

2014 Monitoring Summary



Uchee Creek at AL Hwy 169 (Russell County) (32.37785/-85.18094)

BACKGROUND

Uchee Creek was identified as a Strategic Habitat Unit (SHU) by the Alabama Rivers & Streams Network (ARSN). SHUs are recognized as high-quality habitats occupied by federally listed and state imperiled species. In cooperation with ARSN, the Alabama Department of Environmental Management (ADEM) conducted a habitat and fish community assessment as part of the 2014 Southeast Alabama (SEAL) River Basins Assessment. The objectives of this monitoring were to fully assess biological, chemical, and physical conditions within this reach, estimate overall water quality within the Southeast River Basin, and to provide data to support restoration efforts.



Figure 1. Uchee Creek at UCCR-2, March 12, 2014.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Uchee Creek at UCCR-2 is a Public *Water Supply/Swimming/Fish & Wildlife (PWS/S/F&W)* stream located in Russell County within the Flatwoods/Blackland Prairie Margins (65b) ecoregion. Based on the 2011 National Land Cover Dataset, landuse within the watershed is predominantly forest (50%) with some shrub/scrub and pasture/hay areas. As of April 1, 2016, three NPDES outfalls are active within this watershed.

REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (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. Uchee Creek at UCCR-2 is a low-gradient, glide-pool stream with substrate composed primarily of sand and organic matter (Figure 1). Overall habitat quality and availability was rated as *sub-optimal* for supporting diverse aquatic communities.

BIOASSESSMENT RESULTS

The fish community in Uchee Creek at UCCR-2 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 used to score the overall health of the fish community, based on conditions expected for wadeable streams and rivers in the *Southern Plains* 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. Each site is placed in one of six levels, ranging from 1, or *natural*, to 6, or *highly altered*. Uchee Creek at UCCR-2 was given a score of 4, and was rated as *fair* (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Chattahoochee R
Drainage Area (mi²)		134
Ecoregion^a		65B
% Landuse^b		
Open water		1%
Wetland	Woody	5%
	Emergent herbaceous	<1%
Forest	Deciduous	24%
	Evergreen	18%
	Mixed	8%
Shrub/scrub		18%
Grassland/herbaceous		2%
Pasture/hay		13%
Cultivated crops		6%
Development	Open space	4%
	Low intensity	1%
	Moderate intensity	<1%
	High intensity	<1%
Barren		<1%
Population/km^{2c}		17
# NPDES Permits^d	TOTAL	3
	Construction	2
	Industrial General	1

a.Flatwoods/Blackland Prairie Margins

b.2011 National Land Cover Dataset

c.2010 US Census

d.#NPDES outfalls downloaded from ADEM's NPDES Management System database, April 1, 2016.

Table 2. Physical characteristics of Uchee Creek at UCCR-2, July 29, 2014.

Physical Characteristics		
Width (ft)		40
Canopy Cover		Estimate 50/50
Depth (Ft)		
	Riffle	0.2
	Run	1.0
	Pool	3.0
% of Reach		
	Riffle	5
	Run	25
	Pool	70
% Substrate		
	Clay	2
	Mud/Muck	3
	Gravel	35
	Sand	25
	Silt	5
	Organic Matter	30

Table 3. Results of the fish community assessment of Uchee Creek at UCCR-2, July 29, 2014.

Habitat Assessment	% Max Score	Rating
Instream Habitat Quality	84	Optimal (>79)
Sediment Deposition	48	Marginal (31-<55)
Sinuosity	80	Optimal (>79)
Bank Vegetative Stability	63	Sub-Optimal (58-79)
Riparian Buffer	93	Optimal (>84)
Habitat Assessment Score	138	
% of Maximum Score	77	Sub-Optimal (57-80)

Table 4. Results of the fish community bioassessment conducted in Uchee Creek at UCCR-2, July 29, 2014.

Fish Community Assessment		
	Results	Score
Species Richness & Diversity		
Total native species	26	3
Number cyprinid species	7	1
Number sucker species	2	3
Number of Lepomis species	6	1
Number of darter+madtom species	3	1
Tolerance & Intolerance Measures		
Percent of dominant species	32.32	3
Percent of tolerant species	9.76	5
Percent Lepomis	13.47	3
Trophic Measures		
Percent insectivorous cyprinids	31.99	3
Percent top carnivores	0.34	1
Abundance, Condition & Reproductive Measures		
Percent DELT+hybrids	1.01	1
Percent simple lithophils	54.55	5
IBI Assessment Score		4
Condition		Fair

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly March through October of 2014 to help identify any stressors to the biological communities. Based on data collected at reference reaches within the Flatwoods/Blackland Prairie Margins (65b) ecoregion, median total aluminum values were higher than expected. Dissolved lead and dissolved oxygen were also outside F&W use-class criteria during one sampling event.

SUMMARY

The overall habitat quality for Uchee Creek at UCCR-2 was categorized as *sub-optimal* for this stream type. Bioassessment results indicated the fish community to be in *fair* condition. Median total aluminum concentrations were higher than expected based on data collected at reference reaches within the ecoregion, and dissolved lead and dissolved oxygen violated use-class criteria during one sampling event. Results from this report will be used to fully assess the use support status of Uchee Creek for the 2016 Integrated Water Quality Report.

Table 5. Summary of water quality data collected March-October, 2014. 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	Q
Physical								
Temperature (°C)	10	15.0	26.5	22.2	21.6	4.4		
Turbidity (NTU)	10	11.1	27.5	16.0	16.5	5.1		
Total Dissolved Solids (mg/L)	8	25.0	77.0	62.5	54.9	18.1		
Total Suspended Solids (mg/L)	8	4.0	35.0	10.0	14.1	10.5		
Specific Conductance (µmhos)	10	35.5	61.2	43.1	45.6	8.1		
Hardness (mg/L)	4	12.1	19.0	16.4	16.0	3.1		
Alkalinity (mg/L)	8	9.0	23.6	13.6	14.5	4.7		
Monthly Stream Flow (cfs)	8	0.1	133.7	14.2	47.3	57.9		
Stream Flow during Sample Collection (cfs)	7	2.2	133.7	20.1	54.1	59.0		
Chemical								
Dissolved Oxygen (mg/L)	10	4.5 ^C	9.4	7.8	7.5	1.4	1	
pH (su)	10	6.5	6.8	6.6	6.6	0.1		
^J Ammonia Nitrogen (mg/L)	8	< 0.006	0.184	0.003	0.028	0.063		
Nitrate+Nitrite Nitrogen (mg/L)	8	0.053	0.113	0.080	0.078	0.019		
Total Kjeldahl Nitrogen (mg/L)	8	0.307	0.921	0.484	0.570	0.238		
Total Nitrogen (mg/L)	8	0.364	1.001	0.558	0.648	0.248		
^J Dissolved Reactive Phosphorus (mg/L)	8	0.003	0.006	0.005	0.005	0.001		
Total Phosphorus (mg/L)	8	0.021	0.061	0.030	0.033	0.012		
CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0		
COD (mg/L)	8	4.6	25.0	17.8	16.4	6.6		
TOC (mg/L)	8	4.0	6.8	6.0	5.7	1.1		
Chlorides (mg/L)	8	3.0	4.1	3.4	3.5	0.5		
Atrazine (µg/L)	1				0.14			
Total Metals								
^J Aluminum (mg/L)	4	0.186	0.721	0.618 ^M	0.536	0.252		
Iron (mg/L)	4	1.300	2.320	1.655	1.732	0.498		
Manganese (mg/L)	4	0.058	0.112	0.092	0.088	0.023		
Dissolved Metals								
^J Aluminum (mg/L)	4	< 0.050	0.139	0.045	0.064	0.054		
Antimony (µg/L)	4	< 0.2	0.4	0.1	0.1	0.1		
^J Arsenic (µg/L)	4	0.3	0.7	0.6 ^H	0.5	0.2	4	
Cadmium (µg/L)	4	< 0.246	0.390	0.124	0.142	0.036		
^J Chromium (µg/L)	4	0.572	1.017	0.750	0.772	0.185		
^J Copper (mg/L)	4	0.000	0.001	0.000	0.000	0.000		
Iron (mg/L)	4	0.441	0.969	0.887	0.796	0.240		
^J Lead (µg/L)	4	< 0.2	< 0.5 ^S	0.3	0.2	0.1	1	
^J Manganese (mg/L)	4	0.020	0.104	0.054	0.058	0.041		
^J Nickel (mg/L)	4	< 0.0001	< 0.0005	0.0004	0.0004	0.0001		
Selenium (µg/L)	4	< 0.4	< 0.5	0.2	0.2	0.0		
Silver (µg/L)	4	< 0.252	< 0.460	0.126	0.152	0.052		
Thallium (µg/L)	4	< 0.2	< 0.6	0.1	0.2	0.1		
^J Zinc (mg/L)	4	0.002	0.010	0.004	0.005	0.003		
Biological								
Chlorophyll a (µg/L)	8	< 0.10	14.95	4.27	5.72	5.50		
E. coli (col/100mL)	8	43	411	113	152	123		

C = F&W criterion violated; E = # samples that exceeded criteria; H = F&W human health criterion exceeded; J = estimate; M = value >90% of collected samples in ecoregion 65b; N = # of samples; Q = # of uncertain exceedances; S = F&W hardness-adjusted aquatic life use criterion exceeded.

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