

# 2014 Monitoring Summary



## Patsaliga Creek at Pike County Road 30 (31.83190, -86.18314)

### BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Patsaliga Creek watershed for biological monitoring as part of the 2014 Assessment of the Southeastern Alabama (SEAL) River Basins. A previous survey of Patsaliga Creek at PSGP-1 indicated the fish community to be in *poor* condition. Data collected during the 2014 study will be used to provide additional data to fully assess the biological, chemical, and physical conditions within the reach, and determine use support status of Patsaliga Creek for the 2016 Integrated Water Quality Report.



Figure 1. Patsaliga Creek at PSGP-1, April 16, 2014.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Patsaliga Creek is a *Fish & Wildlife (F&W)* stream located in the Southern Hilly Gulf Coastal Plain (65d) ecoregion. Based on the 2011 National Land Cover Dataset, landuse within the watershed is predominantly forest (59%), with some shrub/scrub and wetland areas. As of April 1, 2016, one NPDES outfall is active within this watershed.

### REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the fish community 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. Patsaliga Creek at PSGP-1 is a relatively deep, slow moving reach, characterized by organic matter, mud/muck, and silt substrates (Figure 1). Overall habitat quality and availability was rated as *sub-optimal* for supporting diverse aquatic communities mainly due to high sediment deposition and marginal vegetative stability.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
<b>Basin</b>		Conecuh R
<b>Drainage Area (mi<sup>2</sup>)</b>		135
<b>Ecoregion<sup>a</sup></b>		65D
<b>% Landuse<sup>b</sup></b>		
	Open water	1%
	Wetland	Woody 11%
		Emergent herbaceous <1%
	Forest	Deciduous 26%
		Evergreen 29%
		Mixed 4%
	Shrub/scrub	12%
	Grassland/herbaceous	2%
	Pasture/hay	7%
	Cultivated crops	4%
	Development	Open space 3%
		Low intensity <1%
		Moderate intensity <1%
		High intensity <1%
	Barren	<1%
<b>Population/km<sup>2c</sup></b>		8
<b># NPDES Permits<sup>d</sup></b>	<b>TOTAL</b>	1
	Small Mining	1

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 Patsaliga Creek at PSGP-1, August 5, 2014.

Physical Characteristics	
<b>Width (ft)</b>	35
<b>Canopy Cover</b>	Estimate 50/50
<b>Depth (ft)</b>	
	Pool 5.0
<b>% of Reach</b>	
	Pool 100
<b>% Substrate</b>	
	Clay 5
	Mud/Muck 20
	Sand 5
	Silt 10
	Organic Matter 60

**Table 3.** Results of the habitat assessment conducted on Patsaliga Creek at PSGP-1, Aug 5, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	58	Sub-Optimal (55-79)
Sediment Deposition	43	Marginal (31-<55)
Sinuosity	63	Sub-Optimal (55-79)
Bank Vegetative Stability	56	Marginal (31-<58)
Riparian Buffer	85	Optimal (>84)
<b>Habitat Assessment Score</b>	<b>112</b>	
<b>% Maximum Score</b>	<b>62</b>	<b>Sub-Optimal (57-80)</b>

**BIOASSESSMENT RESULTS**

The fish community in Patsaliga Creek at PSGP-1 was sampled using Alabama’s Fish Community Index of Biotic Integrity (AL-IBI), developed through a multi-agency (GSA, ADCNR, ADEM) project to establish a comprehensive fish community bioassessment tool for wadeable streams and rivers across the State. The data collected during this survey were used to score the overall health of the fish community, based on conditions expected for wadeable streams and rivers in the *Southern Plains* Ichthyoregion. The AL-IBI uses twelve measures of species richness and diversity, tolerance/intolerance, and abundance, condition, and reproduction to assess the overall health of the fish community. The final IBI score is the sum of all individual metrics on a 60 point scale. The IBI score for Patsaliga Creek at PSGP-1 was 26, indicating the fish community to be in *poor* condition (Table 4).

**Table 4.** Results of the fish community bioassessment conducted in Patsaliga Creek at PSGP-1, Aug 5, 2014.

Fish Community Assessment	Results	Score
	<b>Species Richness &amp; Diversity</b>	
Total native species	18	3
Number shiner species	2	1
Number of sucker species	0	1
Number of centrarchid species	4	1
Number of darter+madtom species	4	3
<b>Tolerance &amp; Intolerance Measures</b>		
Percent of tolerant species	8.96	3
Percent Green Sunfish & Yellow Bullhead	0	5
<b>Trophic Measures</b>		
Percent insectivorous cyprinids	11.94	1
Percent invertivores	44.78	3
Percent top carnivores	2.99	3
<b>Abundance, Condition &amp; Reproductive Measures</b>		
Percent DELT+hybrids	2.99	1
Number of lithophilic spawners	7	1
<b>IBI Assessment Score</b>		<b>26</b>
<b>Condition</b>		<b>Poor</b>

**WATER CHEMISTRY**

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly March through October of 2014 to help identify any stressors to the biological communities. For Patsaliga Creek at PSGP-1, total aluminum and dissolved iron values were higher than expected, based on data collected at reference reaches within the Southern Hilly Gulf Coastal Plain (65d) ecoregion.

**Table 5.** Summary of water quality data collected March-August, 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	E	Q
<b>Physical</b>								
Temperature (°C)	6	13.2	24.2	20.7	19.2	4.8		
Turbidity (NTU)	7	16.4	43.9	23.6	25.4	9.5		
Total Dissolved Solids (mg/L)	7	36.0	78.0	54.0	59.3	15.1		
Total Suspended Solids (mg/L)	7	3.0	11.0	6.0	6.1	3.1		
Specific Conductance (µmhos)	6	37.8	64.6	51.8	50.1	10.6		
Hardness (mg/L)	4	12.8	18.7	16.4	16.0	2.7		
Alkalinity (mg/L)	7	8.5	21.6	16.2	15.2	4.8		
Monthly Stream Flow (cfs)	1	0.1	0.1	0.1	0.1	0.0		
<b>Chemical</b>								
Dissolved Oxygen (mg/L)	6	6.4	9.5	7.3	7.5	1.2		
pH (su)	6	6.3	6.9	6.6	6.6	0.2		
Ammonia Nitrogen (mg/L)	7	< 0.006	0.035	0.003	0.010	0.012		
Nitrate+Nitrite Nitrogen (mg/L)	7	0.016	0.174	0.096	0.086	0.051		
Total Kjeldahl Nitrogen (mg/L)	7	0.221	0.901	0.442	0.488	0.240		
Total Nitrogen (mg/L)	7	0.324	0.917	0.551	0.575	0.216		
Dissolved Reactive Phosphorus (mg/L)	7	0.005	0.011	0.006	0.007	0.002		
Total Phosphorus (mg/L)	7	0.025	0.058	0.036	0.039	0.013		
CBOD-5 (mg/L)	7	< 2.0	< 2.0	1.0	1.0	0.0		
Chlorides (mg/L)	7	2.3	4.3	3.0	3.1	0.6		
<b>Total Metals</b>								
Aluminum (mg/L)	4	0.341	1.280	0.774 <sup>H</sup>	0.792	0.472		
Iron (mg/L)	4	1.760	3.040	1.985	2.192	0.596		
Manganese (mg/L)	4	0.017	0.163	0.048	0.069	0.067		
<b>Dissolved Metals</b>								
Aluminum (mg/L)	4	0.068	0.988	0.128	0.328	0.441		
Antimony (µg/L)	4	< 0.2	< 0.4	0.1	0.1	0.1		
Arsenic (µg/L)	4	0.6	1.0 <sup>H</sup>	0.8	0.8	0.2		4
Cadmium (µg/L)	4	< 0.246	< 0.390	0.123	0.141	0.036		
Chromium (µg/L)	4	0.392	2.377	0.791	1.088	0.887		
Copper (mg/L)	4	0.0004	0.001	0.001	0.001	0.001		
Iron (mg/L)	4	1.080	1.370	1.26 <sup>H</sup>	1.242	0.120		
Lead (µg/L)	4	< 0.4	0.6 <sup>S</sup>	0.4	0.4	0.1		2
Manganese (mg/L)	4	0.010	0.159	0.031	0.058	0.089		
Nickel (mg/L)	4	< 0.0006	0.001	0.001	0.001	0.001		
Selenium (µg/L)	4	< 0.4	0.5	0.2	0.2	0.2		
Silver (µg/L)	4	< 0.252	< 0.460	0.126	0.152	0.052		
Thallium (µg/L)	4	< 0.2	< 0.6	0.1	0.2	0.1		
Zinc (mg/L)	4	0.004	0.012	0.005	0.007	0.004		
<b>Biological</b>								
Chlorophyll a (µg/L)	7	< 0.10	32.04	0.05	7.03	11.73		
E. coli (col/100mL)	7	31	1842	115	385	649		

C = F&W criterion violated; E = # samples that exceeded criteria; H = F&W human health criterion exceeded; J = estimate; M = value >90% of collected samples in ecoregion 65d; N = # of samples; Q = # of uncertain exceedances; S = F&W hardness-adjusted aquatic life use criterion exceeded.

**SUMMARY**

The overall habitat quality for Patsaliga Creek at PSGP-1 was categorized as *sub-optimal* for this stream type. Bioassessment results indicated the fish community to be in *poor* condition. Total aluminum and dissolved iron values were higher than expected, based on data collected at reference reaches within the ecoregion (65d). Further sampling may be required to get a representative assessment of the stream and to ensure that water quality and biological conditions remain stable.

FOR MORE INFORMATION, CONTACT:  
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