Alabama Department of Environmental Management

Ecological Reference Reach

Rivers and Streams Monitoring Program

2007 Monitoring Summary

Excellent

South Sandy Creek at Talledega National Forest Road 731 (Bibb County) (32.96906/-87.39776)

BACKGROUND

South Sandy Creek is one of the streams the Alabama Department of Environmental Management (ADEM) monitors as a "best attainable condition" reference watershed for glide-pool streams throughout the state. The data collected will be used for comparison with other streams in the Fall Line Hills ecoregion (65i).

Additionally, the South Sandy Creek watershed was selected for biological and water quality monitoring as part of the 2007 Assessment of the Black Warrior and Cahaba (BWC) River Basins. The objectives of the BWC Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the BWC basin group.

Figure 1. Reach characteristics of South Sandy Creek at SSB-1 on February 19, 2011.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. South Sandy Creek is a *Fish & Wildlife (F&W)* stream located in the Talladega National Forest in Bibb County. Based on the 2000 National Land Cover Dataset, land cover within the watershed is approximately 95% forest. Population density is very low. As of February 23, 2011, one NPDES permit has 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. South Sandy Creek at SSB-1 is a low-gradient stream characterized by a sand bottom substrate (Figure 1). Overall habitat quality was categorized as *sub-optimal* as a result of marginal in-stream habitat quality and bank and vegetative stability.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi^2)		11
Ecoregion[a]		65i
% Landuse		
Open water		<1
Wetland	Woody	3
	Emergent herbaceous	<1
Forest	Deciduous	27
	Evergreen	39
	Mixed	29
Shrub/scrub		1
Pasture/hay		<1
Cultivated crops		<1
Development	Open space	2
Population/km^2[b]		<1
# NPDES Permits[c]	**TOTAL**	1
401 Water Quality Certification		1

a.Fall Line Hills

b.2000 US Census

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

Table 2. Physical characteristics of South Sandy Creek at SSB-1, May 10, 2007.

Physical Characteristics		
Width (ft)		24
Canopy cover		Mostly Shaded
Depth (ft)		
	Run	1.5
	Pool	3.0
% of Reach		
	Run	90
	Pool	10
% Substrate		
	Sand	68
	Silt	7
	Organic Matter	25

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 scores. Metric results indicated the macroinvertebrate community in South Sandy Creek at SSB-1 to be in *excellent* condition (Table 4).

Table 3. Results of the habitat assessment conducted in South Sandy Creek at SSB-1, May 10, 2007.

Habitat Assessment	(% Maximum Score)	Rating
Instream Habitat Quality	43	Marginal (40-52)
Sediment Deposition	60	Sub-optimal (53-65)
Sinuosity	68	Sub-optimal (65-84)
Bank and Vegetative Stability	56	Marginal (35-59)
Riparian Buffer	88	Sub-optimal (70-89)
Habitat Assessment Score	**130**	
% Maximum score	**59**	**Sub-optimal (53-65)**

Table 4. Results of the macroinvertebrate bioassessment conducted in South Sandy Creek at SSB-1, May 10, 2007.

Macroinvertebrate Assessment			
	Results	**Scores**	**Rating**
Taxa richness measures			
# EPT genera	14	56	Fair (38-56)
Taxonomic composition measures			
% Non-insect taxa	2	100	Excellent (>96.3)
% Plecoptera	15	73	Excellent (>52.8)
% Dominant taxa	9	100	Excellent (>85.2)
Functional composition measures			
% Predators	35	100	Excellent (>72.1)
Tolerance measures			
Beck's community tolerance index	19	86	Excellent (>65.9)
% Nutrient tolerant organisms	15	91	Excellent (>88.1)
WMB-I Assessment Score	**---**	**87**	**Excellent (>78)**

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were scheduled to be collected monthly during March through October of 2007 to help identify any stressors to the biological communities. Metals were collected in April and June.

Dissolved mercury and arsenic concentrations were above detection limits during the April sampling event. Neither metal has been detected at the site since ADEM began sampling in 2002. Additionally, the concentration of total iron was 7.93 mg/L during the same sampling event– approximately double previous maximum concentrations.

SUMMARY

Bioassessment results indicated the macroinvertebrate community in South Sandy Creek at SSB-1 to be in *excellent* condition. Further monitoring is recommended to verify metals concentrations.

Table 5. Summary of water quality data collected March-October, 2007. 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	Median	Avg	SD	Q
Physical							
Temperature (°C)	10	14.0	24.3	18.4	19.2	3.8	
Turbidity (NTU)	10	9.4	90.2	14.6	22.1	24.4	
Total Dissolved Solids (mg/L)	8	19.0	44.0	31.5	31.0	11.4	
Total Suspended Solids (mg/L)	8	7.7	113.0	9.0	22.0	36.8	
Specific Conductance (µmhos)	10	8.5	16.1	12.8	12.8	1.9	
Hardness (mg/L)	1				2.0		
Alkalinity (mg/L)	8	1.6	2.4	2.1	2.1	0.3	
Stream Flow (cfs)	10	1.1	65.6	3.1	9.9	19.7	
Chemical							
Dissolved Oxygen (mg/L)	10	6.6	9.5	8.1	8.2	1.0	
pH (su)	10	6.2	7.3	6.7	6.7	0.4	
Ammonia Nitrogen (mg/L)	8	< 0.015	0.033	0.008	0.012	0.010	
[j] Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.003	0.043	0.018	0.019	0.013	
Total Kjeldahl Nitrogen (mg/L)	8	< 0.150	0.425	0.198	0.229	0.134	
[j] Total Nitrogen (mg/L)	8	< 0.076	0.446	0.234	0.247	0.137	
Dissolved Reactive Phosphorus (mg/L)	8	< 0.004	0.059	0.012	0.017	0.018	
[j] Total Phosphorus (mg/L)	8	0.019	0.042	0.028	0.028	0.009	
CBOD-5 (mg/L)	8	< 1.0	2.5	0.8	1.1	0.7	
COD (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0	
TOC (mg/L)	4	2.8	4.4	3.5	3.6	0.7	
[j] Chlorides (mg/L)	8	1.3	2.1	1.7	1.7	0.3	
Atrazine (µg/L)	5	< 0.05	0.11	0.02	0.04	0.04	
Total Metals							
Aluminum (mg/L)	1				2.900		
Iron (mg/L)	2	4.770	7.930	6.350 [M]	6.350	2.234	
Manganese (mg/L)	2	0.136	0.302	0.219	0.219	0.117	
Dissolved Metals							
Aluminum (mg/L)	2	< 0.015	0.040	0.024	0.024	0.023	
Antimony (µg/L)	2	< 1.6	2.0	0.9	0.9	0.1	
[J] Arsenic (µg/L)	2	< 1.4	< 2.2 [JH]	1.2	1.2	0.2	
Cadmium (mg/L)	2	< 0.000	< 0.005	0.001	0.001	0.002	
Chromium (mg/L)	2	< 0.002	< 0.004	0.002	0.002	0.001	
Copper (mg/L)	2	< 0.002	< 0.005	0.002	0.002	0.001	
Iron (mg/L)	2	0.225	0.370	0.298	0.298	0.102	
Lead (µg/L)	2	< 1.1	< 1.5	0.6	0.6	0.1	
[J] Manganese (mg/L)	2	0.074	0.160	0.117	0.117	0.061	
[J] Mercury (µg/L)	2	< 0.3	1.0 [AH]	0.6	0.6	0.6	1
Nickel (mg/L)	2	< 0.004	< 0.006	0.002	0.002	0.001	
Selenium (µg/L)	2	< 1.6	< 1.6	0.8	0.8	0.0	
Silver (mg/L)	2	< 0.000	< 0.003	0.001	0.001	0.001	
Thallium (µg/L)	2	< 0.6	< 1.2	0.4	0.4	0.2	
Zinc (mg/L)	2	< 0.002	< 0.006	0.002	0.002	0.001	
Biological							
[J] Chlorophyll a (µg/L)	8	< 0.10	5.34	2.67	2.66	1.73	
[J] Fecal Coliform (col/100 mL)	8	160	1500	235	411	450	

A=F&W aquatic life use criteria exceeded; H=F&W human health criterion exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65i; N=# samples; Q=estimated value is an exceedance.

FOR MORE INFORMATION, CONTACT:
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