

2010 Monitoring Summary



Tallaseehatchee Creek at Cedar Springs Drive (Calhoun County) (33.81704/-85.80756)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Tallaseehatchee Creek watershed for biological and water quality monitoring as part of the 2010 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. Tallaseehatchee Creek at TSHC-1, June 15, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Tallaseehatchee Creek is a *Fish & Wildlife (F&W)* stream in Calhoun County. Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (63%) with some urban development (15%) and pasture/hay (13%). As of September 1, 2012, ADEM's NPDES Management System database showed a total of 47 permitted discharges within the watershed.

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. Tallaseehatchee Creek at TSHC-1 is a riffle-run stream characterized by gravel and sand substrates (Figure 1). 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 in comparison to least-impaired reference reaches in the same ecoregion. The final score is the average of all individual metric scores. Metric results indicated the macroinvertebrate community to be in *poor* (Table 4) condition.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Coosa River
Basin		Coosa River
Drainage Area (mi²)		43
Ecoregion^a		67g
% Landuse		
Open water		<1
Wetland	Woody	<1
	Emergent herbaceous	<1
Forest	Deciduous	36
	Evergreen	15
	Mixed	12
Shrub/scrub		3
Grassland/herbaceous		1
Pasture/hay		13
Cultivated crops		4
Development	Open space	7
	Low intensity	7
	Moderate intensity	1
	High intensity	<1
Barren		<1
Population/km^{2b}		55
# NPDES Permits^c	TOTAL	47
	401 Water Quality Certification	2
	Construction Stormwater	40
	Industrial General	2
	Municipal Individual	2
	Underground Injection Control	1

a.Southern Shale Valleys

b.2000 US Census

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

Table 2. Physical characteristics of Tallaseehatchee Creek at TSHC-1, June 15, 2010.

Physical Characteristics	
Width (ft)	38
Canopy cover	Mostly Shaded
Depth (ft)	
	Riffle 1
	Run 1.5
	Pool 2
% of Reach	
	Riffle 15
	Run 75
	Pool 10
% Substrate	
	Bedrock 2
	Boulder 2
	Cobble 10
	Gravel 30
	Sand 31
	Silt 5
	Organic Matter 20

Table 3. Results of the habitat assessment conducted in Tallaseehatchee Creek at TSHC-1, June 15, 2010.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	79	Optimal (> 70)
Sediment Deposition	81	Optimal (> 70)
Sinuosity	90	Optimal (> 84)
Bank and Vegetative Stability	78	Optimal (> 74)
Riparian Buffer	83	Sub-optimal (70-89)
Habitat Assessment Score	194	
% Maximum score	81	Optimal (> 70)

Table 4. Results of the macroinvertebrate bioassessment conducted in Tallaseehatchee Creek at TSHC-1, June 15, 2010.

Macroinvertebrate Assessment		
	Results	Scores
Taxa richness and diversity measures		(0-100)
# EPT taxa	11	30
Shannon Diversity	3.23	25
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	1	1
% Non-insect taxa	13	49
Tolerance measures		
% Tolerant taxa	36	36
WMB-I Assessment Score	---	28
WMB-I Assessment Rating		Poor (23-46)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected semi-monthly or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during May through December of 2010 to help identify any stressors to the biological communities. The September visit indicated copper concentrations as having exceeded criteria applicable to TSHC-1's F&W use classification. Median values of specific conductance, hardness, alkalinity, nitrate+nitrite-nitrogen, total nitrogen and dissolved reactive phosphorus were above concentrations expected in ecoregion 67g. All other parameters were within the expected limits.

SUMMARY

Results of ADEM's 010 habitat assessment conducted at Tallaseehatchee Creek at TSHC-1 indicated the reach to be *optimal* for supporting biological communities. However, the macroinvertebrate bioassessment indicated the macroinvertebrate community to be in *poor* condition, due, in part, to the percent tolerant taxa present. Concentrations of copper, specific conductance, hardness, alkalinity, nitrate+nitrite-nitrogen, total nitrogen and dissolved reactive phosphorus were elevated for streams in the Southern Shale Valleys ecoregion.

Table 5. Summary of water quality data collected May-December, 2010. 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	Med	Avg	SD	E
Physical							
Temperature (°C)	7	10.8	22.9	20.7	18.4	4.5	
Turbidity (NTU)	7	5.8	37.7	9.9	13.4	10.9	
J Total Dissolved Solids (mg/L)	4	108.0	154.0	144.0	137.5	20.3	
J Total Suspended Solids (mg/L)	4	5.0	7.0	7.0	6.5	1.0	
Specific Conductance (µmhos)	7	226.3	274.6	268.9 ^G	261.8	17.4	
Hardness (mg/L)	4	108.0	128.0	123.0 ^G	120.5	9.3	
Alkalinity (mg/L)	4	106.0	140.0	128.0 ^M	125.5	14.8	
Stream Flow (cfs)	5	20.7	52.0	35.4	36.4	12.0	
Chemical							
Dissolved Oxygen (mg/L)	7	7.8	9.3	8.2	8.4	0.6	
pH (su)	7	7.6	7.9	7.8	7.8	0.1	
Ammonia Nitrogen (mg/L)	4	< 0.021	< 0.021	0.010	0.010	0.000	
Nitrate+Nitrite Nitrogen (mg/L)	4	0.830	1.290	1.216 ^M	1.138	0.209	
Total Kjeldahl Nitrogen (mg/L)	4	< 0.080	0.318	0.228	0.204	0.117	
Total Nitrogen (mg/L)	4	< 1.069	1.511	1.394 ^M	1.342	0.197	
Dissolved Reactive Phosphorus (mg/L)	4	0.072	0.164	0.126 ^M	0.122	0.038	
Total Phosphorus (mg/L)	4	0.076	0.162	0.136 ^M	0.128	0.036	
CBOD-5 (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	4	3.0	4.1	3.8	3.6	0.5	
Atrazine (µg/L)	2	< 0.02	< 0.02	0.01	0.01	0.00	
Total Metals							
J Aluminum (mg/L)	4	0.091	0.219	0.146	0.151	0.055	
J Iron (mg/L)	4	0.151	0.224	0.216	0.202	0.034	
J Manganese (mg/L)	4	< 0.001	0.057	0.044	0.036	0.026	
Dissolved Metals							
J Aluminum (mg/L)	4	< 0.033	0.045	0.016	0.024	0.014	
Antimony (µg/L)	4	< 1.9	< 1.9	0.9	0.9	0.0	
Arsenic (µg/L)	4	< 0.4	< 2.1	1.0	0.8	0.4	
Cadmium (mg/L)	4	< 0.000	< 0.014	0.001	0.002	0.003	
J Chromium (mg/L)	4	< 0.009	0.023	0.006	0.010	0.009	
J Copper (mg/L)	4	< 0.013	0.022 ^S	0.008	0.011	0.007	1
J Iron (mg/L)	4	< 0.026	0.051	0.021	0.026	0.018	
Lead (µg/L)	4	< 1.7	< 1.7	0.8	0.8	0.0	
J Manganese (mg/L)	4	< 0.001	0.035	0.023	0.020	0.014	
J Mercury (µg/L)	4	< 0.1	< 0.1	0.0	0.0	0.0	
Nickel (mg/L)	4	< 0.019	< 0.042	0.010	0.012	0.006	
Selenium (µg/L)	4	< 1.7	< 1.7	0.8	0.8	0.0	
Silver (mg/L)	4	< 0.000	< 0.002	0.000	0.000	0.001	
Thallium (µg/L)	4	< 0.6	< 0.6	0.3	0.3	0.0	
Zinc (mg/L)	4	< 0.012	< 0.030	0.015	0.013	0.004	
Biological							
Chlorophyll a (ug/L)	4	< 0.10	1.33	0.80	0.74	0.57	
E. coli (col/100mL)	4	166	1986	227	652	891	

J=estimate; N=# samples; E=# of samples that exceed criterion; S=F&W hardness-adjusted aquatic life use criterion exceeded; G=value higher than median concentration of all verified ecoregional reference reach data; M=value > 90% of all data collected within ecoregion 67g.

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