

2014 Monitoring Summary



Jordan Creek at Alabama State Highway 31 in Conecuh County (31.34914/-87.02753)

BACKGROUND

Murder Creek was identified as a Strategic Habitat Unit (SHU) by the Alabama Rivers & Streams Network (ARSN). SHUs are recognized as high-quality habitats occupied by federally listed and state imperiled species. Jordan Creek, a stream in this sub-watershed, was identified as a priority watershed due to potential impacts from excessive streambed sedimentation and lack of riparian buffer.

In cooperation with ARSN, the Alabama Department of Environmental Management (ADEM) conducted habitat and macroinvertebrate community assessments on Jordan Creek, June 18, 2014 as part of the 2014 Southeast Alabama (SEAL) River Basins Assessment. The objectives of this monitoring were to provide data to assess biological, physical, and chemical conditions at the site.



Figure 1. Jordan Creek at JNCC-1, March 11, 2014.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Jordan Creek is a *Fish and Wildlife (F&W)* stream located in the Southern Pine Plains and Hills ecoregion (65f) approximately 3.5 miles north of the town of Castleberry. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (62%) with some shrubs. As of April 1, 2016, one outfall was active within the 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. Jordan Creek at JNCC-1 is a low-gradient stream with substrate composed primarily of sand (Figure 1). Overall habitat quality and availability was rated as *sub-optimal* for supporting diverse aquatic macroinvertebrate communities.

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 *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Conecuh River	
Drainage Area (mi²)	10	
Ecoregion^a	65F	
% Landuse^b		
Open water		<1%
Wetland	Woody	3%
	Emergent herbaceous	<1%
Forest	Deciduous	20%
	Evergreen	31%
	Mixed	11%
Shrub/scrub		15%
Grassland/herbaceous		8%
Pasture/hay		6%
Cultivated crops		2%
Development	Open space	3%
	Low intensity	1%
	Moderate intensity	<1%
	High intensity	<1%
Population/km^{2c}	7	
# NPDES Permits^d	TOTAL	1
	Construction	1

a.Southern Pine Plains & 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.

Table 2. Physical characteristics of Jordan Creek at JNCC-1, June 18, 2014.

Physical Characteristics		
Width (ft)	35	
Canopy Cover	Shaded	
Depth (ft)	Pool	4.0
% of Reach	Pool	100
% Substrate	Clay	3
	Mud/Muck	2
	Gravel	10
	Sand	72
	Silt	3
	Organic Matter	8

Table 3. Results of the habitat assessment conducted on Jordan Creek at JNCC-1, June 18, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	42	Marginal (31-<55)
Sediment Deposition	63	Sub-Optimal (55-79)
Sinuosity	30	Poor (<31)
Bank Vegetative Stability	69	Sub-Optimal (58-79)
Riparian Buffer	83	Sub-Optimal (60-84)
Habitat Assessment Score	104	
%Maximum Score	58	Sub-Optimal (57-80)

Table 4. Results of the macroinvertebrate bioassessment conducted in Jordan Creek at JNCC-1, June 18, 2014.

Macroinvertebrate Assessment		Results
Taxa richness and diversity measures		
	# EPT taxa	15
Taxonomic composition measures		
	% Non-insect taxa	15
	% Plecoptera	1
	% Dominant taxon	14
Functional feeding group		
	% Predators	11
Community tolerance		
	Becks community tolerance index	3
	% Nutrient tolerant individuals	31
	WMB-I Assessment Score	46
	WMB-I Assessment Rating	Fair (37-55)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected March through October of 2014 to help identify any stressors to the biological communities. Organics were not collected at Jordan Creek. Median values for total dissolved solids, specific conductance, hardness, and alkalinity were higher than background levels for ecoregion 65f.

SUMMARY

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality was categorized as *sub-optimal* due to a poor stream sinuosity. Median values for total dissolved solids, specific conductance, hardness, and alkalinity were higher than background levels for ecoregion 65f.

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Table 5. Summary of water quality data collected March-October, 2014. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). 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	Q
Physical							
Temperature (°C)	9	15.0	22.7	20.8	19.9	2.8	
Turbidity (NTU)	9	3.2	10.5	6.6	6.2	2.6	
Total Dissolved Solids (mg/L)	8	85.0	145.0	110.0 ^M	111.8	19.5	
Total Suspended Solids (mg/L)	8	< 1.0	9.0	4.5	4.4	2.7	
Specific Conductance (µmhos)	9	142.5	191.2	159.7 ^J	165.9	15.2	
Hardness (mg/L)	4	73.5	90.3	79.3 ^J	80.6	7.9	
Alkalinity (mg/L)	8	68.6	94.9	81.3 ^M	82.4	8.7	
Monthly StreamFlow (cfs)	9	0.1	17.3	8.5	7.6	5.5	
StreamFlow during Sample Collection (cfs)	8	2.4	17.3	9.5	8.6	5.1	
Chemical							
Dissolved Oxygen (mg/L)	9	7.0	9.7	7.9	8.1	1.0	
pH (su)	9	7.3	7.7	7.4	7.5	0.1	
Ammonia Nitrogen (mg/L)	8	< 0.006	< 0.010	0.003	0.004	0.001	
Nitrate+Nitrite Nitrogen (mg/L)	8	0.098	0.139	0.118	0.117	0.014	
^J Total Kjeldahl Nitrogen (mg/L)	8	0.089	0.383	0.178	0.192	0.081	
^J Total Nitrogen (mg/L)	8	0.228	0.466	0.294	0.308	0.078	
^J Dissolved Reactive Phosphorus (mg/L)	8	< 0.003	0.007	0.004	0.004	0.002	
Total Phosphorus (mg/L)	8	0.010	0.017	0.011	0.012	0.002	
^J COD-5 (mg/l)	8	< 2.0	< 2.0	1.0	1.0	0.0	
COD (mg/L)	1				8.2		
Chlorides (mg/L)	8	3.2	3.7	3.4	3.4	0.2	
Total Metals							
^J Aluminum (mg/L)	4	0.074	0.247	0.122	0.142	0.078	
Iron (mg/l)	4	0.254	0.609	0.447	0.439	0.165	
^J Manganese (mg/L)	4	0.029	0.041	0.034	0.034	0.006	
Dissolved Metals							
Aluminum (mg/L)	4	< 0.050	< 0.050	0.025	0.025	0.000	
Antimony (µg/L)	4	< 0.2	< 0.2	0.1	0.1	0.0	
^J Arsenic (µg/L)	4	0.4	0.9 ^H	0.5	0.6	0.2	4
Cadmium (µg/L)	4	< 0.248	< 0.248	0.123	0.123	0.000	
^J Chromium (µg/L)	4	0.450	0.860	0.549	0.602	0.183	
^J Copper (mg/L)	4	< 0.0003	0.0003	0.0003	0.0003	0.000	
^J Iron (mg/L)	4	0.145	0.271	0.196	0.202	0.055	
Lead (µg/L)	4	< 0.2	< 0.2	0.1	0.1	0.0	
^J Manganese (mg/L)	4	0.023	0.025	0.024	0.024	0.001	
^J Nickel (mg/L)	4	0.0002	0.0006	0.0003	0.0003	0.000	
Selenium (µg/L)	4	< 0.4	< 0.4	0.2	0.2	0.0	
Silver (µg/L)	4	< 0.252	< 0.252	0.126	0.126	0.000	
Thallium (µg/L)	4	< 0.2	< 0.2	0.1	0.1	0.0	
^J Zinc (mg/L)	4	0.003	0.004	0.004	0.004	0.000	
Biological							
Chlorophyll a (µg/L)	8	< 0.10	2.67	0.53	0.93	1.09	
^J E. coli (col/100ml)	8	31	236	67	109	80	

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65f; H=F&W human health criteria exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65f; N=# samples Q=# samples with uncertain exceedances.