

2006 Monitoring Summary



Basin Assessment Site

Eightmile Creek at University BLVD Road in Mobile County (30.7407/-88.16105)

BACKGROUND

The Alabama Department Environmental Management (ADEM) selected the Eightmile Creek watershed for biological and water quality monitoring as part of the 2006 Assessment of the Escatawpa, Mobile, Lower Tombigbee (EMT) River Basins. The objectives of the EMT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the EMT basin group.

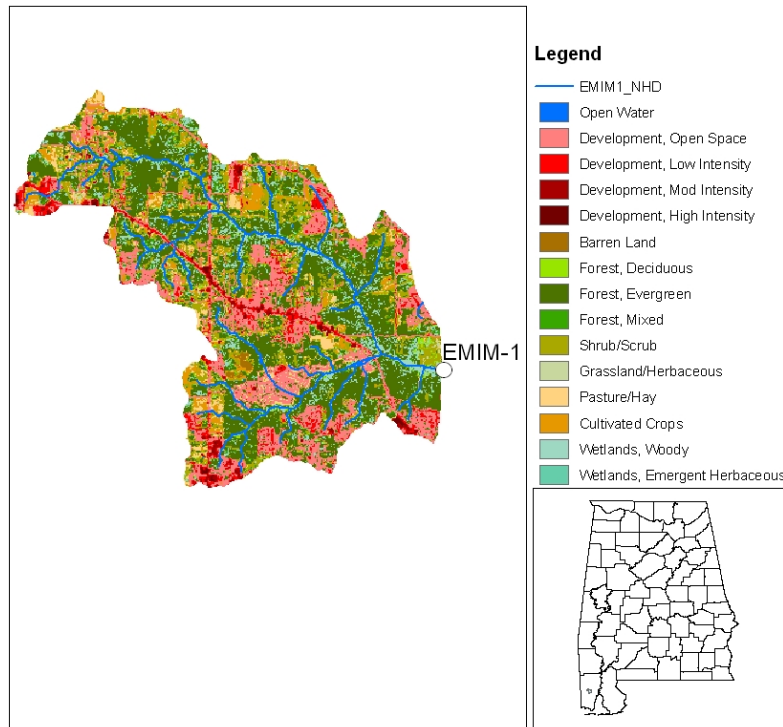


Figure 1. Sampling location and landuse within the Eightmile Creek watershed at EMIM-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Eightmile Creek is a *Fish & Wildlife (F&W)* and *Public Water Supply (PWS)* stream located in the Southern Pine Plains and Hills ecoregion (65f) (Griffith et al. 2001) between the cities of Prichard and Semmes. The watershed is bisected by Highway 98. Landuse within the watershed is mainly forest and woody wetlands (51%) (Fig.1). Development accounted for 25% of land cover. A total of 38 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. Eightmile Creek at EMIM-1 is a low-gradient, sand bottomed stream characteristic of ecoregion 65f. The reach was characterized by a relatively straight channel. Stable habitat for the macroinvertebrate community was limited. Fine sediment deposits were noted during the site visit.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Mobile
Basin		23
Drainage Area (mi ²)		65f
Ecoregion ^a		65f
% Landuse		
Open water		<1
Wetland	Woody	9
	Emergent herbaceous	<1
Forest	Deciduous	2
	Evergreen	36
	Mixed	4
Shrub/scrub		13
Grassland/herbaceous		<1
Pasture/hay		4
Cultivated crops		5
Development	Open space	18
	Low intensity	5
	Moderate intensity	2
	High intensity	<1
Barren		<1
Population/km ^{2b}		198
# NPDES Permits ^c	TOTAL	38
	Construction Stormwater	33
	Mining	3
	Underground Injection Control	2

a.Southern Pine Plains & Hills

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, 18 Sept 2009

Table 2. Physical characteristics of Eightmile Creek at EMIM-1, May 23, 2006.

Physical Characteristics	
Width (ft)	30
Canopy cover	Shaded
Depth (ft)	Run 1.5
	Pool 2.5
% of Reach	Run 70
	Pool 30
% Substrate	Sand 91
	Silt 2
	Organic Matter 7

Table 3. Results of the habitat assessment conducted on Eightmile Creek at EMIM-1, May 23, 2006.

Habitat Assessment (% Maximum Score)	Rating
Instream habitat quality	41 Marginal (40-52)
Sediment deposition	60 Sub-optimal (53-65)
Sinuosity	55 Marginal (45-64)
Bank and vegetative stability	66 Sub-optimal (60-74)
Riparian buffer	90 Sub-optimal (70-90)
Habitat assessment score	137
% Maximum score	62 Sub-optimal (53-65)

Table 4. Results of the macroinvertebrate bioassessment conducted in Eightmile Creek at EMIM-1, May 23, 2006.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures			
# EPT genera	14	56	Fair (38-56)
Taxonomic composition measures			
% Non-insect taxa	11	72	Fair (61.9-92.7)
% Plecoptera	1	4	Fair (3.8-5.6)
% Dominant taxa	9	100	Excellent (>85.2)
Functional composition measures			
% Predators	13	43	Fair (30.2-45.2)
Tolerance measures			
Beck's community tolerance index	14	64	Good (31.9-65.9)
% Nutrient tolerant organisms	29	69	Fair (50.9-76.2)
WMB-I Assessment Score	---	58	Good (57-78)

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 an average of all individual metric scores. The final score indicated the biological community to be in *good* condition (Table 4).

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during March through October of 2006 to help identify any stressors to the biological communities. *In situ* measurements indicated that the Eightmile Creek at EMIM-1 was meeting its *F&W* water use classification. However, the fecal coliform count was greater than 2000 colonies/100mL in one of six samples collected (Aug 9th). Stream flow on that day was 165 cfs, the maximum reported for EMIM-1 in 2006. Median values of other water quality parameters were similar to the 90th percentile of reference reach data collected within ecoregion 65f.

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data.

Habitat and bioassessment data indicated Eightmile Creek at EMIM-1 to be in *good* condition.

Table 5. Summary of water quality data collected March-October, 2006. 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	Median	Avg	SD
Physical						
Temperature (°C)	9	18.0	25.7	24.0	22.8	2.6
Turbidity (NTU)	9	2.7	14.9	4.7	6.1	4.3
Total Dissolved Solids (mg/L)	8	6.0	59.0	35.5	32.6	16.9
Total Suspended Solids (mg/L)	8	< 2.0	12.0	4.5	5.4	3.6
Specific Conductance (µmhos)	9	42.7	50.9	47.1	46.8	2.3
Hardness (mg/L)	3	14.0	33.0	28.0	25.0	9.8
Alkalinity (mg/L)	8	6.5	13.9	10.4	10.4	2.3
Stream Flow (cfs)	8	26.1	165.4	31.8	49.5	47.2
Chemical						
Dissolved Oxygen (mg/L)	9	6.2	8.7	7.4	7.7	0.8
pH (su)	9	6.1	7.0	6.7	6.6	0.3
Ammonia Nitrogen (mg/L)	8	< 0.010	0.050	0.014	0.021	0.018
Nitrate+Nitrite Nitrogen (mg/L)	8	0.081	0.753	0.197	0.259	0.208
Total Kjeldahl Nitrogen (mg/L)	8	< 0.150	0.730	0.215	0.266	0.199
Total Nitrogen (mg/L)	8	0.156	0.973	0.445	0.525	0.276
Dissolved Reactive Phosphorus (mg/L)	8	< 0.004	0.011	0.006	0.006	0.004
Total Phosphorus (mg/L)	8	< 0.004	0.101	0.023	0.031	0.033
CBOD-5 (mg/L)	8	< 1.0	2.5	0.8	1.2	0.9
Chlorides (mg/L)	8	< 1.5	8.3	3.0	4.5	2.8
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	0.00
Total Metals						
Aluminum (mg/L)	3	< 0.05	0.47	0.170	0.222	0.227
Iron (mg/L)	3	0.987	1.68	1.31	1.326	0.347
Manganese (mg/L)	3	0.035	0.072	0.048	0.052	0.019
Dissolved Metals						
Aluminum (mg/L)	3	< 0.05	0.11	0.050	0.062	0.044
Antimony (µg/L)	3	< 7.5	< 7.5	3.8	3.8	0.0
Arsenic (µg/L)	3	< 5	< 5	2.5	2.5	0.0
Cadmium (mg/L)	3	< 0.0003	< 0.0003	0.0001	0.0001	0.000
Chromium (mg/L)	3	< 0.005	< 0.005	0.003	0.003	0.000
Copper (mg/L)	3	< 0.005	< 0.005	0.003	0.003	0.000
Iron (mg/L)	3	0.298	0.838	0.385	0.507	0.290
Lead (µg/L)	3	< 5	23	2.5	9.333	11.8
Manganese (mg/L)	3	0.027	0.039	0.033	0.033	0.006
Mercury (µg/L)	3	< 0.5	< 0.5	0.3	0.3	0.0
Nickel (mg/L)	3	< 0.005	0.008	0.0025	0.0043	0.003
Selenium (µg/L)	3	< 7.5	< 7.5	3.8	3.8	0.0
Silver (mg/L)	3	< 0.001	< 0.001	0.0004	0.001	0.000
Thallium (µg/L)	3	< 9	< 9	4.5	4.5	0.0
Zinc (mg/L)	3	< 0.005	< 0.005	0.003	0.003	0.000
Biological						
Chlorophyll a (µg/L)	8	< 0.10	4.01	0.52	1.06	1.25
^J Fecal Coliform (col/100 mL)	6	10	> 2100 ^C	219	672	872

J=estimate; N=# of samples; C=value exceeds established criteria for *Fish & Wildlife* water use

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