Alabama Department of Environmental Management

Use Support Assessment

Rivers and Streams Monitoring Program

2012 Monitoring Summary

Fair

Turkey Creek at Preserve Park (Jefferson County) (33.70248\ -86.69717)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Turkey Creek watershed for biological and water quality monitoring as part of the 2012 Assessment of the Black Warrior, Cahaba (BWC) River Basin. The objectives of the Black Warrior, Cahaba River Basin Assessments were to assess the biological integrity of each monitoring location and to estimate overall water quality within the BWC basin. Additionally, Turkey Creek was requested to be considered as a possible Outstanding Alabama Water (OAW) candidate.

Figure 1. Turkey Creek at TRKJ-3, May 1, 2012.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Turkey Creek at TRKJ-3 is a *Fish & Wildlife (F&W)* stream primarily located in the Shale Hills ecoregion (68f) in Pinson, Alabama (Jefferson County). Based on the 2006 National Land Cover Dataset, land cover within the watershed is a mixture of developed area (30%), and forest (55%). Reconnaissance of the upstream watershed suggested the potential for sedimentation issues within the creek. As of September 1, 2012, there were a total of 18 NPDES permits that were issued within the watershed, the vast majority of which are construction stormwater permits.

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. Turkey Creek at TRKJ–3 is a primarily bedrock bottomed stream, with the remainder of the substrate composed of sand, gravel, cobble, and boulder (Figure 1). Overall habitat quality was categorized as *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 communityin comparison to conditions expected in north Alabama streams and rivers. Each score is based on a six-point scale, ranging from 1, or *natural*, to 6, or *highly altered*. The macroinvertebrate survey conducted in Turkey Creek at TRKJ-3 rated the site to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi^2)		27
Ecoregion[a]		68f
% Landuse		
Open water		1
Wetland	Woody	<1
	Emergent herbaceous	<1
Forest	Deciduous	46
	Evergreen	5
	Mixed	4
Shrub/scrub		2
Grassland/herbaceous		4
Pasture/hay		5
Cultivated crops		1
Development	Open space	19
	Low intensity	10
	Moderate intensity	1
	High intensity	<1
Barren		1
Population/km^2[b]		348
# NPDES Permits[c]	**TOTAL**	18
Construction Stormwater		17
Industrial General		1

a. Shale Hills

b. 2000 US Census

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

Table 2. Physical characteristics of Turkey Creek at TRKJ-3, May 1, 2012.

Physical Characteristics	
Canopy Cover	Estimate 50/50
Width (ft)	40.0
Depth (ft)	
Riffle	0.5
Run	2.0
Pool	3.0
% of Reach	
Riffle	20
Run	50
Pool	30
% Substrate	
Bedrock	40
Boulder	10
Cobble	15
Gravel	15
Sand	16
Silt	1
Organic Matter	3

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

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	87	Optimal >70
Sediment Deposition	88	Optimal >70
Sinuosity	90	Optimal >84
Bank and Vegetative Stability	81	Optimal >74
Riparian Buffer	84	Sub-optimal (70-89)
Habitat Assessment Score	**206**	
% Maximum Score	**86**	**Optimal >70**

Table 4. Results of the macroinvertebrate bioassessment conducted in Turkey Creek at TRKJ-3, May 1, 2012.

Macroinvertebrate Assessment	
	Results
Taxa richness measures	
Total # Taxa	56
# EPT taxa	17
# Sensitive EPT	8
# Highly-sensitive and Specialized Taxa	2
Taxonomic composition measures	
% EPC taxa	32
% Non-insect taxa	13
% Dominant taxon	48
Functional feeding group measures	
% Predators	5
Tolerance measures	
% Sensitive taxa	21
% Taxa as Tolerant	32
WMB-I Assessment Score	**4**
WMB-I Assessment Rating	**Fair**

WATER CHEMISTRY

Water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly during March through October of 2012 to help identify any stressors to the biological communities. Median specific conductance, total dissolved solids, alkalinity and hardness were higher than background levels for the Southwest Appalachians ecoregion (68).

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Turkey Creek at TRKJ-3 to be in *fair* condition. There was an abundance of stable habitat within the reach, despite potential for siltation issues. Specific conductance, total dissolved solids, alkalinity, and hardness were elevated as compared to data from ADEM's least impaired reference reaches in ecoregion 68. The data presented in this report and all other available data will be reviewed to fully assess conditions. Continued monitoring of water quality and biological conditions is recommended.

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
	Physical						
	Temperature (°C)	9		11.3	21.5	19.3	18.1
	Turbidity (NTU)	9		1.7	3.6	2.0	2.4
J	Total Dissolved Solids (mg/L)	8		150.0	220.0	186.0 [V]	181.8
	Total Suspended Solids (mg/L)	8	<	1.0	4.0	0.5	1.1
	Specific Conductance (µmhos)	9		303.4	318.3	312.8 [3]	311.1
	Hardness (mg/L)	1					87.2 [3]
	Alkalinity (mg/L)	8		61.1	175.0	163.5 [V]	153.8
	Stream Flow (cfs)	8		13.1	37.2	19.1	20.7
	Chemical						
	Dissolved Oxygen (mg/L)	9		9.0	11.1	9.5	9.8
	pH (su)	9		7.7	8.3	7.8	8.0
J	Ammonia Nitrogen (mg/L)	8	<	0.007	0.008	0.004	0.004
J	Nitrate+Nitrite Nitrogen (mg/L)	8		0.444	0.631	0.494	0.513
J	Total Kjeldahl Nitrogen (mg/L)	8	<	0.041	0.310	0.076	0.100
J	Total Nitrogen (mg/L)	8	<	0.508	0.941	0.575	0.612
J	Dissolved Reactive Phosphorus (mg/L)	8		0.006	0.023	0.008	0.009
J	Total Phosphorus (mg/L)	8		0.008	0.042	0.011	0.015
J	CBOD-5 (mg/L)	8	<	2.0	2.0	1.0	1.0
	Chlorides (mg/L)	8		2.6	3.6	2.8	2.8
	Total Metals						
J	Aluminum (mg/L)	1					0.095
	Iron (mg/L)	1					0.246
J	Manganese (mg/L)	1					0.045
	Dissolved Metals						
	Aluminum (mg/L)	1				<	0.043
	Antimony (µg/L)	1				<	3.6
	Arsenic (µg/L)	1				<	1.8
	Cadmium (µg/L)	1				<	0.022
	Chromium (µg/L)	1				<	9.000
	Copper (mg/L)	1				<	0.020
	Iron (mg/L)	1					0.065
	Lead (µg/L)	1				<	0.9
	Manganese (mg/L)	1				<	0.007
	Mercury (µg/L)	1				<	0.035
	Nickel (mg/L)	1				<	0.042
	Selenium (µg/L)	1				<	2.5
	Silver (µg/L)	1				<	0.015
	Thallium (µg/L)	1				<	1.4
	Zinc (mg/L)	1				<	0.012
	Biological						
	Chlorophyll a (ug/L)	1					2.14
	E.coli (col/100mL)	7		28	1046	105	225

J=estimate; N=#of samples; M=value > 90th percentile of all verified ecoregional reference reach data collected within ecoregion 68; G=value > 90th percentile of all verified ecoregional reference reach data within ecoregion 68;

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