

# 2014 Monitoring Summary



## Flat Creek at Pike County Road 48 (31.95142, -85.85615)

### BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected Flat Creek at FLTP-1 for the 2014 Southeast Alabama (SEAL) Basin Assessment. The objectives of the SEAL Basin Assessment were to assess the biological integrity of each monitoring site and to estimate overall water quality within the SEAL basins by conducting a biological assessment and water chemistry analyses.



Figure 1. Flat Creek at FLTP-1, May 14, 2014.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Flat 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 (63%) with some shrub/scrub areas. As of April 1, 2016, no NPDES outfalls have been active within this watershed.

### REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the macroinvertebrate 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. Flat Creek at FLTP-1 is a glide-pool stream with substrate composed primarily of sand and gravel with some organic matter (Figure 1). Overall habitat quality and availability was rated as *sub-optimal* for supporting diverse aquatic communities. However, bank and vegetative stability was rated as *marginal*.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Conecuh R	
Drainage Area (mi <sup>2</sup> )	16	
Ecoregion <sup>a</sup>	65D	
% Landuse <sup>b</sup>		
Open water		1%
Wetland	Woody	4%
	Emergent herbaceous	<1%
Forest	Deciduous	20%
	Evergreen	32%
	Mixed	11%
Shrub/scrub		18%
Grassland/herbaceous		2%
Pasture/hay		5%
Cultivated crops		3%
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
Population/km <sup>2c</sup>	8	

a. Southern Hilly Gulf Coastal Plain

b. 2011 National Land Cover Dataset

c. 2010 US Census

Table 2. Physical characteristics of Flat Creek at FLTP-1, May 14, 2014.

Physical Characteristics		
Width (ft)	20	
Canopy Cover	Shaded	
Depth (ft)		
	Run	1.5
	Pool	3.0
% of Reach		
	Run	50
	Pool	50
% Substrate		
	Gravel	35
	Sand	40
	Silt	3
	Organic Matter	22

**Table 3.** Results of the habitat assessment conducted on Flat Creek at FLTP-1, May 14, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	85	Optimal (>79)
Sediment Deposition	75	Sub-Optimal (55-79)
Sinuosity	68	Sub-Optimal (55-79)
Bank Vegetative Stability	43	Marginal (31-<58)
Riparian Buffer	84	Sub-Optimal (60-84)
<b>Habitat Assessment Score</b>	<b>130</b>	
<b>% of Maximum Score</b>	<b>76</b>	<b>Sub-Optimal (57-80)</b>

## 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 all individual metric scores. Metric results indicated the macroinvertebrate community to be in *fair* condition.

**Table 4.** Results of the macroinvertebrate community bioassessment conducted in Flat Creek at FLTP-1 on May 14, 2014.

Macroinvertebrate Assessment		Results
<b>Taxa richness and diversity measures</b>		
# EPT taxa	12	
<b>Taxonomic composition measures</b>		
% Non-insect taxa	13	
% Plecoptera	4	
% Dominant taxon	17	
<b>Functional feeding group</b>		
% Predators	15	
<b>Community tolerance</b>		
Becks community tolerance index	3	
% Nutrient tolerant individuals	42	
<b>WMB-I Assessment Score</b>	<b>46</b>	
<b>WMB-I Assessment Rating</b>	<b>Fair (37-55)</b>	

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly March through August of 2014 to help identify any stressors to the biological communities. For Flat Creek at FLTP-1, total and dissolved iron concentrations 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	Q
<b>Physical</b>							
Temperature (°C)	7	11.9	24.2	21.2	19.0	4.6	
Turbidity (NTU)	7	14.2	49.1	20.2	23.6	11.5	
Total Dissolved Solids (mg/L)	6	10.0	81.0	46.0	41.5	27.0	
Total Suspended Solids (mg/L)	6	4.0	21.0	12.5	12.7	5.8	
Specific Conductance (µmhos)	7	32.2	44.3	37.0	37.2	4.3	
Hardness (mg/L)	3	11.1	14.5	14.1	13.2	1.8	
Alkalinity (mg/L)	6	7.0	14.8	8.8	9.7	2.8	
Monthly Stream Flow (cfs)	9	0.0	47.9	7.5	12.1	15.5	
Stream Flow during Sample Collection (cfs)	7	0.8	47.9	12.0	15.6	16.1	
<b>Chemical</b>							
Dissolved Oxygen (mg/L)	7	7.1	9.7	8.3	8.4	1.0	
pH (su)	7	6.3	6.8	6.6	6.6	0.2	
Ammonia Nitrogen (mg/L)	6	< 0.006	0.050	0.003	0.011	0.019	
Nitrate+Nitrite Nitrogen (mg/L)	6	0.008	0.077	0.038	0.041	0.024	
Total Kjeldahl Nitrogen (mg/L)	6	0.288	0.952	0.624	0.629	0.213	
Total Nitrogen (mg/L)	6	0.296	0.978	0.692	0.670	0.220	
Dissolved Reactive Phosphorus (mg/L)	6	0.003	0.005	0.004	0.004	0.001	
Total Phosphorus (mg/L)	6	0.021	0.036	0.028	0.028	0.005	
CBOD-5 (mg/L)	6	< 2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	6	2.6	3.3	3.1	3.0	0.3	
<b>Total Metals</b>							
Aluminum (mg/L)	3	0.177	1.580	0.463	0.740	0.741	
Iron (mg/L)	3	3.050	3.170	3.09M	3.103	0.061	
Manganese (mg/L)	3	0.044	0.073	0.046	0.054	0.016	
<b>Dissolved Metals</b>							
Aluminum (mg/L)	3	< 0.050	0.119	0.059	0.068	0.048	
Antimony (µg/L)	3	< 0.2	< 0.2	0.1	0.1	0.0	
Arsenic (µg/L)	3	0.7	1.2H	0.7	0.9	0.3	3
Cadmium (µg/L)	3	< 0.246	< 0.246	0.123	0.123	0.0	
Chromium (µg/L)	3	0.860	2.707	1.090	1.552	1.006	
Copper (mg/L)	3	0.0004	0.001	0.001	0.001	0.001	
Iron (mg/L)	3	0.726	1.760	1.39M	1.292	0.524	
Lead (µg/L)	3	< 0.2	0.59S	0.3	0.3	0.2	2
Manganese (mg/L)	3	0.022	0.049	0.036	0.036	0.014	
Nickel (mg/L)	3	0.0004	0.001	0.001	0.001	0.001	
Selenium (µg/L)	3	< 0.4	< 0.4	0.2	0.2	0.0	
Silver (µg/L)	3	< 0.252	< 0.252	0.126	0.126	0.0	
Thallium (µg/L)	3	< 0.2	< 0.2	0.1	0.1	0.0	
Zinc (mg/L)	3	0.003	0.004	0.004	0.004	0.001	
<b>Biological</b>							
Chlorophyll a (µg/L)	6	< 0.10	5.34	2.22	2.24	2.07	
E. coli (col/100mL)	6	131	731	177	264	232	

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 Flat Creek at FLTP-1 was categorized as *sub-optimal* for this stream type. Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Total and dissolved iron concentrations 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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