

# 2014 Monitoring Summary



## West Fork Choctawhatchee River at AL Highway 27 (Dale County) (31.41135/-85.53484)

### BACKGROUND

The West Fork of the Choctawhatchee River 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) selected the West Fork Choctawhatchee River watershed for biological and water quality monitoring as part of the Assessment of the Southeast Alabama (SE-AL) River basins. 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.

As part of the joint effort to meet these objectives, ADEM collected water samples from March to October of 2014, and the Geological Survey of Alabama (GSA) conducted a habitat and fish community assessment in June.



Figure 1. West Fork Choctawhatchee River at WFCD-10, July 9, 2014.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. West Fork Choctawhatchee River at WFCD-10 is a *Fish & Wildlife (F&W)* stream in Dale County. According to the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (54%) with some shrub/scrub (Table 1). As of April 1, 2016, ADEM has issued a total of 20 NPDES permits in the area.

### 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. Bottom substrate in West Fork Choctawhatchee River at WFCD-10 is mostly bedrock (Figure 1). Overall habitat quality was rated as *sub-optimal*.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Choctawhatchee R
<b>Basin</b>		Choctawhatchee R
<b>Drainage Area (mi<sup>2</sup>)</b>		340
<b>Ecoregion<sup>a</sup></b>		65D
<b>% Landuse<sup>b</sup></b>		
Open water		1%
Wetland	Woody	5%
	Emergent herbaceous	<1%
Forest	Deciduous	23%
	Evergreen	25%
	Mixed	6%
Shrub/scrub		18%
Grassland/herbaceous		2%
Pasture/hay		8%
Cultivated crops		7%
Development	Open space	4%
	Low intensity	1%
	Moderate intensity	<1%
	High intensity	<1%
Barren		<1%
<b>Population/km<sup>2c</sup></b>		13
<b># NPDES Permits<sup>d</sup></b>	<b>TOTAL</b>	20
	Construction	8
	Industrial General	4
	Industrial Individual	4
	Small Mining	1
	Underground Injection Control	3

a. Southern Hilly Gulf Coastal 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 West Fork Choctawhatchee River at WFCD-10, June 4, 2014.

Physical Characteristics		
<b>Canopy Cover</b>		Open
<b>Width (ft)</b>		100.0
<b>Depth (Ft)</b>	Run	3.0
	Pool	2.0
<b>% of Reach</b>	Run	80
	Pool	20
<b>% Substrate</b>	Bedrock	40
	Boulder	10
	Clay	10
	Cobble	20
	Sand	20

**Table 3.** Results of the habitat assessment conducted on West Fork Choctawhatchee River at WFCD-10, June 4, 2014.

Habitat Assessment	% Max Score	Rating
Instream Habitat Quality	68	Sub-Optimal (55-79)
Sediment Deposition	78	Sub-Optimal (55-79)
Sinuosity	58	Sub-Optimal (55-79)
Bank Vegetative Stability	68	Sub-Optimal (58-79)
Riparian Buffer	35	Marginal (31-<60)
<b>Habitat Assessment Score</b>	<b>109</b>	
<b>% of Maximum Score</b>	<b>61</b>	<b>Sub-Optimal (57-80)</b>

## BIOASSESSMENT RESULTS

The fish community in West Fork Choctawhatchee River at WFCD-4 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 West Fork Choctawhatchee River at WFCD-10 was 38, indicating the fish community to be in *fair* condition (Table 4).

**Table 4.** Results of the fish community bioassessment on West Fork Choctawhatchee River at WFCD-10, June 4, 2014.

Fish Community Assessment		
	Results	Score
<b>Species Richness &amp; Diversity</b>		
Total native species	26	3
Number shiner species	7	3
Number of sucker species	0	1
Number of centrarchid species	8	3
Number of darter+madtom species	4	3
<b>Tolerance &amp; Intolerance Measures</b>		
Percent of tolerant species	4.35	5
Percent Green Sunfish & Yellow Bullhead	1.09	3
<b>Trophic Measures</b>		
Percent insectivorous cyprinids	65.65	5
Percent invertivores	5.22	1
Percent top carnivores	1.09	3
<b>Abundance, Condition &amp; Reproductive Measures</b>		
Percent DELT+hybrids	0	5
Number of lithophilic spawners	14	3
<b>IBI Assessment Score</b>		<b>38</b>
<b>Condition</b>		<b>Fair</b>

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 2. In situ measurements and water samples were collected monthly or semi-monthly (metals) during March through October of 2014 to help identify any stressors to the biological communities. Median values for specific conductivity and hardness were higher than median values of all verified ecoregional reference reach data collected in ecoregion 65d. In addition, total iron was higher than 90% of data collected at reference reach streams in ecoregion 65d.

## SUMMARY

The fish community assessment was rated as *fair*, and habitat quality and availability was rated as *sub-optimal*. The impaired fish community may be caused by the elevated specific conductivity, hardness, and total iron levels. Monitoring of this site should continue to ensure the habitat quality remains stable and water quality continues to meet *Fish & Wildlife* use criteria.

**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	Median	Avg	SD	Q
<b>Physical</b>							
Temperature (°C)	8	15.0	27.4	22.4	21.6	5.0	
Turbidity (NTU)	8	6.5	26.7	10.2	12.7	6.3	
<sup>J</sup> Total Dissolved Solids (mg/L)	8	40.0	80.0	60.5	58.1	12.4	
<sup>J</sup> Total Suspended Solids (mg/L)	8	< 1.0	21.0	5.5	7.8	6.8	
Specific Conductance (µmhos)	8	43.5	104.0	70.1 <sup>G</sup>	72.7	22.3	
Hardness (mg/L)	4	16.3	39.3	30.4 <sup>G</sup>	29.1	11.6	
Alkalinity (mg/L)	8	12.2	43.4	26.4	28.2	11.5	
Monthly Stream Flow (cfs)	6	52.9	364.4	103.6	152.2	122.1	
Stream Flow @ Sample Collection (cfs)	6	52.9	364.4	103.6	152.2	122.1	
<b>Chemical</b>							
Dissolved Oxygen (mg/L)	8	8.1	10.0	9.1	9.0	0.8	
pH (su)	8	6.3	7.5	7.3	7.1	0.4	
Ammonia Nitrogen (mg/L)	8	< 0.006	0.036	0.004	0.009	0.012	
Nitrate+Nitrite Nitrogen (mg/L)	8	0.130	0.275	0.233	0.216	0.049	
Total Kjeldahl Nitrogen (mg/L)	8	0.156	1.130	0.332	0.466	0.316	
Total Nitrogen (mg/L)	8	0.324	1.260	0.590	0.682	0.287	
<sup>J</sup> Dissolved Reactive Phosphorus (mg/L)	8	0.003	0.009	0.005	0.005	0.002	
Total Phosphorus (mg/L)	8	0.017	0.027	0.021	0.021	0.003	
<sup>J</sup> CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	8	3.1	4.8	3.8	3.8	0.5	
<b>Total Metals</b>							
<sup>J</sup> Aluminum (mg/L)	4	< 0.050	0.208	0.140	0.128	0.076	
Iron (mg/L)	4	1.010	2.050	1.425	1.478	0.432	
<sup>J</sup> Manganese (mg/L)	4	0.039	0.103	0.073	0.072	0.028	
<b>Dissolved Metals</b>							
Aluminum (mg/L)	4	< 0.050	< 0.050	0.025	0.025	0.000	
Antimony (µg/L)	4	< 0.2	< 0.4	0.1	0.1	0.1	
<sup>J</sup> Arsenic (µg/L)	4	0.5	0.6 <sup>H</sup>	0.6	0.5	0.1	4
Cadmium (mg/L)	4	< 0.246	< 0.390	0.123	0.141	0.036	
<sup>J</sup> Chromium (mg/L)	4	0.430	0.995	0.471	0.592	0.272	
<sup>J</sup> Copper (mg/L)	4	< 0.0003	0.0004	0.0004	0.0003	0.00006	
Iron (mg/L)	4	0.742	1.130	0.936 <sup>M</sup>	0.936	0.159	
Lead (µg/L)	4	< 0.2	< 0.5	0.1	0.2	0.1	
<sup>J</sup> Manganese (mg/L)	4	0.023	0.074	0.052	0.050	0.028	
<sup>J</sup> Nickel (mg/L)	4	< 0.0003	0.004	0.0005	0.001	0.002	
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	
<sup>J</sup> Zinc (mg/L)	4	0.003	0.010	0.004	0.005	0.003	
<b>Biological</b>							
Chlorophyll a (µg/L)	8	< 0.10	3.81	2.22	2.04	1.43	
E. coli (col/100mL)	8	33	488	137	182	146	

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

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