

2010 Monitoring Summary



Chaney Creek at Dallas County Road 3 (32.35438/ -87.28938)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Chaney Creek watershed for biological and water quality monitoring as part of the 2010 Assessment of the Alabama, Coosa and Tallapoosa (ACT) River Basins. The objectives of the ACT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the ACT River basins.



Figure 1. Chaney Creek at CYD-1, April 13, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Chaney Creek at CYD-1 is a *Fish and Wildlife (F&W)* stream located in Dallas County in the Blackland Prairie ecoregion (65a). Based on the 2006 National Land Cover Dataset, land cover within the watershed is composed of pasture, wetland (24%) and forest (18%). As of September 1, 2012, there were a total of three NPDES permits that were issued 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. Chaney Creek at CYD-1 is characterized by a primarily hard pan clay substrate (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 WBM-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 in comparison to least impaired reference reaches in the same ecoregion. The final score is the average of all individual metric scores. Metric results indicated the macroinvertebrate community to be in *good* condition for this stream type (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Alabama River
Basin		Alabama River
Drainage Area (mi²)		43
Ecoregion^a		65a
% Landuse		
Open water		<1
Wetland	Woody	19
	Emergent herbaceous	5
Forest	Deciduous	4
	Evergreen	10
	Mixed	4
Shrub/scrub		7
Grassland/herbaceous		1
Pasture/hay		35
Cultivated crops		11
Development	Open space	4
	Low intensity	<1
	Moderate intensity	<1
Population/km^{2b}		84
# NPDES Permits^c	TOTAL	3
	Construction Stormwater	2
	Underground Injection Control	1

a. Blackland Prairie

b. 2000 US Census

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

Table 2. Physical characteristics of Chaney Creek at CYD-1, April 13, 2010.

Physical Characteristics		
Width (ft)		20
Canopy Cover		Open
Depth (ft)		
	Riffle	0.2
	Run	1.0
	Pool	1.5
% of Reach		
	Riffle	2
	Run	95
	Pool	3
% Substrate		
	Cobble	2
	Gravel	5
	Hard Pan Clay	88
	Sand	2
	Organic Matter	3

Table 3. Results of the habitat assessment conducted on Chaney Creek at CYD-1, April 13, 2010.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	53	Marginal (40-52)
Sediment Deposition	60	Sub-optimal (53-65)
Sinuosity	63	Marginal (45-64)
Bank and Vegetative Stability	61	Sub-optimal (60-74)
Riparian Buffer	73	Sub-optimal (70-89)
Habitat Assessment Score	145	
% Maximum Score	60	Sub-optimal (53-65)

Table 4. Results of the macroinvertebrate bioassessment conducted in Chaney Creek at CYD-1, April 13, 2010.

Macroinvertebrate Assessment		
	Results	Scores (0-100)
Taxa richness and diversity measures		
% EPC taxa	25	37
% Trichoptera & Chironomidae Taxa	40	45
Taxonomic composition measures		
% EP Individuals	23	45
Functional feeding group		
% Collector-Filterer Individuals	12	87
Community tolerance		
% Nutrient Tolerant individuals	22	76
WMB-I Assessment Score	---	58
WMB-I Assessment Rating		Good (46-73)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples are generally collected monthly, March–October, to help identify any stressors to the biological communities. Stream flow was typical of streams in the Blackbelt region of Alabama. Samples were collected March through June of 2010 when the stream was flowing. The stream did not flow in July through October, and samples were not collected.

Median concentrations of specific conductivity, hardness and chlorides were higher than expected in comparison to reference reach data collected in the ecoregion 65a. Stream pH exceeded F&W criteria during one of four sampling events. Arsenic and Thallium exceeded the Human Health (HH) criterion for water and fish consumption.

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Chaney Creek at CYD-1 to be in *good* condition for this stream type. Habitat was assessed as *sub-optimal* for supporting macroinvertebrate communities. Water chemistry results indicated that specific conductance, hardness, chlorides, pH and metals may have been the cause of stressors to the biological community in Chaney Creek watershed. Extremely low stream flows may also account for these results.

Table 5. Summary of water quality data collected March–October, 2010. 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	E
Physical							
Temperature (°C)	4	22.8	28.4	25.2	25.4	2.4	
Turbidity (NTU)	4	4.8	8.4	7.0	6.8	1.5	
Td Dissolved Solids (mg/L)	3	146.0	164.0	154.0	154.7	9.0	
Td Suspended Solids (mg/L)	3	5.0	6.0	6.0	5.7	0.6	
Specific Conductance (µmhos)	4	204.2	294.7	238.6 ^G	244.0	41.0	
Hardness (mg/L)	3	80.8	108.0	90.0 ^G	92.9	13.8	
Alkalinity (mg/L)	3	78.2	143.0	82.5	101.2	36.2	
Stream Flow (cfs)	3	0.6	1.4	0.8	0.9	0.4	
Chemical							
Dissolved Oxygen (mg/L)	4	11.1	13.1	12.2	12.1	0.8	
pH (su)	4	8.1	8.8 ^C	8.4	8.4	0.3	1
Ammonia Nitrogen (mg/L)	3	< 0.021	< 0.021	0.010	0.010	0.000	
Nitrate+Nitrite Nitrogen (mg/L)	3	0.008	0.087	0.011	0.035	0.045	
Td Kjeldahl Nitrogen (mg/L)	3	0.306	0.568	0.469	0.448	0.132	
Td Nitrogen (mg/L)	3	0.317	0.655	0.477	0.483	0.169	
Dissolved Reactive Phosphorus (mg/L)	3	0.010	0.028	0.019	0.019	0.009	
Td Phosphorus (mg/L)	3	0.037	0.056	0.037	0.043	0.011	
CBOD-5 (mg/L)	3	< 2.0	2.1	1.0	1.4	0.6	
Chlorides (mg/L)	3	11.6	14.2	13.9 ^M	13.2	1.4	
Atrazine (µg/L)	2	0.07	0.94	0.50	0.50	0.62	
Total Metals							
Aluminum (mg/L)	3	< 0.033	0.294	0.237	0.182	0.146	
Iron (mg/L)	3	0.293	0.428	0.377	0.366	0.068	
Manganese (mg/L)	3	< 0.001	0.020	0.000	0.007	0.011	
Dissolved Metals							
Aluminum (mg/L)	3	< 0.033	< 0.033	0.016	0.016	0.000	
Antimony (µg/L)	3	< 0.7	3.0	0.9	1.4	1.4	
Arsenic (µg/L)	3	0.6	2.2 ^H	1.0	1.2	0.8	2
Cadmium (mg/L)	3	< 0.003	< 0.014	0.002	0.003	0.003	
Chromium (mg/L)	3	< 0.013	< 0.013	0.006	0.006	0.000	
Copper (mg/L)	3	< 0.013	< 0.013	0.006	0.006	0.000	
Iron (mg/L)	3	< 0.026	0.074	0.013	0.033	0.035	
Lead (µg/L)	3	< 1.0	< 1.7	0.8	0.7	0.2	
Manganese (mg/L)	3	< 0.001	0.005	0.000	0.002	0.003	
Mercury (µg/L)	3	< 0.080	< 0.080	0.040	0.040	0.000	
Nickel (mg/L)	3	< 0.019	< 0.019	0.010	0.010	0.000	
Selenium (µg/L)	3	< 0.4	< 1.7	0.8	0.6	0.4	
Silver (mg/L)	3	< 0.002	< 0.002	0.001	0.001	0.000	
Thallium (µg/L)	3	0.5	< 0.6 ^H	0.3	0.4	0.1	1
Zinc (mg/L)	3	< 0.030	< 0.030	0.015	0.015	0.000	
Biological							
Chlorophyll a (µg/L)	3	< 0.10	2.85	1.07	1.32	1.42	
E. coli (cd/100mL)	3	43	308	228	193	136	

E = # of samples that exceeded criteria; C = F&W criterion exceeded; G = value greater than median concentration of all verified reference data collected in ecoregion 65a; H = F&W Human Health Criterion exceeded; J = estimate; M = value >90% of all verified ecoregional reference reach data collected in the ecoregion 65b; N = # of samples

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