

2013 Monitoring Summary



Ambient Monitoring Site

Sipsey Fork at Winston County Road 60 (34.28558/-87.39906)

BACKGROUND

Sipsey Fork at SF-1 is one of a network of 106 sites monitored annually by the Alabama Department of Environmental Management (ADEM) to identify long-term trends in water quality and to provide data for the development of TMDLs and water quality criteria. A habitat and a macroinvertebrate assessments were conducted on Sipsey Fork at SF-1 in 2013 to assess the biological integrity of the site.

Additionally, Sipsey Fork is one of the streams the Alabama Department of Environmental Management (ADEM) monitors as a “best attainable” condition reference watershed for comparison with large riffle-run streams and rivers throughout the state.



Figure 1. Sipsey Fork at SF-1, September 4, 2013.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Sipsey Fork at SF-1 is a *Fish and Wildlife (F&W)* stream located in Winston County. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (95%). Less than three percent of the area is developed, and population density is low. As of June 6, 2013, two outfalls were active in the 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. Sipsey Fork at SF-1 is a riffle-run stream located in the Dissected Plateau ecoregion (68e) (Figure 1). Benthic substrate in the reach consists primarily of sand. Overall habitat quality was rated as *sub-optimal* for supporting macroinvertebrate communities.

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 north 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 Sipsey Fork at SF-1 rated the site as *good / very good* (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Black Warrior River
Basin		
Drainage Area (mi²)		89
Ecoregion^a		68e
% Landuse		
Open water		<1
Wetland	Woody	<1
	Emergent herbaceous	<1
Forest	Deciduous	58
	Evergreen	20
	Mixed	17
Shrub/scrub		1
Grassland/herbaceous		<1
Pasture/hay		1
Cultivated crops		<1
Development	Open space	1
	Low intensity	<1
	Moderate intensity	<1
Barren		<1
Population/km^{2b}		3
# NPDES Outfalls^c	TOTAL	2
	Construction Stormwater	2

a. Dissected Plateau

b. 2000 US Census

c. #NPDES outfalls downloaded from ADEM’s NPDES Management System database, May 13, 2013.

Table 2. Physical characteristics of Sipsey Fork at SF-1, May 21, 2013.

Physical Characteristics	
Width (ft)	60
Canopy Cover	Open
Depth (ft)	
	Riffle
	Run
	Pool
% of Reach	
	Riffle
	Run
	Pool
% Substrate	
	Boulder
	Cobble
	Gravel
	Sand
	Silt
	Organic Matter

Table 3. Results of the habitat assessment conducted on Sipsey Fk at SF-1, May 21, 2013.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	58	Sub-Optimal (55-79)
Sediment Deposition	15	Poor (<31)
Riffle frequency	75	Sub-Optimal (55-79)
Bank Vegetative Stability	70	Sub-Optimal (58-79)
Riparian Buffer	80	Sub-Optimal (60-84)
Habitat Assessment Score	116	
% of Maximum Score	61	Sub-Optimal (57-80)

Table 4. Results of the macroinvertebrate bioassessment conducted in Sipsey Fork at SF-1, May 21, 2013.

Macroinvertebrate Assessment		
		Results
Taxa richness measures		
Total # Taxa		74
# EPT taxa		21
# Highly-sensitive and Specialized Taxa		10
Taxonomic composition measures		
% EPC taxa		35
% Non-insect taxa		8
% Dominant taxon		25
% Individuals in Dominant 5 Taxa		59
Functional feeding group measures		
% Predators		6
Tolerance measures		
# Sensitive EPT		14
% Sensitive taxa		47
% Taxa as Tolerant		17
WMB-I Assessment Score		3+
WMB-I Assessment Rating		Good/Very good

WATER CHEMISTRY

Results of water chemistry analyses are summarized in Table 5. In situ measurements and water samples were collected monthly during January through December 2013 to help identify any stressors to the biological communities. All parameters met *F&W* use classification criteria throughout the monitoring period. However, median conductivity and chlorides concentrations were higher than expected based on data collected at reference reaches in the Dissected Plateaus ecoregion (68e).

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Sipsey Fork at SF-1 to be in *good/very good* condition. Overall habitat quality was categorized as *sub-optimal* for supporting biological communities. Water chemistry analyses showed median specific conductance and chlorides concentrations were higher than expected for streams in ecoregion 68e. Monitoring should continue to ensure that water quality and biological conditions continue to meet current standards.

Table 5. Summary of water quality data collected January-December, 2013. 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
Physical						
Temperature (°C)	11	5.9	22.7	18.1	16.3	5.8
Turbidity (NTU)	11	1.7	11.9	4.1	5.2	3.4
J Total Dissolved Solids (mg/L)	10	47.0	71.0	60.0	59.7	7.5
J Total Suspended Solids (mg/L)	10	< 1.0	9.0	2.0	3.0	3.0
Specific Conductance (µmhos)	11	75.0	111.0	81.0 ^G	85.5	10.4
Hardness (mg/L)	1				36.5	
Alkalinity (mg/L)	10	13.7	44.2	26.6	26.7	9.2
Stream Flow (cfs)	11	12.0	512.0	92.0	137.5	147.6
Chemical						
Dissolved Oxygen (mg/L)	11	8.5	12.6	9.1	9.6	1.4
pH (su)	11	7.1	7.8	7.5	7.5	0.2
J Ammonia Nitrogen (mg/L)	10	< 0.015	< 0.038	0.014	0.016	0.008
Nitrate+Nitrite Nitrogen (mg/L)	10	< 0.009	0.076	0.026	0.031	0.023
J Total Kjeldahl Nitrogen (mg/L)	10	0.080	0.340	0.160	0.181	0.072
J Total Nitrogen (mg/L)	10	0.128	0.416	0.199	0.212	0.084
J Dissolved Reactive Phosphorus (mg/L)	10	< 0.003	< 0.007	0.004	0.003	0.001
J Total Phosphorus (mg/L)	10	< 0.008	0.020	0.010	0.012	0.006
J CBOD-5 (mg/L)	10	< 2.0	< 2.0	1.0	1.0	0.0
J Chlorides (mg/L)	10	< 1.0	2.9	1.6 ^M	1.6	0.7
Total Metals						
Aluminum (mg/L)	1				2.300	
Iron (mg/L)	1				0.201	
J Manganese (mg/L)	1				0.023	
Dissolved Metals						
J Aluminum (mg/L)	1				0.047	
Antimony (µg/L)	1			<	0.8	
Arsenic (µg/L)	1			<	1.0	
Cadmium (µg/L)	1			<	0.090	
J Chromium (µg/L)	1				0.566	
J Copper (mg/L)	1				0.000	
J Iron (mg/L)	1				0.078	
J Lead (µg/L)	1			<	1.6	
J Manganese (mg/L)	1				0.007	
Nickel (mg/L)	1			<	0.0002	
Selenium (µg/L)	1			<	2.0	
Silver (µg/L)	1			<	1.000	
Thallium (µg/L)	1			<	0.4	
J Zinc (mg/L)	1				0.002	
Biological						
Chlorophyll a (µg/L)	10	< 1.00	< 1.00	0.50	0.50	0.00
J E. coli (col/100mL)	9	28	387	93	130	113

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 68e; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 68e; N=# samples.

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