Alabama Department of Environmental Management

§303(d)/TMDL

Rivers and Streams Monitoring Program

2008 Monitoring Summary

Dry Creek at Highway 79 (Blount County) (33.97158/-86.58878)

BACKGROUND

Dry Creek runs for approximately 12 miles from Locust Fork to its source. The stream has been on Alabama's Clean Water Act (CWA) §303(d) list of impaired waters since 1998 based on data collected in 1988 and 1991. Dry Creek is listed on the 303(d) list for nutrients, ammonia, organic enrichment (CBOD, NBOD), and pathogens due to pasture grazing. In 2008, the Alabama Department of Environmental Management (ADEM) monitored Dry Creek at DRYB-75a to investigate the extent of pathogen impairment within the watershed. The ADEM has collected water quality data on Dry Creek in previous years (2002, 2007) as part of the §303(d) Monitoring Program.

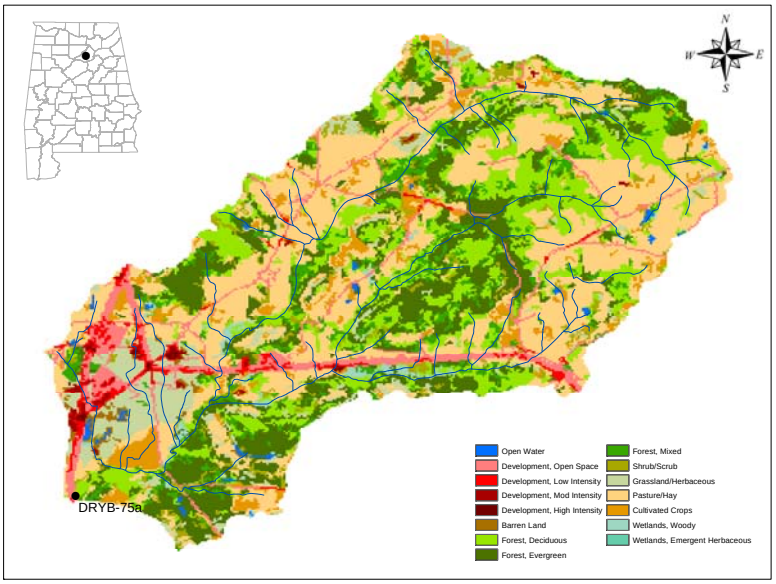

Figure 1. Sampling location and landuse with the Dry Creek watershed at DRYB-75a.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Dry Creek at DRYB-75a is a *Fish and Wildlife (F&W)* stream located in the Black Warrior River basin (Figure 1). Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (42%) and agriculture (37%). As of February 23, 2011, ADEM's NPDES management system shows a total of fifteen permitted discharges in this 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. Dry Creek at DRYB-75a is a high-gradient stream characterized primarily by bedrock, boulder, cobble, and gravel substrates. Instream habitat was rated as optimal. Bank erosion and limited riparian buffers were noted within the reach, however.

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 in *poor* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi^2)		17
Ecoregion[a]		68d
% Landuse		
Open water		1
Wetland	Woody	1
Forest	Deciduous	18
	Evergreen	17
	Mixed	7
Shrub/scrub		4
Grassland/herbaceous		7
Pasture/hay		32
Cultivated crops		5
Development	Open space	6
	Low intensity	2
	Moderate intensity	1
	High intensity	<1
Barren		1
Population/km^2[b]		34
# NPDES Permits[c]	**TOTAL**	15
Construction Stormwater		7
Mining		2
Industrial General		2
Municipal Individual		4

a. Southern Table Plateaus
b. 2000 US Census
c. #NPDES permits downloaded from ADEM's NPDES Management System database, 23 Feb 2011

Table 2. Physical characteristics of Dry Creek at DRYB-75A, June 11, 2008.

Physical Characteristics		
Width (ft)		50
Canopy Cover		Mostly Shaded
Depth (ft)		
	Riffle	0.5
	Run	1.0
	Pool	2.5
% of Reach		
	Riffle	10
	Run	20
	Pool	70
% Substrate		
	Bedrock	35
	Boulder	20
	Cobble	15
	Gravel	15
	Sand	9
	Silt	3
	Organic Matter	3

Table 3. Results of the habitat assessment conducted on Dry Creek at DRYB -75a, June 11, 2008.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	74	Optimal >70
Sediment Deposition	72	Optimal >70
Sinuosity	80	Sub-optimal (65-84)
Bank and Vegetative Stability	45	Marginal (35-59)
Riparian Buffer	66	Marginal (50-69)
Habitat Assessment Score	**161**	
% Maximum Score	**67**	**Sub-optimal (59-70)**

Table 4. Results of macroinvertebrate bioassessment conducted in Dry Creek at DRYB-75a, June 11, 2008.

Macroinvertebrate Assessment			
	Results	**Scores (0-100)**	**Rating**
Taxa richness measures			
# Ephemeroptera (mayfly) genera	6	50	Fair (47-70)
# Plecoptera (stonefly) genera	1	17	Poor (16-31)
# Trichoptera (caddisfly) genera	4	33	Poor (22-44)
Taxonomic composition measures			
% Non-insect taxa	18	29	Poor (24.7-49.4)
% Non-insect organisms	4	90	Fair (62.8-93.9)
% Plecoptera	2	9	Poor (6.56-13.1)
Tolerance measures			
Beck's community tolerance index	2	7	Very Poor (<20.2)
WMB-I Assessment Score	**--**	**34**	**Poor (24-48)**

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, atrazine, and semi-volatile organics) during March through October of 2008 to help identify any stressors to the biological communities. Fecal coliform exceeded the *F&W* criteria during one sampling event (May 14, 2008); stream flow was 14.4 cfs. Median total dissolved solids, specific conductance, alkalinity, dissolved reactive phosphorus, and total phosphorus results were greater than 90% of all reference reach data collected in Southern Table Plateaus ecoregion (68d).

FOR MORE INFORMATION, CONTACT:
Bonnie Coleman, ADEM Environmental Indicators Section
1350 Coliseum Boulevard Montgomery, AL 36110
(334) 260-2737 bcoleman@adem.state.al.us

Table 5. Summary of water quality data collected March-October, 2008. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median (Med), 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)	17	12.2	29.2	24.0	23.2	4.0	
Turbidity (NTU)	17	1.7	9.9	3.4	4.5	2.4	
Total Dissolved Solids (mg/L)	8	210.0	617.0	517.0 M	458.8	158.5	
Total Suspended Solids (mg/L)	8	< 0.3	5.0	2.0	2.6	1.8	
Specific Conductance (µmhos)	17	7.2	863.0	647.0 G	598.1	230.7	
Alkalinity (mg/L)	8	60.2	195.1	150.5 M	135.3	52.4	
Stream Flow (cfs)	7	3.4	16.5	6.2	8.2	5.5	
Chemical							
Dissolved Oxygen (mg/L)	17	5.5	9.4	6.9	7.1	1.2	
pH (su)	17	7.4	8.0	7.7	7.7	0.2	
Ammonia Nitrogen (mg/L)	8	< 0.010	0.093	0.008	0.022	0.031	
Nitrate+Nitrite Nitrogen (mg/L)	8	0.134	0.801	0.404	0.433	0.239	
Total Kjeldahl Nitrogen (mg/L)	8	0.362	2.070	0.909	1.084	0.624	
Total Nitrogen (mg/L)	8	0.983	2.204	1.310	1.517	0.528	
Dissolved Reactive Phosphorus (mg/L)	8	0.014	0.319	0.134 M	0.153	0.119	
Total Phosphorus (mg/L)	8	0.039	0.395	0.145 M	0.178	0.120	
CBOD-5 (mg/L)	8	< 1.0	< 1.0	0.5	0.5	0.0	
Chlorides (mg/L)	8	3.4	27.2	8.2	10.1	7.9	
Biological							
J Fecal Coliform (col/100 mL)	16	4	2200 C	195	367	537	1

J=estimate; N=# samples; E=# of samples that exceed criterion; C=value exceeds established criteria for *F&W* water use classification; G=value greater than median concentration of all verified reference data collected in ecoregion 68d; M=value > 90% of all verified ecoregional reference reach data collected in the ecoregion 68d.

SUMMARY

Results for the 2008 bioassessment indicated the macroinvertebrate community to be in *poor* condition. Intensive water chemistry results indicated higher than expected concentrations of fecal coliform. Water quality data collected by ADEM in 2002, 2007, and 2008 on Dry Creek at DRYB-75a confirmed pathogen impairment. The ADEM will continue to monitor Dry Creek for §303(d)/TMDL development.