

2013 Monitoring Summary



Bughall Creek at Bullock County Road 177 (32.16144/-85.83485)

BACKGROUND

Bughall Creek is among the least-disturbed watersheds within the Blackland Prairie ecoregion, based on landuse, road density, and population density. Therefore, these data will be used to evaluate the use of Bughall Creek at BGHM-1 as a “least-disturbed” reference condition watershed for comparison with other Blackland Prairie streams. A habitat and a macroinvertebrate assessment were conducted on Bughall Creek at BGHM-1 on April 30, 2013.



Figure 1. Bughall Creek at BGHM-1, April 30, 2013.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Bughall Creek at BGHM-1 is a *Fish and Wildlife (F&W)* stream located in Bullock County. Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (67%). Less than four percent of the area is developed, and population density is low. As of June 6, 2013, two outfalls were active in the watershed, both of which are construction stormwater outfalls.

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. Bughall Creek at BGHM-1 is a glide-pool stream located in the Blackland Prairie ecoregion (65a) (Figure 1). Benthic substrate in the reach consists primarily of sand with some organic matter. Overall habitat quality was rated as *sub-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 the average of all individual metric scores. The metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Tallapoosa River	
Drainage Area (mi ²)	33	
Ecoregion ^a	65a	
% Landuse		
Open water		2
Wetland	Woody	7
	Emergent herbaceous	1
Forest	Deciduous	19
	Evergreen	30
	Mixed	18
Shrub/scrub		11
Grassland/herbaceous		1
Pasture/hay		6
Cultivated crops		2
Development	Open space	3
	Low intensity	<1
Population/km ^{2b}	3	
# NPDES Outfalls ^c	TOTAL	2
Construction Stormwater		2

a.Blackland Prairie

b.2000 US Census

c.#NPDES outfalls downloaded from ADEM's NPDES Management System database, June 6, 2013.

Table 2. Physical characteristics of Bughall Creek at BGHM-1, April 30, 2013.

Physical Characteristics		
Width (ft)	22	
Canopy Cover	Mostly Shaded	
Depth (ft)		
	Run	1.5
	Pool	3.0
% of Reach		
	Run	70
	Pool	30
% Substrate		
	Mud/Muck	1
	Sand	71
	Silt	5
	Organic Matter	23

Table 3. Results of the habitat assessment conducted in Bughall Creek at BGHM-1, April 30, 2013.

Habitat Assessment	% Maximum Score	Rating
Instream habitat quality	60	Sub-optimal (65-84)
Sediment deposition	70	Optimal (>65)
Sinuosity	83	Sub-optimal (65-84)
Bank and vegetative stability	41	Marginal (35-59)
Riparian buffer	83	Sub-optimal (70-90)
Habitat assessment score	128	
% Maximum score	50	Sub-optimal (53-65)

Table 4. Results of the macroinvertebrate bioassessment conducted in Bughall Creek at BGHM-1, April 30, 2013.

Macroinvertebrate Assessment		Results
Taxa richness and diversity measures		
	# EPT taxa	11
Taxonomic composition measures		
	% Non-insect taxa	24
	% Plecoptera	8
	% Dominant taxon	37
Functional feeding group		
	% Predators	12
Community tolerance		
	Becks community tolerance index	5
	% Nutrient tolerant individuals	20
	WMB-I Assessment Score	38
	WMB-I Assessment Rating	Fair (37-55)

WATER CHEMISTRY

Results of water chemistry analyses are summarized in Table 5. In situ measurements and water samples were collected March through October 2013 to help identify any stressors to the biological communities. Dissolved oxygen concentrations were below *F&W* use classification criterion in one sample collected on October 10, 2013. Stream flow at the time of sampling was described as “visible but not measureable.” Median concentrations of total aluminum, total iron, antimony, and dissolved iron were higher than expected based on reference reach data for streams located in the Blackland Prairie ecoregion (65a).

SUMMARY

Bughall Creek at BGHM-1 is among the least-disturbed watersheds within the Blackland Prairie ecoregion. It is a low-gradient, sand-bottomed stream, typical of the ecoregion. Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality was categorized as *sub-optimal* for supporting biological communities. Median concentrations of some total and dissolved metals were higher than expected for the Blackland Prairie ecoregion. Monitoring should continue to ensure that water quality and biological conditions meet current standards.

Table 5. Summary of water quality data collected March-October, 2013. 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.

Parameter	N	Min	Max	Med	Avg	SD	E	Q
Physical								
Temperature (°C)	8	11.0	25.1	19.5	19.5	4.6		
Turbidity (NTU)	8	6.8	45.4	22.7	21.7	14.2		
Total Dissolved Solids (mg/L)	7	68.0	112.0	96.0	96.3	16.9		
Total Suspended Solids (mg/L)	7	4.0	48.0	19.0	19.8	14.6		
Specific Conductance (µmhos)	8	80.1	107.0	93.0	93.3	8.8		
Hardness (mg/L)	4	38.2	42.3	40.2	39.7	2.8		
Alkalinity (mg/L)	7	11.1	44.6	32.6	29.6	10.8		
Stream Flow (cfs)	7	0.4	48.2	7.6	13.5	15.9		
Chemical								
Dissolved Oxygen (mg/L)	8	4.7 ^C	10.5	8.0	7.6	2.0	1	
pH (su)	8	6.6	7.4	7.0	7.0	0.3		
Ammonia Nitrogen (mg/L)	7	< 0.008	0.080	0.009	0.018	0.028		
Nitrate+Nitrite Nitrogen (mg/L)	7	0.005	0.154	0.061	0.071	0.048		
Total Kjeldahl Nitrogen (mg/L)	7	0.220	1.470	0.500	0.687	0.466		
Total Nitrogen (mg/L)	7	0.303	1.513	0.561	0.758	0.457		
Dissolved Reactive Phosphorus (r	7	0.010	0.027	0.021	0.018	0.008		
Total Phosphorus (mg/L)	7	0.070	0.197	0.091	0.101	0.043		
CBOD-5 (mg/L)	7	< 2.0	2.3	1.0	1.2	0.5		
Chlorides (mg/L)	7	2.6	3.4	2.9	2.9	0.3		
Total Metals								
Aluminum (mg/L)	4	0.206	2.580	1.400 ^H	1.396	1.002		
Iron (mg/L)	4	1.320	3.410	2.670 ^H	2.518	0.912		
Manganese (mg/L)	4	0.033	0.059	0.048	0.047	0.011		
Dissolved Metals								
Aluminum (mg/L)	4	< 0.076	0.243	0.111	0.126	0.104		
Antimony (µg/L)	4	< 0.1	2.6	1.3 ^H	1.0	0.6		
Arsenic (µg/L)	4	< 1.4	2.7 ^H	1.6	1.6	0.8		3
Cadmium (µg/L)	4	< 0.046	0.170	0.040	0.047	0.030		
Chromium (mg/L)	4	0.885	32.000	18.000	12.221	7.558		
Copper (mg/L)	4	< 0.0003	0.031	0.016	0.012	0.008		
Iron (mg/L)	4	0.452	0.984	0.802 ^H	0.760	0.231		
Lead (µg/L)	4	< 0.1	1.1	0.5	0.4	0.2		
Manganese (mg/L)	4	0.019	0.029	0.024	0.024	0.004		
Mercury (µg/L)	2	< 0.057	0.057	0.028	0.028	0.000		
Nickel (mg/L)	4	0.0005	0.016	0.008	0.008	0.004		
Selenium (µg/L)	4	< 0.2	1.4	0.7	0.6	0.3		
Silver (µg/L)	4	< 0.215	2.120	0.181	0.372	0.481		
Thallium (µg/L)	4	< 0.1	1.5 ^H	0.6	0.7	0.8		1
Zinc (mg/L)	4	0.002	0.017	0.008	0.007	0.003		
Biological								
Chlorophyll a (µg/L)	7	0.53	5.34	2.87	2.83	1.85		
E. coli (col/100mL)	7	129	1203	276	424	377		

C=*F&W* criterion violated; E=# samples that exceeded criteria; H=*F&W* human health criteria exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65a; N=# samples; Q=# of uncertain exceedances..

FOR MORE INFORMATION, CONTACT:
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