

2008 Monitoring Summary



Newton Creek at US Highway 84 (Houston County) (31.23860/-85.50260)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected Newton Creek as part of the 2008 Little Choctawhatchee River Intensive Survey. The purpose of this survey was to help determine permit limits for the Dothan Little Choctawhatchee WWTP that are protective of water quality and biological conditions.

Newton Creek is a tributary of the Little Choctawhatchee River on the west side of Dothan, Alabama. Influencing Newton Creek is Beaver Creek and the Beaver Creek Waste Water Treatment Plant. Beaver Creek is listed on the 2008 303 (d) list of Impaired Waters for Organic Enrichment/Dissolved Oxygen and Nutrients from municipal urban runoff/storm sewers.



Figure 1. Newton Creek at BVC-1, March 3, 2011.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Newton Creek at BVC-1 is a *Fish & Wildlife (F&W)* stream in the Coosa River basin. According to the 2000 National Land Cover Dataset, landuse within the watershed is dominated by forest (98%). As of February 23, 2011, ADEM has issued 137 NPDES permits 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 within the same ecoregion, they give an indication of the physical condition of the site and the quality and availability of habitat. Newton Creek is a low-gradient, glide-pool stream dominated by a sand substrate (Figure 1). Overall habitat quality was rates as *sub-optimal* due to moderate instream habitat quality, sinuosity, and bank and vegetative stability.

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 due to low populations of EPT families present (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Choctawhatchee River
Drainage Area (mi²)		39
Ecoregion^a		65g
% Landuse		
Open water		<1
Wetland	Woody	6
	Emergent herbaceous	<1
Forest	Deciduous	4
	Evergreen	13
	Mixed	1
Shrub/scrub		9
Grassland/herbaceous		<1
Pasture/hay		12
Cultivated crops		24
Development	Open space	14
	Low intensity	10
	Moderate intensity	4
	High intensity	2
Population/km^{2b}		228
# NPDES Permits^c	TOTAL	137
	401 Water Quality Certification	2
	Construction Stormwater	127
	Mining	1
	Industrial General	1
	Industrial Individual	2
	Municipal Individual	2
	Underground Injection Control	2

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 Newton Creek at BVC

Physical Characteristics		
Width (ft)		20
Canopy Cover		Mostly Open
Depth (ft)	Run	1.5
	Pool	2.0
% of Reach	Run	85
	Pool	15
% Substrate	Clay	3
	Mud/Muck	5
	Sand	78
	Silt	8
	Organic Matter	9

Table 3. Results of the habitat assessment conducted in Newton Creek at BVC-1, May 28, 2008.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	46	Marginal (40-52)
Sediment Deposition	60	Sub-optimal (53-65)
Sinuosity	66	Marginal (45-64)
Bank and Vegetative Stability	44	Marginal (35-59)
Riparian Buffer	80	Sub-optimal (70-89)
Habitat Assessment Score	127	
% Maximum Score	58	Sub-optimal (40-52)

Table 4. Results of the macroinvertebrate bioassessment conducted in Newton Creek at BVC-1, May 28, 2008.

Macroinvertebrate Assessment			
	Results	Scores	Rating
		(0-100)	
Taxa richness measures			
# EPT genera	7	28	Poor (19-37)
Taxonomic composition measures			
% Non-insect taxa	14	57	Poor (30.9-61.8)
% Plecoptera	0	0	Very Poor (<1.86)
% Dominant taxa	21	73	Good (70.6-85.2)
Functional composition measures			
% Predators	14	49	Good (45.3-72.1)
Tolerance measures			
Beck's community tolerance index	4	18	Poor (10.6-21.2)
% Nutrient tolerant organisms	38	54	Fair (50.9-76.2)
WMB-I Assessment Score	--	40	Fair (38-56)

Table 5. Summary of water quality data collected March-October, 2008. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL) when results were less than this value for non-metals parameters. 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)	14	11.7	26.2	24.3	21.7	5.0
Turbidity (NTU)	13	5.0	12.7	9.0	8.6	2.1
Total Dissolved Solids (mg/L)	10	38.0	156.0	82.0	89.2	37.4
Total Suspended Solids (mg/L)	9	< 1.0	3.0	1.0	1.7	1.2
Specific Conductance (µmhos)	14	107.2	179.0	146.0 ^G	144.9	20.9
Alkalinity (mg/L)	5	7.2	36.5	31.5 ^M	28.2	12.1
Stream Flow (cfs)	9	0.7	44.1	28.7	25.9	15.2
Chemical						
Dissolved Oxygen (mg/L)	14	5.4	8.8	6.1	6.6	1.1
pH (su)	14	6.0	7.3	6.8	6.8	0.3
Ammonia Nitrogen (mg/L)	8	< 0.014	0.015	0.008	0.007	0.000
Nitrate+Nitrite Nitrogen (mg/L)	10	0.003	2.340	1.460 ^M	1.383	0.686
Total Kjeldahl Nitrogen (mg/L)	10	< 0.150	0.933	0.248	0.341	0.242
Total Nitrogen (mg/L)	10	< 0.078	2.664	1.836 ^M	1.724	0.763
Dissolved Reactive Phosphorus (mg/L)	10	< 0.004	0.305	0.134 ^M	0.131	0.086
Total Phosphorus (mg/L)	10	< 0.013	0.395	0.216 ^M	0.201	0.107
CBOD-5 (mg/L)	8	< 1.0	< 2.0	0.5	0.6	0.2
Chlorides (mg/L)	5	8.9	15.4	13.1 ^M	12.4	2.8
Biological						
Chlorophyll a (ug/L)	6	0.38	2.14	0.60	0.89	0.66

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

WATER CHEMISTRY

Water chemistry results are summarized in Table 5. In situ measurements and water samples were collected monthly beginning March through October 2008. Median concentrations for alkalinity, nutrients (nitrate+nitrite nitrogen, total nitrogen, dissolved reactive phosphorus, and total phosphorus), and chlorides were higher than 90% of all verified data collected from reference reaches in the Dougherty Plain ecoregion. Median specific conductance was higher than median concentrations of all verified ecoregional reference reach data collected within the same ecoregion.

SUMMARY

The habitat assessment for Newton Creek at BVC-1 resulted in a *sub-optimal* rating. The bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Specific conductance, alkalinity, and nutrient concentrations were elevated in comparison to data from ADEM's least-impaired reference reaches in ecoregion 65g. ADEM will continue to review the information in this report along with all other available data.

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