

2005 Monitoring Summary



Bridge Creek at Autauga County Road 10 (32.49794/-86.53376)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Bridge Creek watershed 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.

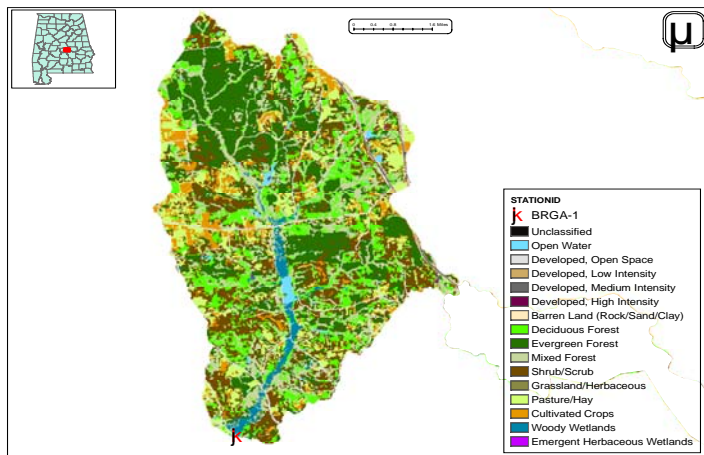


Figure 1. Sampling location and landuse within the Bridge Creek watershed at BRGA-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Bridge Creek at BRGA-1 is a *small Fish & Wildlife (F&W) stream located near the city of Prattville* (Fig. 1). This watershed falls within the Fall Line Hills ecoregion, usually characterized by low to moderate gradient streams with sand and gravel substrates (Griffith et al. 2001, Table 1). Landuse within the watershed is primarily forest (49%), with some areas of pasture and hay. There are a total of 30 NPDES permits were issued within the watershed.

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. Bridge Creek at BRGA-1 is a low-gradient, sand-bottomed stream in the Alabama River basin. Overall habitat quality was categorized as *sub-optimal*, however most parameters fell into the *marginal* category.

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 the score for each metric. Metric results indicated the macroinvertebrate community to be in *good* community condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi ²)		38
Ecogion ^a		65i
% Landuse		
Open water		1
Wetland	Woody	3
	Emergent herbaceous	<1
Forest	Deciduous	17
	Evergreen	16
	Mixed	16
Shrub/scrub		25
Grassland/herbaceous		<1
Pasture/hay		12
Cultivated crops		5
Development	Open space	5
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Population/km ^{2b}		22
# NPDES Permits ^c	TOTAL	30
	401 Water Quality Certification	1
	Construction Stormwater	11
	Mining General Permit (old)	12
	Industrial General	4
	Municipal Individual	1
	Underground Injection Control	1

a. Fall Line Hills

b. 2000 US census data

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

Table 2. Physical characteristics at BRGA-1, June 22, 2005.

Physical Characteristics		
Width (ft)		20
Canopy cover		Shaded
Depth (ft)	Run	2.0
	Pool	4.0
% of Reach	Run	25
	Pool	75
% Substrate	Sand	80
	Silt	5
	Organic Matter	15

Table 3. Results of the habitat assessment conducted June 22, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	56	Marginal (41-58)
Sediment deposition	56	Marginal (41-58)
Sinuosity	53	Marginal (45-64)
Bank and vegetative stability	50	Marginal (35-59)
Riparian buffer	88	Sub-optimal (70-90)
Habitat assessment score	135	
% Maximum score	61	Sub-optimal (59-70)

Table 4. Results of the macroinvertebrate bioassessment conducted on June 22, 2005.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures			
# EPT genera	24	96	Excellent (>78)
Taxonomic composition measures			
% Non-insect taxa	3	100	Excellent (>96.34)
% Plecoptera	5	24	Good (5.6-52.8)
% Dominant taxa	8	100	Excellent (>85.2)
Functional composition measures			
% Predators	23	16	Poor (15.1-30.1)
Tolerance measures			
Beck's community tolerance index	16	73	Excellent (>65.9)
% Nutrient tolerant organisms	17	88	Good (76.2-88.1)
WMB-I Assessment Score	---	71	Good (56-78)

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, herbicides (atrazine), and semi-volatile organics) during March through October of 2005 to help identify any stressors to the biological communities.

Median values of total suspended solids, DRP, and Atrazine were above expected values from this eco-region. Median concentrations from all other parameters were similar to expected values.

CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *good* condition. However, habitat assessment and water quality sampling indicated sedimentation and nutrient enrichment to be issues of concern at this site. Atrazine was also a parameter of concern as both samples exceeded their expected values.

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)	9	12.0	27.0	26.0	22.6	5.8
Turbidity (NTU)	9	8.2	26.9	12.2	15.3	7.1
Total Dissolved Solids (mg/L)	8	18.0	110.0	52.5	55.4	29.7
Total Suspended Solids (mg/L)	8	7.0	54.0	24.0 ^M	25.5	17.1
Specific Conductance (µmhos)	9	10.0	60	23.0	35.0	19.6
Hardness (mg/L)	5	3.7	7.1	4.9	5.4	1.3
Alkalinity (mg/L)	8	2.2	5.2	4.3	3.9	1.0
Stream Flow (cfs)	6	36.8	82.6	49.8	55.0	---
Chemical						
Dissolved Oxygen (mg/L)	9	6.5	10	7.8	8.1	1.1
pH (su)	9	5.6	7.8	7.4	7.0	0.7
Ammonia Nitrogen (mg/L)	8	< 0.015	0.048	0.008	0.020	0.018
^J Nitrate+Nitrite Nitrogen (mg/L)	8	0.061	0.134	0.074	0.086	0.027
Total Kjeldahl Nitrogen (mg/L)	8	< 0.150	1.142	0.126	0.307	0.373
Total Nitrogen (mg/L)	8	0.136	1.207	0.226	0.393	0.364
Dissolved Reactive Phosphorus (mg/L)	8	0.005	0.069	0.029 ^M	0.029	0.021
Total Phosphorus (mg/L)	8	0.012	0.064	0.034	0.036	0.015
CBOD-5 (mg/L)	8	< 1.0	3.9	1.8	2.1	1.2
COD (mg/L)	1	< 2.0	< 2.0	1.0	1.0	
Chlorides (mg/L)	8	3.9	14.0	4.5	5.6	3.4
Atrazine (µg/L)	2	0.11	0.21	0.16 ^M	0.16	0.07
Total Metals						
Aluminum (mg/L)	4	0.066	0.686	0.125	0.250	0.293
Iron (mg/L)	4	1.06	9.78	1.93	3.675	4.102
Manganese (mg/L)	4	0.089	2.1	0.162	0.628	0.983
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	< 0.015	0.008	0.008	0.000
Antimony (µg/L)	4	< 2	< 2	1	1	0.0
Arsenic (µg/L)	4	< 10	< 10	5	5	0.0
Cadmium (mg/L)	4	< 0.005	< 0.005	0.003	0.003	0.000
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	0.000
Copper (mg/L)	4	< 0.005	< 0.005	0.003	0.003	0.000
Iron (mg/L)	4	0.163	0.361	0.22	0.241	0.085
Lead (µg/L)	4	< 2	< 2	1	1	0.0
Manganese (mg/L)	4	0.056	0.121	0.082	0.085	0.029
Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.1875	0.08
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	0.002	0.002	0.000
Thallium (µg/L)	4	< 1	< 1	0.5	0.500	0.000
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0.000
Biological						
^J Chlorophyll a (µg/L)	8	0.53	23.5	2.14	5.21	7.6
Fecal Coliform (col/100 mL)	8	23	600	76	151	188

^J=estimate; N=# samples; M=value > 90th percentile of all data collected within eco-region 65i

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