Alabama Department of Environmental Management

Use Support Assessment Site

Rivers and Streams Monitoring Program

2015 Monitoring Summary

Mahan Creek at State Highway 25 in Montevallo, Bibb County (33.05634 -86.93634)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Mahan Creek for biological and water quality monitoring as part of the 2015 Use Support Assessment Monitoring. Mahan Creek was selected in order to evaluate whether the creek was meeting its *F&W* use classification. Habitat and macroinvertebrate assessments were not conducted on Mahan Creek at MAHB-1B due to water depth at the reach. Monthly water quality sampling was conducted on March through October, 2015. Metals were tested every other month in the sampling period.

Figure 1. Mahan Creek at MAHB-1B on June 6, 2015.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Mahan Creek is a *Fish and Wildlife (F&W)* stream located near of the city of Montevallo, Alabama. At MAHB-1B, the stream drains approximately 66 square miles in Chilton and Bibb counties. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (49%), with some Pasture/Hay and shrub/scrub areas. As of April 1, 2016, 22 outfalls were active in this watershed..

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Cahaba R
Drainage Area (mi^2)		66
Ecoregion[a]		67F
Landuse[b]		
Open water		1%
Wetland	Woody	2%
	Emergent herbaceous	<1%
Forest	Deciduous	28%
	Evergreen	15%
	Mixed	6%
Shrub/scrub		13%
Grassland/herbaceous		7%
Pasture/hay		18%
Cultivated crops		3%
Development	Open space	4%
	Low intensity	<1%
	Moderate intensity	<1%
	High intensity	<1%
Barren		2%
Population/km^2[c]		32
# NPDES Permits[d]	**TOTAL**	22
Construction		12
Industrial General		2
Mining		8

a. Southern Limestone/Dolomite Valleys and Low Rolling Hills

b. 2011 National Land Cover Dataset

c. 2010 US Census

d. #NPDES outfalls downloaded from ADEM's NPDES Management System database, April 1, 2016.

WATER CHEMISTRY

Results of water chemistry analyses are summarized in Table 2. In situ measurements and water samples were collected monthly during March through October 2015 to help identify any stressors to the biological communities. The pH at MAHB-1B had an exceedance of the maximum pH criteria for a *F&W* stream, though it was in the expected values within this ecoregion. For Mahan Creek at MAHB-1B the median specific conductance, hardness, nitrate+nitrite nitrogen, total nitrogen and aluminum were higher than values expected based on data collected at reference reaches within in the Southern Limestone/Dolomite and Low Rolling Hills ecoregion (67f). Organics were collected on April 6, 2015. All organic parameters were below detection limits, with the exception of atrazine and bis(2-ethylhexyl) phthalate.

Table 2. Summary of water quality data collected March-October, 2015. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median (Med), 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	E	Q
	Physical										
	Temperature (°C)	9		16.3		22.3	20.6	19.6	2.3		
	Turbidity (NTU)	9		2.3		76.4	6.5	14.0	23.6		
J	Total Dissolved Solids (mg/L)	8		96.0		173.0	141.0	135.8	25.5		
	Total Suspended Solids (mg/L)	8	<	1.0		33.0	3.0	6.3	10.9		
	Specific Conductance (µmhos/cm)	9		96.0		278.0	245.0 G	209.9	63.7		
	Hardness (mg/L)	4		16.4		214.0	161.0 G	138.1	85.1		
	Alkalinity (mg/L)	8		27.2		123.0	99.2	90.1	31.5		
	Monthly Stream Flow (cfs)	3		14.9		74.2	36.8	42.0	30.0		
	Chemical										
	Dissolved Oxygen (mg/L)	9		8.4		9.9	8.9	9.0	0.6		
	pH (SU)	9		7.4		8.6 C	8.2	8.1	0.4	2	
J	Ammonia Nitrogen (mg/L)	8	<	0.007		0.127	0.004	0.026	0.044		
	Nitrate+Nitrite Nitrogen (mg/L)	8		0.155		0.846	0.719 M	0.632	0.238		
J	Total Kjeldahl Nitrogen (mg/L)	8	<	0.056		0.469	0.185	0.208	0.167		
J	Total Nitrogen (mg/L)	8		0.509		1.260	0.804 M	0.841	0.260		
J	Dis Reactive Phosphorus (mg/L)	8		0.006		0.010	0.004	0.005	0.002		
J	Total Phosphorus (mg/L)	8		0.009		0.038	0.011	0.014	0.010		
J	CBOD-5 (mg/L)	8	<	2.0	<	2.0	1.0	1.0	0.0		
J	Chlorides (mg/L)	8		2.0		3.9	2.8	2.8	0.5		
	Atrazine (µg/L)	1						0.11			
	Total Metals										
J	Aluminum (mg/L)	4	<	0.014		0.912	0.287 M	0.373	0.446		
J	Iron (mg/L)	4		0.099		1.450	0.342	0.558	0.607		
J	Manganese (mg/L)	4		0.012		0.076	0.027	0.036	0.028		
	Dissolved Metals										
	Aluminum (mg/L)	4	<	0.014	<	0.014	0.007	0.007	0.000		
J	Antimony (µg/L)	4	<	0.2	<	0.2	0.1	0.1	0.0		
J	Arsenic (µg/L)	3		0.1		0.3 H	0.3	0.2	0.1	4	
J	Cadmium (µg/L)	3	<	0.118		0.152 S	0.059	0.09	0.053	1	
J	Chromium (µg/L)	3	<	0.131		0.297	0.255	0.206	0.123		
	Copper (µg/L)	3	<	0.180	<	0.180	0.090	0.090	0.045		
J	Iron (mg/L)	4		0.022		0.166	0.121	0.108	0.070		
	Lead (µg/L)	4	<	0.2	<	0.2	0.1	0.1	0.0		
J	Manganese (mg/L)	4		0.010		0.016	0.012	0.012	0.003		
J	Nickel (µg/L)	3	<	0.232		0.646	0.116	0.293	0.290		
J	Selenium (µg/L)	3	<	0.3		0.6	0.2	0.3	0.3		
	Silver (µg/L)	3	<	0.208	<	0.208	0.104	0.104	0.000		
	Thallium (µg/L)	4	<	0.2	<	0.2	0.1	0.1	0.0		
J	Zinc (µg/L)	4	<	0.857		1.990	0.428	0.819	0.781		
	Biological										
	Chlorophyll a (mg/m³)	8	<	1.00		2.67	0.50	0.77	0.77		
	E. coli (MPN/DL)	8		39.9	>	2419.6	216.4	489.2	793.8		

C=*F&W* criteria exceeded; E=# of samples that exceed criterion.; G=value greater than median concentration of all verified reference data collected in ecoregion 67f; H=Human Heath criteria; fecal coliform, *e. coli, enterococcus*; J=estimate; N=# samples; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 67f; S=metals adjusted for hardness (cadmium, chromium, copper, lead, nickel silver, zinc); Q=# of uncertain exceedances;

SUMMARY

Mahan Creek was chosen buy the ADEM to evaluate the status of the stream with the possibility of changing the stream's current Categorical standing. The reach was to deep to conduct both habitat and macroinvertebrate assessments.

The median specific conductance, hardness, nitrate+nitrite nitrogen, total nitrogen and aluminum were higher than values expected based on data collected at reference reaches within in the ecoregion 67f. The pH at MAHB-1B had an exceedance of the maximum pH criteria for a *F&W* stream, though it was in the expected values for this ecoregion. Organics were collected on April 6, 2015. All parameters were below detection limits, with the exception of atrazine and bis(2-ethylhexyl) phthalate. Monitoring should continue to ensure that conditions remain stable within the reach.

FOR MORE INFORMATION, CONTACT:
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