2008 Monitoring Summary

Basin Assessment Site

Maye Creek at US Highway 29, Escambia County (31.10123/-86.94735)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Maye 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.

Maye Creek is also among the least-disturbed watersheds in the Southeastern Floodplains and Low Terraces ecoregion (65p) based on land use, road density, and population density. The 2008 data will be used to evaluate the use of Maye Creek as a "*best attainable*" condition reference watershed for comparison with other streams in this ecoregion.

Figure 1. Upstream–view of Maye Creek at MYCE-1, February 15, 2008.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Maye Creek is a *Fish & Wildlife (F&W)* stream in Escambia County, approximately 6 miles east of East-Brewton. It is a tributary of the Conecuh River. Based on the 2000 National Land Cover Dataset, land use within the watershed is primarily forest (73%) with some shrub/scrub. Population density is very low. As of February 23, 2011, no NPDES permits have been issued in 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. Maye Creek at MYCE-1 is a low gradient glide-pool stream (Figure 1). Instream substrates are predominately sand with some gravel. The overall habitat score was similar to reference reaches in other areas of the coastal plain. However, a lack of riparian buffer was noted as a concern.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). Table 4 summarizes results of taxonomic richness, community composition, and community tolerance metrics. Data collected at MYCE-1 may be used to develop an index of ADEM's WMB-I for sub/ecoregion (65p).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Perdido-Escambia River
Drainage Area (mi^2)		4
Ecoregion[a]		65p
% Landuse		
Open water		<1
Wetland	Woody	1
	Emergent herbaceous	<1
Forest	Deciduous	5
	Evergreen	55
	Mixed	13
Shrub/scrub		15
Pasture/hay		6
Cultivated crops		4
Development	Open space	1
	Low intensity	<1
Population/km^2[b]		<1

a. Southeastern Floodplains & Low Terraces
b. 2000 US Census

Table 2. Physical characteristics of Maye Creek at MYCE-1, May 20, 2008.

Physical Characteristics		
Width (ft)		8.0
Canopy Cover		Shaded
Depth (ft)		
	Run	1.0
	Pool	2.0
% of Reach		
	Run	50
	Pool	50
% Substrate		
	Cobble	2
	Gravel	15
	Sand	70
	Silt	5
	Organic Matter	8

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Table 3. Results of the habitat assessment conducted on Maye Ck at MYCE-1, 05/20/2008.

Habitat Assessment	%Maximum Score
Instream Habitat Quality	61
Sediment Deposition	69
Sinuosity	68
Bank and Vegetative Stability	63
Riparian Buffer	54
Habitat Assessment Score	**140**
% Maximum Score	**63**

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

Macroinvertebrate Assessment		Results
Taxa richness measures		
	# EPT genera	11
Taxonomic composition measures		
	% Non-insect taxa	8
	% Plecoptera	3
	% Dominant taxa	21
Functional composition measures		
	% Predators	37
Tolerance measures		
	Beck's community tolerance index	6
	% Nutrient tolerant organisms	20
WMB-I Assessment Score		--

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 to help identify any stressors to the biological communities. In situ parameters were also measured during the macroinvertebrate assessment. Four out of four *in situ* pH measurements were below *F&W* use classification criteria of 6.0 standard units. However, slightly acidic pH values can be a natural condition in coastal plain streams. Collected metals were generally below detection limits.

SUMMARY

Maye Creek at MYCE-1 was typical of other streams in the Southeastern Floodplains and Low Terraces, which are generally low-gradient streams with sand substrates. Land use, road density and population density categorized Maye Creek among the least-disturbed watersheds in the Southeastern Floodplains and Low Terraces ecoregion (65p). Habitat, bioassessment and water quality data suggest that the reach is similar to reference reaches in other areas of the coastal plain.

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
Physical								
Temperature (°C)	4		20.8		23.0	22.3	22.1	1.0
Turbidity (NTU)	4		1.2		2.2	1.6	1.6	0.4
Total Dissolved Solids (mg/L)	3	<	1.0		36.0	0.5	12.3	20.5
Total Suspended Solids (mg/L)	3	<	1.0		3.0	0.5	1.3	1.4
Specific Conductance (µmhos)	4		23.3		26.3	24.6	24.7	1.3
Hardness (mg/L)	3		2.5		4.8	4.3	3.9	1.2
Alkalinity (mg/L)	3	<	1.0		1.0	0.5	0.5	0.0
Stream Flow (cfs)	4		1.2		2.2	1.9	1.8	0.5
Chemical								
Dissolved Oxygen (mg/L)	4		6.4		7.2	6.7	6.8	0.3
pH (su)	4		4.4^C		4.9	4.8	4.7	0.2
Ammonia Nitrogen (mg/L)	3	<	0.015	< 0.015	0.008	0.008	0.000
Nitrate+Nitrite Nitrogen (mg/L)	3		0.121		0.200	0.133	0.151	0.043
Total Kjeldahl Nitrogen (mg/L)	3	<	0.150		0.246	0.184	0.168	0.087
Total Nitrogen (mg/L)	3	<	0.275		0.379	0.305	0.320	0.054
Dissolved Reactive Phosphorus (mg/L)	3		0.009		0.013	0.012	0.011	0.002
Total Phosphorus (mg/L)	3	<	0.013		0.022	0.021	0.016	0.009
CBOD-5 (mg/L)	3	<	1.0	< 1.0	0.5	0.5	0.0
Chlorides (mg/L)	3		3.1		4.7	4.0	3.9	0.8
Total Metals								
Aluminum (mg/L)	3		0.067		0.086	0.081	0.078	0.010
Iron (mg/L)	3		0.173		0.265	0.176	0.205	0.052
Manganese (mg/L)	3		0.019		0.047	0.045	0.037	0.016
Dissolved Metals								
Aluminum (mg/L)	3		0.036		0.072	0.071	0.060	0.020
Antimony (µg/L)	3	<	2.0	< 2.0	1.0	1.0	0.0
Arsenic (µg/L)	3	<	2	< 2	1	1	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		0.097		0.157	0.101	0.118	0.034
Lead (µg/L)	3	<	2	< 2	1	1	0
Manganese (mg/L)	3		0.019		0.044	0.042	0.035	0.014
Mercury (µg/L)	3	<	0.03	< 0.03	0.02	0.02	0.00
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
Fecal Coliform (col/100 mL)	3		5		6	6	6	1 ^{J}

J=estimate; N=# samples; C=values exceeds established criteria for *F&W* water use classification.