Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2014 Monitoring Summary

Five Runs Creek at Covington County Road 102 (31.07629/-86.51017)

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 assess the biological integrity of each monitoring site, 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-1, September 3, 2014.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Five Runs Creek is a *Fish & Wildlife (F&W)* stream located in Covington County. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (56%). As of April 1, 2016, there are 97 NPDES outfalls present in this watershed.

REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the fish biological 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-1 (Figure 1) is characterized as having a wetted width of 64 feet and approximately 50% of the stream is shaded with a tree canopy. Canopy cover gives the stream a more tolerant range of temperatures for fish during peak hours of sunlight in the summer months. Overall habitat quality was categorized as *sub-optimal* due to instream habitat quality and bank vegetative stability.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Yellow R
Drainage Area (mi^2)		122
Ecoregion[a]		65G
% Landuse[b]		
Open water		1%
Wetland	Woody	5%
	Emergent herbaceous	0%
Forest	Deciduous	8%
	Evergreen	35%
	Mixed	13%
Shrub/scrub		9%
Grassland/herbaceous		2%
Pasture/hay		18%
Cultivated crops		2%
Development	Open space	5%
	Low intensity	2%
	Moderate intensity	0%
	High intensity	0%
Barren		0%
Population/km^2[c]		27
# NPDES Permits[d]	**TOTAL**	97
401 Water Quality Certification		
Construction		70
Industrial General		25
Industrial Individual		
Mining		
Municipal		
No Exposure		
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-1, May 28, 2014.

Physical Characteristics		
Width (ft)		64
Canopy Cover		Estimate 50/50
% of Reach		
	Riffle	1
	Run	75
	Pool	24

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BIOASSESSMENT RESULTS

The fish community in Five Runs Creek at FRCC-1 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. The final IBI score is the sum of all individual metrics on a 60 point scale. The IBI score for Five Runs Creek at FRCC-1 was 32, indicating the fish community to be in *poor* condition (Table 4).

Table 3. Results of the habitat assessment conducted on Five Runs Creek at FRCC-1, May 28, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	77	Sub-Optimal (55-79)
Sediment Deposition	90	Optimal (>79)
Sinuosity	80	Optimal (>79)
Bank Vegetative Stability	74	Sub-Optimal (58-79)
Riparian Buffer	50	Marginal (31-<60)
Habitat Assessment Score	***130***	
% of Maximum Score	***72***	**Sub-Optimal (57-80)**

Table 4. Results of the fish community assessment conducted in Five Runs Creek at FRCC-1, May 28, 2014.

Fish Community Assessment		
	Results	**Score**
Species Richness & Diversity Measures		
Total native species	14	3
Number shiner species	2	1
Number of sucker species	0	1
Number of centrarchid species	5	3
Number of darter+madtom species	4	3
Tolerance & Intolerance Measures		
Percent of tolerant species	2.94	5
Percent Green Sunfish & Yellow Bullhead	0	5
Trophic Measures		
Percent insectivorous cyprinids	22.55	1
Percent invertivores	18.63	1
Percent top carnivores	1.96	3
Abundance, Condition & Reproductive Measures		
Percent DELT+hybrids	0	5
Number of lithophilic spawners	8	1
IBI Assessment Score		**32**
Condition		**Poor**

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 of 2014 to help identify any stressors to the biological communities. Specific conductance, hardness, aluminum, and alkalinity were higher than expected for the Dougherty Plain ecoregion (65g). Arsenic levels were higher than expected on three sampling events. On April 15, 2014, E. coli was higher than expected for a single sample max for a *Fish & Wildlife* use class. Heavy rains the day before collection and flooded banks could possibly contribute to the higher E. coli count.

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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	25.2	22.1	21.3	3.8	
Turbidity (NTU)	8	2.5	26.9	5.0	9.6	9.3	
Total Dissolved Solids (mg/L)	8	19.0	99.0	71.0	69.1	24.6	
Total Suspended Solids (mg/L)	8	< 1.0	29.0	3.5	9.3	11.8	
Specific Conductance (µmhos)	8	40.6	158.7	96.0 G	98.0	38.8	
Hardness (mg/L)	4	15.9	61.3	38.0 G	38.3	18.9	
Alkalinity (mg/L)	8	< 1.1	78.6	42.6 M	43.2	23.9	
Stream Flow (cfs)	4	33.8	87.8	48.7	54.8	23.2	
Chemical							
Dissolved Oxygen (mg/L)	8	7.4	9.2	7.7	7.8	0.6	
pH (su)	8	6.6	7.7	7.3	7.2	0.4	
Ammonia Nitrogen (mg/L)	8	< 0.006	< 0.010	0.003	0.004	0.001	
Nitrate+Nitrite Nitrogen (mg/L)	8	0.095	0.212	0.166	0.166	0.037	
J Total Kjeldahl Nitrogen (mg/L)	8	< 0.049	1.640	0.202	0.390	0.542	
J Total Nitrogen (mg/L)	8	< 0.180	1.735	0.396	0.556	0.512	
J Dissolved Reactive Phosphorus (mg/L)	8	0.003	0.009	0.005	0.005	0.002	
Total Phosphorus (mg/L)	8	0.011	0.034	0.017	0.019	0.008	
CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	8	2.4	4.2	3.4	3.4	0.6	
Total Metals							
J Aluminum (mg/L)	4	0.067	0.680	0.388 M	0.381	0.302	
Iron (mg/L)	4	0.229	0.991	0.740	0.675	0.321	
J Manganese (mg/L)	4	0.035	0.145	0.070	0.080	0.052	
Dissolved Metals							
J Aluminum (mg/L)	4	< 0.050	0.347	0.208	0.197	0.144	
Antimony (µg/L)	4	< 0.2	< 0.4	0.1	0.1	0.1	
J Arsenic (µg/L)	4	< 0.3	0.6H	0.5	0.4	0.2	3
Cadmium (µg/L)	4	< 0.246	< 0.390	0.123	0.141	0.036	
J Chromium (µg/L)	4	0.435	1.051	0.672	0.708	0.255	
J Copper (mg/L)	4	< 0.0003	< 0.002	0.0003	0.0008	0.001	
J Iron (mg/L)	4	0.169	0.566	0.358	0.362	0.191	
J Lead (µg/L)	4	< 0.2	< 0.5	0.2	0.2	0.1	
J Manganese (mg/L)	4	0.017	0.035	0.029	0.028	0.008	
J Nickel (mg/L)	4	< 0.0002	< 0.0006	0.0002	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	0.003	0.013	0.004	0.006	0.005	
Biological							
Chlorophyll a (ug/L)	8	< 0.10	2.67	0.44	0.98	1.10	
J E. coli (col/100mL)	8	15	3466H	57	771	1370	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.

SUMMARY

Bioassessment results indicated the fish community assessment to be in *poor* condition along with the habitat scoring in the *sub-optimal* range. Intensive water quality sampling suggest that specific conductance, hardness, alkalinity, and aluminum 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. Further sampling may be required to get a representative assessment of the stream.