

2008 Monitoring Summary

Use Support Monitoring 305(b)/303(d) Site

Hawkins Creek at Butler County Road 37 (31.74882/-86.62421)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Hawkins Creek watershed for biological and water quality monitoring as part of the 2004 Basin-wide Screening Assessment of the South East Alabama (SE-AL) River Basins. The screening assessments were conducted at stream reaches where land use estimates and non-point source information from the local Soil and Water Conservation Districts indicated a moderate or high potential for impairment from non-point sources in non-urban areas. Results of the 2004 screening-level evaluation identified Hawkins Creek at HWKB-1 for further monitoring during the 2008 Basin Assessment of the South East Alabama (SE-AL) River Basins to more fully assess biological conditions at the site, as well as the extent and cause of any impairment.



Figure 1. Reach Characteristics of Hawkins Creek watershed at HWKB-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hawkins Creek at HWKB-1 is a *Fish & Wildlife (F&W)* stream located near Greenville in Butler County. The Hawkins Creek watershed falls within the Southern Hilly Gulf Coastal Plain (65d) ecoregion, which is characterized by low to moderate gradient, mostly sand bottomed streams (Griffith et al. 2001). Based on the 2000 National Land Cover Dataset, landuse within the watershed is mainly forest followed by shrubs/scrub and pasture/hay. As of February 23, 2011, thirty four permits have been issued 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. Typical of ecoregion 65d, Hawkins Creek at HWKB-1 is a low gradient, sand bottomed stream (Figure 1). In 2008, instream habitat, particularly root banks, was limited within the reach. The reach was also characterized by relatively straight channel.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Perdido-Escambia River
Basin		Perdido-Escambia River
Drainage Area (mi²)		42
Ecoregion^a		65d
% Landuse		
Open water		<1
Wetland	Woody	6
	Emergent herbaceous	<1
Forest	Deciduous	31
	Evergreen	20
	Mixed	8
Shrub/scrub		15
Grassland/herbaceous		<1
Pasture/hay		10
Cultivated crops		2
Development	Open space	5
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Barren		1
Population/km²^b		15
# NPDES Permits^c	TOTAL	34
	401 Water Quality Certification	3
	Construction Stormwater	29
	Industrial General	2

a.Southern Hilly Gulf Coastal Plain

b,2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, February 23, 2011.

Table 2. Physical characteristics of Hawkins Creek at HWKB-1, July 21, 2008.

Physical Characteristics	
Width (ft)	15
Canopy Cover	Mostly Shaded
Depth (ft)	
	Run 0.5
	Pool 2.5
% of Reach	
	Run 50
	Pool 50
% Substrate	
	Clay 5
	Mud/Muck 5
	Sand 56
	Silt 10
	Organic Matter 24

BIOASSESSMENTS

Benthic macroinvertebrate communities were sampled using ADEM's [Intensive Multi-habitat Bioassessment methodology \(WMB-I\)](#). Table 4 summarizes results of taxonomic richness, community composition, and community tolerance metrics. Data collected at HWKB-1 may be used to develop an index of ADEM's WMB-I for ecoregion 65d.

Table 3. Results of the habitat assessment conducted on Hawkins Creek at HWKB-1, July 21, 2008.

Habitat Assessment	%Maximum Score
Instream Habitat Quality	35
Sediment Deposition	55
Sinuosity	38
Bank and Vegetative Stability	29
Riparian Buffer	83
Habitat Assessment Score	103
% Maximum Score	47

Table 4. Results of the macroinvertebrate bioassessment conducted in Hawkins Creek at HWKB-1, July 21, 2008.

Macroinvertebrate Assessment		Results
Taxa richness measures		
	# EPT genera	10
Taxonomic composition measures		
	% Non-insect taxa	26
	% Plecoptera	0
	% Dominant taxa	31
Functional composition measures		
	% Predators	10
Tolerance measures		
	Beck's community tolerance index	7
	% Nutrient tolerant organisms	14

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. [In situ measurements](#) and [water samples](#) were collected in June, August and October, 2008. The reach was characterized by very low flows and, as a result, dissolved oxygen was below the criteria for [F&W](#) water use classification for all sampling events. Collected metals were generally below detection limits.

SUMMARY

Hawkins Creek at HWKB-1 was typical of other streams in the Southern Hilly Gulf Coastal Plains, which are generally low-gradient streams with sand substrates ([Griffith et al. 2001](#)). However, results of the habitat assessment suggested that in-stream habitat was very limited. Bioassessment results indicated low scores in the pollution intolerant groups. Low dissolved oxygen concentrations could be a limiting factor for the aquatic community.

Table 5. Summary of water quality data collected March-October, 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	Q
Physical							
Temperature (°C)	4	19.4	27.3	23.8	23.6	3.3	
Turbidity (NTU)	4	9.4	19.3	11.2	12.8	4.5	
Total Dissolved Solids (mg/L)	3	26.0	76.0	46.0	49.3	25.2	
Total Suspended Solids (mg/L)	3	2.0	7.0	3.0	4.0	2.6	
Specific Conductance (µmhos)	4	95.6	133.1	98.8	106.6	17.9	
Hardness (mg/L)	3	32.7	49.3	45.7	42.6	8.7	
Alkalinity (mg/L)	3	38.8	45.2	44.7	42.9	3.6	
Stream Flow (cfs)	2	0.1	0.3	0.2	0.2	0.1	
Chemical							
Dissolved Oxygen (mg/L)	4	2.5 ^c	5.0	3.9	3.8	1.0	
pH (su)	4	6.5	6.9	6.6	6.7	0.2	
Ammonia Nitrogen (mg/L)	3	< 0.015	0.105	0.015	0.042	0.054	
Nitrate+Nitrite Nitrogen (mg/L)	3	0.006	0.047	0.042	0.032	0.022	
Total Kjeldahl Nitrogen (mg/L)	3	0.339	0.533	0.473	0.448	0.099	
Total Nitrogen (mg/L)	3	0.345	0.575	0.520	0.480	0.120	
Dissolved Reactive Phosphorus (mg/L)	3	0.008	0.011	0.010	0.010	0.002	
Total Phosphorus (mg/L)	3	0.022	0.026	0.024	0.024	0.002	
CBOD-5 (mg/L)	3	< 1.0	< 1.0	0.5	0.5	0.0	
Chlorides (mg/L)	3	2.5	3.8	3.2	3.1	0.6	
Total Metals							
Aluminum (mg/L)	3	0.018	0.113	0.033	0.055	0.051	
Iron (mg/L)	3	1.810	2.670	1.980	2.153	0.455	
Manganese (mg/L)	3	0.309	1.150	0.559	0.673	0.432	
Dissolved Metals							
Aluminum (mg/L)	3	< 0.015	0.019	0.008	0.008	0.001	
Antimony (µg/L)	3	< 2.0	< 2.0	1.0	1.0	0.0	
Arsenic (µg/L)	3	< 2.2	< 2.2	1.1	1.1	0.0	
Cadmium (mg/L)	3	< 0.003	0.005	0.002	0.002	0.001	
Chromium (mg/L)	3	< 0.004	0.013	0.002	0.004	0.003	
Copper (mg/L)	3	< 0.005	0.013	0.002	0.004	0.002	
Iron (mg/L)	3	0.826	0.925	0.922	0.891	0.056	
Lead (µg/L)	3	< 1.5	< 1.5	0.7	0.7	0.0	
Manganese (mg/L)	3	0.292	1.110	0.518	0.640	0.422	
Mercury (µg/L)	3	< 0.0	< 0.0	0.0	0.0	0.0	
Nickel (mg/L)	3	< 0.004	0.006	0.003	0.003	0.001	
Selenium (µg/L)	3	< 1.5	1.6	0.8	0.8	0.0	
Silver (mg/L)	3	< 0.002	0.003	0.002	0.001	0.000	
Thallium (µg/L)	3	< 0.6	< 0.6	0.3	0.3	0.0	
Zinc (mg/L)	3	< 0.003	0.006	0.003	0.002	0.001	
Biological							
Chlorophyll a (µg/L)	3	0.53	3.20	1.34	1.69	1.37	
Fecal Coliform (col/100 mL)	3	52	120	97	90	35	J

J=estimate; N= # of samples; Q=qualifier; C= value exceeds established criteria for *Fish & Wildlife* water use classification.

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