Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2014 Monitoring Summary

Good

Panther Creek at W Mill Street, Butler County (31.63168/-86.76729)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Panther Creek watershed for biological and water quality monitoring as part of the 2014 Assessment of Southeast Alabama. The objectives of the Southeast Alabama Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within Southeast Alabama.

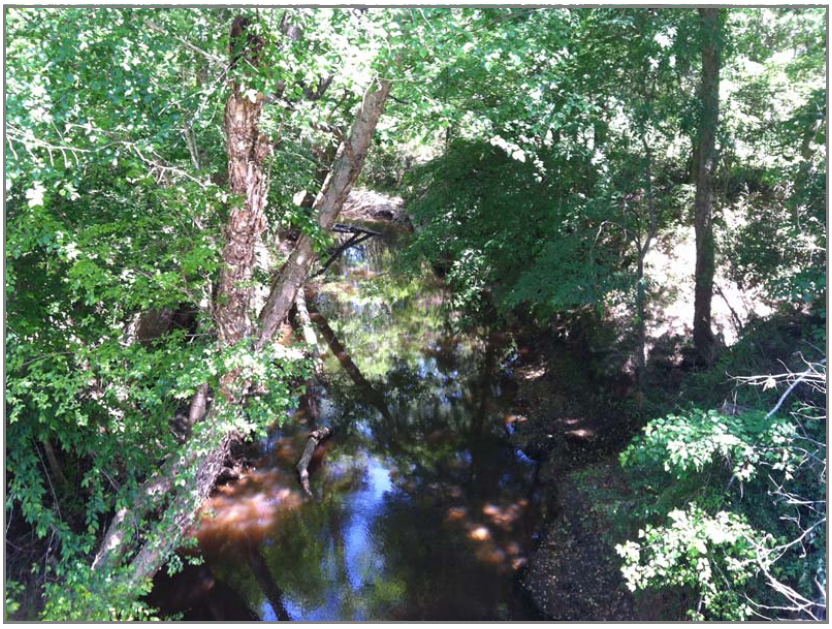

Figure 1. Panther Creek at PNRB-1, May 6, 2014.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Panther Creek is a small *Fish & Wildlife (F&W)* stream located approximately 1 mile west of Georgiana in the Conecuh River basin. Based on the 2011 National Land Cover Dataset, land use within the watershed is primarily forest (76%). As of April 1, 2016, there were six NPDES outfalls active in the area.

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. Panther Creek at PNRB-1 is characterized by a clay bottom, typical of creeks in the 65d ecoregion (Figure 1). Overall habitat quality was categorized as *marginal.*

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

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Conecuh R
Drainage Area (mi^2)		34
Ecoregion[a]		65D
% Landuse[b]		
Open water		<1%
Wetland	Woody	4%
	Emergent herbaceous	<1%
Forest	Deciduous	14%
	Evergreen	56%
	Mixed	6%
Shrub/scrub		9%
Grassland/herbaceous		3%
Pasture/hay		4%
Cultivated crops		1%
Development	Open space	4%
	Low intensity	<1%
	Moderate intensity	<1%
	High intensity	<1%
Barren		<1%
Population/km^2[c]		3
# NPDES Permits[d]	**TOTAL**	6
Construction		6

a. Southern Hilly Gulf Coastal Plain

b. 2011 National Land Cover Dataset

c. 2010 US Census

d. #NPDES outfalls downloaded from ADEM's NPDES Management System database, April 1, 2016.

Table 2. Physical characteristics of Panther Creek at PNRB-1, July 2, 2014.

Physical Characteristics		
Width (ft)		15
Canopy cover		Mostly Shaded
Depth (ft)		
	Run	1
	Pool	2
% of Reach		
	Run	20
	Pool	80
% Substrate		
	Clay	9
	Cobble	1
	Gravel	3
	Hard Pan Clay	75
	Sand	5
	Silt	5
	Organic Matter	2

Table 3. Results of the habitat assessment conducted on Panther Creek at PNRB-1, July 2, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	36	Marginal (31-54)
Sediment Deposition	53	Marginal (31-54)
Sinuosity	33	Marginal (31-54)
Bank Vegetative Stability	41	Marginal (31-57)
Riparian Buffer	65	Sub-Optimal(60-84)
Habitat Assessment Score	***81***	
% Maximum Score	***48***	**Marginal (31-<56)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Panther Creek at PNRB-1, July 2, 2014.

Macroinvertebrate Assessment		
	Results	**Scores**
Taxa richness and diversity measures		**(0-100)**
% EPC taxa	27	42
% Dominant Taxon	15	91
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	24	44
Functional feeding group		
# Collector Taxa	22	75
Community tolerance		
% Nutrient Tolerant individuals	24	71
WMB-I Assessment Score	**---**	**64**
WMB-I Assessment Rating		**Good (48-74)**

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were scheduled for monthly or semi-monthly (metals) sampling, March through October of 2014 to help identify any stressors to the biological communities. However, samples could not be collected in September or October due to no flow conditions. Dissolved oxygen was <5.0 mg/L during low flow conditions in July and August.

SUMMARY

Results of the biological survey indicated the macroinvertebrate community to be in good condition within the reach. However, the habitat assessment indicated sediment deposition, bank erosion, and limited instream habitat within the reach. Monitoring should continue to ensure that biological and water conditions remain stable.

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Table 5. Summary of water quality data collected March through October, 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)	7	13.2	26.2	24.2	20.6	5.6	
Turbidity (NTU)	7	8.5	54.5	12.0	20.1	16.4	
Total Dissolved Solids (mg/L)	6	52.0	92.0	68.0	69.7	14.2	
Total Suspended Solids (mg/L)	6	4.0	71.0	7.0	21.7	27.1	
Specific Conductance	7	30.7	71.2	49.1	52.6	15.9	
Hardness (mg/L)	3	11.8	26.3	14.5	17.5	7.7	
Alkalinity (mg/L)	6	4.9	29.4	13.0	15.8	10.6	
Monthly Stream Flow (cfs)	8	0.0	60.4	0.7	9.8	20.8	
Measured Stream Flow (cfs)	5	0.1	60.4	7.2	15.6	25.3	
Chemical							
Dissolved Oxygen (mg/L)	7	3.1 C	9.9	6.5	6.5	2.8	
pH (SU)	7	6.1	7.0	6.5	6.6	0.3	
J Ammonia Nitrogen (mg/L)	6	< 0.006	0.011	0.003	0.005	0.003	
J Nitrate+Nitrite Nitrogen (mg/L)	6	0.003	0.037	0.015	0.016	0.011	
Total Kjeldahl Nitrogen (mg/L)	6	0.406	1.150	0.501	0.595	0.281	
J Total Nitrogen (mg/L)	6	0.421	1.160	0.517	0.612	0.278	
J Dis Reactive Phosphorus	6	0.003	0.007	0.005	0.005	0.001	
Total Phosphorus (mg/L)	6	0.027	0.068	0.032	0.037	0.016	
CBOD-5 (mg/L)	6	< 2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	6	2.0	3.4	3.1	2.9	0.5	
Total Metals							
Aluminum (mg/L)	3	0.214	0.876	0.286	0.459	0.363	
Iron (mg/L)	3	1.290	2.320	1.370	1.660	0.573	
J Manganese (mg/L)	3	0.024	0.135	0.030	0.063	0.062	
Dissolved Metals							
J Aluminum (mg/L)	3	< 0.050	0.182	0.091	0.099	0.079	
Antimony (µg/L)	3	< 0.176	0.176	0.088	0.088	0.000	
J Arsenic (µg/L)	3	0.452	1.600 H	0.640	0.897	0.616	3
Cadmium (µg/L)	3	< 0.246	< 0.246	0.123	0.123	0.000	
J Chromium (µg/L)	3	0.640	2.381	0.800	1.274	0.962	
J Copper (µg/L)	3	0.530	0.968	0.570	0.689	0.242	
Iron (mg/L)	3	0.411	1.990	0.752	1.051	0.831	
J Lead (µg/L)	3	0.240	0.400 S	0.357	0.332	0.083	1
J Manganese (mg/L)	3	< 0.006	0.025	0.021	0.016	0.012	
J Nickel (µg/L)	3	1.160	1.400	1.348	1.303	0.126	
Selenium (µg/L)	3	< 0.395	0.395	0.198	0.198	0.000	
Silver (µg/L)	3	< 0.252	< 0.252	0.126	0.126	0.000	
Thallium (µg/L)	3	< 0.233	< 0.233	0.116	0.116	0.000	
J Zinc (µg/L)	3	3.780	8.098	5.200	5.693	2.201	
Biological							
Chlorophyll a (mg/m³)	6	< 0.10	48.06	1.20	8.84	19.22	
E coli (MPN/DL)	6	22.8	217.2	132.8	126.9	76.0	

C= *F&W* criterion violated; E=# of samples that exceeded criteria; H=*F&W* human health criterion exceeded; S= *F&W* hardness-adjusted aquatic life use criteria exceeded J=estimate; N= # samples; Q=# of samples that it is uncertain if criteria was exceeded.