Alabama Department of Environmental Management

Trend NPDES Monitoring Site

Rivers and Streams Monitoring Program

2013 Monitoring Summary

™

Fair

Scarham Creek at Marshall County Road 372 (34.29843/-86.11664)

BACKGROUND

Scarham Creek at SCRL-2 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 Total Maximum Daily Loads (TMDL) and water quality criteria. Scarham Creek was listed on Alabama's 1996 Clean Water Act (CWA) §303(d) list of impaired waters (Assessment Unit AL06030001-270-01). The 24 mile stretch of Scarham Creek from Short Creek to its source was identified as being impacted by pesticides, ammonia, siltation, low dissolved oxygen/organic enrichment (DO/OE) and pathogens from numerous agricultural sources. The TMDL, developed to address the pesticides, ammonia, DO/OE, and pathogen impairments was approved by EPA in 2002. EPA approved the siltation TMDL in 2003. A macroinvertebrate assessment conducted at SCRL-2 in 2009 resulted in a *poor* rating.

Figure 1. Scarham Creek at SCRL-2, May 22, 2013.

WATERSHED CHARACTERISTICS

The Scarham Creek watershed at SCRL-2 lies within the Southern Table Plateaus (68d) ecoregion. Scarham Creek is a *Fish & Wildlife (F&W)* stream located near the city of Albertville. Based on the 2006 National Land Cover Dataset landuse in the watershed is primarily pasture and forest (Table 1). ADEM's NPDES Management System database shows a total of 30 NPDES permits issued within this watershed as of May 13, 2013.

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. Scarham Creek at SCRL-2 is a riffle-run stream reach characterized by bedrock, boulder, sand, and cobble substrates (Figure 1). The presence of stable substrate and riffles within the stream reach categorized overall habitat quality as *optimal* for a Southern Table Plateaus stream.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tennessee River
Drainage Area (mi^2)		54
Ecoregion[a]		68d
% Landuse		
Open water		<1
Wetland	Woody	<1
	Emergent herbaceous	<1
Forest	Deciduous	13
	Evergreen	4
	Mixed	12
Shrub/scrub		3
Grassland/herbaceous		1
Pasture/hay		49
Cultivated crops		11
Development	Open space	6
	Low intensity	1
	Moderate intensity	1
	High intensity	<1
Barren		<1
Population/km^2[b]		252
# NPDES Permits[c]	**TOTAL**	30
Construction Stormwater		20
Municipal Individual		9
Underground Injection Control		1

a.Southern Table Plateaus

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, May 13, 2013.

Table 2. Physical characteristics of Scarham Creek at SCRL-2, May 22, 2013.

Physical Characteristics		
Width (ft)		50
Canopy Cover		Mostly Shaded
Depth (ft)		
	Riffle	1.8
	Run	2.0
	Pool	2.5
% of Reach		
	Riffle	70
	Run	20
	Pool	10
% Substrate		
	Bedrock	30
	Boulder	30
	Cobble	10
	Gravel	3
	Sand	20
	Silt	3
	Organic Matter	4

Table 3. Results of the habitat assessment conducted in Scarham Creek at SCRL-2, May 22, 2013.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	85	Optimal >70
Sediment Deposition	78	Optimal >70
Sinuosity	93	Optimal >84
Bank and Vegetative Stability	69	Sub-optimal (60-74)
Riparian Buffer	81	Sub-optimal (70-89)
Habitat Assessment Score	**194**	
% Maximum Score	**81**	**Optimal >70**

BIOASSESSMENT RESULTS

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. Each metric is scored on a 100 point scale. The final score is the average of all individual metric scores. Metric results indicated the macroinvertebrate community in Scarham Creek at SCRL-2 to be in *fair* condition.

Table 4. Results of macroinvertebrate bioassessment conducted in Scarham Creek at SCRL-2, May 22, 2013.

Macroinvertebrate Assessment		
	Results	**Scores**
Taxa richness measures		**(0-100)**
# EPT taxa	19	65
Taxonomic composition measures		
% Non-insect taxa	14	43
% Dominant taxon	36	31
% EPC taxa	34	65
Functional feeding group measures		
% Predators	8	27
Tolerance measures		
% Taxa as Tolerant	36	37
WMB-I Assessment Score	**---**	**45**
WMB-I Assessment Rating		**Fair (39-58)**

WATER CHEMISTRY RESULTS

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected in June, August and October of 2013 to help identify any stressors to the biological communities. Additional in situ data was collected during the macroinvertebrate assessment. Median values for Specific Conductance and Nitrate+Nitrite Nitrogen were higher than expected, as compared to all reference site data collected in ecoregion 68. No organics samples were collected.

SUMMARY

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition despite *optimal* overall habitat conditions. Median values for Specific Conductance and Nitrate+Nitrite Nitrogen were higher than those found in reference reaches in ecoregion 68. Monitoring of Scarham Creek at SCRL-2 should continue to ensure that water quality and biological conditions meet current standards.

Table 5. Summary of water quality data collected June, August, and October 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)	4	18.9	24.3	21.1	21.3	2.7
Turbidity (NTU)	4	0.8	2.3	2.2	1.8	0.7
Total Dissolved Solids (mg/L)	3	54.0	64.0	57.0	58.3	5.1
J Total Suspended Solids (mg/L)	3	< 1.0	2.0	2.0	1.7	0.6
Specific Conductance (µmhos)	4	72.8	95.0	81.0 G	82.4	9.5
Hardness (mg/L)	1				23.9	
Alkalinity (mg/L)	3	7.4	14.7	9.7	10.6	3.7
Stream Flow (cfs)	4	6.2	75.5	41.6	41.2	33.3
Chemical						
Dissolved Oxygen (mg/L)	4	8.2	9.6	8.4	8.6	0.7
pH (su)	4	6.9	7.5	7.4	7.3	0.3
Ammonia Nitrogen (mg/L)	3	< 0.015	0.029	0.008	0.010	0.004
Nitrate+Nitrite Nitrogen (mg/L)	3	0.388	0.907	0.880 M	0.725	0.292
J Total Kjeldahl Nitrogen (mg/L)	3	0.246	0.552	0.369	0.389	0.154
J Total Nitrogen (mg/L)	3	0.634	1.432	1.276	1.114	0.423
Dissolved Reactive Phosphorus (mg/L)	3	0.013	0.018	0.016	0.016	0.002
Total Phosphorus (mg/L)	3	0.027	0.036	0.035	0.033	0.005
CBOD-5 (mg/L)	3	< 2.0	< 2.0	1.0	1.0	0.0
Chlorides (mg/L)	3	4.3	6.0	4.5	4.9	0.9
Total Metals						
J Aluminum (mg/L)	1				0.085	
Iron (mg/L)	1				0.332	
J Manganese (mg/L)	1				0.036	
Dissolved Metals						
Aluminum (mg/L)	1			<	0.009	
Antimony (µg/L)	1			<	0.2	
Arsenic (µg/L)	1			<	2.5	
Cadmium (µg/L)	1			<	0.090	
Chromium (mg/L)	1			<	0.344	
J Copper (mg/L)	1				0.0003	
Iron (mg/L)	1				0.264	
J Lead (µg/L)	1			<	1.8	
J Manganese (mg/L)	1				0.017	
Nickel (mg/L)	1			<	0.001	
Selenium (µg/L)	1			<	0.8	
Silver (µg/L)	1			<	1.703	
Thallium (µg/L)	1			<	0.2	
Zinc (mg/L)	1			<	0.001	
Biological						
J Chlorophyll a (ug/L)	3	< 1.00	1.07	1.07	0.88	0.33
J E. coli (col/100 mL)	3	45	66	50	54	11

G=value > median concentration of all verified reference data collected in ecoregion 68; J=reported value is an estimate; M=values > 90th percentile of all verified reference data collected in ecoregion 68; N=# samples.

FOR MORE INFORMATION, CONTACT:
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