

2010 Monitoring Summary



Ambient Monitoring Site

Uphapee Creek at AL Hwy 81 in Macon County (32.47751/-86.69554)

BACKGROUND

Uphapee Creek at UPHM-3 is one of a network of 94 ambient sites monitored annually to identify long-term trends in water quality and to provide data for the development of TMDLS and water quality criteria. The data collected at this site will be used for nutrient criteria development in the Tallapoosa River basin in 2010. The site also has a USGS stream flow gauging station (02419000).

A habitat and macroinvertebrate assessment was conducted on June 22, 2010 to assess the biological integrity at this site.



Figure 1. Uphapee Creek at UPHM-3, June 13, 2011.

WATERSHED CHARACTERISTICS

The Uphapee Creek watershed lies within the Fall Line Hills (65i) ecoregion and has a drainage area of 333 square miles. Based on the 2006 National Land Cover Dataset, it is largely comprised of forest (56%). Fifteen percent of the watershed is pasture lands, with some cultivated crops and development (9%). As of February 23, 2011, the ADEM has issued 626 NPDES permits in this watershed, the majority of which are construction stormwater permits (Table 1).

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. Uphapee Creek at UPHM-3 (Figure 1) is a *Fish & Wildlife (F&W)* stream. It is a wide, high-gradient stream characterized by sand and gravel substrates. Overall habitat quality was categorized as *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 the average of the score for each metric. The relatively low taxa richness of stoneflies, a pollution-intolerant group, and high percent dominance of pollution-tolerant organisms indicated the macroinvertebrate community at UPHM-3 to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tallapoosa River
Drainage Area (mi²)		333
Ecoregion^a		65i
% Landuse		
Open water		1
Wetland	Woody	7
	Emergent herbaceous	<1
Forest	Deciduous	24
	Evergreen	18
	Mixed	14
Shrub/scrub		11
Grassland/herbaceous		1
Pasture/hay		10
Cultivated crops		5
Development	Open space	6
	Low intensity	2
	Moderate intensity	1
	High intensity	<1
Barren		1
Population/km^{2b}		57
# NPDES Permits^c	TOTAL	626
	401 Water Quality Certification	11
	Construction Stormwater	574
	Mining	9
	Industrial General	13
	Municipal Individual	13
	Underground Injection Control	6

a. Fall Line Hills

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, February 23, 2011

Table 2. Physical characteristics of Uphapee Creek at UPHM-3, June 22, 2010.

Physical Characteristics	
Width (ft)	45
Canopy Cover	Mostly Open
Depth (ft)	
	Riffle 0.7
	Run 1.5
	Pool 4.0
% of Reach	
	Riffle 5
	Run 50
	Pool 45
% Substrate	
	Cobble 1
	Gravel 30
	Sand 56
	Silt 7
	Organic Matter 6

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Table 3. Results of the habitat assessment conducted on Uphapee Creek at UPHM-3, June 22, 2010.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	74	Optimal >65
Sediment Deposition	68	Optimal >65
Sinuosity	73	Sub-optimal (65-84)
Bank and Vegetative Stability	78	Optimal >74
Riparian Buffer	83	Sub-optimal (70-89)
Habitat Assessment Score	172	
% Maximum Score	71	Optimal >65

Table 4. Results of macroinvertebrate bioassessment conducted in Uphapee Creek at UPHM-3, June 22, 2010.

Macroinvertebrate Assessment				
	Results Scores		Rating	
Taxa richness measures				
# EPT genera	18	72	Good (57-78)	
Taxonomic composition measures				
% Non-insect taxa	8	85	Fair (61.9-92.7)	
% Plecoptera	1	4	Fair (3.8-5.6)	
% Dominant taxa	26	60	Fair (47.1-70.5)	
Functional composition measures				
% Predators	9	33	Fair (30.2-45.2)	
Tolerance measures				
Beck's community tolerance index	11	50	Good (31.9-65.9)	
% Nutrient tolerant organisms	68	3	Very Poor (<25.4)	
WMB-I Assessment Score	--	44	Fair (38-56)	

WATER CHEMISTRY RESULTS

Median values of in situ measurements and water chemistry of samples collected April through November of 2010 to help identify any stressors to the biological communities are presented in Table 5. Median total dissolved solids, alkalinity, pH, and nutrient (ammonia, nitrate+nitrite, total nitrogen, and chlorides) concentrations were above values expected for Fall Line Hills streams. The median conductivity value was greater than median values of all verified reference data collected in this ecoregion.

SUMMARY

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality was categorized as *optimal*. Water chemistry results indicated that concentrations of total dissolved solids, alkalinity, pH, nutrients (ammonia, nitrate+nitrite, total nitrogen, and chlorides) and conductivity were elevated as compared to data from ADEM's least-impaired reference reaches in ecoregion 65i. Monitoring should continue to ensure that water quality and biological conditions remain stable.

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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
Physical						
Temperature (°C)	9	14.2	27.8	25.6 ^M	23.0	5.4
Turbidity (NTU)	9	0.6	15.7	6.9	6.7	5.0
^J Total Dissolved Solids (mg/L)	8	48.0	146.0	94.0 ^M	94.5	32.4
Total Suspended Solids (mg/L)	8	<1.0	29.0	3.5	6.9	9.4
Specific Conductance (µmhos)	9	76.3	241.5	159.5 ^G	154.5	54.4
Hardness (mg/L)	1				44.7	
Alkalinity (mg/L)	8	26.9	78.4	60.0 ^M	56.2	17.4
Stream Flow (cfs)	9	16.8	286.0	43.0	95.6	108.3
Chemical						
Dissolved Oxygen (mg/L)	9	6.7	10.1	8.2	8.2	1.1
pH (su)	9	6.7	7.7	7.3 ^M	7.3	0.3
Ammonia Nitrogen (mg/L)	8	<0.021	<0.021	0.010	0.010	0.000
Nitrate+Nitrite Nitrogen (mg/L)	8	0.311	1.210	0.718 ^M	0.740	0.296
Total Kjeldahl Nitrogen (mg/L)	8	<0.080	0.472	0.260	0.254	0.165
Total Nitrogen (mg/L)	8	<0.624	1.682	1.014 ^M	0.994	0.355
^J Dissolved Reactive Phosphorus (mg/L)	8	<0.003	0.011	0.008	0.007	0.003
^J Total Phosphorus (mg/L)	8	0.008	0.060	0.015	0.020	0.017
CBOD-5 (mg/L)	8	<2.0	<2.0	1.0	1.0	0.0
Chlorides (mg/L)	8	3.8	14.8	8.3 ^M	8.4	3.8
Total Metals						
Aluminum (mg/L)	1				<0.033	
Iron (mg/L)	1				0.602	
Manganese (mg/L)	1				0.069	
Dissolved Metals						
Aluminum (mg/L)	1				<0.033	
Antimony (µg/L)	1				<1.9	
Arsenic (µg/L)	1				<2.1	
Cadmium (mg/L)	1				<0.014	
Chromium (mg/L)	1				<0.013	
Copper (mg/L)	1				<0.013	
Iron (mg/L)	1				0.233	
Lead (µg/L)	1				<1.7	
Manganese (mg/L)	1				<0.001	
Mercury (µg/L)	1				<0.1	
Nickel (mg/L)	1				<0.019	
Selenium (µg/L)	1				<1.7	
Silver (mg/L)	1				<0.002	
Thallium (µg/L)	1				<0.6	
Zinc (mg/L)	1				<0.030	
Biological						
Chlorophyll a (ug/L)	8	0.10	2.67	0.53	0.94	0.90
^J E. coli (col/100mL)	2	27	166	97	97	98

^JEstimate; N=# samples; G=value greater than median concentration of all verified reference data collected in ecoregion 65i; M=value > 90% of ADEM's verified reference reaches collected in ecoregion 65i.