Alabama Department of Environmental Management

Ecological Reference Reach Site

Rivers and Streams Monitoring Program

2014 Monitoring Summary

West Fork Choctawhatchee River at Highway 10 (Barbour County) (31.66369/-85.50449)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the West Fork Choctawhatchee River watershed for biological and water quality monitoring as part of the 2014 Assessment of the Southeast Alabama (SEAL) River Basins. The objectives of the SEAL Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the basins.

West Fork Choctawhatchee River at WCHB-1A is among the least-disturbed watersheds in the Southeast Alabama (SEAL) basin group based on landuse, road density, and population density and is an ecoreference candidate station. The 2014 data will be used to evaluate West Fork Choctawhatchee River as a best attainable condition reference watershed for comparison with other stations in the same ecoregion.

Figure 1. West Fork Choctawhatchee River at WCHB-1A, June 12, 2014.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. West Fork Choctawhatchee River is designated as a *Fish & Wildlife (F&W)* stream. West Fork Choctawhatchee River at WCHB-1A is a low gradient river that drains an 87 square mile watershed through Barbour County in the Southern Hilly Gulf Coastal Plain ecoregion (65d). Based on the 2011 National Land Cover Dataset, land use within the watershed is composed of forest (52%), shrub/scrub, with some cultivated crops and pasture/hay. Population density is low, and less than 8% of the watershed area is developed. As of April 1, 2016, only one permit has been issued 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. Bottom substrate in West Fork Choctawhatchee River at WCHB-1A is characterized by organic matter and sand (Figure 1). Overall habitat quality was rated as *sub-optimal* for supporting a healthy fish community.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Choctawhatchee R
Drainage Area (mi^2)		87
Ecoregion[a]		65D
% Landuse[b]		
Open water		1%
Wetland	Woody	4%
	Emergent herbaceous	<1%
Forest	Deciduous	20%
	Evergreen	26%
	Mixed	6%
Shrub/scrub		18%
Grassland/herbaceous		2%
Pasture/hay		11%
Cultivated crops		9%
Development	Open space	4%
	Low intensity	1%
	Moderate intensity	<1%
	High intensity	<1%
Barren		<1%
Population/km^2[c]		8
# NPDES Permits[d]	**TOTAL**	1
Construction		1

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 WCHB-1A, July 31, 2014.

Physical Characteristics		
Width (ft)		35
Canopy cover		Shaded
Depth (ft)		
	Run	1.5
	Pool	4.0
% of Reach		
	Run	60
	Pool	40
% Substrate		
	Gravel	5
	Sand	30
	Silt	5
	Organic Matter	55
	Mud/Muck	5

BIOASSESSMENT RESULTS

The fish community in West Fork Choctawhatchee River at WCHB-1A 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 WCHB-1A was 38, indicating the fish community to be in *fair* condition.

Table 3. Results of the fish community assessment of West Fork Choctawhatchee River at WCHB-1A, July 31, 2014.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	77	Sub-Optimal (55-79)
Sediment Deposition	60	Sub-Optimal (55-79)
Sinuosity	73	Sub-Optimal (55-79)
Bank Vegetative Stability	85	Optimal (>79)
Riparian Buffer	85	Optimal (>84)
Habitat Assessment Score	***141***	
% Maximum Score	***78***	**Sub-Optimal (57-80)**

Table 4. Results of the fish community bioassessment conducted in West Fork Choctawhatchee River at WCHB-1A, July 31, 2014.

Fish Community Assessment		
	Results	**Score**
Species Richness & Diversity		
Total native species	24	3
Number shiner species	5	3
Number of sucker species	2	3
Number of centrarchid species	7	3
Number of darter+madtom species	4	3
Tolerance & Intolerance Measures		
Percent of tolerant species	8.33	3
Percent Green Sunfish & Yellow Bullhead	1.67	3
Trophic Measures		
Percent insectivorous cyprinids	41.67	3
Percent invertivores	29.17	3
Percent top carnivores	1.67	3
Abundance, Condition & Reproductive Measures		
Percent DELT+hybrids	0	5
Number of lithophilic spawners	15	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 monthly, and semi-monthly (metals) from March through October of 2014, to help identify any stressors to the biological communities. Median values for specific conductance and hardness were higher than expected based on median values of reference reaches within ecoregion 65d.

SUMMARY

West Fork Choctawhatchee River at WCHB-1A was found to be *sub-optimal* in its ability to support healthy and diverse fish communities. The overall fish community condition was rated as *fair.* Specific conductivity and hardness values were above expected levels for ecoregion 65d.

Monitoring of West Fork Choctawhatchee River at WCHB -1A should continue to ensure that conditions remain stable at the site.

Table 5. Summary of water quality data collected March-October, 2014. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median (Med), 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
Physical							
Temperature (°C)	10	11.6	23.6	21.3	19.2	4.5	
Turbidity (NTU)	10	8.9	17.6	13.8	13.3	3.4	
Total Dissolved Solids (mg/L)	8	31.0	70.0	49.0	49.0	11.2	
Total Suspended Solids (mg/L)	8	5.0	28.0	7.5	10.5	7.5	
Specific Conductance (µmhos)	10	43.0	86.5	65.4 G	66.3	15.8	
Hardness (mg/L)	4	17.6	34.3	24.6 G	25.3	7.3	
Alkalinity (mg/L)	8	13.2	36.1	27.6	26.4	8.3	
Stream Flow (cfs)	4	27.4	77.9	31.9	42.3	23.9	
Chemical							
Dissolved Oxygen (mg/L)	10	7.2	9.9	7.6	8.0	0.9	
pH (su)	10	6.7	7.4	7.0	7.0	0.2	
J Ammonia Nitrogen (mg/L)	8	< 0.006	0.032	0.004	0.009	0.010	
Nitrate+Nitrite Nitrogen (mg/L)	8	0.163	0.385	0.274	0.282	0.076	
Total Kjeldahl Nitrogen (mg/L)	8	0.176	0.773	0.338	0.382	0.199	
Total Nitrogen (mg/L)	8	0.398	1.011	0.646	0.664	0.182	
J Dissolved Reactive Phosphorus (mg/L)	8	0.003	0.006	0.004	0.004	0.001	
Total Phosphorus (mg/L)	8	0.016	0.048	0.023	0.026	0.011	
J CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0	
COD (mg/L)	7	< 1.6	19.6	3.1	8.8	8.9	
TOC (mg/L)	8	2.8	6.4	4.4	4.3	1.0	
Chlorides (mg/L)	8	2.8	4.6	3.6	3.7	0.5	
Atrazine (µg/L)	1				0.29		
Total Metals							
J Aluminum (mg/L)	4	0.068	0.541	0.275	0.290	0.198	
Iron (mg/L)	4	1.020	2.430	1.830	1.778	0.580	
Manganese (mg/L)	4	0.129	0.215	0.146	0.159	0.038	
Dissolved Metals							
J Aluminum (mg/L)	4	< 0.050	0.196	0.025	0.068	0.086	
Antimony (µg/L)	4	< 0.2	< 0.4	0.1	0.1	0.1	
J Arsenic (µg/L)	4	0.4	0.6 H	0.4	0.5	0.1	4
Cadmium (mg/L)	4	< 0.246	< 0.390	0.123	0.141	0.036	
J Chromium (mg/L)	4	0.255	0.658	0.540	0.498	0.178	
J Copper (mg/L)	4	< 0.0003	0.001	0.0003	0.0005	0.0004	
Iron (mg/L)	4	0.729	1.330	0.875	0.952	0.265	
Lead (µg/L)	4	< 0.2	< 0.5	0.1	0.2	0.1	
Manganese (mg/L)	4	0.093	0.135	0.101	0.108	0.019	
J Nickel (mg/L)	4	< 0.0002	< 0.0006	0.0002	0.0003	0.0002	
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	0.002	0.004	0.003	0.003	0.001	
Biological							
Chlorophyll a (µg/L)	8	< 0.10	14.95	0.29	3.36	5.52	
E. coli (col/100mL)	8	99	816	149	258	249	

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; N= # samples; Q= # of uncertain exceedances.

FOR MORE INFORMATION, CONTACT:
Ruthie Perez, ADEM Aquatic Assessment Unit
1350 Coliseum Boulevard Montgomery, AL 36110
(334) 260-2762 ryperez@adem.state.al.us