Alabama Department of Environmental Management

Ecological Reference Reach

Rivers and Streams Monitoring Program

2019 Monitoring Summary

Excellent

Dry Creek at Calhoun Co. Rd. 55– Rabbittown Road. (33.84240/-85.59422)

BACKGROUND

Dry Creek is among the least-disturbed watersheds within the Southern Sandstone Ridges ecoregion, based on landuse, road density, and population density. Since 2000, it has been monitored by the Alabama Department of Environmental Management (ADEM) as a "high quality" reference watershed for comparison with other streams within the ecoregion. Habitat and macroinvertebrate community surveys were conducted to assess the health of the biological communities. Data from reference watersheds are used to characterize natural or background conditions expected in different ecoregions throughout the state. Dry Creek was sampled in 2019 to provide high-quality reference reach data for Southern Sandstone Ridges streams.

Figure 1. Dry Creek at DRYC-2, May 21, 2019.

Table 1. Summary of general watershed characteristics: DRYC-2

Watershed Characteristics	
Basin	Coosa
Drainage Area (mi²)	5.1
Ecoregion°	67H
Assessment Unit	AL03150106-0502-700
Use Class	F&W
AU Category	1
12-digit Hydrologic Unit Code (HUC)	031501060502
Landuse Categories (2011 National Land Cover Dataset)	
Open Water (%)	<1.0
Wetland, Total (%)	<1.0
Wetlands, Woody (%)	<1.0
Wetlands, Emergent Herbaceous (%)	<1.0
Forested, Total (%)	99.2
Forested, Deciduous (%)	46.0
Forested, Evergreen (%)	32.6
Forested, Mixed (%)	20.7
Shrub/Scrub (%)	0.7
Grassland/Herbaceous (%)	0.1
Pasture/Hay (%)	<1.0
Crops, Cultivated (%)	<1.0
Developed, Total (%)	<1.0
Developed, Open Space (%)	<1.0
Developed, Low Intensity (%)	<1.0
Developed, Medium Intensity (%)	<1.0
Developed, High Intensity (%)	<1.0
Barren Land (Rock, Sand, Clay) (%)	<1.0
Population/km² (2010 US Census)	1
Roads	
Road Density	0.0
# Road Crossings per Stream km	0.0
Watershed Disturbance Score*	**1**
Watershed Disturbance Category*	**1**

° Southern Sandstone Ridges
† 12-digit HUC located in a Strategic Habitat Unit.
± 12-digit HUC identified as Clean Water Partnership priority watershed.
* Measure of watershed disturbance based on landuse, population, and road density summarized in this table.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Dry Creek is a *Fish & Wildlife (F&W)* stream located in the Talladega National Forest near Burns, AL in the Coosa River basin. According to the 2011 National Land Cover Dataset, the watershed is mostly forested, with approximately 99% forest. There are no permitted outfalls. This watershed is of exceptional quality, is sparsely populated and has undergone little development. The watershed has a low road density.

REACH CHARACTERISTICS

General observations (Figure 1, Table 2) and a habitat survey (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. Like other streams in ecoregion 67h, Dry Creek at DRYC-2 is a high gradient stream characterized predominantly by a boulder and cobble substrate. Overall habitat quality and availability has been rated as *Optimal* for supporting the macroinvertebrate communities due to a large riparian buffer, low sediment deposition, and stable banks.

Table 2. Physical characteristics of Dry Creek at DRYC-2, May 21, 2019.

Physical Characteristics	
Width (ft)	15
Canopy Cover	Mostly Shaded
Depth (ft)	
Riffle	0.2
Run	0.5
Pool	1.0
% of Reach	
Riffle	30
Run	60
Pool	10
% Substrate	
Bedrock	15
Boulder	30
Cobble	35
Gravel	10
Sand	2
Silt	2
Organic Matter	6

Table 3. Results of the habitat assessment survey conducted on Dry Creek at DRYC-2, May 21, 2019.

Habitat Survey	% Max Score	Rating
Instream Habitat Quality	78	Sub-optimal/Optimal (75-79.999)
Sediment Deposition	89	Optimal (80-100)
Riffle Frequency	93	Optimal (80-100)
Bank Vegetative Stability	78	Sub-optimal/Optimal (75-79.999)
Riparian Zone Measurements	76	Sub-optimal/Optimal (75-79.999)
Habitat Assessment Score	**162**	
% Maximum Score	**81**	**Optimal (80-100)**

BIOASSESSMENT RESULTS

The benthic macroinvertebrate community was sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). Measures of taxonomic richness, community composition and pollution tolerance were used to assess the overall health of the macroinvertebrate community in comparison to conditions expected in central Alabama streams and rivers. Each site is placed in one of six levels ranging from 1, or *natural*, to 6, or *highly altered*.

The macroinvertebrate community on Dry Creek at DRYC -2 was rated as *Excellent*, with 69 total taxa, 10 rare, highly sensitive taxa (Attribute 2), 31 ubiquitous, sensitive taxa (Attribute 3), and 19 Attribute 2 and 3 EPT. The community was comprised of 59% attribute 2 and 3 taxa (Table 4).

Table 4. Results of the Macroinvertebrate survey conducted on Dry Creek at DRYC-2, May 21, 2019.

Macroinvertebrate Assessment	Results	Scores
Taxonomic richness and diversity metrics		
Taxa Count	69	69
# rare and highly sensitive taxa	10	10
# sensitive taxa	31	31
# sensitive EPT taxa	19	19
Percent taxon metrics		
% rare and highly sensitive taxa	14	14
% sensitive taxa	45	45
% sensitive EPT taxa	28	28
% highly tolerant taxa	6	6
Percent individual metrics		
% rare and highly sensitive individuals	13	13
% sensitive individuals	29	29
% sensitive EPT individuals	24	24
% tolerant individuals	8	8
WMB-I Survey Score		**2.2**
WMB-I Survey Rating		**Excellent (2-2.149)**

WATER CHEMISTRY

Results of water chemistry analyses are summarized in Table 5. In situ measurements and water samples were collected during March, May, July and September 2019 to help characterize the reach. E.coli was documented as exceeding the *F&W* single sample criterion during the July sampling.

Table 5. Summary of water quality data collected during March, May, July and September, 2019. 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.

	DRYC-2 AL03150106-0502-700	N	Min	Max	Med	Avg	SD	E	10thP	90thP
	Physical									
	Temperature (°C)	5	9.8	25.4	20.7	19.1	6.6		9.8	25.4
	Turbidity (NTU)	5	1.1	7.3	1.8	2.7	2.6		1.1	7.3
	Total Dissolved Solids (mg/L)	4	25.0	30.0	29.5	28.5	2.4		25.0	30.0
	Total Suspended Solids (mg/L)	4	<1.0	10.0	2.0	3.6	4.4		0.5	10.0
	Specific Conductance (µmhos/cm)	5	14.0	343.4	25.7	87.7	143.1		14.0	343.4
	Hardness (mg/L)	4	2.8	8.3	4.8	5.2	2.3		2.8	8.3
	Alkalinity (mg/L)	4	1.6	6.6	4.1	4.1	2.1		1.6	6.6
	Measured Stream Flow (cfs)	4	0.5	24.9	1.9	7.3	11.8		0.5	24.9
	Chemical									
	Dissolved Oxygen (mg/L)	5	7.9	11.5	8.4	9.0	1.5		7.9	11.5
	pH (SU)	5	6.6[D]	7.8	6.9	7.1	0.5		6.6	7.8
	Ammonia Nitrogen (mg/L)	4	<0.004	<0.016	0.008	0.006	0.003		0.002	0.008
J	Nitrate+Nitrite Nitrogen (mg/L)	4	<0.003	0.072	0.020	0.028	0.031		0.002	0.072
	Total Kjeldahl Nitrogen (mg/L)	4	<0.200	0.326	0.100	0.156	0.113		0.100	0.326
J	Total Nitrogen (mg/L)	4	<0.102	0.338	0.150	0.185	0.106		0.102	0.338
J	Dis Reactive Phosphorus (mg/L)	4	<0.005	0.005	0.004	0.004	0.001		0.002	0.005
J	Total Phosphorus (mg/L)	4	0.004	0.013	0.006	0.008	0.004		0.004	0.013
J	TOC (mg/L)	4	1.0	1.3	1.1	1.1	0.1		1.0	1.3
J	CBOD-5 (mg/L)	4	<2.0	<2.0	1.0	1.0	0.0		1.0	1.0
	COD (mg/L)	4	<3.7	5.1	3.2	3.3	1.7		1.8	5.1
	Chlorides (mg/L)	4	1.0	1.4	1.3	1.2	0.2		1.0	1.4
	Sulfate (mg/L)	4	2.68	5.12	2.82	3.36	1.18		2.68	5.12
	Total Metals									
J	Aluminum (T) (mg/L)	4	<0.023	0.045	0.012	0.020	0.017		0.012	0.045
J	Iron (T) (mg/L)	4	<0.063	0.125	0.032	0.055	0.047		0.032	0.125
	Manganese (T) (mg/L)	4	<0.004	<0.004	0.002	0.002	0.000		0.002	0.002
	Dissolved Metals									
	Aluminum (mg/L)	3	<0.023	<0.023	0.012	0.012	0.000		0.012	0.012
	Antimony (µg/L)	4	<1.480	<1.480	0.740	0.740	0.000		0.740	0.740
	Arsenic (µg/L)	4	<0.689	<0.689	0.344	0.344	0.000		0.344	0.344
	Cadmium (µg/L)	4	<0.726	<0.726	0.363	0.363	0.000		0.363	0.363
	Chromium (µg/L)	4	<0.793	<0.793	0.396	0.396	0.000		0.396	0.396
	Copper (µg/L)	4	<1.190	<1.190	0.595	0.595	0.000		0.595	0.595
J	Iron (mg/L)	3	<0.063	0.064	0.032	0.042	0.019		0.032	0.064
	Lead (µg/L)	4	<0.697	<0.697	0.348	0.348	0.000		0.348	0.348
	Manganese (mg/L)	3	<0.004	<0.004	0.002	0.002	0.000		0.002	0.002
	Nickel (µg/L)	4	<1.960	<1.960	0.980	0.980	0.000		0.980	0.980
	Selenium (µg/L)	4	<1.900	<1.900	0.950	0.950	0.000		0.950	0.950
	Silver (µg/L)	4	<1.350	<1.350	0.675	0.675	0.000		0.675	0.675
	Thallium (µg/L)	4	<0.641	<0.641	0.320	0.320	0.000		0.320	0.320
	Zinc (µg/L)	4	<2.340	<2.340	1.170	1.170	0.000		1.170	1.170
	Biological									
	Chlorophyll a (mg/m³)	4	<0.10	2.14	0.78	0.94	0.90		0.05	2.14
	E. coli (MPN/DL)	4	3.1	307.6[H]	45.0	100.2	143.6	1	3.1	307.6

E=# of samples that exceed criterion.; H=Human Heath criteria; J=estimate; N=# samples; D= an individual value >90% of all verified ecoregional reference reach data collected in the ecoregion (67h)

SUMMARY

The ADEM monitors Dry Creek as a "high-quality" reference reach for comparison with other streams in the Southern Sandstone Ridges ecoregion. Dry Creek at DRYC-2 is typical of streams in the region, characterized by high gradient streams with a boulder and cobble substrate.

Water quality conditions are very high. E.coli was documented as exceeding the *F&W* single sample criterion during the July sampling. The overall habitat quality and availability has been rated as *optimal* for supporting the macroinvertebrate communities, which is rated as *excellent* due to high diversity and taxa richness within the reach.

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