

2008 Monitoring Summary



Dry Creek at Dry Creek Road (Blount County) (34.01850/-86.54382)

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. It is listed for nutrients, ammonia, organic enrichment (CBOD, NBOD), and pathogens due to pasture grazing. In 2008, ADEM monitored Dry Creek at DRYB-9 to investigate the extent of pathogen impairment within the watershed. ADEM has collected water quality data on Dry Creek in previous years (1991, 2007) as part of the §303(d) Monitoring Program.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi²)		4
Ecoregion^a		68d
% Landuse		
Open water		<1
Wetland	Woody	<1
Forest	Deciduous	21
	Evergreen	14
	Mixed	7
Shrub/scrub		4
Grassland/herbaceous		5
Pasture/hay		38
Cultivated crops		5
Development	Open space	3
	Low intensity	<1
	Moderate intensity	<1
Barren		<1
Population/km^{2b}		9

a. Southern Table Plateaus

b. 2000 US Census

Table 2. Physical characteristics of Dry Creek at DRYB-9, June 11, 2008.

Physical Characteristics		
Width (ft)		15
Canopy Cover		Open
Depth (ft)	Riffle	0.2
	Run	0.5
	Pool	0.5
% of Reach	Riffle	10
	Run	80
	Pool	10
% Substrate	Bedrock	91
	Cobble	3
	Gravel	1
	Sand	1
	Silt	1
	Organic Matter	2

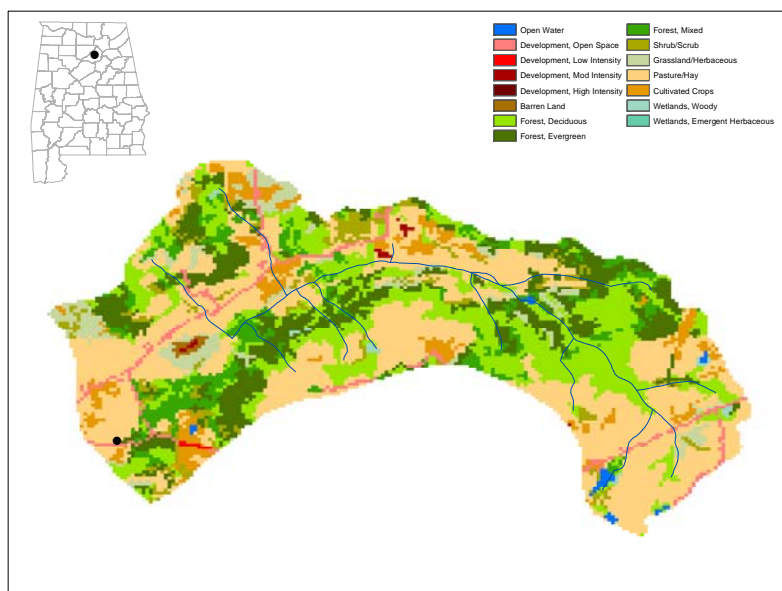


Figure 1. Sampling location and landuse within the Dry Creek watershed at DRYB-9.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Dry Creek is a *Fish and Wildlife (F&W)* stream located in the Black Warrior River basin near Cleveland (Figure 1). Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily agriculture (43%) and forest (42%). The ADEM does not have any NPDES permits issued in the Dry Creek watershed as of June 6, 2013.

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-9 is a high-gradient stream with a primarily bedrock bottom, which naturally limits instream habitat and is susceptible to scouring during high flow events. Overall habitat quality was rated as *sub-optimal* for supporting a diverse biological community.

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 3. Results of the habitat assessment conducted on Dry Creek at DRYB-9, June 11, 2008.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	38	Poor <41
Sediment Deposition	83	Optimal >70
Sinuosity	90	Optimal >84
Bank and Vegetative Stability	81	Optimal >74
Riparian Buffer	23	Poor <50
Habitat Assessment Score	145	
% Maximum Score	60	Sub-optimal (59-70)

Table 4. Results of macroinvertebrate bioassessment conducted in Dry Creek at DRYB-9, June 11, 2008.

Macroinvertebrate Assessment			
	Results	Scores (0-100)	Rating
Taxa richness measures			
# Ephemeroptera (mayfly) genera	8	67	Fair (47-70)
# Plecoptera (stonefly) genera	2	33	Fair (32-49)
# Trichoptera (caddisfly) genera	3	25	Poor (22-44)
Taxonomic composition measures			
% Non-insect taxa	13	48	Poor (24.7-49.4)
% Non-insect organisms	27	30	Very Poor (<31.3)
% Plecoptera	2	8	Poor (6.56-13.1)
Tolerance measures			
Beck's community tolerance index	6	21	Poor (20.2-40.9)
WMB-I Assessment Score	--	33	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 April through October of 2008 to help identify any stressors to the biological communities. Fecal coliform and pH exceeded the *F&W* criteria during one sampling event; however, two exceedances for fecal coliform are allowed for the number of samples taken. Median total dissolved solids, temperature, specific conductance, alkalinity, and dissolved reactive phosphorus results were greater than 90% of all reference reach data collected in Southern Table Plateaus ecoregion (68d).

Table 5. Summary of water quality data collected April-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)	11	17.1	29.3	26.0 ^M	24.6	3.6	
Turbidity (NTU)	11	1.5	9.1	5.6	5.4	2.2	
Total Dissolved Solids (mg/L)	6	127.0	269.0	200.0 ^M	204.3	52.9	
Total Suspended Solids (mg/L)	6	< 1.0	11.0	5.5	5.4	4.2	
Specific Conductance (µmhos)	11	210.0	406.0	318.5 ^G	309.1	59.5	
Alkalinity (mg/L)	6	32.1	108.9	44.4 ^M	56.8	31.1	
Stream Flow (cfs)	6	1.3	4.3	1.9	2.4	1.1	
Chemical							
Dissolved Oxygen (mg/L)	11	7.6	13.8	9.1	9.5	1.7	
pH (su)	11	7.3	9.0 ^C	8.0	8.0	0.4	1
Ammonia Nitrogen (mg/L)	6	< 0.010	< 0.015	0.008	0.007	0.001	
Nitrate+Nitrite Nitrogen (mg/L)	6	< 0.000	0.854	0.338	0.369	0.348	
Total Kjeldahl Nitrogen (mg/L)	6	0.285	2.210	1.185	1.287	0.785	
Total Nitrogen (mg/L)	5	< 0.586	2.212	1.426	1.551	0.672	
Dissolved Reactive Phosphorus (mg/L)	6	0.010	0.019	0.015 ^M	0.015	0.003	
Total Phosphorus (mg/L)	6	< 0.002	0.083	0.033	0.037	0.027	
CBOD-5 (mg/L)	6	< 1.0	2.2	0.5	1.0	0.7	
Chlorides (mg/L)	6	3.2	10.6	5.4	6.5	3.2	
Biological							
^J Fecal Coliform (col/100 mL)	10	47	3900 ^C	245	605	1168	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. The high percent bedrock provides little protection for benthic macroinvertebrates during high flow events. However, intensive water chemistry results indicated higher than expected concentrations of fecal coliform within the watershed. Water quality data collected by ADEM in 1991, 2007, and 2008 on Dry Creek at DRYB-9 confirmed pathogen impairment. The ADEM will continue to monitor Dry Creek for §303(d)/TMDL development.

FOR MORE INFORMATION, CONTACT:

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