

2005 Monitoring Summary



Tallaseehatchee Creek at Talladega Co Rd 105 at bridge east of Childersburg(33.25606/-86.25825)

BACKGROUND

Tallaseehatchee Creek at TH-1 is one of a network of 94 sites monitored annually to identify long-term trends in water quality and to provide data for the development of TMDLS and water quality criteria. Habitat and macroinvertebrate assessments were conducted at this site to assess the biological integrity of the site.

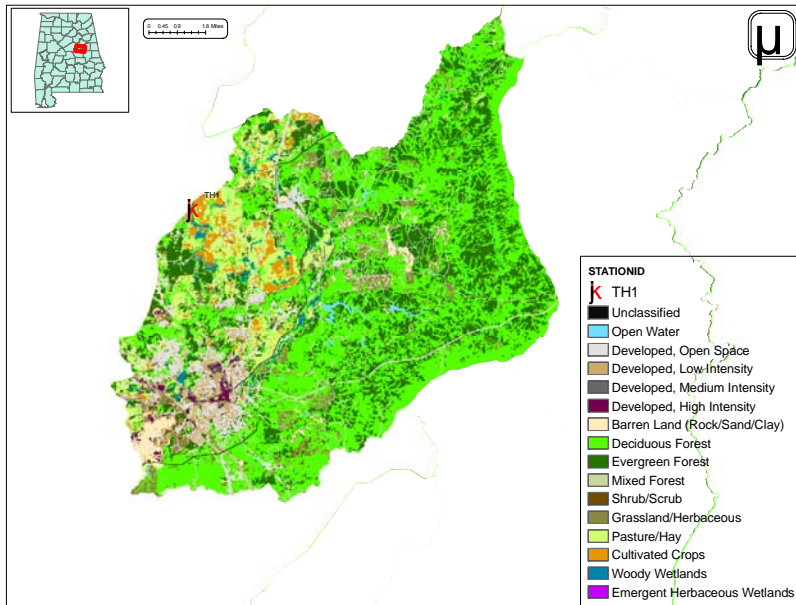


Figure 1. Sampling location and landuse within th Tallaseehatchee Creek watershed at TH-1.

WATERSHED CHARACTERISTICS

The Tallaseehatchee Creek watershed at TH-1 lies within the Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f) ecoregion. About 70% of the watershed is comprised of forest and wooded wetlands. Fourteen percent of the watershed is pasture lands and cultivated crops. Most of the city of Sylacauga lies in the southeast corner of the watershed. A total of ninety five permitted discharges have been located on the watershed.

REACH CHARACTRISTICS

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. Tallaseehatchee Creek at TH-1 is a low-gradient, riffle-run stream reach in the Coosa River basin. Sedimentation, as evidenced by the high percentage of gravel and sand substrates, was an issue in the reach. Overall habitat quality was categorized as *sub-optimal*.

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. The relatively low taxa richness of mayflies, and absence of stoneflies, the two pollution-intolerant groups, indicated the macroinvertebrate community to be in *poor* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics	
Drainage Area (mi ²)	123
Ecoregion ^a	67f
% Landuse	
Open water	<1
Wetland	Woody 1
Forest	Deciduous 45
	Evergreen 22
	Mixed 2
Shrub/scrub	1
Grassland/herbaceous	5
Pasture/hay	7
Cultivated crops	2
Development	Open space 8
	Low intensity 3
	Moderate intensity 1
	High intensity <1
Barren	2
Population/km ^{2b}	57
# NPDES Permits ^c	TOTAL 95
401 Water Quality Certification	3
Construction Stormwater	43
Mining	4
Mining General Permit (old)	25
Industrial General	1
Industrial Individual	6
Municipal Individual	12
Underground Injection Control	1

a.Southern Limestone/Dolomite Valleys and Low Rolling Hills

b.2000 US Census data

c.#NPDES permits downloaded from ADEM's NPDES Management System database, 9 Jun 2008

Table 2. Physical characteristics of Tallaseehatchee Creek at TH-1, June 29, 2005.

Physical characteristics	
Width (ft)	50
Canopy cover	Est. 50/50
Depth (ft)	Riffle 0.8
	Run 1.5
	Pool 2.5
% of Reach	Riffle 10
	Run 70
	Pool 20
% Substrate	Boulder 1
	Cobble 25
	Gravel 25
	Sand 40
	Silt 4
	Organic Matter 5

Table 3. Results of the habitat assessment conducted on Tallaseeatchee Creek at TH-1, June 29, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	65	Sub-optimal (59-70)
Sediment deposition	59	Marginal (41-58)
Sinuosity	65	Sub-optimal (65-84)
Bank and vegetative stability	60	Sub-optimal (60-74)
Riparian buffer	78	Sub-optimal (70-90)
Habitat assessment score	161	
% Maximum score	67	Sub-optimal (59-70)

Table 4. Results of the macroinvertebrate bioassessment conducted in Tallaseehatchee Creek at TH-1, June 29, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores	Rating
Taxa richness measures		(0-100)	
# Ephemeroptera (mayfly) genera	5	42	Poor (23-46)
# Plecoptera (stonefly) genera	0	0	Very Poor (<16)
# Trichoptera (caddisfly) genera	9	75	Good (67-83)
Taxonomic composition measures			
% Non-insect taxa	13	48	Poor (24.7-49.4)
% Non-insect organisms	16	58	Poor (31.3-62.7)
% Plecoptera	0	0	Very Poor (<6.56)
Tolerance measures			
Beck's community tolerance index	9	32	Poor (20.2-40.7)
WMB-I Assessment Score	---	36	Poor (24-48)

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected in June, August and October or June only (metals) to help identify any stressors to the biological communities. *In situ* parameters and fecal coliform counts indicated that Tallaseehatchee Creek at TH-1 was meeting water quality criteria for its *Fish & Wildlife* use classification. However, median values of specific conductivity and chlorides were higher than expected for this specific ecoregion (67f). Median nutrient concentrations (total nitrogen, nitrate-nitrite-nitrogen, total phosphorus and dissolved reactive phosphorus) were also higher than expected.

CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community in Tallaseehatchee Creek at TH-1 to be in *poor* condition, below aquatic life use criteria for its *Fish & Wildlife* water use classification. Results of other data collected at the site suggest sedimentation and nutrient enrichments to be potential causes of the deteriorated biological condition. Potential sources of these impacts include non-point source (NPS) runoff from crop, pasture, and urban areas or point source discharges.

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)	3	13.8	28.0	28.0	23.3	8.2
Turbidity (NTU)	3	2.9	12.7	5.7	7.1	5.1
Total dissolved solids (mg/L)	3	101.0	218.0	157.0	158.7	58.5
Total suspended solids (mg/L)	3	6.0	9.0	8.0	7.7	1.5
Specific conductance (µmhos)	3	197.5	545.7	309.3 ^M	350.8	177.8
Hardness (mg/L)	3	55.7	152.0	105.0	104.2	48.2
Alkalinity (mg/L)	3	58.7	136.9	91.2	95.6	39.3
Stream Flow (cfs)	3	22.3	134.8	69.9	75.7	---
Chemical						
Dissolved oxygen (mg/L)	3	7.0	9.57	7.1	7.9	1.5
pH (su)	3	7.4	7.57	7.6	7.5	0.1
Ammonia Nitrogen (mg/L)	3	< 0.015	< 0.015	0.008	0.008	0.000
Nitrate+Nitrite Nitrogen (mg/L)	3	0.738	1.830	1.125 ^M	1.231	0.554
Total Kjeldahl Nitrogen (mg/L)	3	0.223	0.572	0.437	0.411	0.176
Total nitrogen (mg/L)	3	1.175	2.402	1.348 ^M	1.642	0.664
^J Dissolved reactive phosphorus (mg/L)	3	0.169	0.781	0.201 ^M	0.384	0.344
^J Total phosphorus (mg/L)	3	0.152	1.037	0.329 ^M	0.506	0.468
CBOD-5 (mg/L)	3	1.5	4.4	2.4 ^M	2.8	1.5
Chlorides (mg/L)	3	13.0	78.1	32.8 ^M	41.3	33.4
Total Metals						
Aluminum (mg/L)	1				0.190	
Iron (mg/L)	1				0.607	
Manganese (mg/L)	1				0.056	
Dissolved Metals						
Aluminum (mg/L)	1				0.008	
Antimony (µg/L)	1				1	
Arsenic (µg/L)	1				5	
Cadmium (mg/L)	1				0.0025	
Chromium (mg/L)	1				0.002	
Copper (mg/L)	1				0.003	
Iron (mg/L)	1				0.126	
Lead (µg/L)	1				1	
Manganese (mg/L)	1				0.022	
Mercury (µg/L)	1				0.3	
Nickel (mg/L)	1				0.003	
Selenium (µg/L)	1				5	
Silver (mg/L)	1				0.0015	
Thallium (µg/L)	1				0.500	
Zinc (mg/L)	1				0.003	
Biological						
^J Chlorophyll a (µg/L)	3	0.53	1.07	0.80	0.80	0.3
^J Fecal Coliform (col/100 mL)	3	80	180	100	120	53

J=Estimate; N= # samples; M= value>90% of all verified ecoregional reference reach data collected in the sub-ecoregional/ecoregion 67f.

FOR MORE INFORMATION, CONTACT:
 Sreeletha Prem Kumar ADEM Aquatic Assessment Unit
 1350 Coliseum Boulevard Montgomery, AL 36110
 (334) 260-2782 skumar@adem.state.al.us