Alabama Department of Environmental Management

303(d)/TMDL

Rivers and Streams Monitoring Program

2007 Monitoring Summary

Fair

Chitwood Creek at Blount County Road 33, approximately 2.8 miles ds of Oneonta WWTP discharge (33.95269/-86.54606).

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected Chitwood Creek for biological and water quality monitoring to assess water quality after upgrades to Oneonta waste water treatment plant. ADEM monitored Chitwood Creek at CCB-5, approximately 2.8 miles downstream of the Oneonta waste water treatment facility discharge point. A habitat and macroinvertebrate assessment were conducted on Chitwood Creek at CCB-5 on May 30, 2007.

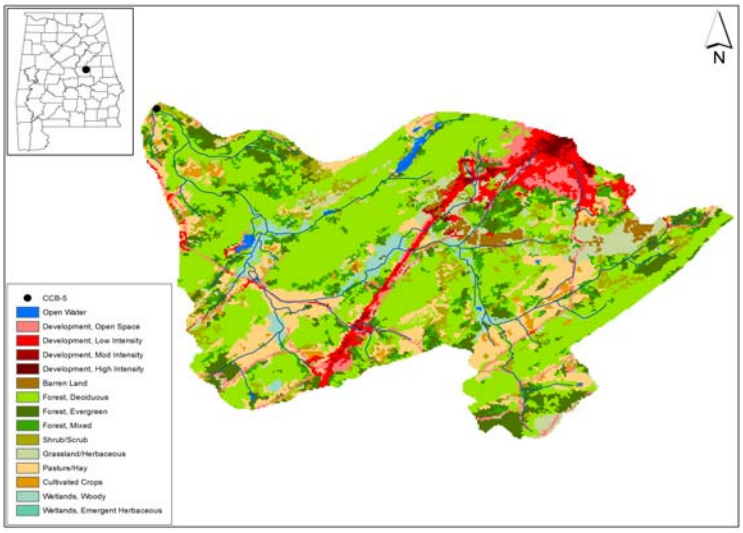

Figure 1. Chitwood Creek at CCB-5.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Chitwood Creek at CCB-5 is a *Fish and Wildlife* (*F&W*) stream located in the Black Warrior River basin and drains approximately 15 square miles within the Southern Table Plateaus ecoregion (*Griffith et al. 2001*) of Blount County. Based on the 2000 national land cover dataset, landuse within the watershed was composed of forest (60%), with pasture and shrub areas (Table 1). As of February 23, 2011, ADEM has issued 11 NPDES permits in this 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. Chitwood Creek at CCB-5 is a small, mostly-shaded stream reach (Fig 1). Bottom substrate consists primarily of boulder, bedrock, and cobble, with silt, gravel, and sand. Overall habitat quality and availability were rated as *optimal* for supporting diverse aquatic macroinvertebrate communities.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi^2)		15
Ecoregion[a]		68d
% Landuse		
Open water		<1
Wetland	Woody	3
Forest	Deciduous	44
	Evergreen	9
	Mixed	7
Shrub/scrub		6
Grassland/herbaceous		5
Pasture/hay		13
Cultivated crops		1
Development	Open space	5
	Low intensity	5
	Moderate intensity	1
	High intensity	<1
Barren		1
Population/km^2[b]		60
# NPDES Permits[c]	**TOTAL**	11
Construction Stormwater		9
Municipal Individual		2

a. Southern Table Plateaus
b. 2000 US Census
c. #NPDES permits downloaded from ADEM's NPDES Management System database February 23,2011

Table 2. Physical characteristics of Chitwood Creek at CCB-5, May 30, 2007.

Physical Characteristics		
Width (ft)		30
Canopy Cover		Mostly Shaded
Depth (ft)		
	Riffle	0.7
	Run	1.5
	Pool	2.0
% of Reach		
	Riffle	25
	Run	65
	Pool	10
% Substrate		
	Bedrock	25
	Boulder	35
	Cobble	12
	Gravel	8
	Sand	7
	Silt	10
	Organic Matter	3

Table 3. Results of the habitat assessment conducted on Chitwood Creek at CCB-5, May 30, 2007.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	75	Optimal >70
Sediment Deposition	66	Sub-optimal (59-70)
Sinuosity	83	Sub-optimal (65-84)
Bank and Vegetative Stability	78	Optimal >74
Riparian Buffer	83	Sub-optimal (70-89)
Habitat Assessment Score	**181**	
% Maximum Score	**75**	**Optimal >70**

Table 4. Results of the macroinvertebrate bioassessment conducted in Chitwood Creek at CCB-5 on May 30, 2007.

Macroinvertebrate Assessment		
	Results	**Scores**
Taxa richness measures		**(0-100)**
# EPT taxa	20	70
Taxonomic composition measures		
% Non-insect taxa	10	61
% Dominant taxon	21	74
% EPC taxa	22	41
Functional feeding group measures		
% Predators	9	32
Tolerance measures		
% Taxa as Tolerant	27	64
WMB-I Assessment Score	**---**	**57**
WMB-I Assessment Rating		**Fair (39-58)**

Table 5. Summary of water quality data collected March-October, 2007. 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	17.0	24.0	19.6	19.9	2.7
Turbidity (NTU)	9	3.2	22.8	5.0	6.7	6.2
Total Dissolved Solids (mg/L)	8	96.0	304.0	193.0 M	195.4	66.0
Total Suspended Solids (mg/L)	8	1.0	21.0	4.0	6.0	6.4
Specific Conductance (µmhos)	9	219.5	508.5	380.1 G	372.2	90.1
Alkalinity (mg/L)	8	96.7	145.5	124.9 M	121.4	15.2
Stream Flow (cfs)	8	1.8	14.8	4.0	5.9	4.3
Chemical						
Dissolved Oxygen (mg/L)	9	7.9	12.7	8.7	9.0	1.5
pH (su)	9	7.4	9.2 C	7.9	7.9	0.5
Ammonia Nitrogen (mg/L)	8	< 0.015	<0.015	0.008	0.008	0.000
Nitrate+Nitrite Nitrogen (mg/L)	8	0.070	2.120	0.666 M	0.829	0.660
Total Kjeldahl Nitrogen (mg/L)	8	< 0.150	0.796	0.327	0.332	0.232
Total Nitrogen (mg/L)	8	< 0.469	2.916	0.921	1.161	0.854
Dissolved Reactive Phosphorus (mg/L)	8	0.486	2.130	1.085 M	1.198	0.608
Total Phosphorus (mg/L)	8	0.515	2.360	1.185 M	1.298	0.653
CBOD-5 (mg/L)	8	< 1.0	2.1	0.5	0.8	0.6
J Chlorides (mg/L)	8	9.4	54.8	30.3 M	32.0	15.8
Biological						
J Fecal Coliform (col/100 mL)	7	9	160	83	80	56

J=estimate; N= # of samples; G=value higher than median concentration of all verified ecoregional reference reach data collected in ecoregion 68d; M=value >90% of collected samples in ecoregion 68d; C=value exceeds established criteria for *F&W* water use classification.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). The WMB-I measures taxonomic richness, community composition, and community tolerance to assess the overall health of the macroinvertebrate community. Each score is based on a 100 point scale. The final score is the average of the individual metric scores. The 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 during March through October of 2007 to help identify any stressors to the biological communities. Median values of dissolved solids, alkalinity, dissolved reactive phosphorous, total phosphorous, and chlorides were higher than the 90th percentile of all verified reference data collected within ecoregion 68d. Specific conductance was greater than median concentrations of all verified ecoregional reference reach data collected in ecoregion 68d. In situ pH exceeded *F&W* criteria during the March 13th site visit.

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data. Results of the 2007 bioassessment indicated the macroinvertebrate community in Chitwood Creek at CCB-5 to be in *fair* condition. Water quality data indicate elevated median values of multiple parameters, including total phosphorous and nitrate+nitrite nitrogen. In-situ pH exceeded *F&W* criteria during the March 13th site visit. These data, along with the fair bioassessment result, suggest that further monitoring is needed to determine if Chitwood Creek at CCB-5 is meeting its *F&W* use classification.

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