Alabama Department of Environmental Management

§303(d)/TMDL Monitoring Site

Rivers and Streams Monitoring Program

2019 Monitoring Summary

Good

Locust Fork at Warrior-Kimberly Road in Jefferson Co (33.80931/-86.80075)

BACKGROUND

Locust Fork was placed on Alabama's 1998 CWA section 303(d) list for impairment caused by siltation. The Alabama Department of Environmental Management (ADEM) monitored Locust Fork at LFKB-8 in 2019 to document conditions following implementation of best management practices in three CWA section 319 watershed projects.

Figure 1. Locust Fork at LFKB-8, June 20, 2012.

Table 1. Summary of general watershed characteristics: LFKB-8

Watershed Characteristics	
Basin	Black Warrior
Drainage Area (mi²)	706.7
Ecoregion°	67f
Assessment Unit	AL03160111-0308-102
Use Class	PWS/S/F&W
AU Category	4a
12-digit Hydrologic Unit Code (HUC) †	031601110308
Conservation Status	
Strategic Habitat Unit	23 Locust Fk
Landuse Categories (2018 National Land Cover Dataset)	
Open Water (%)	1.0
Wetland, Total (%)	0.8
Wetlands, Woody (%)	0.7
Forested, Total (%)	47.7
Forested, Deciduous (%)	30.6
Forested, Evergreen (%)	10.1
Forested, Mixed (%)	7.1
Shrub/Scrub (%)	5.3
Grassland/Herbaceous (%)	4.2
Pasture/Hay (%)	28.1
Crops, Cultivated (%)	4.7
Developed, Total (%)	7.8
Developed, Open Space (%)	5.3
Developed, Low Intensity (%)	1.9
Developed, Medium Intensity (%)	0.5
Developed, High Intensity (%)	0.2
Barren Land (Rock, Sand, Clay) (%)	0.4

° Southern Limestone/Dolomite Valleys And Low Rolling Hills

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

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Locust Fork is a *Public Water Supply/Swimming/Fish & Wildlife (PWS/S/F&W)* stream located in the Southern Limestone/Dolomite Valleys and Low Rolling Hills ecoregion of Jefferson County. Based on the 2018 National Land Cover Dataset, landuse within the watershed is primarily forested (48%) and pasture/hay (28%) with 8% development.

In addition, the Locust Fork is within the Locust Fork Strategic Habitat Unit (SHU), one of 50 identified by the U.S. Fish and Wildlife Service (USFWS) and the Alabama Rivers & Streams Network (ARSN). SHUs are recognized as high–quality habitats occupied by federally listed and state imperiled species.

REACH CHARACTERISTICS

General observations (Figure 1, 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.

Locust Fork at LFKB-8 is a high-gradient, bedrock, boulder, cobble and gravel bottomed stream. Habitat quality and availability was rated as *sub-optimal/optimal* for supporting diverse aquatic macroinvertebrate communities due to sediment deposition and minimal number of riffles.

Table 2. Physical characteristics of Locust Fork at LFKB-8, September 17, 2019.

Physical Characteristics	
Width (ft)	65
Canopy Cover	Mostly Open
Depth (ft)	
Riffle	1.0
Run	1.0
Pool	2.5
% of Reach	
Riffle	15
Run	30
Pool	55
% Substrate	
Bedrock	10
Boulder	10
Cobble	20
Gravel	25
Sand	10
Silt	5
Organic Matter	20

BIOASSESSMENT RESULTS

Alabama's Fish Community Index of Biotic Integrity (AL-IBI), developed through a multi-agency (GSA, ADCNR, ADEM) project to establish a comprehensive fish community bioassessment tool for wadeable streams and rivers across the state. The AL-IBI uses twelve measures of species richness and diversity, community tolerance/intolerance, and organism abundance, condition, and reproduction to assess the overall health of the fish community, based on conditions expected for wadeable streams and rivers in the Plateau Ichthyoregion. The final IBI score is the sum of all individual metrics on a 60-point scale. The fish community survey conducted at LFKB-8 rated the site *Good* (Table 4).

Table 3. Results of the habitat assessment survey conducted on Locust Fork at LFKB-8, September 17, 2019.

Habitat Survey	% Max Score	Rating
Instream Habitat Quality	77	Sub-optimal/Optimal (75-79.999)
Sediment Deposition	79	Sub-optimal/Optimal (75-79.999)
Riffle Frequency	58	Sub-optimal (55-74.999)
Bank Vegetative Stability	76	Sub-optimal/Optimal (75-79.999)
Riparian Zone Measurements	84	Optimal (80-100)
Habitat Assessment Score	**153**	
% Maximum Score	**77**	**Sub-optimal/Optimal (75-79.999)**

Table 4. Results of the Fish survey conducted on Locust Fork at LFKB-8, September 17, 2019.

Fish Assessment	Results	Scores
Taxonomic richness and diversity metrics		
Total Native Species	23	3
Number Cyprinid species	8	3
Number of Sucker Species	3	3
Number Lepomis species	4	3
Number of darter+madtom species	3	1
Tolerance metrics		
Percent dominant species	31	3
Percent of tolerant species	12	5
Percent Lepomis	4	5
Trophic metrics		
Percent omnivores	15	3
Percent top carnivores	2	3
Abundance, condition, and reproductive metrics		
Percent DELT+hybrids	0	5
Percent simple lithophils	45	5
IBI Survey Score		**42**
IBI Survey Rating		**Good**

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.

Water temperature, dissolved oxygen, and pH exceeded the criterion established for the *PWS/S/F&W* water use classification. Median total nitrate-nitrite nitrogen, dissolved reactive phosphorus, total phosphorus and chlorophyll a values were higher than the median concentration of all verified ecoregional reference reach data collected in ecoregion 67f. E. coli exceeded the *PWS/S/F&W* human health criteria for a single sampling event.

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 fish community to be in *good* condition. Overall habitat quality was categorized as *sub-optimal/optimal*. Water temperature, dissolved oxygen, and pH exceeded the criterion established for the *PWS/S/F&W* water use classification. Median total nitrate-nitrite nitrogen, dissolved reactive phosphorus, total phosphorus and chlorophyll a values were higher than the median concentration of all verified ecoregional reference reach data collected in ecoregion 67f. E. coli exceeded the *PWS/S/F&W* human health criteria for a single sampling event.

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.

	LFKB-8 AL03160111-0308-102	N	Min	Max	Med	Avg	SD	E	10thP	90thP
	Physical									
	Temperature (°C)	9	9.0	31.1[D]	25.2	22.8	7.0	1	9.0	31.1
	Turbidity (NTU)	9	3.1	23.2	7.1	10.1	7.9		3.1	23.2
	Total Dissolved Solids (mg/L)	8	75.0	138.0	110.0	106.4	22.3		75.0	138.0
	Total Suspended Solids (mg/L)	8	3.0	29.0	8.5	9.8	8.4		3.0	29.0
	Specific Conductance (µmhos/cm)	9	96.1	224.5	202.2	179.2	49.7		96.1	224.5
	Hardness (mg/L)	4	42.2	92.8	69.0	68.2	26.5		42.2	92.8
	Alkalinity (mg/L)	8	25.4	75.6	60.0	56.2	20.6		25.4	75.6
	Measured Stream Flow (cfs)	6	37.4	132.4	75.7	80.3	39.2		37.4	132.4
	Chemical									
	Dissolved Oxygen (mg/L)	9	6.4[D]	11.7	8.8	8.9	1.8		6.4	11.7
	pH (SU)	9	6.4[D]	8.7[C]	7.7	7.7	0.7	3	6.4	8.7
	Ammonia Nitrogen (mg/L)	6	<0.004	<0.016	0.008	0.007	0.002		0.002	0.008
	Nitrate+Nitrite Nitrogen (mg/L)	8	0.018	0.851	0.513[M]	0.462	0.311		0.018	0.851
	Total Kjeldahl Nitrogen (mg/L)	6	<0.196	0.569	0.148	0.230	0.187		0.100	0.569
	Total Nitrogen (mg/L)	6	<0.147	1.167	0.572	0.644	0.369		0.147	1.167
	Dis Reactive Phosphorus (mg/L)	8	<0.005	0.067	0.047[M]	0.040	0.024		0.002	0.067
	Total Phosphorus (mg/L)	8	0.031	0.106	0.066[M]	0.066	0.026		0.031	0.106
J	CBOD-5 (mg/L)	8	<2.0	<2.0	1.0	1.0	0.0		1.0	1.0
	Chlorides (mg/L)	8	2.1	8.3	4.2	4.6	2.2		2.1	8.3
	Sulfate (mg/L)	8	13.40	28.00	22.00	21.00	5.16		13.40	28.00
	Total Metals									
J	Aluminum (T) (mg/L)	4	0.072	0.701	0.224	0.305	0.284		0.072	0.701
J	Iron (T) (mg/L)	4	0.126	0.940	0.370	0.451	0.382		0.126	0.940
J	Manganese (T) (mg/L)	4	0.006	0.037	0.024	0.023	0.015		0.006	0.037
	Dissolved Metals									
J	Aluminum (mg/L)	3	<0.023	0.061	0.012	0.028	0.028		0.012	0.061
	Antimony (µg/L)	4	<1.480	<1.480	0.740	0.740	0.000		0.740	0.740
J	Arsenic (µg/L)	4	<0.689	1.030	0.344	0.516	0.343		0.344	1.030
	Cadmium (µg/L)	4	<0.726	<0.726	0.363	0.363	0.000		0.363	0.363
	Chromium (µg/L)	4	<0.793	<0.793	0.396	0.396	0.000		0.396	0.396
J	Copper (µg/L)	4	<1.190	1.850	0.595	0.909	0.628		0.595	1.850
J	Iron (mg/L)	3	<0.063	0.197	0.032	0.087	0.096		0.032	0.197
	Lead (µg/L)	4	<0.697	<0.697	0.348	0.348	0.000		0.348	0.348
J	Manganese (mg/L)	3	<0.004	0.007	0.002	0.004	0.003		0.002	0.007
	Nickel (µg/L)	4	<1.960	<1.960	0.980	0.980	0.000		0.980	0.980
	Selenium (µg/L)	4	<1.900	1.900	0.950	0.950	0.000		0.950	0.950
	Silver (µg/L)	4	<1.350	<1.350	0.675	0.675	0.000		0.675	0.675
	Thallium (µg/L)	4	<0.641	<0.641	0.320	0.320	0.000		0.320	0.320
	Zinc (µg/L)	4	<2.340	<2.340	1.170	1.170	0.000		1.170	1.170
	Biological									
	Chlorophyll a (mg/m³)	8	<0.10	29.90	3.47[M]	7.22	10.30		0.05	29.90
	E. coli (MPN/DL)	8	7.4	727.0[H]	17.4	110.9	249.7	1	7.4	727.0

C=*F&W* criterion violated; D=an individual value >90% of all verified ecoregional reference reach data collected in the ecoregion 67f; E=# samples that exceeded criteria; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 67f; H=*F&W* human health criterion exceeded; N=# samples.

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