

2005 Monitoring Summary

Brush Creek at U.S. Hwy 80 in Dallas County (32.43883/-87.37375)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Brush Creek watershed for biological and water quality monitoring as part of the 2005 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River Basins.

A macroinvertebrate assessment, which is conducted to assess the biological integrity of each monitoring site and to estimate overall water quality within the ACT basin group, was attempted, but could not be completed due to non-flowing site conditions. A habitat assessment was conducted in April.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Brush Creek is a *Fish & Wildlife (F&W)* stream located in Dallas County (Fig. 1). Landuse within the watershed is primarily pasture and croplands with some wetland areas. Population density is relatively low in this area.

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. Brush Creek at BRSD-18 is a shallow, low-gradient stream reach located in the Blackland Prairie ecoregion (Table 1). The stream was not flowing during three of seven site visits. Overall habitat quality was categorized as *marginal* due to bank erosion, a lack of in-stream habitat, and low flow conditions. The reach was also characterized by a relatively straight stream channel, which puts it at risk to impacts from sedimentation and scouring.

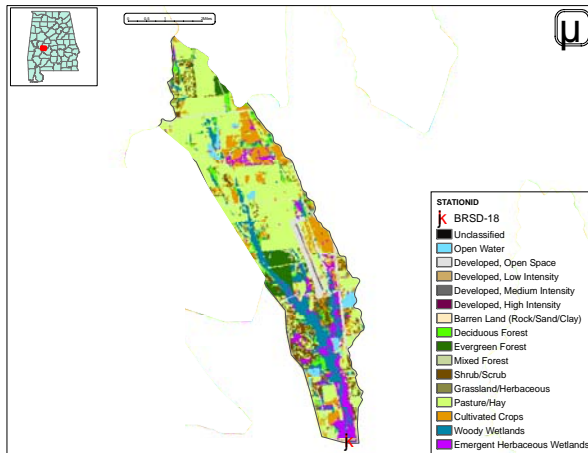


Figure 1. Sampling location and landuse within the Brush Creek watershed at BRSD-18.

Table 1. Summary of watershed characteristics.

Physical Characteristics		
Drainage Area (mi ²)		21
Ecoregion ^a		65a
% Landuse		
Open water		2
Wetland	Woody	12
	Emergent herbaceous	7
Forest	Deciduous	3
	Evergreen	4
	Mixed	1
Shrub/scrub		7
Grassland/herbaceous		<1
Pasture/hay		46
Cultivated crops		12
Development	Open space	6
	Low intensity	1
	Moderate intensity	<1
Population/km ² ^b		8
# NPDES Permits ^c	TOTAL	5
	Construction Stormwater	1
	Mining General Permit (old)	4

a. Blackland Prairie

b. 2000 U.S. Census data

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

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 4. Brush Creek at BRSD-18 was visited monthly during March through October of 2005. No-flow conditions prevented sampling during three of seven site visits. Median total suspended solids, and total and dissolved reactive phosphorus concentrations were slightly elevated for a Blackland Prairie stream. The fecal coliform count was above the 2,000 colonies/100 mL criteria for Fish & Wildlife Use Classification during two of four sampling events, with 8,300 and 2,500 colonies/100 mL measured during July 11, 2005 and August 11, 2005, respectively. Stream flows at the time of collection were documented to be above normal and may account for the elevated fecal coliform results.

Table 2. Physical characteristics of Brush Creek at BRSD-18, April 11, 2005.

Physical Characterization		
Width (ft)		40
Canopy cover		Mostly Open
Depth (ft)		
	Run	1.6
	Pool	2.0
% of Reach		
	Run	90
	Pool	10
% Substrate		
	Silt	10
	Clay	85
	Organic Matter	5

Table 3. Results of habitat assessment conducted April 11, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	42	Marginal (40-52)
Sediment deposition	53	Sub-optimal (53-65)
Sinuosity	30	Poor (<45)
Bank and vegetative stability	50	Marginal (35-59)
Riparian buffer	55	Marginal (50-69)
Habitat assessment score	112	
% Maximum score	51	Marginal (40-52)

CONCLUSIONS

Monthly water quality samples indicated nutrient concentrations (total and dissolved reactive phosphorus) in Brush Creek at BRSD-18 to be higher than expected for Blackland Prairie streams. Additionally, results of a habitat assessment conducted at the site suggested a lack of instream habitat, which minimizes the diversity of habitable areas for biological communities within the stream. However, low stream flows during the sampling period prevented the performance of the macroinvertebrate assessment needed to assess the impact of nutrient and habitat conditions on the aquatic macroinvertebrate community.

Table 4. Summary of water quality data collected March-October, 2005. 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	Median	Avg	SD
Physical						
Temperature (°C)	5	20.0	24.0	23.0	22.4	1.8
Turbidity (NTU)	4	57.3	261.0	94.8	127.0	92.4
Total dissolved solids (mg/L)	4	55.0	177.0	118.5	117.3	51.4
Total suspended solids (mg/L)	4	52.0	152.0	66.0 ^M	84.0	46.4
Specific conductance (µmhos)	4	46.8	161.5	149.7	126.9	53.9
Hardness (mg/L)	1				65.4	
Alkalinity (mg/L)	4	22.5	63.1	50.0	46.4	18.4
Stream Flow (cfs)	3	1.6	80.3	5.4	29.1	
Chemical						
Dissolved oxygen (mg/L)	4	5.9	8	6.8	6.9	0.9
pH (su)	4	6.1	7.65	7.2	7.0	0.7
Ammonia Nitrogen (mg/L)	4	< 0.015	0.311	0.008	0.083	0.152
Nitrate+Nitrite Nitrogen (mg/L)	4	0.047	0.402	0.123	0.174	0.165
Total Kjeldahl Nitrogen (mg/L)	4	0.489	0.981	0.808	0.771	0.226
Total nitrogen (mg/L)	4	0.678	1.383	0.860	0.945	0.320
Dissolved reactive phosphorus (mg/L)	4	0.023	0.181	0.041 ^M	0.071	0.075
Total phosphorus (mg/L)	4	0.081	0.226	0.137 ^M	0.145	0.061
CBOD-5 (mg/L)	4	< 1.0	3.3	1.8	1.9	1.2
Chlorides (mg/L)	4	3.8	15.2	7.5	8.5	4.9
Total Metals						
Aluminum (mg/L)	1				0.682	
Iron (mg/L)	1				1.130	
Manganese (mg/L)	1				<0.005	
Dissolved Metals						
Aluminum (mg/L)	1				0.074	
Antimony (µg/L)	1				<2	
Arsenic (µg/L)	1				<10	
Cadmium (mg/L)	1				<0.005	
Chromium (mg/L)	1				<0.004	
Copper (mg/L)	1				<0.005	
Iron (mg/L)	1				0.189	
Lead (µg/L)	1				<2	
Manganese (mg/L)	1				<0.005	
Mercury (µg/L)	1				<0.3	
Nickel (mg/L)	1				<0.006	
Selenium (µg/L)	1				<10	
Silver (mg/L)	1				<0.003	
Thallium (µg/L)	1				<1	
Zinc (mg/L)	1				<0.006	
Biological						
^J Chlorophyll a (µg/L)	4	0.10	9.46	5.08	4.93	4.3
^J Fecal Coliform (col/100 mL)	4	73	8300 ^C	1350	2768	3853

J=estimate; N=# samples; M=value > 90th percentile of all verified ecoregional reference reach data collected within eco-region 65a; C= value exceeds established criteria for Fish & Wildlife use classification.

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