

2019 Monitoring Summary



Ecological Reference Reach

Unnamed tributary to Tallapoosa River at Punkin Hill Road (32.93171/-85.66638)

BACKGROUND

The unnamed tributary to Tallapoosa River is among the least-disturbed watersheds within the Southern Outer Piedmont ecoregion, based on landuse, road density, and population density. Since 2019, it has been monitored by the Alabama Department of Environmental Management (ADEM) as a “high quality” reference watershed for comparison with other streams within the ecoregion. Habitat and macroinvertebrate community surveys were conducted to assess the health of the biological communities. Data from reference watersheds are used to characterize natural or background conditions expected in different ecoregions throughout the state. The unnamed tributary to Tallapoosa River was sampled in 2019 to provide high-quality reference reach data for Southern Outer Piedmont streams.



Figure 1. Unnamed tributary to Tallapoosa River at UCOT-2, April 23, 2019.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. The unnamed tributary to Tallapoosa River is a *Fish & Wildlife (F&W)* stream located at Punkin Hill Road near Sessions, AL in the Tallapoosa River basin. According to the 2021 National Land Cover Dataset, the watershed is mostly forested (68%) with shrub/scrub (15%). There are no permitted outfalls. Only 5% of the watershed has been developed.

REACH CHARACTERISTICS

General observations (Figure 1, Table 2) and a habitat survey (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. Like other streams in ecoregion 45b, The unnamed tributary to Tallapoosa River at UCOT-2 is a low to moderate gradient stream characterized predominantly by a gravel and sand substrate. Overall habitat quality and availability has been rated as *Sub-optimal* for supporting the macroinvertebrate communities due to a large riparian buffer and stable banks. However, there is a decrease in riffle frequency from slight sediment deposition.

BIOASSESSMENT RESULTS

The benthic macroinvertebrate community was sampled using ADEM’s Intensive Multi-habitat Bioassessment methodology (WMB-I). Measures of taxonomic richness, community composition and pollution tolerance were used to assess the overall health of the macroinvertebrate community in comparison to conditions expected in central Alabama streams and rivers. Each site is placed in one of six levels ranging from 1, or *natural*, to 6, or *highly altered*.

The macroinvertebrate community on the unnamed tributary to Tallapoosa River at UCOT-2 was rated as *good-excellent*, with 58 total taxa, 9 rare, highly sensitive taxa (Attribute 2), 25 ubiquitous, sensitive taxa (Attribute 3), and 12 Attribute 2 and 3 EPT. The community was comprised of 37% attribute 2 and 3 taxa (Table 4).

Table 1. Summary of general watershed characteristics: UCOT-2.

Watershed Characteristics	
Basin	Tallapoosa
Drainage Area (mi ²)	2.6
Ecoregion ^a	45b
Assessment Unit	AL03150109-0309-900
Use Class	F&W
AU Category	3
12-digit Hydrologic Unit Code (HUC)	31501090309
Landuse Categories (2021 National Land Cover Dataset)	
Wetland, Total (%)	0.5
Wetlands, Woody (%)	0.5
Forested, Total (%)	68.3
Forested, Deciduous (%)	31.2
Forested, Evergreen (%)	30.0
Forested, Mixed (%)	7.1
Shrub/Scrub (%)	14.9
Grassland/Herbaceous (%)	5.8
Pasture/Hay (%)	5.1
Developed, Total (%)	5.4
Developed, Open Space (%)	5.0
Developed, Low Intensity (%)	0.4
Population/km (2020 US Census Data)	25.19

^a Southern Outer Piedmont

Table 2. Physical characteristics of Tallapoosa River at UCOT-2, April 23, 2019.

Physical Characteristics	
Width (ft)	15
Canopy Cover	Shaded
Depth (ft)	
Riffle	0.3
Run	1.0
Pool	1.5
% of Reach	
Riffle	3
Run	80
Pool	17
% Substrate	
Boulder	2
Cobble	5
Gravel	28
Sand	60
Silt	1
Organic Matter	4

Table 3. Results of the habitat assessment survey conducted on Tallapoosa River at UCOT-2, April 23, 2019.

Habitat Survey	% Max Score	Rating
Instream Habitat Quality	65	Sub-optimal (55-74.999)
Sediment Deposition	58	Sub-optimal (55-74.999)
Riffle Frequency	25	Poor/Marginal (25-29.999)
Bank Vegetative Stability	64	Sub-optimal (55-74.999)
Riparian Zone Measurements	90	Optimal (80-100)
Habitat Assessment Score	129	
% Maximum Score	64	Sub-optimal (55-74.999)

Table 4. Results of the macroinvertebrate survey conducted on Tallapoosa River at UCOT-2, April 23, 2019.

Macroinvertebrate Assessment	Results	Scores
Taxonomic richness and diversity metrics		
Taxa Count	58	58
# rare and highly sensitive taxa	9	9
# sensitive taxa	25	25
# sensitive EPT taxa	12	12
Percent taxon metrics		
% rare and highly sensitive taxa	16	16
% sensitive taxa	43	43
% sensitive EPT taxa	21	21
% highly tolerant taxa	7	7
Percent individual metrics		
% rare and highly sensitive individuals	33	33
% sensitive individuals	61	61
% sensitive EPT individuals	11	11
% tolerant individuals	4	4
WMB-I Survey Score		2.8
WMB-I Survey Rating		Good-excellent (2.5-2.849)

WATER CHEMISTRY

Results of water chemistry analyses are summarized in Table 5. In situ measurements and water samples were collected during March through October 2019 to help characterize the reach. Readings for median hardness, minimum dissolved oxygen, and maximum ammonia nitrogen were outside the expected reference values for ecoregion 45b. E.coli was documented as exceeding the *F&W* single sample human health cri-

SUMMARY

The ADEM monitors the unnamed tributary to Tallapoosa River as a “high-quality” reference reach for comparison with other streams in the Southern Outer Piedmont ecoregion. The unnamed tributary to Tallapoosa River at UCOT-2 is typical of streams in the region, characterized by low to moderate gradient streams with a gravel and sand substrate.

Water quality conditions are very high. E.coli was documented as exceeding the *F&W* single sample criterion during the October sampling. The overall habitat quality and availability has been rated as *Sub-optimal* for supporting the macroinvertebrate community, which is rated as *Good-Excellent* due to high diversity and taxa richness within the reach.

Table 5. Summary of water quality data collected during March through October, 2019. 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.

UCOT-2 AL03150109-0309-900	N	Min	Max	Med	Avg	SD	E	10thP	90thP
Physical									
Temperature (°C)	9	10.6	22.1	19.8	18.4	4.2		10.6	22.1
Turbidity (NTU)	9	2.8	8.0	4.8	5.0	1.4		2.8	8.0
Total Dissolved Solids (mg/L)	8	30.0	48.0	41.0	39.0	6.6		30.0	48.0
Total Suspended Solids (mg/L)	8	1.0	6.0	2.5	2.8	1.7		1.0	6.0
Specific Conductance (µmhos/cm)	9	44.1	54.0	49.0	49.4	3.5		44.1	54.0
Hardness (mg/L)	4	16.4	19.5	17.6 ^G	17.8	1.3		16.4	19.5
Alkalinity (mg/L)	8	18.1	24.9	22.6	22.0	2.6		18.1	24.9
Measured Stream Flow (cfs)	9	0.4	4.1	2.2	2.2	1.3		0.4	4.1
Chemical									
Dissolved Oxygen (mg/L)	9	6.8 ^D	11.3	8.4	8.7	1.6		6.8	11.3
pH (SU)	9	7.0	7.7	7.1	7.2	0.3		7.0	7.7
Ammonia Nitrogen (mg/L)	8	<0.004	0.061 ^D	0.008	0.013	0.020		0.002	0.061
Nitrate+Nitrite Nitrogen (mg/L)	8	0.005	0.109	0.066	0.059	0.036		0.005	0.109
Total Kjeldahl Nitrogen (mg/L)	8	<0.075	0.472	0.100	0.136	0.138		0.038	0.472
Total Nitrogen (mg/L)	8	<0.042	0.508	0.166	0.195	0.136		0.042	0.508
Dis Reactive Phosphorus (mg/L)	8	0.007	0.010	0.008	0.008	0.001		0.007	0.010
Total Phosphorus (mg/L)	8	0.010	0.021	0.016	0.015	0.004		0.010	0.021
TOC (mg/L)	8	1.0	1.7	1.1	1.2	0.2		1.0	1.7
CBOD-5 (mg/L)	8	<2.0	<2.0	1.0	1.0	0.0		1.0	1.0
COD (mg/L)	8	<3.7	12.3	4.4	5.4	3.1		1.8	12.3
Chlorides (mg/L)	8	1.8	2.0	2.0	2.0	0.1		1.8	2.0
Sulfate (mg/L)	8	0.53	1.00	0.59	0.64	0.16		0.53	1.00
Total Metals									
Aluminum (T) (mg/L)	4	0.053	0.137	0.068	0.082	0.038		0.053	0.137
Iron (T) (mg/L)	4	0.237	0.422	0.298	0.314	0.090		0.237	0.422
Manganese (T) (mg/L)	4	<0.004	0.015	0.002	0.005	0.006		0.002	0.015
Dissolved Metals									
Aluminum (mg/L)	3	<0.023	<0.023	0.012	0.012	0.000		0.012	0.012
Antimony (µg/L)	4	<1.480	<1.480	0.740	0.740	0.000		0.740	0.740
Arsenic (µg/L)	4	<0.689	<0.689	0.344	0.344	0.000		0.344	0.344
Cadmium (µg/L)	4	<0.726	<0.726	0.363	0.363	0.000		0.363	0.363
Chromium (µg/L)	4	<0.793	1.050	0.644	0.684	0.338		0.396	1.050
Copper (µg/L)	4	<1.190	1.190	0.595	0.595	0.000		0.595	0.595
Iron (mg/L)	3	0.083	0.199	0.150	0.144	0.058		0.083	0.199
Lead (µg/L)	4	<0.697	<0.697	0.348	0.348	0.000		0.348	0.348
Manganese (mg/L)	3	<0.004	<0.004	0.002	0.002	0.000		0.002	0.002
Nickel (µg/L)	4	<1.960	<1.960	0.980	0.980	0.000		0.980	0.980
Selenium (µg/L)	4	<1.900	<1.900	0.950	0.950	0.000		0.950	0.950
Silver (µg/L)	4	<1.350	<1.350	0.675	0.675	0.000		0.675	0.675
Thallium (µg/L)	4	<0.641	<0.641	0.320	0.320	0.000		0.320	0.320
Zinc (µg/L)	4	<2.340	<2.340	1.170	1.170	0.000		1.170	1.170
Biological									
Chlorophyll a (mg/m³)	8	<1.00	1.07	0.50	0.64	0.26		0.50	1.07
E. coli (MPN/DL)	8	46.4	2419.6 ^H	129.6	398.3	817.6	1	46.4	2419.6

H= *F&W* human health criterion violated; D= an individual value >90% of all verified ecoregional reference reach data collected in the ecoregion 45b; E=# of samples that exceed criterion.; G=value higher than median concentration of all verified ecoregional reference reach data collected in the

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