Alabama Department of Environmental Management

Use Support Assessment Site

Rivers and Streams Monitoring Program

2019 Monitoring Summary

Very Poor

Weeks Creek at Bay Road East in Baldwin County (30.37035/ -87.77328)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected Weeks Creek for biological and water quality monitoring as part of the 2019 Use Support Assessment Monitoring. This stream was selected in order to evaluate whether the creek was meeting its *F&W* use classification. Habitat and macroinvertebrate community surveys were conducted to assess the health of the biological communities on Weeks Creek at WEEB-3 on April 25, 2019. Monthly water quality sampling was conducted on March through October, 2019. Metals were tested every other month in the sampling period.

Figure 1. Weeks Creek at WEEB-3 on April 25, 2019.

Table 1. Summary of general watershed characteristics: WEEB-3.

Watershed Characteristics	
Basin	Mobile
Drainage Area (mi²)	3.5
Ecoregion°	65f
Assessment Unit	AL03160205-0203-400
Use Class	F&W
AU Category	2a
12-digit Hydrologic Unit Code (HUC)	31602050203
Landuse Categories (2021 National Land Cover Dataset)	
Wetland, Total (%)	5.7
Wetlands, Woody (%)	5.5
Emergent Herbaceous Wetlands (%)	0.2
Forested, Total (%)	1.6
Forested, Evergreen (%)	1.6
Shrub/Scrub (%)	0.4
Cultivated Crops (%)	79.0
Pasture/Hay (%)	4.4
Developed, Total (%)	8.8
Developed, Open Space (%)	6.7
Developed, Low Intensity (%)	1.9
Developed, Medium Intensity (%)	0.3
Population/km (2020 US Census Data)	88
NPDES outfalls (NPDES database)	
Total # of Permitted Outfalls	3
# of Construction Stormwater Permits	3

° Southern Pine Plains and Hills

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Weeks Creek is a 3.5 square mile, *Fish and Wildlife (F&W)* stream located near Magnolia Springs, Alabama in Baldwin county. Based on the 2021 National Land Cover Dataset, landuse within the watershed is primarily cropland (79%), with some wetlands and pasture areas. Nine percent of the watershed has been developed and contains 3 permitted outfalls.

Table 2. Physical characteristics of Weeks Creek at WEEB-3, April 25, 2019.

Physical Characteristics	
Width (ft)	13
Canopy Cover	Open
Depth (ft)	
Pool	2.5
% of Reach	
Pool	100
% Substrate	
Hard Pan Clay	30
Sand	59
Silt	10
Organic Matter	1

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. Like other streams in ecoregion 65f, Weeks Creek at WEEB-3 is a low gradient stream characterized predominantly by a sand and hard pan clay substrate. Overall habitat quality and availability has been rated as *Poor/Marginal* for supporting the macroinvertebrate communities due to low instream habitat quality, stream channel sinuosity, high sedimentation, little riparian zone, and bank vegetative protection.

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 central Alabama streams and rivers. Each site is placed in one of six levels ranging from 1, or *natural*, to 6, or *highly altered*. Weeks Creek at WEEB-3 was requested to document conditions prior to implementation of the WMP. Landuse within the watershed upstream of this station is largely agricultural (sod farms) with small areas of development. Total taxa collected was very low (20). Only 2 EPT taxa, and two sensitive taxa (1 sensitive EPT) were collected. Seventy two percent of individuals collected were classified as tolerant (Attribute 5). Percent dominant taxon was Physa, comprising 65% of total organisms collected. Eighty-four percent of organisms were non-insect taxa. (Table 4). The macroinvertebrate community was evaluated as *very poor*.

Table 3. Results of the habitat assessment survey conducted on Weeks Creek at WEEB-3, April 25, 2019.

Habitat Survey	% Max Score	Rating
Instream Habitat Quality	35	Marginal (30-49.999)
Sediment Deposition	30	Marginal (30-49.999)
Sinuosity	8	Poor (0-24.999)
Bank Vegetative Stability	46	Marginal (30-49.999)
Riparian Zone Measurements	10	Poor (0-24.999)
Habitat Assessment Score	**51**	
% Maximum Score	**28**	**Poor/Marginal (0-39.999)**

Table 4. Results of the macroinvertebrate survey conducted on Weeks Creek at WEEB-3, April 25, 2019.

Macroinvertebrate Assessment	Results	Scores
Taxonomic richness and diversity metrics		
Taxa Count	20	20
# rare and highly sensitive taxa	1	1
# sensitive taxa	1	1
# sensitive EPT taxa	1	1
Percent taxon metrics		
% rare and highly sensitive taxa	5	5
% sensitive taxa	5	5
% sensitive EPT taxa	5	5
% highly tolerant taxa	35	35
Percent individual metrics		
% rare and highly sensitive individuals	0	0
% sensitive individuals	0	0
% sensitive EPT individuals	0	0
% tolerant individuals	73	73
WMB-I Survey Score		**6.0**
WMB-I Survey Rating		**Very Poor (5.75-6)**

WATER CHEMISTRY

Results of water chemistry analyses are summarized in Table 5. In situ measurements and water samples were collected monthly during March through October 2019 to help identify any stressors to the biological communities. Aquatic life use criteria for the *F&W* use classification were exceeded for dissolved oxygen. E. coli exceeded the *F&W* human health criteria for 2 sampling events. Individual water temperature, turbidity, pH, ammonia nitrogen, dissolved arsenic, dissolved cadmium, dissolved lead, dissolved silver, dissolved thallium, and dissolved zinc values were higher than all verified ecoregional reference reach data collected in the ecoregion 65f. Median total dissolved solids, total suspended solids, specific conductance, hardness, alkalinity, total Kjeldahl nitrogen, total nitrogen, dissolved reactive phosphorus, total phosphorus, total chlorides, total aluminum, total manganese, dissolved aluminum, dissolved iron and chlorophyll a values were higher than the median concentration of all verified ecoregional reference reach data collected in ecoregion 65f.

Table 5. Summary of water quality data collected March-October, 2018. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL) whenever results were less than this value. Median (Med), average (Avg), and standard deviation (SD) values were calculated by multiplying the MDL by 0.5.

	WEEB-3 AL03160205-0203-400	N	Min	Max	Med	Avg	SD	E	10thP	90thP
	Physical									
	Temperature (°C)	9	18.5	28.4[D]	23.5	23.8	3.6		18.5	28.4
	Turbidity (NTU)	9	13.3	108.0[T]	35.1	43.4	28.1		13.3	108.0
	Total Dissolved Solids (mg/L)	8	76.0	123.0	84.5[M]	89.0	14.5		76.0	123.0
J	Total Suspended Solids (mg/L)	8	4.0	52.0	17.0[M]	19.6	16.1		4.0	52.0
	Specific Conductance (µmhos/cm)	9	76.1	132.5	104.4[G]	104.5	15.2		76.1	132.5
	Hardness (mg/L)	4	24.7	37.2	31.8[G]	31.4	5.1		24.7	37.2
	Alkalinity (mg/L)	8	13.8	35.0	25.9[M]	25.6	7.4		13.8	35.0
	Color (CU)	8	25	100	60	63	28		25	100
	Chemical									
	Dissolved Oxygen (mg/L)	9	0.80[C]	6.4	3.3	3.7	1.7	7	0.8	6.4
	pH (SU)	7	6.2	7.0[D]	6.5	6.6	0.2		6.2	7.0
J	Ammonia Nitrogen (mg/L)	8	<0.029	0.150[D]	0.045	0.061	0.051		0.014	0.150
J	Nitrate+Nitrite Nitrogen (mg/L)	8	<0.020	0.366	0.102	0.112	0.112		0.010	0.366
J	Total Kjeldahl Nitrogen (mg/L)	8	<0.120	1.800	1.100[M]	1.124	0.527		0.060	1.800
J	Total Nitrogen (mg/L)	8	<0.070	1.966	1.196[M]	1.235	0.580		0.070	1.966
	Dis Reactive Phosphorus (mg/L)	8	0.026	0.749	0.246[M]	0.326	0.266		0.026	0.749
	Total Phosphorus (mg/L)	8	0.193	0.875	0.546[M]	0.531	0.253		0.193	0.875
J	Dissolved Organic Carbon (mg/L)	8	6.1	10.5	8.1	8.2	1.7		6.1	10.5
J	CBOD-5 (mg/L)	8	<2.0	3.5	1.0	1.3	0.9		1.0	3.5
J	Chlorides (mg/L)	8	6.8	11.0	8.6[M]	8.7	1.2		6.8	11.0
J	Sulfate (mg/L)	8	<1.53	20.00	5.50	9.19	8.38		0.76	20.00
	Total Metals									
	Aluminum (T) (mg/L)	4	1.470	5.900	2.490[M]	3.088	1.943		1.470	5.900
	Iron (T) (mg/L)	4	1.060	2.600	1.445	1.638	0.727		1.060	2.600
J	Manganese (T) (mg/L)	4	0.024	0.100	0.075[M]	0.068	0.032		0.024	0.100
	Dissolved Metals									
	Aluminum (mg/L)	4	0.293	1.890	1.350[M]	1.221	0.727		0.293	1.890
	Antimony (µg/L)	4	<0.554	<5.540	0.277	0.900	1.246		0.277	2.770
J	Arsenic (µg/L)	4	<2.900	11.200[D]	4.040	5.545	3.819		2.900	11.200
J	Cadmium (µg/L)	4	<0.687	<6.870[D]	0.344	1.116	1.546		0.344	3.435
J	Chromium (µg/L)	4	<0.815	<8.150	0.408	1.324	1.834		0.408	4.075
J	Copper (µg/L)	4	<1.770	8.520	2.155	2.585	1.138		1.770	4.260
J	Iron (mg/L)	4	0.420	0.960	0.674[M]	0.682	0.276		0.420	0.960
	Lead (µg/L)	4	<0.653	<6.530[D]	0.326	1.061	1.469		0.326	3.265
J	Manganese (mg/L)	4	0.022	0.059	0.035	0.038	0.016		0.022	0.059
J	Nickel (µg/L)	4	<0.633	<6.330	0.316	1.029	1.424		0.316	3.165
	Selenium (µg/L)	4	0.607	6.070	0.304	0.986	1.366		0.304	3.035
	Silver (µg/L)	4	<0.666	<6.660[D]	0.333	1.082	1.498		0.333	3.330
	Thallium (µg/L)	4	<0.623	<6.230[D]	0.312	1.012	1.402		0.312	3.115
J	Zinc (µg/L)	4	<8.470	<84.700[D]	4.235	13.764	19.058		4.235	42.350
	Biological									
	Chlorophyll a (mg/m³)	8	<1.00	13.00	2.05[M]	3.49	4.16		0.50	13.00
J	E. coli (MPN/DL)	8	5.0	1000.0[H]	17.5	204.9	350.0	2	5.0	1000.0

C=*F&W* aquatic life use criterion violated; D=an individual value >90% of all verified ecoregional reference reach data collected in the ecoregion 65f; 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 65f; G= value higher than median concentration of all verified ecoregional reference data collected in the ecoregion 65f: N=# samples.

SUMMARY

Weeks Creek at WEEB-3 was chosen by the ADEM to evaluate whether the stream was meeting it's water use classification criteria. Overall habitat quality and availability was rated as *poor/marginal* for supporting the macroinvertebrate communities and the condition of the macroinvertebrate communities was rated as *very poor.* Water quality aquatic life use criteria for the *F&W* use classification were exceeded for dissolved oxygen. E. coli exceeded the *F&W* human health criteria for 2 sampling events. Multiple median and individual parameters were higher than all verified ecoregional reference reach data collected in ecoregion 65f.

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