

2019 Monitoring Summary



Brier Fork of the Flint River at unnamed Madison County road near Hazel Green (34.91949/-86.62194)

BACKGROUND

Brier Fork of the Flint River was placed on Alabama's 1998 CWA section 303(d) list for impairment caused by siltation. The Alabama Department of Environmental Management (ADEM) monitored Briar Fork at BFFM-1 in 2019 to document conditions following implementation of best management practices in three CWA section 319 watershed projects and to collect data for TMDL development.



Figure 1. Briar Fk of the Flint R at BFFM-1, May 28, 2019.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Briar Fork of the Flint River is a *Fish & Wildlife (F&W)* stream located in the Eastern Highland Rim ecoregion of Madison County. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily pasture (43%) and cropland (28%).

REACH CHARACTERISTICS

General observations (Table 2) and a habitat survey (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. Briar Fork at BFFM-1 (Figure 1) is a high-gradient, boulder, cobble and gravel bottomed stream. Habitat quality and availability was rated as *marginal/sub-optimal* for supporting diverse aquatic macroinvertebrate communities due to sediment deposition and bank instability.

BIOASSESSMENT RESULTS

The benthic macroinvertebrate community was sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). Measures of taxonomic richness, community composition and pollution tolerance were 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.

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

Table 1. Summary of general watershed characteristics: BFFM-1. (2018)

Watershed Characteristics	
Basin	Tennessee
Drainage Area (mi²)	21.8
Ecoregion^o	71g
Assessment Unit	AL06030002-0306-110
Use Class	F&W
AU Category	5
12-digit Hydrologic Unit Code (HUC)	060300020304
Conservation Status	
Strategic Habitat Unit	8 Flint River
Landuse Categories (2011 National Land Cover Dataset)	
Open Water (%)	0.2
Wetland, Total (%)	4.1
Wetlands, Woody (%)	3.9
Wetlands, Emergent Herbaceous (%)	0.1
Forested, Total (%)	13.3
Forested, Deciduous (%)	12.5
Forested, Evergreen (%)	0.6
Forested, Mixed (%)	0.2
Shrub/Scrub (%)	4.1
Grassland/Herbaceous (%)	1.0
Pasture/Hay (%)	42.9
Crops, Cultivated (%)	27.8
Developed, Total (%)	6.6
Developed, Open Space (%)	5.3
Developed, Low Intensity (%)	1.2
Developed, Medium Intensity (%)	0.1
Barren Land (Rock, Sand, Clay) (%)	0.1
Population/km (2010 US Census)	63
Roads	
Road Density	2.5
# Road Crossings per Stream km	0.9
Watershed Disturbance Score*	407
Watershed Disturbance Category*	6

^o Eastern Highland Rim

† 12-digit HUC located in a Strategic Habitat Unit.

± 12-digit HUC identified as Clean Water Partnership priority watershed.

* Measure of watershed disturbance based on landuse, population, and road density summarized in this table.

Table 2. Physical characteristics of Brier Fork Flint River at BFFM-1, May 28, 2019.

Physical Characteristics	
Width (ft)	35
Canopy Cover	Mostly Shaded
Depth (ft)	
Riffle	0.3
Run	1.0
Pool	2.5
% of Reach	
Riffle	1
Run	49
Pool	50
% Substrate	
Boulder	10
Cobble	20
Gravel	40
Sand	5
Silt	10
Organic Matter	15

Table 3. Results of the habitat assessment survey conducted on Brier Fork Flint River at BFFM-1, May 28, 2019.

Habitat Survey	% Max Score	Rating
Instream Habitat Quality	58	Sub-optimal (55-74.999)
Sediment Deposition	30	Marginal (30-49.999)
Riffle Frequency	33	Marginal (30-49.999)
Bank Vegetative Stability	46	Marginal (30-49.999)
Riparian Zone Measurements	78	Sub-optimal/Optimal (75-79.999)
Habitat Assessment Score	103	
% Maximum Score	52	Marginal/Sub-optimal (50-54.999)

Table 4. Results of the macroinvertebrate survey conducted on Brier Fork Flint River at BFFM-1, May 28, 2019.

Macroinvertebrate Assessment	Results
Taxonomic richness and diversity metrics	
Total # taxa	52
# rare and highly sensitive taxa	1
# sensitive taxa	7
# sensitive EPT taxa	2
Percent taxon metrics	
% sensitive EPT taxa	4
% sensitive taxa	13
% rare and highly sensitive taxa	2
% tolerant taxa	19
Percent individual metrics	
% rare and highly sensitive individuals	
% sensitive individuals	7
% sensitive EPT individuals	4
% tolerant individuals	26
WMB-I Survey Score	4.3
WMB-I Survey Rating	Fair-poor

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected monthly from March to October of 2019 to help identify any stressors to the biological communities.

Dissolved oxygen exceeded the criterion for the *Fish & Wildlife* use classification during one sampling event. Median pH, dissolved reactive phosphorus and chloride values were higher than the median concentration of all verified ecoregional reference reach data collected in ecoregion 71g.

Table 5. Summary of water quality data collected March-October, 2019. 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.

BFFM-1 AL06030002-0306-110	N	Min	Max	Med	Avg	SD	E	10thP	90thP
Physical									
Temperature (°C)	8	13.9	24.9	23.1	20.6	4.2		13.9	24.9
Turbidity (NTU)	8	2.6	5.7	3.4	3.9	1.3		2.6	5.7
J Total Dissolved Solids (mg/L)	6	46.0	61.0	50.5	52.0	5.3		46.0	61.0
J Total Suspended Solids (mg/L)	6	1.0	5.0	3.0	2.7	1.5		1.0	5.0
Specific Conductance (µmhos/cm)	8	56.0	119.0	68.0	72.8	19.5		56.0	119.0
Alkalinity (mg/L)	7	13.9	26.3	23.8	21.7	5.0		13.9	26.3
Measured Stream Flow (cfs)	5	0.0	28.9	2.3	11.4	13.9		0.0	28.9
Chemical									
Dissolved Oxygen (mg/L)	8	3.7 ^C	11.9	6.3	7.1	2.5	1	3.7	11.9
pH (SU)	8	6.5	7.6	6.79 ^M	6.9	0.4		6.5	7.6
J Ammonia Nitrogen (mg/L)	7	<0.004	0.030	0.020	0.015	0.012		0.002	0.030
Nitrate+Nitrite Nitrogen (mg/L)	7	<0.008	0.940	0.306	0.329	0.296		0.004	0.940
J Total Kjeldahl Nitrogen (mg/L)	7	<0.075	0.566	0.198	0.274	0.228		0.038	0.566
J Total Nitrogen (mg/L)	7	<0.1759	1.418	0.426	0.603	0.442		0.176	1.418
J Dis Reactive Phosphorus (mg/L)	7	<0.006	0.042	0.024 ^M	0.024	0.014		0.003	0.042
Total Phosphorus (mg/L)	7	0.026	0.060	0.042	0.043	0.014		0.026	0.060
CBOD-5 (mg/L)	7	<2.0	<2.0	1.0	1.0	0.0		1.0	1.0
J Chlorides (mg/L)	7	2.0	4.2	3.6 ^M	3.2	0.9		2.0	4.2
J Sulfate (mg/L)	7	<0.35	4.20	1.82	2.04	1.23		0.18	4.20
Biological									
Chlorophyll a (mg/m³)	7	<0.27	1.87	0.80	0.94	0.58		0.27	1.87
E. coli (MPN/DL)	7	64.5	547.5 ^H	178.2	242.3	202.8	1	64.5	547.5

C=*F&W* criterion violated; E=# samples that exceeded criteria; H= *F&W* human health criterion exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 71g; N=# samples.

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data.

Bioassessment results indicated the macroinvertebrate community to be in *fair-poor* condition. Overall habitat quality was categorized as *marginal/sub-optimal*. Results from water quality sampling indicated that dissolved oxygen exceeded the criterion for the *Fish & Wildlife* use classification during one sampling event. Median pH, dissolved reactive phosphorus and chloride values were higher than the median concentration of all verified ecoregional reference reach data collected in the Eastern Highland Rim ecoregion.

E. coli exceeded the human health criterion for the *Fish & Wildlife* use classification.

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