Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2006 Monitoring Summary

Good

Franklin Creek at Warren Cr Road in Mobile County (30.4874/-88.35205)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Franklin Creek watershed for biological and water quality monitoring as part of the 2006 Assessment of the Escatawpa, Mobile, and 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.

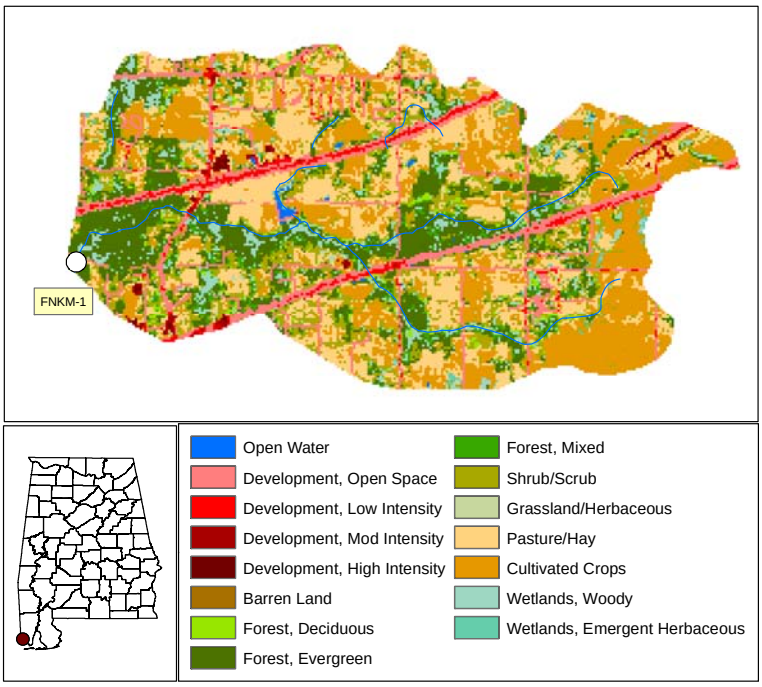

Figure 1. Sampling location and landuse within the Franklin Creek watershed at FNKM-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Franklin Creek at FNKM -1 is a *Fish & Wildlife* (*F&W)* stream located in the Southern Pine Plains and Hills ecoregion (65f) (Griffith et al. 2001). Landuse within the watershed is mainly pasture and agriculture (44%), forest (22%), and woody wetlands (Fig.1). Development accounted for 13% of land cover. A total of nine permitted discharges 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. Franklin Creek at FNKM-1 is a low-gradient stream with sand substrate (Figure 2). Although stable substrates were somewhat limited, the overall habitat quality was categorized as *optimal*.

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).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Escatawpa
Drainage Area (mi^2)		10
Ecoregion[a]		65f
% Landuse		
Open water		<1
Wetland	Woody	5
	Emergent herbaceous	1
Forest	Deciduous	2
	Evergreen	17
	Mixed	3
Shrub/scrub		14
Grassland/herbaceous		1
Pasture/hay		22
Cultivated crops		22
Development	Open space	10
	Low intensity	2
	Moderate intensity	1
	High intensity	<1
Population/km^2 [b]		98
# NPDES Permits[c]	**TOTAL**	9
Construction Stormwater		4
Mining		1
Industrial Individual		1
Municipal Individual		1
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 Franklin Creek at FNKM-1, May 18, 2006.

Physical Characteristics		
Width (ft)		15
Canopy cover		Shaded
Depth (ft)	Run	1.5
	Pool	2.5
% of Reach	Run	65
	Pool	35
% Substrate	Sand	80
	Silt	3
	Organic Matter	13
	Mud/Muck	4

Table 3. Results of the habitat assessment conducted on Franklin Creek at FNKM-1, May 18, 2006.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	46	Marginal (40-52)
Sediment deposition	74	Optimal (>65)
Sinuosity	68	Sub-optimal (65-84)
Bank and vegetative stability	65	Sub-optimal (60-74)
Riparian buffer	90	Sub-optimal (70-90)
Habitat assessment score	148	
% Maximum score	**67**	**Optimal (>65)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Franklin Creek at FNKM-1, May 18, 2006.

Macroinvertebrate Assessment			
	Results	**Scores**	**Rating**
Taxa richness measures			
# EPT genera	20	80	Excellent (>78)
Taxonomic composition measures			
% Non-insect taxa	9	80	Fair (61.9-92.7)
% Plecoptera	3	15	Good (5.7-52.8)
% Dominant taxa	16	85	Excellent (>85.2)
Functional composition measures			
% Predators	21	72	Good (45.3-72.1)
Tolerance measures			
Beck's community tolerance index	14	64	Good (31.9-65.9)
% Nutrient tolerant organisms	24	77	Good (76.3-88.1)
WMB-I Assessment Score	**---**	**68**	**Good (57-78)**

Figure 2. Franklin Creek at FNKM-1, January 21, 2010.

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. Stream pH was slightly acidic,a natural condition for Alabama's black -water coastal streams. The median concentration of nitrogen (nitrate+nitrite nitrogen and total nitrogen) were higher than expected based on the 90th percentile of reference reach data located in the Southern Pine Plains and Hills (65f) ecoregion.

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 macroinvertebrate assessments indicated Franklin Creek at FNKM-1 to be in *good* condition. However, nutrient enrichment (nitrate+nitrite-nitrogen and total nitrogen) was a concern within the reach.

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	19.0	25.0	21.9	22.2	2.3
Turbidity (NTU)	9	1.7	4.0	2.5	2.6	0.7
Total Dissolved Solids (mg/L)	8	1.0	65.0	36.5	32.8	21.8
Total Suspended Solids (mg/L)	8	< 2.0	6.0	2.5	3.3	1.5
Specific Conductance (µmhos)	9	39.9	59.4	42.9	45.8	6.9
Hardness (mg/L)	3	10.0	32.0	24.0	22.0	11.1
Alkalinity (mg/L)	8	4.4	9.0	5.6	6.0	1.6
Stream Flow (cfs)	6	7.4	11.9	8.9	9.1	1.6
Chemical						
Dissolved Oxygen (mg/L)	9	6.3	8.5	7.2	7.2	0.7
pH (su)	9	5.9[C]	6.7	6.2	6.2	0.2
Ammonia Nitrogen (mg/L)	8	< 0.010	0.044	0.008	0.015	0.014
Nitrate+Nitrite Nitrogen (mg/L)	8	0.583	0.770	0.669[M]	0.681	0.064
Total Kjeldahl Nitrogen (mg/L)	8	< 0.140	0.501	0.209	0.248	0.144
Total Nitrogen (mg/L)	8	0.738	1.263	0.900[M]	0.929	0.167
Dissolved Reactive Phosphorus (mg/L)	8	< 0.004	0.024	0.005	0.007	0.007
Total Phosphorus (mg/L)	8	< 0.004	0.052	0.011	0.018	0.017
CBOD-5 (mg/L)	8	< 1.0	2.3	1.0	1.2	0.8
Chlorides (mg/L)	8	1.6	9.6	6.6	6.2	3.0
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	0.00
Total Metals						
Aluminum (mg/L)	3	< 0.1	0.14	0.110	0.100	0.046
Iron (mg/L)	3	0.486	0.701	0.617	0.601	0.108
Manganese (mg/L)	3	0.023	0.04	0.033	0.032	0.009
Dissolved Metals						
Aluminum (mg/L)	3	< 0.05	0.15	0.050	0.075	0.066
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	0.208	0.413	0.239	0.287	0.111
Lead (µg/L)	3	< 5	< 5	2.5	2.5	0.0
Manganese (mg/L)	3	0.022	0.04	0.028	0.030	0.009
Mercury (µg/L)	3	< 0.5	< 0.5	0.3	0.3	0.0
Nickel (mg/L)	3	< 0.005	0.007	0.0025	0.004	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	0.0004	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	< 0.36	3.20	0.98	1.25	0.98
[J] Fecal Coliform (col/100 mL)	6	13	320	28	75	121

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

FOR MONITORING INFORMATION, CONTACT:
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