0.317		0.188
Total Nitrogen (mg/L)	4	< 0.056	0.616	0.496	0.416		0.247 J
Dissolved Reactive Phosphorus (mg/L)	4	0.017	0.026	0.021	0.021		0.004
Total Phosphorus (mg/L)	4	0.044	0.067	0.064	0.060		0.011
CBOD-5 (mg/L)	4	< 2.0	2.1	1.0	1.3		0.6
Chlorides (mg/L)	4	3.6	5.0	4.3	4.3		0.7
Atrazine (µg/L)	2	< 0.02	< 0.02	0.01	0.01		0.00
Total Metals							
Aluminum (mg/L)	4	0.294	1.520	0.936	0.922		0.503
Iron (mg/L)	4	0.649	2.360	1.400	1.452		0.707
Manganese (mg/L)	4	< 0.001	0.037	0.000	0.010		0.018 J
Dissolved Metals							
Aluminum (mg/L)	4	< 0.033	< 0.033	0.016	0.016		0.000
Antimony (µg/L)	4	< 0.7	< 1.9	0.9	0.8		0.3
Arsenic (µg/L)	4	< 0.4	< 2.1	1.0	0.8		0.4
Cadmium (mg/L)	4	< 0.003	< 0.014	0.007	0.006		0.003
Chromium (mg/L)	4	< 0.013	< 0.013	0.006	0.006		0.000
Copper (mg/L)	4	< 0.013	< 0.013	0.006	0.006		0.000
Iron (mg/L)	4	< 0.026	0.241	0.060	0.093		0.108 J
Lead (µg/L)	4	< 1.7	< 1.7	0.8	0.8		0.0
Manganese (mg/L)	4	< 0.001	0.005	0.000	0.002		0.002 J
Mercury (µg/L)	4	< 0.08	< 0.08	0.04	0.04		0.00
Nickel (mg/L)	4	< 0.019	< 0.019	0.010	0.010		0.000
Selenium (µg/L)	4	< 1.7	< 1.7	0.8	0.8		0.0
Silver (mg/L)	4	< 0.002	< 0.002	0.001	0.001		0.000
Thallium (µg/L)	4	< 0.6	< 0.6	0.3	0.3		0.0
Zinc (mg/L)	4	< 0.030	< 0.030	0.015	0.015		0.000
Biological							
Chlorophyll a (µg/L)	4	< 0.53	2.14	0.80	1.06		0.77
E. coli (col/100mL)	4	93	921	242	374		390

G=value greater than median concentration of all verified reference data collected in ecoregion 65a; J=estimate; M=value > 90th percentile of all verified ecoregional reference reach data collected in ecoregion 65a; N=# samples; Q= Laboratory Qualifier Codes.

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