Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2012 Monitoring Summary

Poor

Cypress Creek at Kauloosa Avenue (Tuscaloosa County) (33.16516/-

BACKGROUND

Cypress Creek is located in Tuscaloosa, and has experienced significant development over the last decade. The Alabama Department of Environmental Management (ADEM) selected Cypress Creek watershed for biological and water quality monitoring in response to complaints from stakeholders concerned about the impact of the development on conditions within the stream.

Figure 1. Cypress Creek at CYPT-1, May 1, 2012.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Cypress Creek at CYPT-1 is a *Fish & Wildlife (F&W)* stream located in Tuscaloosa, Alabama in the Fall Line Hills ecoregion (65i). Based on the 2006 National Land Cover Dataset, land cover within the watershed is mostly forest (38%) and development (46%). As of September 1, 2012, 23 NPDES permit outfalls were located 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. Cypress Creek at CYPT–1 is a primarily sand bottomed stream (Figure 1). Overall habitat quality was categorized as *sub-optimal* for supporting aquatic macroinvertebrate communities.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WBM-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 in Cypress Creek at CYPT-1 to be in *poor* community condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi^2)		11
Ecoregion[a]		65i
% Landuse		
Open water		1
Wetland	Woody	1
Forest	Deciduous	27
	Evergreen	2
	Mixed	9
Shrub/scrub		9
Grassland/herbaceous		1
Pasture/hay		4
Cultivated crops		2
Development	Open space	18
	Low intensity	15
	Moderate intensity	9
	High intensity	4
Population/km^2[b]		346
# NPDES Permits[c]	**TOTAL**	23
Construction Stormwater		16
Mining		1
Industrial General		5
Industrial Individual		1

a.Fall Line Hills

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, September 1, 2012.

Table 2. Physical characteristics of Cypress Creek at CYPT-1, May 1, 2012.

Physical Characteristics	
Width (ft)	30
Canopy Cover	Mostly Shaded
Depth (ft)	
Riffle	0.4
Run	1.0
Pool	2.0
% of Reach	
Riffle	5
Run	80
Pool	15
% Substrate	
Boulder	1
Cobble	10
Gravel	25
Sand	45
Silt	11
Organic Matter	8

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Table 3. Results of the habitat assessment conducted on Cypress Creek at CYPT-1, May 1, 2012.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	53	Sub-optimal (53-65)
Sediment Deposition	53	Sub-optimal (53-65)
Sinuosity	65	Sub-optimal (65-84)
Bank and Vegetative Stability	56	Marginal (35-59)
Riparian Buffer	53	Marginal (50-69)
Habitat Assessment Score	**134**	
% Maximum Score	**56**	**Sub-optimal (53-65)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Cypress Creek at CYPT-1 on May 1, 2012..

Macroinvertebrate Assessment	
	Results
Taxa richness and diversity measures	
# Ephemeroptera (mayfly) taxa	1
# Plecoptera (stonefly) taxa	0
# Trichoptera (caddisfly) taxa	2
Taxonomic composition measures	
% Non-insect taxa	13
% Plecoptera	0
% Non-insect organisms	3
Community tolerance	
Becks community tolerance index	1
WMB-I Assessment Score	24
WMB-I Assessment Rating	Poor (24-47)

WATER CHEMISTRY

Water chemistry analyses are presented in Table 5. In situ measurements and water samples were supposed to be collected bi-monthly during March through September of 2012 to help identify any stressors to the biological communities. In situ parameters were also measured in May during the macroinvertebrate assessment. Median specific conductance, hardness, total dissolved solids, alkalinity and nitrate—nitrite values were higher than background levels for ecoregion 65i.

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Cypress Creek at CYPT-1 to be in *poor* condition and the habitat to be in *sub-optimal* condition. The median concentrations of several physical parameters were higher than expected for the Fall Line Hills ecoregion. Median specific conductance, hardness, total dissolved solids, alkalinity, and nitrogen values were higher than background levels for ecoregion 65i.

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Table 5. Summary of water quality data collected March – October, 2012. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). 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)	5	12.0	23.8	22.3	20.2	4.8
Turbidity (NTU)	5	4.5	31.5	11.6	15.6	12.2
Total Dissolved Solids (mg/L)	4	72.0	104.0	91.0[M]	89.5	13.4
Total Suspended Solids (mg/L)	4	< 1.0	13.0	7.0	6.9	6.5
Specific Conductance (µmhos)	5	105.7	141.1	110.5[G]	116.3	14.2
Hardness (mg/L)	4	41.7	49.4	42.7[G]	44.1	3.6
Alkalinity (mg/L)	4	42.8	51.3	44.3[M]	45.7	3.8
Stream Flow (cfs)	5	4.6	64.6	5.2	18.3	26.1
Chemical						
Dissolved Oxygen (mg/L)	5	6.7	9.3	8.3	8.1	1.0
pH (su)	5	6.4	7.0	6.7	6.7	0.2
Ammonia Nitrogen (mg/L)	4	< 0.007	0.243	0.013	0.068	0.117
Nitrate+Nitrite Nitrogen (mg/L)	4	0.264	0.373	0.312[M]	0.316	0.045
Total Kjeldahl Nitrogen (mg/L)	4	< 0.041	0.413	0.342	0.279	0.176
Total Nitrogen (mg/L)	4	< 0.394	0.725	0.630	0.595	0.143
[J] Dissolved Reactive Phosphorus (mg/L)	4	< 0.004	0.007	0.005	0.005	0.002
[J] Total Phosphorus (mg/L)	4	0.009	0.040	0.026	0.025	0.014
CBOD-5 (mg/L)	4	< 2.0 <	2.0	1.0	1.0	0.0
Chlorides (mg/L)	4	3.0	4.2	3.7	3.6	0.6
Total Metals						
Aluminum (mg/L)	4	< 0.043	0.480	0.375	0.313	0.217
Iron (mg/L)	4	0.663	1.520	1.240	1.166	0.383
Manganese (mg/L)	4	0.113	0.176	0.156	0.150	0.031
Dissolved Metals						
Aluminum (mg/L)	4	< 0.043 <	0.043	0.022	0.022	0.000
Antimony (µg/L)	4	< 3.6 <	3.6	1.8	1.8	0.0
Arsenic (µg/L)	4	< 1.8 <	1.8	0.9	0.9	0.0
Cadmium (µg/L)	4	< 0.022	0.046	0.023	0.020	0.006
Chromium (mg/L)	4	< 0.009	0.009	0.004	0.004	0.000
Copper (mg/L)	4	< 0.020	0.020	0.010	0.010	0.000
Iron (mg/L)	4	0.190	0.315	0.261	0.257	0.061
Lead (µg/L)	4	< 0.9 <	0.9	0.4	0.4	0.0
Manganese (mg/L)	4	0.096	0.171	0.148	0.141	0.035
Mercury (µg/L)	4	< 0.035 <	0.035	0.018	0.018	0.000
Nickel (mg/L)	4	< 0.042 <	0.042	0.021	0.021	0.000
Selenium (µg/L)	4	< 2.5 <	2.5	1.2	1.2	0.0
Silver (µg/L)	4	< 0.015	0.215	0.108	0.082	0.050
Thallium (µg/L)	4	< 1.4 <	1.4	0.7	0.7	0.0
Zinc (mg/L)	4	< 0.012 <	0.012	0.006	0.006	0.000
Biological						
Chlorophyll a (ug/L)	4	< 0.10	2.14	0.05	0.57	1.04
[J] E. coli (col/100mL)	4	225	2420	1,373	1347	1239

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