Alabama Department of Environmental Management

§303(d)/TMDL Monitoring Site

Rivers and Streams Monitoring Program

2012 & 2013 Monitoring Summary

TM

Fair

Lost Creek at AL Highway 69 (Walker County) (33.76422/-87.35835)

BACKGROUND

Lost Creek, from AL Highway 69 at Oakman to the mill dam at Cedrum (approximately 17.33 miles), has been on Alabama's Clean Water Act (CWA) §303(d) list of impaired waters for only partially meeting its *Fish and Wildlife (F&W)* water use classification. It was listed for siltation due to abandoned surface mining. The segment was listed as impaired based on data collected in 1987. Development of a Total Maximum Daily Load (TMDL) is scheduled for 2014.

In 2012, the Alabama Department of Environmental Management (ADEM) conducted a macroinvertebrate assessment and a habitat assessment in Lost Creek at LOSW-1 to verify impairment to aquatic communities. In 2013, monthly water chemistry samples were collected to identify the causes of impairment and support TMDL development.

Figure 1. Lost Creek at LOSW-1, August 6, 2013.

WATERSHED CHARACTERISTICS

Watershed charatcteristics are summarized in Table 1. Lost Creek at LOSW-1 is a *Fish & Wildlife (F&W)* stream in Walker County. According to the 2000 National Land Cover Dataset, landuse within the watershed is primarily forest (55%) with some grassland and pastures. As of September 1, 2012, ADEM has issued 27 NPDES discharge permits in this watershed, eighteen of which are mining permits.

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. Lost Creek at LOSW-1 is characterized by a bedrock and sand substrate (Figure 1). Overall habitat quality was rated as *sub-optimal* due to inadequate habitat quality and bank stability.

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Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi^2)		134
Ecoregion[a]		68f
% Landuse		
Open water		1
Wetland	Woody	2
	Emergent herbaceous	<1
Forest	Deciduous	23
	Evergreen	22
	Mixed	10
Shrub/scrub		12
Grassland/herbaceous		14
Pasture/hay		11
Cultivated crops		<1
Development	Open space	4
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Barren		1
Population/km^2[b]		21
# NPDES Permits[c]	**TOTAL**	27
Construction Stormwater		2
Mining		18
Industrial General		6
Industrial Individual		1

a.Shale Hills

b.2000 US Census

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

Table 2. Physical characteristics of Lost Creek at LOSW-1, October 17, 2012.

Physical Characteristics	
Width (ft)	60
Canopy Cover	Estimate 50/50
Depth (ft)	
Riffle	0.7
Run	2.6
Pool	1.6
% of Reach	
Riffle	17
Run	60
Pool	23
% Substrate	
Bedrock	40
Boulder	13
Cobble	3
Gravel	7
Sand	27
Fines	7
Stick Wood	3

Table 3. Results of the habitat assessment conducted on Lost Creek at LOSW-1, October 17, 2012.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	55	Marginal (41-58)
Sediment Deposition	63	Sub-optimal (59-70)
Sinuosity	55	Marginal (45-64)
Bank and Vegetative Stability	44	Marginal (35-59)
Riparian Buffer	80	Sub-optimal (70-89)
Habitat Assessment Score	**147**	
% Maximum Score	**61**	**Sub-optimal (59-70)**

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Nonwadeable Intensive Multi-habitat Bioassessment methodology (NWMB-I). The NWMB-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 metric scores. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

Table 4. Results of the macroinvertebrate bioassessment conducted in Lost Creek at LOSW-1, October 17, 2012.

Macroinvertebrate Assessment		
	Results	**Scores**
Taxa richness measures		**(0-100)**
# EPT taxa	16	52
Taxonomic composition measures		
% Non-insect taxa	14	45
% Dominant taxon	13	96
% EPC taxa	23	42
Functional feeding group measures		
% Predators	12	46
Tolerance measures		
% Taxa as Tolerant	39	27
WMB-I Assessment Score	**---**	**51**
WMB-I Assessment Rating		**Fair (39-58)**

FOR MORE INFORMATION, CONTACT:
Brien Diggs, ADEM Aquatic Assessment Unit
1350 Coliseum Boulevard Montgomery, AL 36110
(334) 260-2750 lod@adem.state.al.us

Table 5. Summary of LOSW-1 water quality data collected from March-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)	9	10.5	26.2	19.5	20.0	5.8
Turbidity (NTU)	9	2.5	23.8	3.6	7.6	8.1
Total Dissolved Solids (mg/L)	8	238.0	1139.0	575.0[M]	629.0	333.4
Total Suspended Solids (mg/L)	8	<1.0	19.0	3.0	7.2	8.0
Specific Conductance (µmhos)	9	361.4	1673.0	863.2[G]	935.8	459.4
Alkalinity (mg/L)	8	91.4	431.0	234.0[M]	245.3	127.3
Stream Flow (cfs)	7	21.8	194.7	73.0	82.1	56.0
Chemical						
Dissolved Oxygen (mg/L)	8	7.4	10.5	7.8	8.5	1.3
pH (su)	9	7.4	8.1	7.9	7.8	0.2
Ammonia Nitrogen (mg/L)	8	<0.008	0.054	0.009	0.016	0.017
Nitrate+Nitrite Nitrogen (mg/L)	8	<0.002	0.212	0.103	0.102	0.063
[J]Total Kjeldahl Nitrogen (mg/L)	8	<0.051	0.536	0.232	0.224	0.183
[J]Total Nitrogen (mg/L)	8	<0.030	0.646	0.337	0.326	0.231
[J]Dissolved Reactive Phosphorus (mg/L)	8	<0.004	0.008	0.006	0.005	0.002
[J]Total Phosphorus (mg/L)	8	0.008	0.023	0.013	0.014	0.005
CBOD-5 (mg/L)	8	<2.0	<2.0	1.0	1.0	0.0
Chlorides (mg/L)	8	1.4	2.8	2.1	2.1	0.5

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

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected from March-October, 2013 to help identify potential stressors to the biological communities.

The median values of total dissolved solids, specific conductance, and alkalinity in LOSW-1 were higher than expected when compared to reference reaches in ecoregion 68. LOSW-1 appears to be meeting its *F&W* water use classification.

SUMMARY

The elevated level of total dissolved solids support the continued inclusion of Lost Creek at LOSW-1 on the CWA 303(d) list for siltation. The TMDLs for these impairments is set to be drafted in 2014.

Macroinvertebrate sampling indicated the macroinvertebrate community to be in *fair* condition. Water chemistry analyses suggested the elevated total dissolved solids, specific conductance, and alkalinity concentrations may be impacting macroinvertebrate communities.