Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2014 Monitoring Summary

Fair

Five Runs Creek at Covington County Road 31 (31.15440/-86.48646)

BACKGROUND

Five Runs 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 on May 28, 2014 as part of the 2014 Southeast Alabama (SEAL) River Basins Assessment. The objectives of this monitoring were to provide data to fully assess the biological, physical, and chemical conditions within the reach, to estimate overall water quality within the Southeast River Basin, and to provide data to support restoration efforts.

Figure 1. Five Runs Creek at FRCC-2, August 18, 2014.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Five Runs Creek is a *Fish & Wildlife (F&W)* stream located in Covington County, south of Andalusia in the Dougherty Plain ecoregion (65G). Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (47%). As of April 1, 2016 ADEM there are 88 NPDES outfalls in 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. Five Runs Creek at FRCC-2 (Figure 1) is a low gradient stream characterized as having a mostly sandy substrate. Overall habitat quality was categorized as *sub-optimal* due to marginal bank vegetative stability and riparian buffer.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Yellow R
Drainage Area (mi^2)		80
Ecoregion[a]		65G
% Landuse[b]		
Open water		1%
Wetland	Woody	4%
	Emergent herbaceous	<1%
Forest	Deciduous	11%
	Evergreen	22%
	Mixed	14%
Shrub/scrub		10%
Grassland/herbaceous		3%
Pasture/hay		22%
Cultivated crops		3%
Development	Open space	6%
	Low intensity	2%
	Moderate intensity	1%
	High intensity	<1%
Barren		<1%
Population/km^2[c]		39
# NPDES Permits[d]	**TOTAL**	88
Construction		61
Industrial General		25
Small Mining		1
Underground Injection Control		1

a. Dougherty Plain
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 Five Runs Creek at FRCC-2, May 28, 2014.

Physical Characteristics		
Width (ft)		60
Canopy Cover		Estimate 50/50
Depth (ft)		
	Riffle	0.8
	Run	1.5
	Pool	3.0
% of Reach		
	Riffle	1
	Run	80
	Pool	19
% Substrate		
	Mud/Muck	1
	Gravel	1
	Sand	98

BIOASSESSMENT RESULTS

The fish community in Five Runs Creek at FRCC-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 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 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 IBI score for Five Runs Creek at FRCC-2 was 40, indicating the fish community to be in *fair* condition (Table 4).

Table 3. Results of the habitat assessment conducted on Five Runs Creek at FRCC-2 on May 28, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	90	Optimal (>79)
Sediment Deposition	68	Sub-Optimal (55-79)
Sinuosity	88	Optimal (>79)
Bank Vegetative Stability	45	Marginal (31-<58)
Riparian Buffer	38	Marginal (31-<60)
Habitat Assessment Score	***118***	
% of Maximum Score	***66***	**Sub-Optimal (57-80)**

Table 4. Results of the fish community assessment conducted in FRCC-2 on May 28, 2014.

Fish Community Assessment	Results	Score
Species Richness & Diversity		
Total native species	20	3
Number shiner species	5	3
Number of sucker species	0	1
Number of centrarchid species	4	3
Number of darter+madtom species	4	3
Tolerance & Intolerance Measures		
Percent of tolerant species	3.42	5
Percent Green Sunfish & Yellow Bullhead	1.28	3
Trophic Measures		
Percent insectivorous cyprinids	68.8	5
Percent invertivores	41.88	3
Percent top carnivores	2.14	3
Abundance, Condition & Reproductive Measures		
Percent DELT+hybrids	0	5
Number of lithophilic spawners	10	3
IBI Assessment Score		**40**
Condition		**Fair**

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. When possible, in situ measurements and water samples were collected monthly during March through October 2014 to help identify any stressors to the biological communities. Specific conductance, hardness, total aluminum, and dissolved aluminum and lead were higher than expected for the Dougherty Plain ecoregion. Heavy rains the day before collection and flooded banks could possibly contribute to the higher E. coli count during the April station visit. All other parameters selected for sampling were within expected limits and did not exceed criteria applicable to Five Runs Creek's *Fish & Wildlife* water use designation.

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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)	8	13.6	26.4	23.3	22.2	4.5	
Turbidity (NTU)	8	5.1	67.2	6.8	19.9	23.5	
Total Dissolved Solids (mg/L)	8	36.0	72.0	57.0	57.2	11.2	
Total Suspended Solids (mg/L)	8	< 1.0	89.0	3.5	17.5	31.2	
Specific Conductance (µmhos)	8	43.6	107.9	73.8[G]	75.8	19.6	
Hardness (mg/L)	4	15.0	37.1	27.2[G]	26.6	9.0	
Alkalinity (mg/L)	8	11.6	47.7	27.7	28.9	11.0	
Stream Flow during Sample Collection (cfs)	5	11.4	78.7	31.5	43.5	31.4	
Chemical							
Dissolved Oxygen (mg/L)	8	6.9	9.6	7.1	7.4	0.9	
pH (su)	8	6.6	7.3	7.0	7.0	0.2	
Ammonia Nitrogen (mg/L)	8	< 0.006	< 0.010	0.003	0.004	0.001	
Nitrate+Nitrite Nitrogen (mg/L)	8	0.121	0.252	0.188	0.183	0.041	
[J] Total Kjeldahl Nitrogen (mg/L)	8	0.071	1.530	0.248	0.393	0.474	
[J] Total Nitrogen (mg/L)	8	0.256	1.651	0.450	0.576	0.454	
[J] Dissolved Reactive Phosphorus (mg/L)	8	< 0.003	0.012	0.005	0.006	0.003	
Total Phosphorus (mg/L)	8	0.015	0.072	0.020	0.032	0.024	
CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	8	3.4	5.5	5.2	5.0	0.7	
Total Metals							
Aluminum (mg/L)	4	< 0.050	1.870	0.560[M]	0.754	0.835	
Iron (mg/L)	4	0.627	3.110	1.360	1.614	1.066	
Manganese (mg/L)	4	0.072	0.420	0.136	0.191	0.158	
Dissolved Metals							
[J] Aluminum (mg/L)	4	< 0.050	0.604	0.258[M]	0.286	0.258	
Antimony (µg/L)	4	< 0.2	< 0.4	0.1	0.1	0.1	
[J] Arsenic (µg/L)	4	0.5	0.7[H]	0.6	0.6	0.1	4
Cadmium (µg/L)	4	< 0.246	< 0.390	0.123	0.141	0.036	
[J] Chromium (µg/L)	4	0.253	1.269	0.573	0.667	0.440	
[J] Copper (mg/L)	4	< 0.0003	0.001	0.0006	0.0007	0.0005	
Iron (mg/L)	4	0.511	1.090	0.822	0.811	0.274	
[J] Lead (µg/L)	4	< 0.2	0.5[S]	0.2	0.2	0.2	1
[J] Manganese (mg/L)	4	0.027	0.089	0.054	0.056	0.026	
[J] Nickel (mg/L)	4	< 0.0002	0.0006	0.0001	0.0001	0.0001	
Selenium (µg/L)	4	< 0.4	< 0.5	0.2	0.2	0.1	
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	0.003	0.014	0.004	0.006	0.006	
Biological							
Chlorophyll a (ug/L)	8	< 0.10	2.67	0.56	1.00	0.96	
[J] E. coli (col/100mL)	8	26	4839[H]	55	946	1778	1

G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion; H=*F&W* human health criterion exceeded; J=estimate; M=value>90% of all verified ecoregional reference reach data collected in the ecoregion 65g; N=# samples; Q= uncertain exceedences; S= *F&W* hardness-adjusted aquatic life use criteria exceeded.

SUMMARY

Bioassessment results indicated the fish community to be in *fair* condition along with the habitat scoring in the *sub-optimal* category. Intensive water quality sampling suggests that specific conductance, hardness, and aluminum concentrations were higher than expected for reference streams found in the Doughtery Plain ecoregion (65g). As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data. Monitoring efforts should continue to make sure water quality criteria remain stable or improve.