

2008 Monitoring Summary



Pond Creek at Blue Springs WMA Road 45 (Covington County) (31.09315/-86.51805)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Pond Creek watershed for biological and water quality monitoring as part of the [2008 Assessment of the Southeast Alabama \(SE AL\) River Basins](#). The objectives of the SE AL Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the SE AL basin group. Pond Creek is also among the least-disturbed watersheds in the Dougherty Plain ecoregion (65g) based on land use, road density, and population density. The 2008 data will be used to evaluate the use of Pond Creek as “*best attainable*” condition reference watershed for comparison with other streams in this ecoregion.

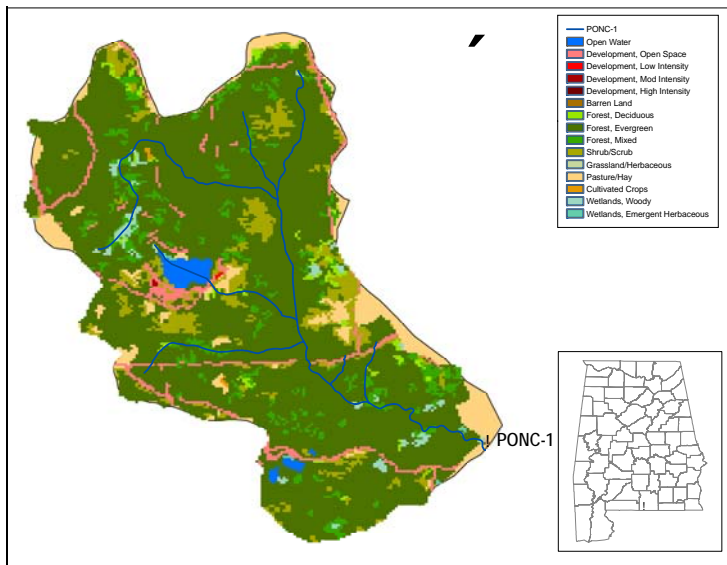


Figure 1. Sampling location and landuse within the Pond Creek watershed at PONC-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Pond Creek is a small [Fish & Wildlife \(F&W\)](#) stream in Covington County’s Blue Spring Wildlife Management Area (Figure 1). It is a tributary of Five Runs Creek which flows into the Yellow River. Based on the 2000 National Land Cover Dataset, land use within the watershed is primarily forest (82%) with some shrub/scrub. As of February 23, 2011, no NPDES permits have been issued in 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. Pond Creek at PONC-1 is a low gradient glide-pool stream. Instream substrates were dominated by sand. Overall habitat quality was categorized as *sub-optimal*. However, instream habitat quality and sinuosity were rated as *poor*.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM’s [Intensive Multi-habitat Bio-assessment methodology \(WMB-I\)](#). Table 4 summarizes results of taxonomic richness, community composition, and community tolerance metrics. 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 in Pond Creek at PONC-1 to be in *good* condition.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Yellow River	
Drainage Area (mi ²)	7	
Ecoregion ^a	65g	
% Landuse		
Open water		<1
Wetland	Woody	1
	Emergent herbaceous	<1
Forest	Deciduous	1
	Evergreen	75
	Mixed	6
Shrub/scrub		8
Pasture/hay		2
Cultivated crops		<1
Development	Open space	4
	Low intensity	<1
	Moderate intensity	<1
Population/km ^{2b}	<1	

a. Dougherty Plain

b. 2000 US Census

Table 2. Physical characteristics of Pond Creek at PONC-1, May 21, 2008.

Physical Characteristics		
Width (ft)	9	
Canopy Cover	Mostly Shaded	
Depth (ft)	Run	1.0
	Pool	2.0
% of Reach	Run	50
	Pool	50
% Substrate	Sand	80
	Silt	8
	Organic Matter	12

Table 3. Results of the habitat assessment conducted in Pond Creek at PONC-1, May 21, 2008.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	39	Poor <40
Sediment Deposition	64	Sub-optimal (53-65)
Sinuosity	38	Poor <45
Bank and Vegetative Stability	76	Optimal >74
Riparian Buffer	88	Sub-optimal (70-89)
Habitat Assessment Score	140	
% Maximum Score	64	Sub-optimal (53-65)

Table 4. Results of the macroinvertebrate bioassessment conducted in Pond Creek at PONC-1, May 21, 2008.

Macroinvertebrate Assessment			
	Results	Scores (0-100)	Rating
Taxa richness measures			
# EPT genera	11	44	Fair (38-56)
Taxonomic composition measures			
% Non-insect taxa	11	71	Fair (61.9-92.7)
% Plecoptera	33	100	Excellent (>52.8)
% Dominant taxa	31	46	Fair (47.1-70.5)
Functional composition measures			
% Predators	10	36	Fair (30.2-45.2)
Tolerance measures			
Beck's community tolerance index	8	36	Good (31.9-65.9)
% Nutrient tolerant organisms	27	72	Fair (50.9-76.2)
WMB-I Assessment Score	--	58	Good (57-78)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. [In situ measurements](#) and [water samples](#) were collected July, September, and November 2008 to help identify any stressors to the biological communities. In situ parameters were also measured during the macroinvertebrate assessment. The slightly acidic pH is typical for this region of Alabama. Dissolved nickel exceeded *F&W* aquatic life use criteria on November 18, 2008. Median dissolved aluminum concentrations were slightly higher than expected, based on verified reference reach data collected in ecoregion 65g. No organics samples were collected.

SUMMARY

Landuse, road density, and population density categorized Pond Creek as among the least-disturbed watersheds in the SE-AL basin group. However, to be used for comparison with other streams, best attainable" reference reaches must be representative of other streams in the ecoregion. Pond Creek at PONC-1 was typical of other streams in the Dougherty Plains ecoregion, which are generally darkly tannic, low-gradient, sandy-bottomed streams. Slightly acidic instream pH is also characteristic of this stream type. The macroinvertebrate community was found to be in *good* condition, with excellent representation of pollution intolerant taxa (stoneflies). However, instream habitat was limited and water quality sampling showed some dissolved metals to be higher than expected based on applicable criteria and comparison with least-impaired reference reach data.

Table 5. Summary of water quality data collected during 2008. 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	E
Physical							
Temperature (°C)	4	11.3	21.9	21.4	19.0	5.2	
Turbidity (NTU)	4	1.7	4.4	2.8	2.9	1.1	
Total Dissolved Solids (mg/L)	3	< 1.0	54.0	8.0	20.8	29.0	
Total Suspended Solids (mg/L)	3	< 1.0	< 1.0	0.5	0.7	0.3	
Specific Conductance (µmhos)	4	12.9	22.5	15.1	16.4	4.2	
Hardness (mg/L)	3	1.1	3.2	2.2	2.2	1.0	
Alkalinity (mg/L)	3	< 1.0	< 1.0	0.5	0.5	0.0	
Stream Flow (cfs)	4	1.4	5.1	2.8	3.0	1.5	
Chemical							
Dissolved Oxygen (mg/L)	4	8.0	10.3	8.2	8.6	1.1	
pH (su)	4	4.0 ^C	5.0	4.6	4.6	0.4	4
Ammonia Nitrogen (mg/L)	3	< 0.014	< 0.015	0.008	0.007	0.000	
Nitrate+Nitrite Nitrogen (mg/L)	3	0.032	0.057	0.037	0.042	0.013	
Total Kjeldahl Nitrogen (mg/L)	3	< 0.141	< 0.150	0.075	0.074	0.003	
Total Nitrogen (mg/L)	3	< 0.107	0.128	0.112	0.116	0.011	
Dissolved Reactive Phosphorus (mg/L)	3	0.012	0.013	0.012	0.012	0.001	
^J Total Phosphorus (mg/L)	3	< 0.005	0.020	0.019	0.014	0.010	
CBOD-5 (mg/L)	3	< 1.0	< 2.0	1.0	1.0	0.5	
Chlorides (mg/L)	3	1.9	2.5	2.2	2.2	0.3	
Total Metals							
^J Aluminum (mg/L)	3	0.097	0.263	0.121	0.160	0.090	
^J Iron (mg/L)	3	0.092	0.271	0.196	0.186	0.090	
^J Manganese (mg/L)	3	0.009	0.035	0.035	0.026	0.015	
Dissolved Metals							
^J Aluminum (mg/L)	3	0.047	0.222	0.059 ^M	0.109	0.098	
Antimony (µg/L)	3	< 2.0	< 2.0	1.0	0.1	0.0	
Arsenic (µg/L)	3	< 1.6	< 2.2	1.1	1.0	0.2	
Cadmium (mg/L)	3	< 0.003	< 0.005	0.002	0.002	0.001	
Chromium (mg/L)	3	< 0.004	< 0.013	0.006	0.005	0.003	
Copper (mg/L)	3	< 0.005	< 0.013	0.006	0.005	0.002	
^J Iron (mg/L)	3	0.030	0.228	0.086	0.115	0.102	
Lead (µg/L)	3	< 0.6	< 1.5	0.7	0.6	0.3	
^J Manganese (mg/L)	3	0.010	0.035	0.033	0.026	0.014	
Mercury (µg/L)	3	< 0.0	< 0.1	0.0	0.0	0.0	
^J Nickel (mg/L)	3	< 0.004	0.013 ^A	0.003	0.006	0.006	1
Selenium (µg/L)	3	< 1.5	< 1.6	0.8	0.8	0.0	
Silver (mg/L)	3	< 0.002	< 0.003	0.001	0.001	0.000	
Thallium (µg/L)	3	< 0.5	< 0.6	0.3	0.3	0.0	
^J Zinc (mg/L)	3	< 0.003	< 0.006	0.003	0.002	0.001	
Biological							
Chlorophyll a (ug/L)	3	< 0.10	< 0.10	0.05	0.05	0.00	
^J Fecal Coliform (col/100 mL)	3	28	600	62	230	321	

A=*F&W* aquatic life use criterion exceeded; C=*F&W* criterion exceeded; E=# of samples that exceeded criterion; J=estimate; M=value>90% of all verified ecoregional reference reach data collected in ecoregion 65g; N=# of samples.

FOR MORE INFORMATION, CONTACT:
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