

2008 Monitoring Summary



Double Bridges Creek at Geneva County Road 40 (31.12958/-85.98057)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) monitored Double Bridges Creek at DBCG-2 and several other locations upstream for possible impacts from added discharges from New Brockton Waste Water Treatment Plant (WWTP), Enterprise WWTP#2, and Pilgrims Pride Corporation (chicken processor). The parameters of interest were total suspended solids (TSS) and nutrients (nitrogen and phosphorous). Macroinvertebrate and habitat assessments were conducted to verify possible impairment to aquatic communities. Additionally, dissolved oxygen concentrations were monitored for seventy-two hours (July 7-10, 2008). Results from these data may also be used in the determination of Total Maximum Daily Load (TMDL) needs and priorities.



Figure 1. Upstream-view of Double Bridges Creek at DBCG-2, September 10, 2008.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Double Bridges Creek is a *Fish and Wildlife (F&W)* stream that drains approximately 140 square miles in Coffee and Geneva Counties. It runs roughly between the communities of New Brockton and Geneva and past the City of Enterprise, the largest population center in the vicinity. Based on the 2000 National Land Cover Dataset, landuse within the watershed is primarily forest (38%), crops and pasture. As of February 23, 2011, ADEM has issued 70 NPDES permits in this watershed, mainly for construction stormwater.

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. Double Bridges Creek at DBCG-2 is a medium gradient stream (Figure 1). Instream substrates were dominated by hardpan clay and sand. Habitat quality and availability were rated *sub-optimal* for supporting macroinvertebrate communities.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Choctawhatchee River
Drainage Area (mi ²)		140
Ecoregion ^a		65g
% Landuse		
Open water		<1
Wetland	Woody	3
	Emergent herbaceous	<1
Forest	Deciduous	7
	Evergreen	20
	Mixed	11
Shrub/scrub		14
Grassland/herbaceous		<1
Pasture/hay		16
Cultivated crops		22
Development	Open space	6
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Population/km ^{2b}		30
# NPDES Permits ^c	TOTAL	70
	401 Water Quality Certification	3
	Construction Stormwater	57
	Industrial General	4
	Industrial Individual	2
	Municipal Individual	4

a. Dougherty Plain

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, February 23, 2011

Table 2. Physical characteristics of Double Bridges Creek at DBCG-2, May 21, 2008.

Physical Characteristics		
Width (ft)		35
Canopy Cover		Mostly Shaded
Depth (ft)		
	Run	1.5
	Pool	2.5
% of Reach		
	Run	40
	Pool	60
% Substrate		
	Hardpan Clay	69
	Cobble	1
	Sand	20
	Silt	5
	Organic Matter	5

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 scores for each individual metric. Metric results indicated the macroinvertebrate community to be in *good* condition overall (Table 4), with good representation of pollution sensitive organisms and high diversity.

Table 3. Results of the habitat assessment conducted in Double Bridges Creek at DBCG-2, May 21, 2008.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	48	Marginal (40-52)
Sediment Deposition	80	Optimal >65
Sinuosity	53	Marginal (45-64)
Bank and Vegetative Stability	48	Marginal (35-59)
Riparian Buffer	64	Marginal (50-69)
Habitat Assessment Score	129	
% Maximum Score	59	Sub-optimal (53-65)

WATER CHEMISTRY

[In situ measurements](#) were collected monthly, during April through November 2008, as well as during the macroinvertebrate assessment, to help identify any stressors to the biological communities. Water samples were collected bi-monthly during April and November for nutrient and sediment analysis. Water chemistry results are summarized in Table 5. *In situ* specific conductance measurements were higher than expected for the ecoregion, based on the median value of reference reach data collected in ecoregion 65g. Temperature, dissolved oxygen, and pH measurements met *F&W* use classification criteria. Median nutrient concentrations (nitrate+nitrite-nitrogen, total nitrogen, dissolved reactive phosphorus, and total phosphorus) and chlorides were higher than the 90th percentile of reference reach data collected in ecoregion 65g. The concentration of chlorophyll *a*, which is used as an index of in-stream algal biomass, was also higher than expected. No bacteriological (fecal coliform) samples or organics were collected.

SUMMARY

As part of the [assessment process](#), ADEM will review the monitoring information presented in this report, along with all other available data.

Double Bridges Creek was sampled at DBCG-2 to monitor potential impacts from point source discharges. Median concentration of total suspended solids was similar to background levels, based on the 90th percentile of ecoregional reference reach data. Median nutrient and chlorophyll-*a* concentrations were higher than expected. Conductivity and chlorides were also elevated. However, results of the 2008 bioassessment indicated the macroinvertebrate communities at this location to be in *good* condition.

Table 4. Results of the macroinvertebrate bioassessment conducted in Double Bridges Creek at DBCG-2, May 21, 2008.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures			
# EPT genera	24	96	Excellent (>78)
Taxonomic composition measures			
% Non-insect taxa	12	64	Fair (61.9-92.7)
% Plecoptera	6	32	Good (5.7-52.8)
% Dominant taxa	16	86	Excellent (>85.2)
Functional composition measures			
% Predators	8	29	Poor (15.1-30.1)
Tolerance measures			
Beck's community tolerance index	15	68	Excellent (>65.9)
% Nutrient tolerant organisms	30	66	Fair (50.9-76.2)
WMB-I Assessment Score	--	63	Good (57-78)

Table 5. Summary of water quality data collected April-November, 2008. 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
Physical						
Temperature (°C)	9	8.1	25.7	23.5	20.5	6.2
Turbidity (NTU)	8	7.4	35.5	11.0	13.5	9.1
Total Dissolved Solids (mg/L)	4	28.0	68.0	53.0	50.5	19.7
Total Suspended Solids (mg/L)	4	< 1.0	7.0	3.0	3.4	2.7
Specific Conductance (µmhos)	9	65.5	151.3	94.5 ^M	103.0	27.6
Alkalinity (mg/L)	4	12.6	95.0	20.8	37.3	38.6
Stream Flow (cfs)	7	11.0	86.4	45.1	49.3	33.0
Chemical						
Dissolved Oxygen (mg/L)	9	7.2	11.2	7.6	8.2	1.3
pH (su)	9	6.7	7.3	7.0	7.0	0.2
Ammonia Nitrogen (mg/L)	4	< 0.014	0.015	0.008	0.007	0.000
Nitrate+Nitrite Nitrogen (mg/L)	4	0.848	1.570	1.370 ^M	1.290	0.313 ^J
Total Kjeldahl Nitrogen (mg/L)	4	0.364	0.533	0.404	0.426	0.074
Total Nitrogen (mg/L)	4	1.381	1.987	1.748 ^M	1.716	0.253 ^J
Dissolved Reactive Phosphorus (mg/L)	4	0.189	0.392	0.310 ^M	0.300	0.085
Total Phosphorus (mg/L)	4	0.277	0.440	0.381 ^M	0.370	0.071
CBOD-5 (mg/L)	4	< 1.0	2.0	0.8	0.9	0.6
Chlorides (mg/L)	4	2.7	13.2	9.59 ^M	8.8	4.4
Biological						
Chlorophyll <i>a</i> (ug/L)	4	< 0.10	8.54	4.00 ^M	4.15	3.53

N=# samples; J=estimate; M=value > 90th percentile of all verified ecoregional reference reach data collected in the subecoregion/ecoregion 65g. (Specific Conductance: M=value > median of all ecoregional reference reach data).

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