

2008 Monitoring Summary



Hatchechubbee Creek at Antioch Road (Russell County) (34.96110/-88.13780)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Hatchechubbee Creek watershed for biological and water quality monitoring as part of the [2008 Assessment of the Southeastern Alabama \(SE-AL\) River Basins](#). The objectives of these monitoring activities were to assess the biological integrity of each sampling location and to estimate overall water quality within the SE-AL basins.

Additionally, Hatchechubbee Creek is among the least-disturbed watersheds in the SE-AL basin group based on landuse, road density, and population density. Therefore, these data will be used to evaluate the use of Hatchechubbee Creek as a “best attainable” condition reference watershed for comparison with other Southeastern Plains streams.

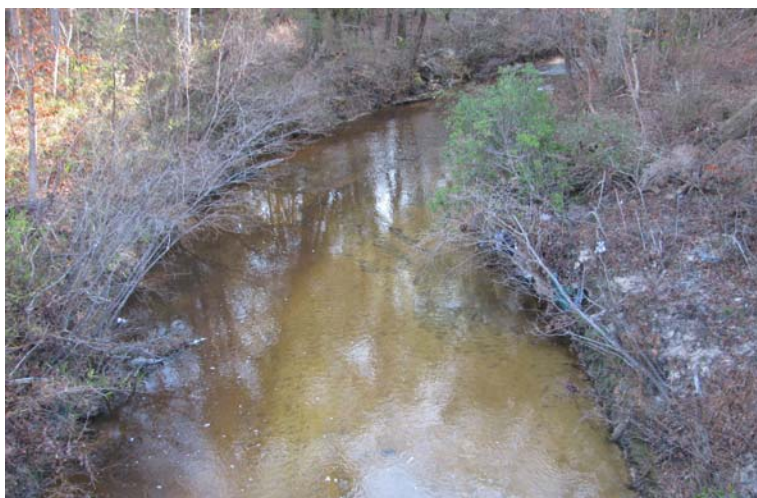


Figure 1. Hatchechubbee Creek at HECR-3, facing downstream.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Hatchechubbee Creek is a small [Fish and Wildlife \(F&W\)](#) stream located in Russell County. At HECR-3, the stream drains approximately thirty-one square miles of countryside and has very little development. Based on the 2000 National Land Cover Dataset, landuse within the watershed is primarily forest (65%) with some shrub/scrub areas. The ADEM has issued four NPDES permits in the Hatchechubbee Creek watershed as of February 23, 2011.

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. Hatchechubbee Creek at HECR-3 is a low-gradient, glide-pool stream with a primarily bedrock bottom (Figure 1). Overall habitat quality was categorized as *marginal*.

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 all individual metric scores. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Chattahoochee River	
Drainage Area (mi ²)	31	
Ecoregion ^a	65b	
% Landuse		
Open water	<1	
Wetland	Woody	4
	Emergent herbaceous	<1
	Deciduous	24
Forest	Evergreen	29
	Mixed	12
Shrub/scrub	16	
Grassland/herbaceous	<1	
Pasture/hay	6	
Cultivated crops	5	
Development	Open space	2
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Population/km ^{2b}	5	
# NPDES Permits ^c	TOTAL	4
	Construction Stormwater	2
	Industrial Individual	2

a.Flatwoods/Blackland Prairie Margins

b.2000 US Census

c.#NPDES permits downloaded from ADEM’s NPDES Management System database, 23 Feb 2011

Table 2. Physical characteristics of Hatchechubbee Ck at HECR-3, June 5, 2008.

Physical Characteristics		
Width (ft)	14	
Canopy Cover	Shaded	
Depth (ft)	Run	0.5
	Pool	1.0
% of Reach	Run	80
	Pool	20
% Substrate	Bedrock	70
	Cobble	1
	Gravel	1
	Sand	20
	Silt	5
	Organic Matter	3

Table 3. Results of the habitat assessment conducted on Hatchechubbee Creek at HECR-3, June 5, 2008.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	34	Poor <40
Sediment Deposition	54	Sub-optimal (53-65)
Sinuosity	38	Poor <45
Bank and Vegetative Stability	61	Sub-optimal (60-74)
Riparian Buffer	83	Sub-optimal (70-89)
Habitat Assessment Score	114	
% Maximum Score	52	Marginal (40-52)

Table 4. Results of macroinvertebrate bioassessment conducted in Hatchechubbee Creek at HECR-3, June 5, 2008.

Macroinvertebrate Assessment			
	Results	Scores (0-100)	Rating
Taxa richness measures			
# EPT genera	16	64	Good (57-78)
Taxonomic composition measures			
% Non-insect taxa	12	65	Fair (61.9-92.7)
% Plecoptera	1	3	Poor (1.86-3.7)
% Dominant taxa	36	34	Poor (23.5-47.0)
Functional composition measures			
% Predators	14	49	Good (45.3-72.1)
Tolerance measures			
Beck's community tolerance index	9	41	Good (31.9-65.9)
% Nutrient tolerant organisms	8	100	Excellent (>88.1)
WMB-I Assessment Score	--	51	Fair (38-56)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. [In situ measurements](#) and [water samples](#) were collected monthly, semi-monthly (metals), or quarterly (pesticides, atrazine, and semi-volatile organics) during March through October of 2008 to help identify any stressors to the biological communities. Median dissolved metals (iron and manganese) and total iron were higher than expected, based on the 90th percentile of data collected at reference reaches within the Flatwoods/Blackland Prairie Margins ecoregion (65b).

SUMMARY

Landuse, road density, and population density categorized Hatchechubbee Creek among the least-impaired watersheds in the SE-AL basin group. Hatchechubbee Creek at HECR-3 was typical of other streams in the Flatwoods/Blackland Prairie Margins, which are generally low-gradient, glide-pool streams with sand and clay substrates. However, habitat and bioassessment results indicated the reach to be in *fair* condition. Additionally, intensive water chemistry results indicated higher than expected median concentrations of total iron and dissolved iron and manganese.

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Table 5. Summary of water quality data collected March-October, 2008. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median (Med), 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	Q
Physical							
Temperature (°C)	4	15.8	26.8	24.8	23.0	5.0	
Turbidity (NTU)	4	5.5	12.7	10.6	9.8	3.2	
Total Dissolved Solids (mg/L)	3	< 1.0	58.0	40.0	32.8	29.4	
Total Suspended Solids (mg/L)	3	< 1.0	7.0	2.0	3.2	3.4	
Specific Conductance (µmhos)	4	35.8	62.6	51.2	50.2	12.3	
Hardness (mg/L)	3	11.9	18.1	12.1	14.0	3.5	
Alkalinity (mg/L)	3	8.1	17.9	12.7	12.9	4.9	
Stream Flow (cfs)	1				0.2		
Chemical							
Dissolved Oxygen (mg/L)	4	6.3	9.0	7.0	7.3	1.2	
pH (su)	4	6.7	7.3	6.8	6.9	0.3	
Ammonia Nitrogen (mg/L)	3	< 0.015	0.035	0.021	0.021	0.014	
Nitrate+Nitrite Nitrogen (mg/L)	3	0.008	0.076	0.012	0.032	0.038	
Total Kjeldahl Nitrogen (mg/L)	3	0.232	0.714	0.345	0.430	0.252	
Total Nitrogen (mg/L)	3	0.240	0.790	0.357	0.462	0.290	
Dissolved Reactive Phosphorus (mg/L)	3	0.006	0.009	0.009	0.008	0.002	
Total Phosphorus (mg/L)	3	0.023	0.033	0.032	0.029	0.006	
CBOD-5 (mg/L)	3	< 1.0	< 2.0	0.5	0.7	0.3	
Chlorides (mg/L)	3	2.4	2.8	2.7	2.6	0.2	
Total Metals							
Aluminum (mg/L)	3	0.018	0.105	0.071	0.065	0.044	J
Iron (mg/L)	3	2.780	3.880	3.040 ^M	3.233	0.575	
Manganese (mg/L)	3	0.027	0.186	0.160	0.124	0.085	
Dissolved Metals							
Aluminum (mg/L)	3	< 0.015	< 0.019	0.008	0.008	0.001	
Antimony (µg/L)	3	< 2.0	< 2.0	1.0	0.1	0.0	
Arsenic (µg/L)	3	< 1.6	< 2.2	1.1	1.0	0.2	
Cadmium (mg/L)	3	< 0.003	< 0.005	0.002	0.002	0.001	
Chromium (mg/L)	3	< 0.004	< 0.013	0.002	0.004	0.003	
Copper (mg/L)	3	< 0.005	< 0.013	0.002	0.004	0.002	
Iron (mg/L)	3	0.866	1.780	1.300 ^M	1.315	0.457	
Lead (µg/L)	3	< 0.6	< 1.5	0.7	0.6	0.3	
Manganese (mg/L)	3	0.020	0.162	0.145 ^M	0.109	0.078	
Mercury (µg/L)	3	< 0.0	< 0.0	0.0	0.0	0.0	
Nickel (mg/L)	3	< 0.004	< 0.006	0.003	0.003	0.001	
Selenium (µg/L)	3	< 1.5	< 1.6	0.8	0.8	0.0	
Silver (mg/L)	3	< 0.003	0.004	0.002	0.002	0.001	J
Thallium (µg/L)	3	< 0.5	< 0.6	0.3	0.3	0.0	
Zinc (mg/L)	3	< 0.003	< 0.006	0.003	0.002	0.001	
Biological							
Chlorophyll a (µg/L)	3	< 0.10	2.14	0.41	0.87	1.12	
Fecal Coliform (col/100 mL)	3	25	110	36	57	46	

J=estimate; N=# samples; M=value > 90% of all verified ecoregional reference reach data collected in the ecoregion 65b.