Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2005 Monitoring Summary

Fair™

Oakachoy Creek at Highway 259 Crossing (Coosa County) (32.83415 /-86.04025)

BACKGROUND

Alabama Department of Environmental Management (ADEM) selected the Oakachoy 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 Assessment were to assess the biological integrity of each monitoring site and to estimate overall water quality within the ACT basin group.

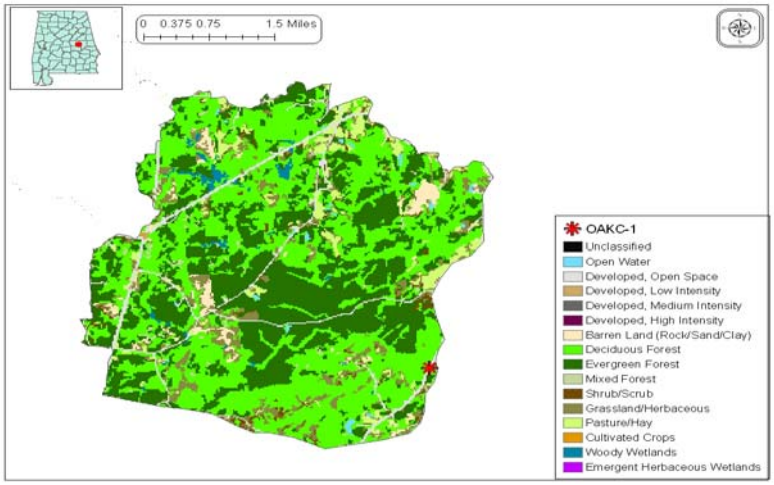

Figure 1. Sampling location and land use within the Oakachoy watershed at OAKC-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Oakachoy Creek at OAKC-1 is designated as a *Fish and Wildlife* (F&W) stream located in the Tallapoosa River Basin. Land use is primarily forest (80%) (Fig. 1). It is part of the *Southern Inner Piedmont* subecoregion, which is a rolling to hilly well-dissected upland that contains mostly forest with some grassland and pasture.

REACH CHARACTERISTICS

General observations (Table 2) and habitat assessments (Table 3) were completed during the macroinvertebrate bioassessment. In comparison with reference reaches in the same ecoregion, this information gives an indication of the physical condition of the reach and the quality and availability of habitat. Oakachoy Creek at OAKC-1 is a high-gradient, riffle-run stream with a large, open canopy. Sand comprised 35% of the bottom substrate. Habitat assessment results categorized habitat quality and availability as *sub-optimal* for biological communities. Sedimentation and sinuosity were rated as *marginal* due to the lack of riffles and bends, which could increase the impact from sedimentation and scouring and ultimately minimize available habitat for aquatic 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 at OAKC-1 to be in *fair* condition.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi^2)		17
Ecoregion[a]		45a
% Landuse		
Open water		<1
Wetland	Woody	1
	Emergent herbaceous	
Forest	Deciduous	45
	Evergreen	34
	Mixed	1
Shrub/scrub		1
Grassland/herbaceous		7
Pasture/hay		4
Cultivated crops		<1
Development	Open space	4
	Low intensity	<1
	Moderate intensity	
	High intensity	
Barren		2
Population/km^2 [b]		5
# NPDES Permits[c]	**TOTAL**	1
Mining		1

a. Southern Inner Piedmont
b. 2000 U.S. Census data
c. #NPDES permits downloaded from ADEM's NPDES Management System database, 9 Jun 2008.

Table 2. Physical characteristics of Oakachoy Creek at OAKC-1, June 23, 2005 .

Physical characteristics		
Width (ft)		30
Canopy cover		Mostly Open
Depth (ft)		
	Riffle	0.8
	Run	1
	Pool	2.5
% of Reach		
	Riffle	15
	Run	55
	Pool	30
% Substrate		
	Boulder	15
	Cobble	25
	Gravel	15
	Sand	35
	Silt	2
	Clay	1
	Organic Matter	7

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Table 3. Results of habitat assessment conducted of Oakachoy Creek at

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	74	Optimal (> 70)
Sediment deposition	49	Marginal (41-58)
Sinuosity	55	Marginal (45-64)
Bank and vegetative stability	64	Sub-optimal (60-74)
Riparian buffer	90	Sub-optimal (70-90)
Habitat assessment score	166	
% Maximum score	**69**	**Sub-optimal (59-70)**

Table 4. Results of the macro invertebrate bioassessment conducted in Oakachoy Creek June 23, 2005

Macroinvertebrate Assessment Results			
	Results	**Scores**	**Rating**
Taxa richness measures		**(0-100)**	
# Ephemeroptera (mayfly) genera	15	100	Excellent (>86)
# Plecoptera (stonefly) genera	4	67	Good (50-75)
# Trichoptera (caddisfly) genera	8	67	Good (67-83)
Taxonomic composition measures			
% Non-insect taxa	9	65	Fair (49.4-74.1)
% Non-insect organisms	4	91	Fair (62.7-93.9)
% Plecoptera	3	15	Fair (13.1-19.7)
Tolerance measures			
Beck's community tolerance index	23	82	Excellent (>80.4)
WMB-I Assessment Score	**---**	**69**	**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, and semi-volatile organics) during March through October of 2005. Specific conductivity and nitrate+nitrite nitrogen were higher than expected based on the 90th percentile of data collected at ADEM's least-impaired reaches in ecoregion 45a.

CONCLUSION

The macroinvertebrate assessment received a *fair* rating. Results of other data suggest habitat degradation, sedimentation, and nutrient enrichment as potential causes of the degraded biological condition.

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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)	8	11.0	25.0	19.0	19.1	5.2
Turbidity (NTU)	8	7.9	41.1	15.1	16.9	10.8
Total dissolved solids (mg/L)	7	47.0	69.0	51.0	56.9	8.9
Total suspended solids (mg/L)	7	4.0	32.0	9.0	11.4	9.3
Specific conductance (µmhos)	8	46.1	68.1	51.7[M]	53.8	7.8
Hardness (mg/L)	5	10.0	18.0	13.0	13.7	2.9
Alkalinity (mg/L)	7	11.6	24.0	20.2	19.0	4.4
Stream Flow (cfs)	8	5.9	73	24.5	26.6	---
Chemical						
Dissolved oxygen (mg/L)	8	8.1	10	8.8	9.0	0.800
pH (su)	8	6.8	7.9	7.2	7.2	0.300
Ammonia Nitrogen (mg/L)	7	< 0.015	< 0.015	0.008	0.008	0.000
Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.003	0.233	0.119[M]	0.124	0.083
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	0.342	0.075	0.133	0.106
Total nitrogen (mg/L)	7	0.076	0.461	0.201	0.257	0.150
[j] Dissolved reactive phosphorus (mg/L)	7	< 0.004	0.022	0.010	0.012	0.007
Total phosphorus (mg/L)	7	0.025	0.074	0.049	0.048	0.017
CBOD-5 (mg/L)	7	< 1.0	1.8	1.2	1.2	0.400
COD (mg/L)	1	< 2.0	< 2.0	1.0	1.0	0
[j] Chlorides (mg/L)	6	4.2	2.0	4.5	4.8	1.0
Atrazine (µg/L)	2	< 0.05	0.05	0.03	0.03	0.00
Total Metals						
Aluminum (mg/L)	4	< 0.015	0.431	0.207	0.213	0.200
Iron (mg/L)	4	0.821	1.54	0.897	1.039	0.300
Manganese (mg/L)	4	< 0.005	0.084	0.035	0.039	0
Dissolved Metals						
Aluminum (mg/L)	4	< 0.015	< 0.015	0.0075	0.008	0
Antimony (µg/L)	4	< 2	< 2	1	1	0
Arsenic (µg/L)	3	< 10	< 10	5	5	0
Cadmium (mg/L)	4	< 0.005	< 0.005	0.0025	0.0025	0
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	0
Copper (mg/L)	4	< 0.005	< 0.005	0.0025	0.003	0
Iron (mg/L)	4	0.239	0.582	0.316	0.3633	0.2
Lead (µg/L)	4	< 2	< 2	1	1	2.0
Manganese (mg/L)	4	< 0.005	< 0.023	0.0025	0.008	0
[j] Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.1875	0.100
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0
Selenium (µg/L)	4	< 10	< 10	5	5	0
Silver (mg/L)	4	< 0.003	< 0.003	0.0015	0.0015	0
Thallium (µg/L)	4	< 1	< 1	0.5	0.500	0
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	0
Biological						
[J] Chlorophyll a (µg/L)	7	0.53	4.81	1.07	1.72	1.50
[J] Fecal Coliform (col/100 mL)	7	28	290	120	132	87

J=estimate; N= # of samples; M=value >90% of collected samples in ecoregion 45a.