2005 Monitoring Summary

Basin Assessment Site

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

TM

Poor

Ohatchee Creek at Verbon George Road (Calhoun County) (33.89680/-85.87570)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Ohatchee 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 of each monitoring site and to estimate overall water quality within the ACT basin group.
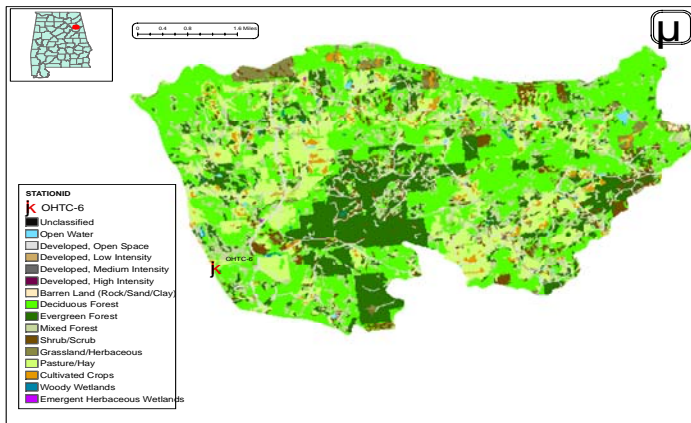

Figure 1. Sampling location and landuse within the Ohatchee Creek watershed at OHTC-6.

WATERSHED CHARACTERISTICS

Ohatchee Creek is a small *Swimming/Fish & Wildlife (S/F&W)* stream located within the Coosa River basin (Fig. 1). It drains approximately 34 mi^2 in Calhoun County before its confluence with the Coosa River. It is located in the Southern Shale Valleys sub-ecoregion, characterized by undulating to rolling valleys and some low rounded hills that are dominated by shale. Landuse within the watershed is primarily forest (70%) and pasture/hay (17%). Watershed characteristics are summarized in 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. Ohatchee Creek at OHTC-6 is a high-gradient stream. Instream substrates were dominated by gravel and clay, with some cobble and sand. Habitat quality and availability within the reach were rated *optimal* for supporting macroinvertebrate communities.

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 *poor* community condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi^2)		34
Ecoregion[a]		67g
% Landuse		
Open water		<1
Wetland	Woody	<1
	Emergent herbaceous	<1
Forest	Deciduous	40
	Evergreen	17
	Mixed	13
Shrub/scrub		4
Grassland/herbaceous		3
Pasture/hay		17
Cultivated crops		2
Development	Open space	4
	Low intensity	<1
	Moderate intensity	<1
Barren		<1
Population/km^2 [b]		31
# NPDES Permits [c]	TOTAL	2
Construction Stormwater		2

a. Southern Shale Valleys
b. 2000 US Census data
c. #NPDES permits downloaded from ADEM's NPDES Management System database

Table 2. Physical characteristics at OHTC-6, May 3, 2005.

Physical Characteristics		
Width (ft)		20
Canopy cover		Est. 50/50
Depth (ft)		
	Riffle	0.5
	Run	1.5
	Pool	3.0
% of Reach		
	Riffle	15
	Run	25
	Pool	60
% Substrate		
	Cobble	12
	Gravel	40
	Sand	15
	Silt	3
	Clay	25
	Organic Matter	5

Table 3. Results of the habitat assessment conducted at OHTC-6 May 3, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	78	Optimal (> 70)
Sediment deposition	61	Sub-optimal (59-70)
Sinuosity	78	Sub-optimal (65-84)
Bank and vegetative stability	60	Sub-optimal (60-74)
Riparian buffer	90	Sub-optimal (70-90)
Habitat assessment score	181	
% Maximum score	**75**	**Optimal (> 70)**

Table 4. Results of the macroinvertebrate bioassessment conducted at OHTC-6 May 3, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores (0-100)	Rating
Taxa richness measures			
# Ephemeroptera (mayfly) genera	6	50	Fair (47-70)
# Plecoptera (stonefly) genera	3	50	Good (50-75)
# Trichoptera (caddisfly) genera	4	33	Poor (22-44)
Taxonomic composition measures			
% Non-insect taxa	12	53	Fair (49.4-74.1)
% Non-insect organisms	3	92	Fair (62.7-93.9)
% Plecoptera	1	5	Very Poor (<6.56)
Tolerance measures			
Beck's community tolerance index	10	36	Poor (20.2-40.7)
WMB-I Assessment Score	**---**	**46**	**Poor (24-48)**

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. *In situ* measurements showed Ohatchee Creek to be meeting temperature, turbidity, dissolved oxygen, and pH criteria for its *S/F&W* use classification. The fecal coliform count was >200 colonies/100mL in one of four samples collected. Results of most metals analyses were below detection limits. Where detected, metal were at concentrations similar to 90 percent of ecoregional reference reach samples.

CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community in Ohatchee Creek at OHTC-6 to be in *poor* condition, below aquatic life use criteria for its *S/F&W* use classification. However, other data collected at the site did not identify potential causes of the degraded biological condition. One fecal coliform sample was > 200 col/100mL.

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. Metals results were compared to ADEM's chronic aquatic life use criteria adjusted for hardness.

Parameter	N	Min	Max	Median	Avg	SD
Physical						
Temperature (°C)	5	14.0	26.0	22.0	20.4	5.2
Turbidity (NTU)	5	4.2	15.1	10.1^M	9.8	4.0
Total dissolved solids (mg/L)	4	64.0	114.0	92.0	90.5	21.5
Total suspended solids (mg/L)	4	5.0	13.0	10.0	9.5	3.4
Specific conductance (μmhos)	5	122.4	183.7	134.8	143.0	24.0
Hardness (mg/L)	2	62.3	114.0	88.2	88.2	36.6
Alkalinity (mg/L)	4	60.6	97.3	63.2	71.1	17.6
Stream Flow (cfs)	5	8.7	31.8	27.1	23.5	---
Chemical						
Dissolved oxygen (mg/L)	5	7.2	9.7	8.5	8.4	1.2
pH (su)	5	7.1	7.89	7.6	7.6	0.3
Ammonia Nitrogen (mg/L)	4	< 0.015	0.016	0.011	0.012	0.005
Nitrate+Nitrite Nitrogen (mg/L)	4	0.099	0.195	0.158	0.153	0.041
Total Kjeldahl Nitrogen (mg/L)	4	< 0.150	0.255	0.164	0.164	0.103
Total nitrogen (mg/L)	4	0.223	0.421	0.312	0.317	0.088
Dissolved reactive phosphorus (mg/L)	4	< 0.004	0.012	0.009	0.008	0.004
Total phosphorus (mg/L)	4	0.005	0.063	0.045	0.039	0.025
CBOD-5 (mg/L)	4	< 1.0	4.0	1.2	1.7	1.7
J Chlorides (mg/L)	4	4.0	4.4	4.2	4.2	0.2
Atrazine (μg/L)	1				< 0.05	- -
Total Metals						
Aluminum (mg/L)	2	< 0.015	0.173	0.0903	0.090	0.1
Iron (mg/L)	2	0.369	0.763	0.566	0.566	0.3
Manganese (mg/L)	2	0.055	0.058	0.0565	0.057	0.002
Dissolved Metals						
Aluminum (mg/L)	2	< 0.015	< 0.015	0.0075	0.008	0.0
Antimony (μg/L)	2	< 2	< 2	1	1	0
Arsenic (μg/L)	2	< 10	< 10	5	5	0
Cadmium (mg/L)	2	< 0.005	< 0.005	0.0025	0.0025	0.0
Chromium (mg/L)	2	< 0.004	< 0.004	0.002	0.002	0.0
Copper (mg/L)	2	< 0.005	< 0.005	0.0025	0.003	0.0
Iron (mg/L)	2	0.112	0.146	0.129	0.129	0.024
Lead (μg/L)	2	< 2	< 2	1	1	0
Manganese (mg/L)	2	< 0.005	0.03	0.0163	0.016	0.019
J Mercury (μg/L)	2	< 0.3	< 0.3	0.225	0.225	0.1
Nickel (mg/L)	2	< 0.006	< 0.006	0.003	0.003	0.0
Selenium (μg/L)	2	< 10	< 10	5	5	0
Silver (mg/L)	2	< 0.003	< 0.003	0.0015	0.0015	0.0
Thallium (μg/L)	2	< 1	< 1	0.5	0.500	0
Zinc (mg/L)	2	< 0.006	< 0.006	0.003	0.003	0.0
Biological						
J Chlorophyll *a* (μg/L)	4	0.10	1.07	0.80	0.69	0.5
J Fecal Coliform (col/100 mL)	4	67	240	130	142	72

J=estimate; N=# samples; M=value > 90th percentile of samples collected within eco-region 67.