

2014 Monitoring Summary



Burnt Corn Creek at Escambia County Road 77 (31.16900/-87.09830)

BACKGROUND

Murder Creek was identified as a Strategic Habitat Unit (SHU) by the Alabama Rivers and Streams Network (ARSN). SHUs are recognized as high-quality habitats occupied by federally listed and state imperiled species. Burnt Corn Creek, from Murder Creek upstream to Sevenmile Creek, is on Alabama's 2010 Clean Water Act (CWA) §303(d) list of impaired waters for metals (mercury) impairment from atmospheric sources. In Alabama's 2014 Integrated Report, Burnt Corn Creek, from Sevenmile Creek upstream to its source, is an unassessed Category 3 water, due to insufficient data to fully assess its condition relative to its *Swimming/Fish&Wildlife (S/F&W)* use classification.

The Alabama Department of Environmental Management (ADEM) selected Burnt Corn Creek watershed for biological and water quality monitoring as part of the 2014 Use Support Assessments of Southeast Alabama (SEAL) River Basins. The objectives of the project were to provide data to fully assess conditions within the reach, estimate overall water quality within the SEAL basins, and support restoration efforts.



Figure 1. Burnt Corn Creek at BCRC-3, September 3, 2014.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Burnt Corn Creek is located in the Southern Pine Plains and Hills ecoregion (65f) approximately 4.7 miles north of Brewton. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (59%). As of April 1, 2016, 42 outfalls were active within the watershed.

REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the fish community bioassessment. 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. Burnt Corn Creek at BCRC-3 is a low-gradient, sand and gravel stream (Figure 1). Overall habitat quality and availability was rated as *sub-optimal* for supporting diverse fish communities.

BIOASSESSMENT RESULTS

The fish community in Burnt Corn Creek at BCRC-3 was sampled using Alabama's Fish Community Index of Biotic Integrity (AL-IBI). The AL-IBI uses twelve measures of species richness and diversity, tolerance, 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.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Conecuh River	
Drainage Area (mi ²)	162	
Ecoregion ^a	65F	
% Landuse ^b		
Open water		<1%
Wetland	Woody	5%
	Emergent herbaceous	<1%
Forest	Deciduous	12%
	Evergreen	35%
	Mixed	12%
Shrub/scrub	12%	
Grassland/herbaceous	7%	
Pasture/hay	9%	
Cultivated crops	4%	
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
	High intensity	<1%
Barren	1%	
Population/km ^{2c}	8	
# NPDES Permits ^d	TOTAL	42
	Construction	16
	Industrial General	8
	Industrial Individual	6
	Mining	8
	Municipal	1
	Small Mining	3

a.Southern Pine Plains & Hills

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 Burnt Corn Creek at BCRC-3, June 30, 2014.

Physical Characteristics		
Width (ft)	60	
Canopy Cover	Estimate 50/50	
Depth (ft)	Run	2.5
	Pool	4.0
% of Reach	Run	50
	Pool	50
% Substrate	Gravel	50
	Sand	35
	Silt	4
	Organic Matter	11

The AL-IBI data 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 IBI score for Burnt Corn Creek at BCRE-3 was 40, indicating the fish community to be in *fair* condition (Table 4).

Table 3. Results of the habitat assessment conducted on Burnt Corn Creek at BCRE-3, June 30, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	80	Optimal (>79)
Sediment Deposition	70	Sub-Optimal (55-79)
Sinuosity	65	Sub-Optimal (55-79)
Bank Vegetative Stability	74	Sub-Optimal (58-79)
Riparian Buffer	88	Optimal (>84)
Habitat Assessment Score	140	
% Maximum Score	82	Optimal (>80)

Table 4. Results of the fish community bioassessment conducted in Burnt Corn Creek at BCRE-3, June 30, 2014.

Fish Community Assessment		
	Results	Score
Species Richness & Diversity		
Total native species	22	3
Number shiner species	4	3
Number of sucker species	0	1
Number of centrarchid species	6	3
Number of darter+madtom species	8	5
Tolerance & Intolerance Measures		
Percent of tolerant species	3.73	5
Percent Green Sunfish & Yellow Bullhead	0	5
Trophic Measures		
Percent insectivorous cyprinids	59.34	3
Percent invertivores	24.9	1
Percent top carnivores	2.07	3
Abundance, Condition & Reproductive Measures		
Percent DELT+hybrids	0	5
Number of lithophilic spawners	12	3
IBI Assessment Score		40
Condition		Fair

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected March through October of 2014 to help identify any stressors to the biological communities. Organics were collected at Burnt Corn Creek on April 2nd. With the exception of Atrazine, all parameters were below detection limits. Atrazine levels were within values expected for this stream type. Median values for several physical parameters and dissolved iron were higher than background levels for ecoregion 65f.

SUMMARY

The in-stream habitat quality at Burnt Corn Creek was rated as *sub-optimal*; however, median concentrations of several physical parameters and dissolved iron may have had an effect on fish communities. Monitoring should continue to ensure that water quality and biological conditions remain stable.

Table 5. Summary of water quality data collected March-October, 2014. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). 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	Q
Physical							
Temperature (°C)	10	15.8	28.2	22.5	22.1	4.6	
Turbidity (NTU)	10	3.2	22.8	10.2	9.7	5.8	
Total Dissolved Solids (mg/L)	8	51.0	99.0	66.5 ^M	67.4	15.1	
Total Suspended Solids (mg/L)	8	< 1.0	23.0	8.0	8.9	7.9	
Specific Conductance (µmhos)	10	40.0	84.7	67.4 ^J	64.9	11.7	
Hardness (mg/L)	4	24.1	29.6	28.0 ^J	27.4	2.4	
Alkalinity (mg/L)	8	6.3	30.9	26.2 ^M	24.1	7.7	
Monthly Stream Flow (cfs)	2	17.1	96.2	56.7	56.7	55.9	
Chemical							
Dissolved Oxygen (mg/L)	10	7.2	9.4	8.2	8.4	0.8	
pH (su)	10	6.0	7.4	7.0	7.0	0.4	
Ammonia Nitrogen (mg/L)	8	< 0.006	0.010	0.003	0.004	0.001	
Nitrate+Nitrite Nitrogen (mg/L)	8	0.077	0.227	0.096	0.109	0.049	
Total Kjeldahl Nitrogen (mg/L)	8	0.150	0.720	0.314	0.358	0.176	
Total Nitrogen (mg/L)	8	0.254	0.947	0.403	0.467	0.219	
^J Dissolved Reactive Phosphorus (mg/L)	8	< 0.002	0.005	0.002	0.002	0.001	
Total Phosphorus (mg/L)	8	0.010	0.029	0.016	0.018	0.007	
^J CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	8	3.0	4.0	3.5	3.5	0.4	
Atrazine (µg/L)	1				0.17		
Total Metals							
^J Aluminum (mg/L)	4	0.092	0.557	0.184	0.254	0.211	
Iron (mg/L)	4	0.748	1.460	0.916	1.010	0.320	
^J Manganese (mg/L)	4	0.038	0.066	0.042	0.047	0.013	
Dissolved Metals							
^J Aluminum (mg/L)	4	< 0.050	0.114	0.058	0.064	0.037	
Antimony (µg/L)	4	< 0.2	< 0.2	0.1	0.1	0.0	
^J Arsenic (µg/L)	4	0.4 ^H	0.6 ^H	0.6	0.5	0.1	4
Cadmium (µg/L)	4	< 0.246	< 0.246	0.123	0.123	0.000	
^J Chromium (µg/L)	4	0.380	0.600	0.500	0.495	0.110	
^J Copper (mg/L)	4	0.0003	0.0005	0.0004	0.0004	0.000	
Iron (mg/L)	4	0.463	0.768	0.645 ^M	0.630	0.135	
^J Lead (µg/L)	4	< 0.2	< 0.2	0.1	0.1	0.0	
^J Manganese (mg/L)	4	0.025	0.037	0.033 ^M	0.032	0.005	
^J Nickel (mg/L)	4	0.0003	0.0006	0.0004	0.0004	0.000	
Selenium (µg/L)	4	< 0.4	< 0.4	0.2	0.2	0.0	
Silver (µg/L)	4	< 0.252	< 0.252	0.126	0.126	0.000	
Thallium (µg/L)	4	< 0.2	< 0.2	0.1	0.1	0.0	
^J Zinc (mg/L)	4	0.004	0.005	0.004	0.004	0.001	
Biological							
Chlorophyll a (ug/L)	8	< 0.10	2.14	0.40	0.70	0.79	
^J E. coli (col/100mL)	8	19	436	51	103	139	

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65f; H=F&W human health criteria exceeded; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 65f; N=# samples Q=# samples with uncertain exceedances.

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