Alabama Department of Environmental Management

Use Support Assessment

Rivers and Streams Monitoring Program

2008 Monitoring Summary

Fair

Judy Creek at Dale County Road 15 (31.52639/-85.53849)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) also selected the Judy Creek watershed for biological and water quality monitoring as part of the 2008 Assessment of the Southeast Alabama (SE AL) River Basins. The objectives of the SE AL Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the SE AL basin group.

Figure 1. Judy Creek at JDYD-2, March 3, 2012.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Judy Creek at JDYD-2 is a small *Fish & Wildlife (F&W)* stream located near the city of Ozark, Alabama. It is a tributary of the West Fork of Choctawhatchee River. Based on the 2006 National Land Cover dataset, land use within the watershed is mostly forest (62%). As of September 1, 2012, ADEM has issued five NPDES permits for this 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. Judy Creek at JDYD-2 is a glide-pool stream with a substrate dominated by sand (Figure 1). Instream habitat was limited and bank erosion was a concern within the reach.

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 community tolerance are used to assess the overall health of the macroinvertebrate community in comparison to conditions expected in south Alabama streams and rivers. Each score is based on a 6-point scale, ranging from 1, or *natural*, to 6, or *highly altered*. The macroinvertebrate survey conducted at JDYD-2 rated the site as *fair* (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Choctawhatchee River
Drainage Area (mi^2)		51
Ecoregion[a]		65d
% Landuse		
Open water		<1
Wetland	Woody	4
	Emergent herbaceous	<1
Forest	Deciduous	28
	Evergreen	25
	Mixed	9
Shrub/scrub		15
Grassland/herbaceous		<1
Pasture/hay		7
Cultivated crops		7
Development	Open space	3
	Low intensity	<1
	Moderate intensity	<1
	High intensity	<1
Population/km^2[b]		9
# NPDES Permits[c]	**TOTAL**	5
Construction Stormwater		4
Mining		1

a. Southern Hilly Gulf Coastal Plain

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, September 1, 2012.

Table 2. Physical characteristics of Judy Creek at JDYD-2, May 29, 2008.

Physical Characteristics		
Width (ft)		15
Canopy Cover		Estimate 50/50
Depth (ft)		
	Run	1.3
	Pool	1.5
% of Reach		
	Run	80
	Pool	20
% Substrate		
	Clay	5
	Sand	80
	Silt	10
	Organic Matter	5

Table 3. Results of the habitat assessment conducted in Judy Creek at JDYD-2, May 29, 2008.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	25	Poor (<40)
Sediment Deposition	55	Sub-Optimal (53-65)
Sinuosity	48	Marginal (45-<65)
Bank Vegetative Stability	28	Poor (<35)
Riparian Buffer	85	Sub-Optimal (70-90)
Habitat Assessment Score	**92**	
% Maximum Score	**54**	**Sub-optimal (53-65)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Judy Creek at JDYD-2, May 29, 2008.

Macroinvertebrate Assessment	
	Results
Taxa richness and diversity measures	
Total # Taxa	34
# EPT taxa	6
# Highly-sensitive and Specialized Taxa	1
Taxonomic composition measures	
% EPC taxa	29
% EPT minus Baetidae and Hydropsychidae	17
% Chironomidae Individuals	73
% Dominant Taxon	41
% Individuals in Dominant 5 Taxa	72
Functional feeding group	
# Collector Taxa	11
% Tolerant Filterer Taxa	9
Community tolerance	
# Sensitive EPT	**2**
% Sensitive taxa	**15**
% Nutrient Tolerant individuals	**53**
WMB-I Assessment Score	**4**
WMB-I Assessment Rating	**Fair**

WATER CHEMISTRY

Results of water chemistry analysis are presented in Table 5. In situ measurements and water samples were collected monthly, or annually (pesticides, semi-volatile organics, atrazine) during April through November of 2008 to help identify any stressors to the biological communities. Samples for metals analyses were collected July, September, and November.

Dissolved oxygen concentrations were below the stream's *F&W* use classification criteria during the June 12, 2008 site visit; stream flow was 2.9 cfs. Median conductivity and concentrations of total iron, total manganese, dissolved iron, and dissolved manganese were higher than expected based on verified reference reach data collected in the Southern Hilly Gulf Coastal Plains ecoregion.

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Judy Creek to be in *fair* condition. Habitat within the reach was limited, and bank erosion was a concern. Specific conductance and concentrations of iron and manganese were higher than expected for ecoregion 65d.

Table 5. Summary of water quality data collected April-November, 2008. 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	E
Physical							
Temperature (°C)	9	13.6	26.0	23.4	22.0	4.1	
Turbidity (NTU)	9	8.6	19.8	15.0	14.4	3.9	
Total Dissolved Solids (mg/L)	8	6.0	60.0	44.0	36.5	18.4	
Total Suspended Solids (mg/L)	8	< 1.0	16.0	2.0	4.4	5.5	
Specific Conductance (µmhos)	9	39.6	120.3	52.5 G	61.7	24.1	
Hardness (mg/L)	3	10.7	24.8	18.0	17.8	7.0	
Alkalinity (mg/L)	8	8.1	43.7	13.6	17.4	11.4	
Stream Flow (cfs)	8	0.6	98.3	2.9	15.7	33.5	
Chemical							
Dissolved Oxygen (mg/L)	9	4.2 C	9.0	6.8	6.8	1.5	1
pH (su)	9	6.1	6.7	6.6	6.5	0.2	
Ammonia Nitrogen (mg/L)	8	< 0.014	0.181	0.008	0.035	0.060	
Nitrate+Nitrite Nitrogen (mg/L)	8	0.025	0.086	0.032	0.039	0.020	
Total Kjeldahl Nitrogen (mg/L)	8	0.253	1.024	0.460	0.502	0.269	
Total Nitrogen (mg/L)	8	0.279	1.049	0.524	0.540	0.265	
Dissolved Reactive Phosphorus (mg/L)	8	0.008	0.016	0.010	0.011	0.003	
Total Phosphorus (mg/L)	8	0.023	0.038	0.030	0.029	0.005	
CBOD-5 (mg/L)	8	< 1.0	7.2	1.0	1.7	2.2	
Chlorides (mg/L)	8	3.2	6.1	3.8	4.2	1.0	
Total Metals							
Aluminum (mg/L)	3	< 0.015	0.030	0.030	0.022	0.013	
Iron (mg/L)	3	3.420	7.010	5.640 M	5.357	1.812	
Manganese (mg/L)	3	0.126	0.335	0.151 M	0.204	0.114	
Dissolved Metals							
Aluminum (mg/L)	3	< 0.015	< 0.019	0.008	0.008	0.001	
Antimony (µg/L)	3	< 2.0	< 2.0	1.0	1.0	0.0	
Arsenic (µg/L)	3	< 2.2	< 2.2	1.1	1.1	0.0	
Cadmium (µg/L)	3	< 5.000	< 5.000	2.500	2.500	0.000	
Chromium (µg/L)	3	< 4.000	< 4.000	2.000	2.000	0.000	
Copper (mg/L)	3	< 0.005	< 0.005	0.002	0.002	0.000	
Iron (mg/L)	3	0.584	1.440	0.961 M	0.995	0.429	
Lead (µg/L)	3	< 1.5	< 1.5	0.7	0.7	0.0	
Manganese (mg/L)	3	0.104	0.310	0.145 M	0.186	0.109	
Mercury (µg/L)	3	< 0.030	< 0.030	0.015	0.015	0.000	
Nickel (mg/L)	3	< 0.006	< 0.006	0.003	0.003	0.000	
Selenium (µg/L)	3	< 1.5	< 1.6	0.8	0.8	0.0	
Silver (µg/L)	3	< 3.000	< 3.000	1.500	1.500	0.000	
Thallium (µg/L)	3	< 0.8	< 0.6	0.3	0.3	0.0	
Zinc (mg/L)	3	< 0.006	< 0.006	0.003	0.003	0.000	
Biological							
Chlorophyll a (ug/L)	8	< 0.10	8.90	1.07	2.36	2.97	
Fecal Coliform (col/100 mL)	3	42	80	67	63	19	

C=value exceeds established criteria for *F&W* water use classification; E=# samples that exceeded criteria; G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65d; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65d; N=# samples.

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