Alabama Department of Environmental Management

Use Support Assessment Site

Rivers and Streams Monitoring Program

2008 Monitoring Summary

Fair

Double Bridges Creek at Coffee County Rd 636 (31.25521/-85.94730)

BACKGROUND

The Alabama Department of Environmental Management conducted sampling to investigate nutrient and total suspended solids (TSS) concentrations downstream of municipal and industrial discharges within the Double Bridges Creek watershed. A habitat and macroinvertebrate assessment were conducted on Double Bridges Creek at DBCC-1 on May 21, 2008.

Figure 1. Double Bridges Creek at DBCC-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Double Bridges Creek is a small watershed located near the city of Enterprise, AL within the Choctawhatchee River Basin. Based on the 2000 National Land Cover Dataset, landuse within the watershed is primarily forest (39%) and agriculture (34%), with some shrub/scrub. The presence of cropland and pasture as well as pine and mixed forest are characteristic of streams in the Dougherty Plain ecoregion. Population density in the watershed is low. As of February 23, 2011, 56 NPDES permits were issued, with 80% of the NPDES permits being for construction.

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 is a low-gradient stream with a bottom substrate dominated by sand (Figure 1). The lack of stable substrate combined with poor instream habitat and a lack of sinuosity within the reach categorized the overall habitat quality as *sub-optimal* for supporting macroinvertebrate communities.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Choctawhatchee River
Drainage Area (mi^2)		40
Ecoregion[a]		65g
% Landuse		
Open water		1
Wetland	Woody	2
	Emergent herbaceous	<1
Forest	Deciduous	7
	Evergreen	22
	Mixed	10
Shrub/scrub		13
Grassland/herbaceous		<1
Pasture/hay		15
Cultivated crops		19
Development	Open space	8
	Low intensity	2
	Moderate intensity	1
	High intensity	<1
Population/km^2[b]		65
# NPDES Permits[c]	**TOTAL**	56
401 Water Quality Certification		3
Construction Stormwater		45
Industrial General		4
Municipal Individual		4

a.Dougherty Plain
b.2000 US Census
c.#NPDES permits downloaded from ADEM's NPDES Management System database, 23 Feb 2011

Table 2. Physical characteristics of Double Bridges Creek at DBCC-1, May 21, 2008.

Physical Characteristics		
Width (ft)		15
Canopy Cover		Mostly Shaded
Depth (ft)		
	Run	1.5
	Pool	3.0
% of Reach		
	Run	70
	Pool	30
% Substrate		
	Sand	86
	Silt	4
	Organic Matter	10

Table 3. Results of the habitat assessment conducted on Double Bridges Creek at DBCC-1, May 21, 2008.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	39	Poor <40
Sediment Deposition	61	Sub-optimal (53-65)
Sinuosity	38	Poor <45
Bank and Vegetative Stability	64	Sub-optimal (60-74)
Riparian Buffer	58	Marginal (50-69)
Habitat Assessment Score	**120**	
% Maximum Score	**54**	**Sub-optimal (53-65)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Double Bridges Creek at DBCC-1, May 21, 2008.

Macroinvertebrate Assessment			
	Results	**Scores (0-100)**	**Rating**
Taxa richness measures			
# EPT genera	10	40	Fair (38-56)
Taxonomic composition measures			
% Non-insect taxa	5	98	Excellent (>96.3)
% Plecoptera	5	23	Good (5.7-52.8)
% Dominant taxa	35	38	Poor (23.5-47.0)
Functional composition measures			
% Predators	10	33	Fair (30.2-45.2)
Tolerance measures			
Beck's community tolerance index	6	27	Fair (21.3-31.8)
% Nutrient tolerant organisms	51	31	Poor (25.4-50.8)
WMB-I Assessment Score	**--**	**41**	**Fair (38-56)**

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. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly and semi-monthly during April through November of 2008 to help identify any stressors to the biological communities. Median chlorophyll *a*, chlorides, nitrate+nitrite nitrogen, alkalinity, and specific conductance results were higher than expected based on data collected at reference reaches within the Dougherty Plain ecoregion (65g).

Table 5. Summary of water quality data collected April-November, 2008. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median (Med), 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	7.4	25.0	23.5	20.4	6.1
Turbidity (NTU)	8	10.5	17.6	14.2	14.4	2.1
Total Dissolved Solids (mg/L)	4	24.0	76.0	36.0	43.0	23.2
Total Suspended Solids (mg/L)	4	< 1.0	5.0	4.5	3.6	2.1
Specific Conductance (µmhos)	9	37.8	106.5	78.1 G	76.0	21.1
Alkalinity (mg/L)	4	21.2	28.7	22.7 M	23.8	3.4
Stream Flow (cfs)	5	10.3	30.8	17.7	18.5	8.1
Chemical						
Dissolved Oxygen (mg/L)	9	6.1	10.7	7.0	7.5	1.5
pH (su)	9	6.0	7.4	7.0	6.8	0.5
Ammonia Nitrogen (mg/L)	4	< 0.015	0.068	0.008	0.023	0.030
Nitrate+Nitrite Nitrogen (mg/L)	4	0.318	0.533	0.354 M	0.390	0.097
Total Kjeldahl Nitrogen (mg/L)	4	< 0.141	0.312	0.212	0.202	0.100
Total Nitrogen (mg/L)	4	< 0.418	0.845	0.552	0.592	0.183
Dissolved Reactive Phosphorus (mg/L)	4	0.009	0.016	0.010	0.011	0.003
Total Phosphorus (mg/L)	4	0.030	0.043	0.034	0.036	0.006
CBOD-5 (mg/L)	4	< 1.0	< 2.0	0.8	0.8	0.3
Chlorides (mg/L)	4	6.3	8.6	7.3 M	7.4	1.0
Biological						
Chlorophyll a (ug/L)	4	< 0.10	3.74	2.22 M	2.06	1.52

N=# samples; M=value > 90% of all verified ecoregional reference reach data collected in the ecoregion 65g; G=value > median concentration of all verified ecoregional reference reach data collected in ecoregion 65g.

SUMMARY

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Instream habitat and riparian buffers were limited. Median concentrations of chlorophyll *a*, chlorides, nitrate+nitrite nitrogen, alkalinity, and specific conductivity were higher than expected based on data collected at reference reaches within the Dougherty Plain ecoregion. As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data.

FOR MORE INFORMATION, CONTACT:
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