Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2005 Monitoring Summary

Fair

Turkey Creek at unnamed County Rd. off County Rd. 59, just upstream of Pine Barren Creek (31.94563/-86.98731)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Turkey Creek watershed for biological and water quality monitoring as part of the 2005 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River Basins. The objectives of the ACT Basin Assessments were to assess the biological integrity each monitoring site and to estimate overall water quality within the ACT basin group.

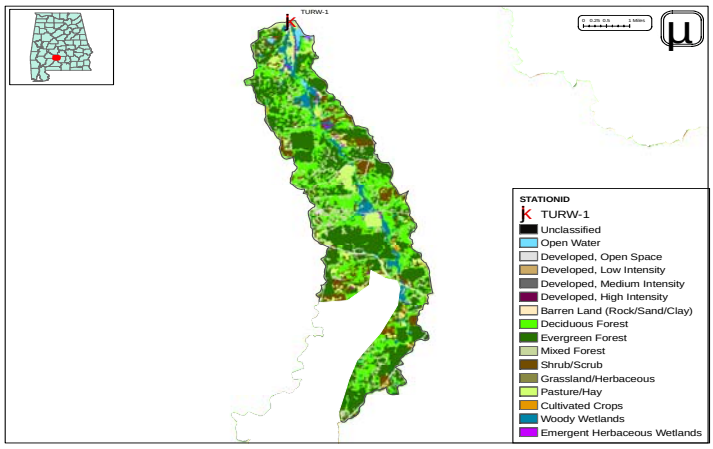

Figure 1. Sampling location and landuse within the Turkey Creek watershed at TURW-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Turkey Creek is a *Fish & Wildlife (F&W)* stream located in Wilcox County in the Southern Hilly Gulf Coastal Plains ecoregion (67f). Landuse within the watershed is primarily forest (79%). There are 3 permitted discharges located along the watershed (Table 1).

REACH CHARACTERISTICS

General observations (Table 2) and habitat assessments (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 TURW-1 is a run dominated, low-gradient sandy stream with very little riffle area. Overall habitat quality was categorized as *marginal* due to sediment deposition and a lack of riffle habitat. Poor bank stability and a narrow riparian buffer also lowered the overall habitat score.

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 an average of the score for each metric. Metric results indicated the macroinvertebrate community to be characterized by pollution-tolerant taxa groups, indicating *fair* community condition.

Table 1. Summary of watershed characteristics at TURW-1, 2005.

Watershed Characteristics		
Drainage Area (mi^2)		24
Ecoregion[a]		65d
% Landuse		
Open water		1
Wetland	Woody	5
	Emerg. Deciduous	<1
Forest	Deciduous	28
	Evergreen	36
	Mixed	10
Shrub/scrub		9
Grassland/Herb		<1
Pasture/hay		6
Cultivated crops		1
Development	Open space	3
	Low Intensity	<1
Population/km^2[b]		3
# NPDES Permits[c]	**TOTAL**	3
Mining General Permit (old)		2
Industrial General		1

a. Southern Table Plateaus
b. 2000 U.S. Census Data
c. # NPDES permits download from ADEM's NPDES Management System database, 9 Jun 2008

Table 2. Physical characteristics of Turkey Creek at TURW-1 May 26, 2005.

Physical characteristics		
Width (ft)		25
Canopy cover		Mostly Shaded
Depth (ft)		
	Riffle	0.3
	Run	0.6
	Pool	1.0
% of Reach		
	Riffle	2
	Run	93
	Pool	5
% Substrate		
	Bed rock	76
	Boulder	2
	Cobble	2
	Gravel	5
	Sand	10
	Silt	2
	Organic Matter	3

Table 3. Results of the habitat assessment conducted on Turkey Creek at TURW-1 on May 26, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	57	Sub-optimal (53-65)
Sediment deposition	53	Marginal (40-52)
Sinuosity	55	Marginal (45-64)
Bank and vegetative stability	26	Poor (<35)
Riparian buffer	48	Poor (<50)
Habitat assessment score	116	
% Maximum score	**48**	**Marginal (40-52)**

Table 4. Results of the macroinvertebrate bioassessment conducted on Turkey Creek at TURW-1 on May 26, 2005.

Macroinvertebrate Assessment Results			
	Results	**Scores**	**Rating**
Taxa richness measures		**(0-100)**	
# Ephemeroptera (mayfly) genera	14	100	Excellent (>85)
# Plecoptera (stonefly) genera	4	67	Good (50-75)
# Trichoptera (caddisfly) genera	2	17	Very Poor (<22)
Taxonomic composition measures			
% Non-insect taxa	10	60	Fair (49.4-74.1)
% Non-insect organisms	1	98	Excellent (>97)
% Plecoptera	3	14	Fair (13.1-19.7)
Tolerance measures			
Beck's community tolerance index	10	36	Poor (20.2-40.7)
WMB-I Assessment Score	**---**	**56**	**Fair (48-72)**

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during March through October of 2005 to help identify any stressors to the biological communities. Median values of nutrients, *in situ* values and metals collected during this period were within normal ranges or below detection limits (Table 5).

CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality was categorized as *marginal* due to lack of riparian and bank vegetation, decreased sinuosity and increased sediment deposition.

Table 5. Summary of water quality data collected March-October, 2005. 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	Median	Avg	SD
Physical						
Temperature (°C)	8	12.0	27.0	21.9	20.7	4.9
Turbidity (NTU)	8	8.7	76.8	21.8	35.4	29.4
Total Dissolved Solids (mg/L)	7	57.0	199.0	84.0	95.1	48.0
Total Suspended Solids (mg/L)	7	5.0	79.0	22.0	31.0	26.3
Specific Conductance (µmhos)	8	62.5	144.1	100.5	98.5	29.7
Hardness (mg/L)	3	27.4	43.8	39.6	36.9	8.5
Alkalinity (mg/L)	7	20.9	57.0	35.3	34.8	12.5
Stream Flow (cfs)	7	2.8	110.9	15.0	27.7	---
Chemical						
Dissolved Oxygen (mg/L)	8	6.7	11	9.0	8.7	1.5
pH (su)	8	6.8	7.8	7.4	7.3	0.3
Ammonia Nitrogen (mg/L)	7	< 0.015	0.170	0.008	0.031	0.061
Nitrate+Nitrite Nitrogen (mg/L)	7	0.028	0.059	0.041	0.041	0.012
Total Kjeldahl Nitrogen (mg/L)	7	0.202	0.627	0.414	0.401	0.155
Total Nitrogen (mg/L)	7	0.253	0.655	0.444	0.442	0.152
Dissolved Reactive Phosphorus (mg/L)	7	0.007	0.014	0.010	0.011	0.003
Total Phosphorus (mg/L)	7	< 0.004	0.063	0.050	0.043	0.022
CBOD-5 (mg/L)	7	< 1.0	2.9	1.1	1.4	1.0
Chlorides (mg/L)	7	4.6	7.2	5.1	5.4	0.9
Atrazine (µg/L)	2	< 0.05	0.09	0.06	0.06	---
Total Metals						
Aluminum (mg/L)	4	< 0.015	1.65	0.157	0.493	0.8
Iron (mg/L)	4	0.709	2.75	1.29	1.510	0.9
Manganese (mg/L)	4	0.018	0.048	0.026	0.030	---
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	0.124	0.052	0.059	0.1
Antimony (µg/L)	4	< 2	< 2	1	1	---
Arsenic (µg/L)	3	< 10	< 10	5	5	---
Cadmium (mg/L)	4	< 0.005	< 0.005	0.003	0.003	---
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	---
Copper (mg/L)	4	< 0.005	< 0.005	0.003	0.003	---
Iron (mg/L)	4	0.186	0.543	0.27	0.317	0.2
Lead (µg/L)	4	< 2	< 2	1	1	---
Manganese (mg/L)	4	< 0.005	0.042	0.010	0.016	---
Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.15	---
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	---
Selenium (µg/L)	4	< 10	< 10	5	5	---
Silver (mg/L)	4	< 0.003	< 0.003	0.002	0.002	---
Thallium (µg/L)	4	< 1	< 1	0.5	0.500	---
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	---
Biological						
[J] Chlorophyll a (µg/L)	7	0.53	6.41	3.20	3.28	2.1
[J] Fecal Coliform (col/100 mL)	6	50	770	360	370	286

J=estimate; N=# samples

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