

2005 Monitoring Summary



Dry Creek at Calhoun County Road 55 in Talladega National Forest (33.84240/-85.59422)

BACKGROUND

Dry Creek is one of the streams the Alabama Department of Environmental Management (ADEM) monitors as a “best attainable condition” reference watershed for comparison with streams throughout the Southern Sandstone Ridges ecoregion.

Additionally, Dry Creek was selected for biological and water quality monitoring as part of the 2005 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River Basins. The objectives of the ACT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the ACT basin group.

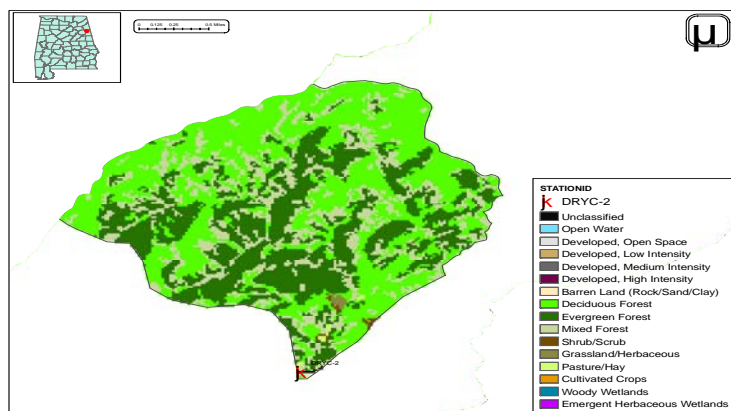


Figure 1. Sampling location and land use within the Dry Creek watershed at DRYC-2.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Dry Creek at DRYC-2 is a small *Fish & Wildlife (F&W)* stream located in the Southern Sandstone Ridges Ecoregion. Land cover within the watershed is almost entirely forested (100%; Fig 1). As of June 9, 2008, ADEM’s NPDES Management System database did not show any permitted discharges located within the watershed.

REACH CHARACTERISTICS

General observations (Table 2) and habitat assessments (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 DRYC-2 is a high-gradient, riffle-run stream in the Coosa River floodplain. The presence of mixed and deciduous forest are characteristic of streams in the Southern Sandstone Ridges ecosystem (Table 1). Overall habitat quality was rated as *optimal* for supporting macroinvertebrate communities.

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 *excellent* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics			
Drainage Area (mi ²)			5
Ecoregion ^a			67h
% Landuse			
Forest	Deciduous		46
	Evergreen		33
	Mixed		21
Shrub/scrub			<1
Grassland/herbaceous			<1
Pasture/hay			<1
Development	Open space		<1
Population/km ^{2b}			5

a. Southern Sandstone Ridges

b. 2000 U S census data

Table 2. Physical characteristics at DRYC-2,

Physical Characteristics	
Width (ft)	15
Canopy cover	Mostly Shaded
Depth (ft)	
	Riffle 0.5
	Run 1.0
	Pool 1.5
% of Reach	
	Riffle 75
	Run 20
	Pool 5
% Substrate	
	Bedrock 30
	Boulder 35
	Cobble 15
	Gravel 10
	Sand 5
	Silt 2
	Organic Matter 3

Table 3. Results of habitat assessment conducted at DRYC-2 on May 3, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	95	Optimal (> 70)
Sediment deposition	94	Optimal (> 70)
Sinuosity	95	Optimal (≥85)
Bank and vegetative stability	86	Optimal (≥75)
Riparian buffer	76	Sub-optimal (70-90)
Habitat assessment score	215	
% Maximum score	90	Optimal (> 70)

Table 4. Results of the macroinvertebrate assessment conducted at DRYC-2, May 3, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores	Rating
		(0-100)	
Taxa richness measures			
# Ephemeroptera (mayfly) genera	13	100	Excellent (>85)
# Plecoptera (stonefly) genera	11	100	Excellent (>75)
# Trichoptera (caddisfly) genera	15	100	Excellent (>83)
Taxonomic composition measures			
% Non-insect taxa	2	90	Excellent (>87.1)
% Non-insect organisms	0	100	Excellent (>97)
% Plecoptera	7	36	Good (19.7-59.8)
Tolerance measures			
Beck's community tolerance index	43	100	Excellent (>80.4)
WMB-I Assessment Score	---	89	Excellent (>86)

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 2005 to help identify any stressors to the biological communities. *In situ* parameters indicated that Dry Creek at DRYC-2 was meeting water quality criteria for its *Fish & Wildlife* use classification. Dissolved oxygen concentrations ranged from 8.4 - 10.5mg/L. Individual fecal coliform counts did not exceed 200 colonies/100 ml of sample. Median concentrations of nutrients, total and dissolved solids, and chlorides were well within the expected limit for streams in the Southern Sandstone Ridges ecoregion. Metals concentrations were below detection limits. Pesticides, semi-volatiles and atrazine were not detected in the one sample collected in June.

CONCLUSIONS

Landuse, road density, and population density categorize Dry Creek among the least-disturbed watersheds in the ACT basin group. Water quality data indicate the site to be typical of other reference reaches in the Southern Sandstone Ridges ecoregion. Bioassessment results show the macroinvertebrate community to be in *excellent* condition. Habitat and water quality were also unimpaired.

Table 5. Summary of water quality data collected March-October, 2005. 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. Metals results were compared to ADEM's chronic aquatic life use criteria adjusted for hardness.

Parameter	N	Min	Max	Median	Avg	SD
Physical						
Temperature (°C)	8	12.5	26.0	17.3	18.1	4.5
Turbidity (NTU)	8	0.8	6.9	1.9	2.6	1.9
Total dissolved solids (mg/L)	7	5.0	90.0	20.0	32.3	29.8
Total suspended solids (mg/L)	7	4.0	29.0	6.0	9.3	8.8
Specific conductance (µmhos)	8	19.9	33.9	22.1	24.4	5.2
Hardness (mg/L)	5	2.5	8.6	5.2	5.2	2.3
Alkalinity (mg/L)	7	1.9	8.2	3.1	4.4	2.5
Stream Flow (cfs)	7	0.2	32.1	6.4	10.6	---
Chemical						
Dissolved oxygen (mg/L)	8	8.4	10.5	9.2	9.4	0.9
pH (su)	8	6.8	7.4	7.1	7.1	0.2
Ammonia Nitrogen (mg/L)	7	< 0.015	0.017	0.015	0.012	0.004
Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.003	0.047	0.005	0.011	0.016
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.339	0.075	0.145	0.120
Total nitrogen (mg/L)	7	0.076	0.348	0.083	0.156	0.118
Dissolved reactive phosphorus (mg/L)	7	< 0.004	0.008	0.005	0.005	0.002
Total phosphorus (mg/L)	7	0.009	0.040	0.032	0.026	0.011
CBOD-5 (mg/L)	7	< 1.0	3.1	0.5	1.3	1.1
COD (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0
^J Chlorides (mg/L)	6	3.5	3.9	3.6	3.6	0.1
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	0.00
Total Metals						
Aluminum (mg/L)	4	< 0.015	0.037	0.0075	0.015	0.015
Iron (mg/L)	4	0.015	0.14	0.0625	0.070	0.056
Manganese (mg/L)	4	< 0.005	0.053	0.0025	0.015	0.025
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	0.088	0.0075	0.028	0.040
Antimony (µg/L)	4	< 2	< 2	1	1	0.0
Arsenic (µg/L)	3	< 10	< 10	5	5	0.0
Cadmium (mg/L)	4	< 0.005	< 0.005	0.0025	0.0025	0.000
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	0.000
Copper (mg/L)	4	< 0.005	< 0.005	0.0025	0.003	0.000
Iron (mg/L)	4	< 0.005	0.063	0.01	0.02138	0.029
Lead (µg/L)	4	< 2	< 2	1	1	0.0
Manganese (mg/L)	4	< 0.005	< 0.005	0.0025	0.003	0.000
^J Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.188	0.075
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Selenium (µg/L)	4	< 10	< 10	5	5	0.0
Silver (mg/L)	4	< 0.003	< 0.003	0.0015	0.0015	0.000
Thallium (µg/L)	4	< 1	< 1	0.5	0.500	0.0
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Biological						
^J Chlorophyll a (µg/L)	7	0.27	2.67	0.53	1.04	1.0
^J Fecal Coliform (col/100 mL)	7	2	200	40	69	71

^J=estimate; N=number of samples; M=value > 90th percentile of all data collected within ecoregion 67h

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