

# 2006 Monitoring Summary



**Dry Creek at AL Hwy 25 in Marengo County (32.32025/-87.62983)**

## BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected Dry 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.** Dry Creek at DRYM-30, January 27, 2010.

## WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Dry Creek is a *Fish & Wildlife* (F&W) stream located in Flatwoods/Blackland Prairie Margins ecoregion (65b) (Griffith et al. 2001). This ecoregion is located within the “Blackbelt” region of Alabama. Landuse within the watershed is primarily pasture/hay. Population density is low in this watershed. According to NPDES permit data as of June 9, 2008 there have been no permits issued.

## 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. Dry Creek at DRYM-30 is a shallow, low-gradient stream characterized by clay (primary hardpan clay) substrate (Figure 1). The presence of riparian buffer and the lack of sedimentation categorized overall habitat quality as *sub-optimal*, although the availability of instream habitat and bank and vegetative stability was limited within the each (Table 3).

## 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 the score for each metric. Metric results indicated the macroinvertebrate community to be characterized by pollution-tolerant taxa groups, indicating *fair* community condition (Table 4).

**Table 1.** Summary of watershed characteristics.

Watershed Characteristics		
Basin	Lower Tombigbee River	
Drainage Area (mi <sup>2</sup> )	29	
Ecoregion <sup>a</sup>	65b	
% Landuse		
Open water		1
Wetland	Woody	8
	Emergent herbaceous	1
Forest	Deciduous	9
	Evergreen	6
	Mixed	6
Shrub/scrub		6
Grassland/herbaceous		<1
Pasture/hay		58
Cultivated		
crops		2
Development	Open space	3
	Low intensity	<1
	Moderate intensity	<1
Population/km <sup>2b</sup>	5	
# NPDES Permits <sup>c</sup>	0	
<b>TOTAL</b>	<b>0</b>	

a.Flatwoods/Blackland Prairie Margins

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, 9 Jun 2008

**Table 2.** Physical characteristics of Dry Ck at DRYM-30, May 31, 2006.

Physical Characteristics		
<b>Canopy Cover</b>	Mostly Open	
<b>Depth (Ft)</b>	Run	0.7
	Pool	1.0
<b>% of Reach</b>	Run	90
	Pool	10
<b>% Substrate</b>	Clay	55
	Cobble	10
	Gravel	15
	Sand	8
	Silt	10
	Organic Matter	2

**Table 3.** Results of the habitat assessment conducted on Dry Ck at DRYM-30, 05/31/2006.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	47	Marginal (40-52)
Sediment Deposition	63	Sub-optimal (53-65)
Sinuosity	30	Poor <45
Bank and Vegetative Stability	55	Marginal (35-59)
Riparian Buffer	83	Sub-optimal (70-89)
<b>Habitat Assessment Score</b>	<b>127</b>	
<b>% Maximum Score</b>	<b>58</b>	<b>Sub-optimal (53-65)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted May 31, 2006.

Macroinvertebrate Assessment			
	Results	Scores	Rating
<b>Taxa richness measures</b>			
# EPT genera	10	40	Fair (38-56)
<b>Taxonomic composition measures</b>			
% Non-insect taxa	11	68	Fair (61.9-92.7)
% Plecoptera	0	0	Very Poor
% Dominant taxa	59	0	Very Poor
<b>Functional composition measures</b>			
% Predators	9	32	Fair (30.2-45.2)
<b>Tolerance measures</b>			
Beck's community tolerance index	5	23	Fair (21.3-31.8)
% Nutrient tolerant organisms	4	100	Excellent (>88.1)
<b>WMB-I Assessment Score</b>	<b>-</b>	<b>38</b>	<b>Fair (38-56)</b>

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. When possible, in situ measurements and water samples are collected monthly or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during March through October to help identify any stressors to the biological communities.

The hydrology of Dry Creek at DRYM-30 is typical of streams in the blackbelt region of Alabama, which tend to be flashy streams. Flow could not be measured at DRYM-30 in March and April due to high flow conditions, but measured 0.0 cfs by the end of May. Samples were not collected August through October because the reach was essentially a series of intermittent pools.

## SUMMARY

Macroinvertebrate assessment results indicated the macroinvertebrate community in Dry Creek at DRYM-30 to be in *fair* condition, despite very low flow conditions.

**Table 5.** Summary of water quality data collected March-October, 2006. 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. Metals results were compared to ADEM's chronic aquatic life use criteria adjusted for hardness.

Parameter	N	Min	Max	Med	Avg	SD	Q
<b>Physical</b>							
Temperature (°C)	6	16.0	30.0	22.7	23.2	6.3	
Turbidity (NTU)	6	1.8	93.2	3.6	18.6	36.6	
Total Dissolved Solids (mg/L)	5	163.0	204.0	169.0	174.6	16.6	
Total Suspended Solids (mg/L)	5	3.0	102.0	5.0	26.2	42.8	
Specific Conductance (µmhos)	6	168.6	326.4	278.9 <sup>M</sup>	271.0	60.4	
Alkalinity (mg/L)	5	73.2	142.4	91.0 <sup>M</sup>	95.9	28.4	
Stream Flow (cfs)	2	0.0	2.6	1.3	1.3	1.8	
<b>Chemical</b>							
Dissolved Oxygen (mg/L)	5	7.3	10.7	9.0	9.1	1.3	
pH (su)	6	7.6	8.4	7.7	7.9	0.3	
Ammonia Nitrogen (mg/L)	5	< 0.015	0.034	0.018	0.017	0.011	
Nitrate+Nitrite Nitrogen (mg/L)	5	< 0.003	1.172	0.007	0.243	0.519	
Total Kjeldahl Nitrogen (mg/L)	5	0.187	0.803	0.664	0.550	0.266	
Total Nitrogen (mg/L)	5	< 0.386	1.359	0.744	0.793	0.355	
Dissolved Reactive Phosphorus (mg/L)	5	< 0.004	0.052	0.012	0.019	0.020	
Total Phosphorus (mg/L)	5	< 0.012	0.140	0.050	0.064	0.047	
CBOD-5 (mg/L)	5	1.1	3.4	1.7	2.0	1.0	
COD (mg/L)	1	<			< 2.0		
TOC (mg/L)	1				6.6		
Chlorides (mg/L)	3	4.4	10.6	5.2	6.8	3.4	
Atrazine (µg/L)	1	<			< 0.05		
<b>Biological</b>							
Chlorophyll a (ug/L)	5	0.53	6.68	1.39	2.61	2.52	
Fecal Coliform (col/100 mL)	3	30	5700 <sup>C</sup>	70	1,933	3,262 *	

\*=estimate; N=# samples; M=value > 90th percentile of all verified ecoregional reference reach data collected within the Black-belt region of Alabama ; C= value exceeds established criteria for F&W use classification.

### FOR MORE INFORMATION, CONTACT:

Tonya Mayberry, ADEM Aquatic Assessment Unit  
1350 Coliseum Boulevard Montgomery, AL 36110  
(334) 260-2759 tmayberry@adem.state.al.us