

2010 Monitoring Summary



Basin Assessment Site

Soapstone Creek at US Hwy 80 East of Selma in Dallas County (32.32220/-86.90630)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Soapstone Creek watershed for biological and water quality monitoring as part of the 2010 Alabama, Coosa, and Tallapoosa (ACT) Basin Assessment Monitoring. The objectives of the ACT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the basin.



Figure 1. Soapstone Creek at SPD-1, April 14, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Soapstone Creek is a small *Fish & Wildlife (F&W)* stream that flows through the Flatwoods/Blackland Prairie Margins ecoregion (65b) in Dallas County. Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (59%) interspersed with pasture, shrubs/scrubs, and woody wetlands. Population density is relatively low in this area. As of September 1, 2012, only one outfall is active 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. Soapstone Creek at SPD-1 is a low gradient stream dominated by sand, gravel, and clay substrates (Figure 1). Overall habitat quality was categorized as *optimal*.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). Measures of taxonomic richness, community composition, and community tolerance are used to assess the overall health of the macroinvertebrate community in comparison to conditions expected in coastal plain Alabama streams and rivers. Each site is placed in one of six levels, ranging from 1, or *natural* to 6, or *highly altered*. The macroinvertebrate survey conducted in Soapstone Creek at SPD-1 rated the site as *good-fair*. Relative abundance and numbers of pollution-sensitive taxa are more, while relative abundance and numbers of pollution-tolerant taxa are lower (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Alabama River
Drainage Area (mi²)		21
Ecoregion^a		65b
% Landuse		
Open water		<1
Wetland	Woody	9
	Emergent herbaceous	<1
Forest	Deciduous	31
	Evergreen	23
	Mixed	5
Shrub/scrub		11
Grassland/herbaceous		<1
Pasture/hay		10
Cultivated crops		5
Development	Open space	5
	Low intensity	<1
Population/km^{2b}		14
# NPDES Permits^c	TOTAL	1
	Municipal	1
	Individual	1

a.Flatwoods/Blackland Prairie Margins

b.2000 US Census

c.#NPDES outfalls downloaded from ADEM's NPDES Management System database, September 1, 2012

Table 2. Physical characteristics of Soapstone Creek at SPD-1, April 14, 2010.

Physical Characteristics		
Canopy Cover		Mostly Shaded
Width (ft)		25
Depth (ft)		
	Run	1.5
	Pool	2.5
% of Reach		
	Run	60
	Pool	40
% Substrate		
	Boulder	5
	Clay	2
	Cobble	5
	Gravel	15
	Hard Pan Clay	10
	Sand	52
	Silt	6
	Organic Matter	5

Table 3. Results of the habitat assessment conducted on Soapstone Creek at SPD-1, April 14, 2010.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	64	Sub-optimal (53-65)
Sediment Deposition	64	Sub-optimal (53-65)
Sinuosity	45	Marginal (45-64)
Bank and Vegetative Stability	75	Optimal >74
Riparian Buffer	85	Sub-optimal (70-89)
Habitat Assessment Score	152	
% Maximum Score	69	Optimal >65

Table 4. Results of the macroinvertebrate bioassessment conducted in Soapstone Creek at SPD-1, April 14, 2010.

Macroinvertebrate Assessment		Results
Taxa richness and diversity measures		
	Total # Taxa	75
	# EPT taxa	15
	# Highly-sensitive and Specialized Taxa	6
Taxonomic composition measures		
	% EPC taxa	26
	% Trichoptera & Chironomidae Taxa	49
	% EP Individuals	12
	% Chironomidae Individuals	60
	% Individuals in Dominant 5 Taxa	36
Functional feeding group		
	% Collector-Filterer Individuals	13
	% Tolerant Filterer Taxa	8
Community tolerance		
	# Sensitive EPT	6
	% Sensitive taxa	24
	% Nutrient Tolerant individuals	31
	WMB-I Assessment Score	3-
	WMB-I Assessment Rating	Good-Fair

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly from April through October, 2010 to help identify any stressors to the biological communities. *In situ* parameters suggested that Soapstone Creek at SPD-1 was meeting *F&W* use classification. Arsenic exceeded the Human Health criteria for water and fish consumption in April. Samples were collected for pesticides, semi-volatile organics and atrazine in May and October and results were below detection limits.

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report along with all other available data.

Bioassessment results indicated the macroinvertebrate community to be in *good-fair* condition. Habitat was assessed as *optimal* for supporting macroinvertebrate communities. Intensive water quality studies also support the assessment results.

Table 5. Summary of water quality data collected April-October, 2010. 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	E
Physical								
Temperature (°C)	6	15.0	27.5	18.9	20.6	5.7		
Turbidity (NTU)	6	1.6	11.6	2.8	4.2	3.7		
Total Dissolved Solids (mg/L)	5	72.0	104.0	92.0	89.2	12.5		
Total Suspended Solids (mg/L)	5	1.0	9.0	2.0	3.2	3.4		
Specific Conductance (µmhos)	6	110.3	164.2	125.2	131.4	21.6		
Hardness (mg/L)	5	45.5	71.0	56.0	55.7	9.9		
Alkalinity (mg/L)	5	42.3	64.3	51.2	52.2	8.8		
Stream Flow (cfs)	6	0.9	9.0	4.8	4.6	3.4		
Chemical								
Dissolved Oxygen (mg/L)	6	5.3	9.4	9.1	8.5	1.6		
pH (su)	6	7.0	8.1	7.5	7.5	0.4		
Ammonia Nitrogen (mg/L)	5	< 0.021	< 0.021	0.010	0.010	0.000		
Nitrate+Nitrite Nitrogen (mg/L)	5	0.006	0.234	0.171	0.142	0.088	J	
Total Kjeldahl Nitrogen (mg/L)	5	< 0.080	0.296	0.040	0.129	0.124		
Total Nitrogen (mg/L)	5	< 0.046	0.485	0.274	0.271	0.178	J	
Dissolved Reactive Phosphorus (mg/L)	5	0.007	0.013	0.010	0.010	0.003	J	
Total Phosphorus (mg/L)	5	0.013	0.038	0.015	0.024	0.013		
CBOD-5 (mg/L)	5	< 2.0	2.3	1.0	1.3	0.6		
Chlorides (mg/L)	5	4.6	5.9	4.9	5.0	0.5		
Atrazine (µg/L)	2	< 0.02	< 0.02	0.01	0.01	0.00		
Total Metals								
Aluminum (mg/L)	5	< 0.033	0.400	0.016	0.105	0.167	J	
Iron (mg/L)	5	< 0.026	0.243	0.120	0.125	0.113	J	
Manganese (mg/L)	5	< 0.001	0.013	0.000	0.004	0.006	J	
Dissolved Metals								
Aluminum (mg/L)	5	< 0.033	< 0.033	0.016	0.016	0.000		
Antimony (µg/L)	5	< 0.7	< 1.9	0.9	0.8	0.2		
Arsenic (µg/L)	5	< 1.4 ^H	2.1	1.0	1.1	0.2	J	1
Cadmium (mg/L)	5	< 0.000	< 0.014	0.002	0.003	0.004		
Chromium (mg/L)	5	< 0.013	< 0.013	0.006	0.006	0.000		
Copper (mg/L)	5	< 0.013	< 0.013	0.006	0.006	0.000		
Iron (mg/L)	5	< 0.026	0.122	0.013	0.039	0.047	J	
Lead (µg/L)	5	< 1.7	< 1.7	0.8	0.8	0.0		
Manganese (mg/L)	5	< 0.001	0.005	0.000	0.002	0.002	J	
Mercury (µg/L)	5	< 0.1	< 0.1	0.0	0.0	0.0		
Nickel (mg/L)	5	< 0.019	< 0.019	0.010	0.010	0.000		
Selenium (µg/L)	5	< 1.7	< 1.7	0.8	0.8	0.0		
Silver (mg/L)	5	< 0.000	< 0.002	0.001	0.001	0.000		
Thallium (µg/L)	5	< 0.6	< 0.6	0.3	0.3	0.0		
Zinc (mg/L)	5	< 0.030	< 0.030	0.015	0.015	0.000		
Biological								
Chlorophyll a (ug/L)	5	< 0.10	3.45	1.60	1.55	1.35		
E. coli (col/100mL)	5	56	579	59	166	231	J	

E= # samples that exceeded criteria; H=human health criterion exceeded; J=estimate; N=# samples; Q=qualifier.

FOR MORE INFORMATION, CONTACT:
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