

2019 Monitoring Summary



Ecological Reference Reach

Hatchet Creek approximately 4 miles upstream of Coosa County Road 18 (32.94392/-86.23579)

BACKGROUND

Hatchet Creek is among the least-disturbed watersheds within the Southern Inner Piedmont ecoregion, based on landuse, road density, and population density. Since 2016, 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. Data from reference watersheds are used to characterize natural or background conditions expected in different ecoregions throughout the state. Hatchet Creek was sampled in 2019 to provide high-quality reference reach data for Southern Inner Piedmont streams.

Hatchet Creek is within one of 50 Strategic Habitat Units (SHU) by the U.S. Fish and Wildlife Service (USFWS) and the Alabama Rivers & Streams Network (ARSN). SHUs are recognized as high quality habitats occupied by federally listed and state imperiled species.



Figure 1. Hatchet Creek at HATC-4, June 8, 2019.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hatchet Creek is an *Outstanding Alabama Waterway/Swimming/Fish & Wildlife (OAW/S/F&W)* stream located near Rockford, Alabama. According to the 2016 National Land Cover Dataset, the watershed is over 73% forested with 77 permitted outfalls. It is sparsely populated with few roads. It is located within a Strategic Habitat Unit that supports eight federally listed threatened or endangered aquatic species and five other aquatic species listed to be of the *Highest or High Conservation Concern* by the state of Alabama.

REACH CHARACTERISTICS

General observations (Figure 1, Table 2) and a habitat survey (Table 3) were completed during the fish community 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 45a, Hatchet Creek at HATC-4 is a medium-high gradient stream characterized predominantly by a bedrock, cobble and gravel substrate. Overall habitat quality was categorized as *sub-optimal/optimal* for supporting the biological communities in this stream type.

BIOASSESSMENT RESULTS

The fish community in Hatchet Creek at HATC-4 was sampled using Alabama’s Fish Community Index of Biotic Integrity (AL-IBI), developed through a multi-agency (GSA, ADCNR, ADEM) project to establish a comprehensive fish community bioassessment tool for wadeable streams and rivers across the state. The data collected during this survey were to score the overall health of the fish community, based on conditions expected for wadeable streams and rivers in the Ridge & Valley/Piedmont Ichthyoregion. The AL-IBI uses twelve measures of species richness and diversity, tolerance/intolerance, and abundance, condition, and reproduction to assess the overall health of the fish community. The final IBI score is the sum of all individual metrics on a 60 point scale. The IBI score for Hatchet Creek at HATC-4 was 48, indicating the fish community to be in *Good* condition (Table 4).

Table 1. Summary of general watershed characteristics: HATC-4

Watershed Characteristics	
Basin	Coosa
Drainage Area (mi²)	237.0
Ecoregion*	45A
Assessment Unit	AL03150107-0709-100
Use Class	OAW/S/F&W
AU Category	1
12-digit Hydrologic Unit Code (HUC)	031501070708
Conservation Status	
Strategic Habitat Unit	29 Hatchet Creek
Landuse Categories (2011 National Land Cover Dataset)	
Open Water (%)	0.2
Wetland, Total (%)	2.2
Wetlands, Woody (%)	2.1
Wetlands, Emergent Herbaceous (%)	0.1
Forested, Total (%)	73.3
Forested, Deciduous (%)	46.9
Forested, Evergreen (%)	25.6
Forested, Mixed (%)	0.8
Shrub/Scrub (%)	7.8
Grassland/Herbaceous (%)	8.0
Pasture/Hay (%)	4.1
Crops, Cultivated (%)	0.0
Developed, Total (%)	4.2
Developed, Open Space (%)	3.9
Developed, Low Intensity (%)	0.3
Barren Land (Rock, Sand, Clay) (%)	0.2
Population/km (2010 US Census)	9
NPDES outfalls (NPDES database, Jan 1, 2016)	
Total # of Permitted Outfalls	77
# of Construction Stormwater Permits	66
# of Industrial General	6
# of Municipal Permits	2
# of UIC	3
Roads	
Road Density	1.3
# Road Crossings per Stream km	0.4
Watershed Disturbance Score*	69
Watershed Disturbance Category*	3

* Southern Inner Piedmont

† 12-digit HUC located in a Strategic Habitat Unit.

± 12-digit HUC identified as Clean Water Partnership priority watershed.

* Measure of watershed disturbance based on landuse, population, and road density summarized in this table.

Table 2. Physical characteristics of Hatchet Creek at HATC-4, May 28, 2019.

Physical Characteristics	
Width (ft)	120
Canopy Cover	Open
Depth (ft)	
Riffle	1.0
Run	2.0
Pool	3.0
% of Reach	
Riffle	35
Run	35
Pool	30
% Substrate	
Bedrock	45
Boulder	5
Cobble	20
Gravel	10
Sand	15
Organic Matter	5

Table 3. Results of the habitat assessment survey conducted on Hatchet Creek at HATC-4, May 28, 2019.

Habitat Survey	% Max Score	Rating
Instream Habitat Quality	77	Sub-optimal/Optimal (75-79.999)
Sediment Deposition	59	Sub-optimal (55-74.999)
Riffle Frequency	60	Sub-optimal (55-74.999)
Bank Vegetative Stability	88	Optimal (80-100)
Riparian Zone Measurements	90	Optimal (80-100)
Habitat Assessment Score	153	
% Maximum Score	76	Sub-optimal/Optimal (70-84.999)

Table 4. Results of the Fish survey conducted on Hatchet Creek at HATC-4, May 28, 2019.

Fish Assessment	Results	Scores
Taxonomic richness and diversity metrics		
Total Native Species	23	3
Number of shiner species	7	3
Number Lepomis species	1	1
Number of darter+madtom species	6	3
Tolerance metrics		
Number of intolerant species	3	5
Percent of tolerant species	0.3	5
Percent Lepomis	3	5
Trophic metrics		
Percent omnivores	0.3	5
Percent insectivorous Cyprinids	57	3
Percent top carnivores	3	5
Abundance, condition, and reproductive metrics		
Percent DELT+hybrids	0	5
Percent simple miscellaneous	43	5
IBI Survey Score		48
IBI Survey Rating		Good

WATER CHEMISTRY

Results of water chemistry analyses are summarized in Table 5. In situ measurements and water samples were collected monthly from April, June, August and October 2019 to help characterize the reach. In situ parameters were well within ranges to protect *Outstanding Alabama Waterway/Swimming/Fish & Wildlife (OAW/S/F&W)* uses. Individual water temperature and dissolved oxygen values were slightly higher and lower than expected based off of data collected at reference reaches within the Southern Inner Piedmont ecoregion (45a). The median value of specific conductance was >90% of all verified ecoregional reference reach data collected in the ecoregion 45a.

Table 5. Summary of water quality data collected April, June, August and 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.

HATC-4 AL03150107-0709-100	N	Min	Max	Med	Avg	SD	10thP	90thP
Physical								
Temperature (°C)	5	13.8	27.8 ^D	23.8	21.3	6.3	13.8	27.8
Turbidity (NTU)	5	3.6	7.9	5.3	5.6	1.7	3.6	7.9
Total Dissolved Solids (mg/L)	4	25.0	41.0	35.5	34.2	7.0	25.0	41.0
Total Suspended Solids (mg/L)	4	1.0	3.0	1.0	1.5	1.0	1.0	3.0
Specific Conductance (µmhos/cm)	5	32.4	47.2	40.1 ^M	39.9	5.3	32.4	47.2
Alkalinity (mg/L)	4	9.9	18.0	13.8	13.9	3.4	9.9	18.0
Measured Stream Flow (cfs)	4	72.3	215.1	119.8	131.8	62.1	72.3	215.1
Chemical								
Dissolved Oxygen (mg/L)	5	7.1 ^D	10.2	7.6	8.2	1.3	7.1	10.2
pH (SU)	5	6.8	7.2	7.1	7.0	0.1	6.8	7.2
Ammonia Nitrogen (mg/L)	4	<0.004	0.016	0.008	0.006	0.003	0.002	0.008
^J Nitrate+Nitrite Nitrogen (mg/L)	4	0.003	0.013	0.005	0.006	0.004	0.003	0.013
Total Kjeldahl Nitrogen (mg/L)	4	<0.200	0.493	0.100	0.198	0.196	0.100	0.493
^J Total Nitrogen (mg/L)	4	<0.103	0.498	0.109	0.205	0.196	0.103	0.498
Dis Reactive Phosphorus (mg/L)	4	<0.005	<0.005	0.002	0.002	0.000	0.002	0.002
^J Total Phosphorus (mg/L)	4	0.009	0.013	0.011	0.011	0.002	0.009	0.013
^J CBOD-5 (mg/L)	4	<2.0	<2.0	1.0	1.0	0.0	1.0	1.0
Chlorides (mg/L)	4	1.6	1.8	1.7	1.7	0.1	1.6	1.8
Sulfate (mg/L)	4	1.28	1.95	1.68	1.65	0.28	1.28	1.95
Biological								
Chlorophyll a (mg/m³)	4	<1.00	3.20	1.07	1.46	1.19	0.50	3.20
E. coli (MPN/DL)	4	25.6	69.7	52.2	49.9	18.3	25.6	69.7

D=an individual value >90% of all verified ecoregional reference reach data collected in the ecoregion 45A; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 45A; N=# samples.

SUMMARY

The ADEM monitors Hatchet Creek at HATC-4 as a “high-quality” reference reach for comparison with other Southern Inner Piedmont streams. HATC-4 is typical of streams in the region, characterized by moderate to high gradient riffles with bedrock, cobble and gravel substrates. Recognized as a Strategic Habitat Unit, the watershed is of exceptional quality and is 73% forested. Water quality conditions are very high, and the fish community was found to be in *good* condition.

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