

2014 Monitoring Summary



Burnt Corn Creek at Smith Madden Road in Conecuh County (31.27198/-87.16918)

BACKGROUND

Burnt Corn Creek is a tributary of Murder Creek, which 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. Middle Burnt Corn Creek was also identified as a priority watershed due to potential impacts from silvicultural activities, excessive sedimentation, and lack of riparian buffer.

The Alabama Department of Environmental Management (ADEM) selected the Middle Burnt Corn Creek watershed for biological and water quality monitoring as part of the 2014 Southeast Alabama (SEAL) River Basins Assessment. The objectives of this monitoring were to provide data to assess biological, physical, and chemical conditions at the site, estimate overall water quality within the SEAL Basin Group, and support restoration efforts.



Figure 1. Burnt Corn Creek at BCRC-5, July 16, 2014.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Burnt Corn Creek at BCRC-5 is a *Swimming/Fish & Wildlife (S/F&W)* stream located in southern Conecuh County near the Florida state line. According to the 2011 National Land Cover Dataset, land use within the watershed is primarily forest (58%). Population density in the area is low. As of April 1, 2016, nine outfalls were active in this watershed.

REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the fish IBI 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. Burnt Corn Creek at BCRC-5 is a glide-pool stream located in the Southern Pine Plains and Hills ecoregion (Figure 1). Bottom substrate consists primarily of organic matter and sand. Overall habitat quality was rated as *sub-optimal* for supporting a diverse aquatic community.

BIOASSESSMENT RESULTS

The fish community in Burnt Corn Creek at BCRC-5 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

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Conecuh R
Drainage Area (mi ²)		109
Ecoregion ^a		65F
% Landuse ^b		
Open water		<1%
Wetland	Woody	5%
	Emergent herbaceous	<1%
Forest	Deciduous	15%
	Evergreen	31%
	Mixed	12%
Shrub/scrub		12%
Grassland/herbaceous		6%
Pasture/hay		11%
Cultivated crops		3%
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
	High intensity	<1%
Barren		1%
Population/km ^{2c}		7
# NPDES Outfalls ^d	TOTAL	9
	Industrial General	1
	Mining	5
	Municipal	1
	Small Mining	2

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-5 on July 2, 2014.

Physical Characteristics		
Width (ft)		28
Canopy Cover		Mostly Open
Depth (ft)	Run	2.0
	Pool	3.5
% of Reach	Run	70
	Pool	30
% Substrate	Mud/Muck	5
	Gravel	1
	Sand	40
	Silt	4
	Organic Matter	50

BIOASSESSMENT RESULTS (cont)

in 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. The final IBI score is the sum of all individual metrics on a 60 point scale. The IBI score for Burnt Corn Creek at BCRC-5 was 38, indicating the fish community to be in *fair* condition (Table 4).

Table 3. Results of the habitat assessment conducted on Burnt Corn Creek at BCRC-5, July 2, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream habitat quality	70	Sub-optimal (55-79)
Sediment Deposition	53	Marginal (31-<55)
Sinuosity	55	Sub-optimal (55-79)
Bank and Vegetative Stability	80	Optimal (>79)
Riparian Buffer	86	Optimal (>84)
Habitat Assessment Score	130	
% Maximum Score	76	Sub-optimal (57-80)

Table 4. Results of the fish community bioassessment conducted in Burnt Corn Creek at BCRC-5, July 2, 2014.

Fish Community Assessment		
	Results	Score
Species Richness & Diversity		
Total native species	25	3
Number shiner species	4	3
Number of sucker species	0	1
Number of centrarchid species	7	3
Number of darter+madtom species	6	3
Tolerance & Intolerance Measures		
Percent of tolerant species	6.4	3
Percent Green Sunfish & Yellow Bullhead	1.16	3
Trophic Measures		
Percent insectivorous cyprinids	37.79	3
Percent invertivores	30.81	3
Percent top carnivores	4.65	5
Abundance, Condition & Reproductive Measures		
Percent DELT+hybrids	0	5
Number of lithophilic spawners	14	3
IBI Assessment Score		38
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 community. Organics were collected on April 2, 2014. The atrazine concentration was above the minimum detection limit (MDL) on that date. Specific conductance and concentrations of total dissolved solids, hardness, alkalinity, total manganese, dissolved iron, and dissolved manganese were higher than expected based on reference reach data collected in the Southern Pine Plains and Hills ecoregion (65f).

SUMMARY

Bioassessment results indicated the fish community in Burnt Corn Creek at BCRC-5 to be in *fair* condition. Overall habitat quality was categorized as *sub-optimal* for supporting the biological community. Results of water chemistry analyses showed that the atrazine concentration was above MDL in one sample collected in April. In addition, conductivity and concentrations of total dissolved solids, hardness, alkalinity, total manganese, dissolved iron, and dissolved manganese were higher than expected based on reference reach data collected in the Southern Pine Plains and Hills ecoregion (65f).

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	Q
Physical							
Temperature (°C)	9	16.1	27.0	20.4	21.5	4.4	
Turbidity (NTU)	9	3.8	13.1	8.7	8.4	3.6	
Total Dissolved Solids (mg/L)	8	<	1.0	99.0	71.0 ^M	64.8	30.2
^J Total Suspended Solids (mg/L)	8	<	1.0	23.0	10.0	10.1	8.1
Specific Conductance (µmhos/cm@25C)	9	57.1	95.9	83.8 ^G	79.2	12.0	
Hardness (mg/L)	4	28.9	41.7	33.4 ^G	34.3	6.2	
Alkalinity (mg/L)	8	21.2	43.9	33.8 ^M	33.4	7.0	
Monthly Stream Flow (cfs)	4	20.1	65.1	31.5	37.0	21.6	
Stream Flow during Sample Collection (cfs)	4	20.1	65.1	31.5	37.0	21.6	
Chemical							
Dissolved Oxygen (mg/L)	9	7.5	9.1	8.2	8.3	0.7	
pH (su)	9	6.9	7.5	7.2	7.2	0.2	
^J Ammonia Nitrogen (mg/L)	8	<	0.006	0.011	0.004	0.005	0.003
Nitrate+Nitrite Nitrogen (mg/L)	8	0.097	0.194	0.122	0.128	0.029	
^J Total Kjeldahl Nitrogen (mg/L)	8	0.081	0.485	0.320	0.312	0.124	
^J Total Nitrogen	8	0.201	0.582	0.478 ^M	0.441	0.123	
^J Dissolved Reactive Phosphorus (mg/L)	8	<	0.003	0.005	0.004	0.003	0.001
Total Phosphorus (mg/L)	8	0.010	0.031	0.014	0.018	0.008	
^J CBOD-5 (mg/L)	8	<	2.0	<	2.0	1.0	1.0
Chlorides (mg/L)	8	3.2	3.9	3.6 ^M	3.5	0.3	
Atrazine (µg/L)	1				0.10		
Total Metals							
^J Aluminum (mg/L)	4	0.109	0.439	0.220	0.247	0.147	
Iron (mg/L)	4	0.781	1.340	1.044	1.052	0.244	
Manganese (mg/L)	4	0.054	0.069	0.065 ^M	0.063	0.006	
Dissolved Metals							
^J Aluminum (mg/L)	4	<	0.050	0.194	0.025	0.067	0.084
Antimony (µg/L)	4	<	0.2	<	0.2	0.1	0.0
^J Arsenic (µg/L)	4	0.5	0.6 ^H	0.6	0.6	0.0	0.0
Cadmium (µg/L)	4	<	0.246	<	0.246	0.123	0.000
^J Chromium (mg/L)	4	0.0004	0.001	0.001	0.001	0.000	
^J Copper (mg/L)	4	<	0.0003	0.0004	0.0004	0.0004	0.000
Iron (mg/L)	4	0.468	0.730	0.684 ^M	0.642	0.118	
Lead (µg/L)	4	<	0.2	<	0.2	0.1	0.0
^J Manganese (mg/L)	4	0.032	0.056	0.038 ^M	0.041	0.010	
^J Nickel (mg/L)	4	0.0003	0.0004	0.0004	0.0004	0.000	
Selenium (µg/L)	4	<	0.4	<	0.4	0.2	0.0
Silver (µg/L)	4	<	0.252	<	0.252	0.126	0.000
Thallium (µg/L)	4	<	0.2	<	0.2	0.1	0.0
^J Zinc (mg/L)	4	0.004	0.006	0.004	0.004	0.001	
Biological							
Chlorophyll a (ug/L)	8	<	0.10	2.14	0.72	0.79	0.72
^J E. coli (MPN/DL)	8	43.5	167	53.8	75.7	43.5	

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

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