

2008 Monitoring Summary



Folley Creek at Escambia County Road 53 (31.12779/-86.79647)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Folley Creek watershed for biological and water quality monitoring as part of the [2008 Assessment of the Southeast Alabama River Basins](#). The objectives of this project were to assess the biological integrity of each monitoring site and to estimate overall water quality within the basin. The 2008 water quality data will be used to evaluate the use support of Folley Creek.

Additionally, Folley Creek is among the least-disturbed watersheds in the Southeast Alabama River Basin group based on landuse, road density, and population density. Therefore, these data will also be used to evaluate the use of Folley Creek as a “best attainable” condition reference watershed for comparison with other Southeastern Plains streams.



Figure 1. Folley Creek at FYCE-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Folley Creek at FYCE-1 is a small [Fish & Wildlife \(F&W\)](#) stream located within the Southern Pine Plains and Hills ecoregion in Escambia County. Based on the 2000 National Land Cover Dataset, landuse within the watershed is composed primarily forest (72%) and shrub/scrub. As of February 23, 2011, no NPDES permits were issued 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. Folley Creek at FYCE-1 is a low-gradient stream dominated by sand substrate (Figure 1). Habitat quality and availability within the reach was rated *sub-optimal* for supporting 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 characterized by pollution-intolerant taxa groups, indicating *good* community condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Perdido-Escambia	
Drainage Area (mi ²)	3	
Ecoregion ^a	65f	
% Landuse		
Open water	<1	
Wetland	Woody	<1
Forest	Deciduous	9
	Evergreen	52
	Mixed	11
Shrub/scrub	19	
Pasture/hay	3	
Cultivated crops	4	
Development	Open space	1
Population/km ^{2b}	<1	

a. Southern Pine Plains & Hills

b. 2000 US Census

Table 2. Physical characteristics of Folley Creek at FYCE-1, May 20, 2008.

Physical Characteristics		
Width (ft)	15	
Canopy Cover	Mostly Shaded	
Depth (ft)	Run	0.5
	Pool	2.0
% of Reach		
	Run	90
	Pool	10
% Substrate		
	Gravel	2
	Sand	90
	Silt	4
	Organic Matter	4

Table 3. Results of the habitat assessment conducted on Folley Creek at FYCE-1, May 20, 2008.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	32	Poor <40
Sediment Deposition	63	Sub-optimal (53-65)
Sinuosity	38	Poor <45
Bank and Vegetative Stability	69	Sub-optimal (60-74)
Riparian Buffer	83	Sub-optimal (70-89)
Habitat Assessment Score	126	
% Maximum Score	57	Sub-optimal (53-65)

Table 4. Results of the macroinvertebrate bioassessment conducted in Folley Creek at FYCE-1, May 20, 2008.

Macroinvertebrate Assessment			
	Result Scores		Rating
Taxa richness measures			
# EPT genera	7	28	Poor (19-37)
Taxonomic composition			
% Non-insect taxa	21	22	Very Poor
% Plecoptera	10	51	Good (5.7-52.8)
% Dominant taxa	12	94	Excellent (>85.2)
Functional composition measures			
% Predators	47	100	Excellent (>72.1)
Tolerance measures			
Beck's community tolerance	7	32	Good (31.9-65.9)
% Nutrient tolerant organisms	16	90	Excellent (>88.1)
WMB-I Assessment Score	--	59	Good (57-78)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. [In situ measurements](#) and [water samples](#) were collected May, July, and September 2008. Folley Creek at FYCE-1 met *F&W* use classification criterion for temperature, pathogens, and dissolved oxygen. Stream pH exceeded *F&W* use classification criteria for all sampling events; however, pH measurements were normal for ecoregion 65f. Median specific conductance and dissolved manganese concentrations were higher than expected based on reference data collected in the Southern Pine Plains & Hills ecoregion. Most dissolved metals were below detection limits.

SUMMARY

FYCE-1 met *F&W* use classification criterion for temperature, pathogens, and dissolved oxygen. Stream pH exceeded *F&W* use classification criteria for all sampling events but were normal for ecoregion 65f. The water quality samples collected in 2008 for Folley Creek at FYCE-1 provide data to support its current *F&W* use classification.

When Folley Creek was assessed in 1999, the macroinvertebrate community was rated as poor; however, overall bioassessment results in 2008 indicated the macroinvertebrate community to be in *good* condition. The difference in results is due to the assessment process. In 1999, data compiled by the local Soil and Water Conservation Districts were used as a screening tool to target sub-watersheds with the greatest potential for impairment from nonpoint sources. The multihabitat EPT method used in 1999 was a screening technique which oversampled for pollution tolerant macroinvertebrates with the purpose of identifying sites that needed further monitoring.

Through future site visits, ADEM will verify that Folley Creek is a least disturbed watershed for Southeastern Plains streams.

Table 5. Summary of water quality data collected during 2008. 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.

Parameter	N	Min	Max	Med	Avg	SD	E
Physical							
Temperature (°C)	4	22.6	24.3	23.5	23.5	0.8	
Turbidity (NTU)	4	2.5	8.4	3.2	4.4	2.8	
Total Dissolved Solids (mg/L)	3	< 1.0	40.0	16.0	18.8	19.9	
Total Suspended Solids (mg/L)	3	3.0	9.0	5.0	5.7	3.1	
Specific Conductance (µmhos)	4	33.3	35.5	34.6 ^G	34.5	1.0	
Hardness (mg/L)	3	2.8	6.8	6.3	5.3	2.2	
Alkalinity (mg/L)	3	< 1.0	< 1.0	0.5	0.5	0.0	
Stream Flow (cfs)	4	3.7	4.7	4.0	4.1	0.5	
Chemical							
Dissolved Oxygen (mg/L)	4	7.7	8.0	8.0	7.9	0.2	
pH (su)	4	4.2 ^C	4.9 ^C	4.6	4.6	0.3	4
Ammonia Nitrogen (mg/L)	3	< 0.015	< 0.015	0.008	0.008	0.000	
Nitrate+Nitrite Nitrogen (mg/L)	3	0.006	0.019	0.016	0.014	0.007	
Total Kjeldahl Nitrogen (mg/L)	3	< 0.150	< 0.150	0.075	0.075	0.000	
Total Nitrogen (mg/L)	3	< 0.081	< 0.094	0.091	0.089	0.007	
Dissolved Reactive Phosphorus (mg/L)	3	0.009	0.012	0.011	0.011	0.002	
Total Phosphorus (mg/L)	3	< 0.013	0.023	0.022	0.017	0.009	
CBOD-5 (mg/L)	3	< 1.0	< 1.0	0.5	0.5	0.0	
Chlorides (mg/L)	3	2.5	3.3	2.6	2.8	0.4	
Total Metals							
Aluminum (mg/L)	3	0.262	0.415	0.413	0.363	0.088	
Iron (mg/L)	3	0.441	0.597	0.579	0.539	0.085	
Manganese (mg/L)	3	0.022	0.047	0.043	0.037	0.013	
Dissolved Metals							
Aluminum (mg/L)	3	0.123	0.195	0.158	0.159	0.036	
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 (mg/L)	3	< 0.003	< 0.005	0.002	0.002	0.001	
Chromium (mg/L)	3	< 0.004	< 0.013	0.002	0.004	0.003	
Copper (mg/L)	3	< 0.005	< 0.013	0.002	0.004	0.002	
Iron (mg/L)	3	0.124	0.224	0.171	0.173	0.050	
Lead (µg/L)	3	< 1.5	< 1.5	0.7	0.7	0.0	
Manganese (mg/L)	2	0.022	0.047	0.035 ^M	0.035	0.018	
Mercury (µg/L)	3	< 0.0	< 0.0	0.0	0.0	0.0	
Nickel (mg/L)	3	< 0.004	< 0.006	0.003	0.003	0.001	
Selenium (µg/L)	3	< 1.5	< 1.6	0.8	0.8	0.0	
Silver (mg/L)	3	< 0.002	< 0.003	0.002	0.001	0.000	
Thallium (µg/L)	3	< 0.6	< 0.6	0.3	0.3	0.0	
Zinc (mg/L)	3	< 0.003	< 0.006	0.003	0.002	0.001	
Biological							
Chlorophyll a (ug/L)	3	< 0.10	2.14	1.07	1.09	1.04	
^J Fecal Coliform (col/100 mL)	3	22	59	50	44	19	

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

FOR MORE INFORMATION, CONTACT:

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