

2013 Monitoring Summary



§303(d)/TMDL Monitoring Site

Mill Pond Creek at Mill Pond Bridge (Matt Morrow Road) in Marshall County (34.34155/-

BACKGROUND

Since 1998, Mill Pond Creek, from Hog Jaw Creek to its source (approximately 1.3 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 (habitat alteration) caused by agriculture. The segment was listed as impaired based on data collected in 1994 and 1995.

The Alabama Department of Environmental Management (ADEM) monitored Mill Pond Creek at MLPM-1 to verify and document siltation at this site. A macroinvertebrate and a habitat assessment were conducted to verify impairment to aquatic communities. Monthly water chemistry samples were collected to identify the causes of impairment. Results from these data may also be used in determination of Total Maximum Daily Load (TMDL) needs and priorities.

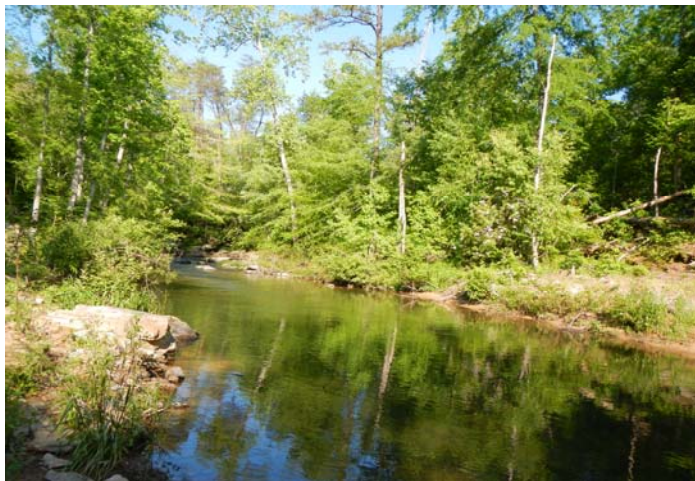


Figure 1. Mill Pond Creek at MLPM-1, May 15, 2013.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Mill Pond Creek at MLPM-1 is a *Fish & Wildlife (F&W)* stream located in Marshall County, approximately 15 miles west of Guntersville. According to the 2006 National Land Cover Dataset, landuse within the watershed is primarily pasture/hay and forested (31%). As of September 1, 2012, ADEM has issued no NPDES discharge permits 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. Mill Pond Creek at MLPM-1 is a riffle run stream with a bedrock substrate, typical of other streams within the Southern Table ecoregion (Figure 1). Overall habitat quality was rated as *sub-optimal*. Though the creek has optimal instream habitat quality; it also has marginal sinuosity, bank stability and riparian buffer.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Tennessee River	
Drainage Area (mi ²)	11	
Ecoregion ^a	68d	
% Landuse		
Open water		1
Wetland	Woody	1
Forest	Deciduous	21
	Evergreen	4
	Mixed	6
Shrub/scrub		6
Grassland/herbaceous		1
Pasture/hay		34
Cultivated crops		4
Development	Open space	8
	Low intensity	11
	Moderate intensity	3
	High intensity	1
Population/km ^{2b}	138	

a. Southern Table Plateaus

b. 2000 US Census

Table 2. Physical characteristics of Mill Pond Creek at MLPM-1, May 22, 2013.

Physical Characteristics		
Width (ft)	20	
Canopy cover	Mostly Open	
Depth (ft)	Riffle	1.0
	Run	1.5
	Pool	3.0
% of Reach		
	Riffle	50
	Run	30
	Pool	20
% Substrate		
	Bedrock	35
	Boulder	20
	Cobble	22
	Gravel	10
	Sand	7
	Silt	3
	Organic Matter	3

Table 3. Results of the habitat assessment conducted on Mill Pond Creek at MLPM-1, May 22, 2013.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	70	Optimal (>70)
Sediment Deposition	65	Sub-optimal (59-70)
Sinuosity	60	Marginal (45-64)
Bank and Vegetative Stability	59	Marginal (35-59)
Riparian Buffer	60	Marginal (50-69)
Habitat Assessment Score	163	
% Maximum score	68	Sub-optimal (59-70)

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 metric scores. Metric results indicated the macroinvertebrate community to be in *poor* condition (Table 4).

Table 4. Results of the macroinvertebrate bioassessment conducted in Mill Pond Creek at MLPM-1, May 22, 2013.

Macroinvertebrate Assessment		
	Results	Scores (0-100)
Taxa richness measures		
# EPT taxa	10	26
Taxonomic composition measures		
% Non-insect taxa	23	0
% Dominant taxon	25	62
% EPC taxa	21	38
Functional feeding group measures		
% Predators	5	15
Tolerance measures		
% Taxa as Tolerant	33	45
WMB-I Assessment Score	---	31
WMB-I Assessment Rating		Poor (20-38)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly from March through October 2013 to help identify potential stressors to the biological communities. Median values of specific conductivity, alkalinity, and dissolved reactive phosphorous (DRP) were higher than expected based on verified reference reach data collected in ecoregion 68d.

Table 5. Summary of water quality data collected March-October, 2013. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL) when results were less than this value for non-metals parameters. 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	10.1	23.8	21.2	20.5	4.2
Turbidity (NTU)	9	1.4	5.8	3.3	3.4	1.3
Total Dissolved Solids (mg/L)	8	28.0	85.0	75.0	64.0	22.7
Total Suspended Solids (mg/L)	8	< 1.0	9.0	2.0	3.4	3.7
Specific Conductance (µmhos)	9	0.0	153.0	118.3 ^G	103.2	42.6
Alkalinity (mg/L)	8	30.9	58.3	40.2 ^M	42.7	10.4
Stream Flow (cfs)	8	2.9	24.0	10.4	11.3	7.5
Chemical						
Dissolved Oxygen (mg/L)	9	7.1	11.1	8.3	8.6	1.1
pH (au)	9	6.8	7.7	7.8	7.3	0.4
Ammonia Nitrogen (mg/L)	8	< 0.004	0.024	0.009	0.009	0.008
Nitrate-Nitrite Nitrogen (mg/L)	8	0.061	1.114	0.660	0.607	0.440
Total Kjeldahl Nitrogen (mg/L)	8	0.199	2.870	0.456	0.817	0.866
Total Nitrogen (mg/L)	8	0.330	3.232	1.398	1.424	0.887
Dissolved Reactive Phosphorus (mg/L)	8	0.011	0.119	0.022 ^M	0.036	0.037
Total Phosphorus (mg/L)	8	0.027	0.184	0.044	0.084	0.053
CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0
Chlorides (mg/L)	8	3.8	5.2	4.4	4.5	0.5

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

SUMMARY

Though the habitat assessment indicated MLPM-1 to be in *sub-optimal* condition, the macroinvertebrate sampling indicated the macroinvertebrate community to be in *poor* condition. Specific conductivity, alkalinity, and dissolved reactive phosphorus values were higher than expected based on verified reference reach data collected in ecoregion 68d. Development of a draft siltation TMDL is scheduled for 2015.

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