Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

# 2014 Monitoring Summary

Fair

## Little Choctawhatchee River at Dale County Road 9 (31.26250/-85.57014)

### BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Panther Creek-Little Choctawhatchee River (0314-0201-0504) watershed for biological and water quality monitoring as part of the 2014 Southeast Alabama Basin Assessment (SEAL). The watershed was identified as a priority of the US Fish and Wildlife Service, Dale County Soil and Water Conservation District, the Alabama Department of Conservation and Natural Resources, and the Choctawhatchee Riverkeepers. Agricultural, forestry, and aquatic resource concerns within the watershed included potential fo rexcessive sediment in the streambed, lack of riparian cover, excessive nutrients and algae, and urban and agricultural runoff. The objectives of the SEAL Basin Assessments were to provide data to assess biological, physical, and chemical conditions within the reach, estimate overall water quality within the SEAL basin group, and support restoration efforts.

**Figure 1**. Little Choctawhatchee River at LCHH-4, October 15, 2014.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Choctawhatchee River is a *Fish & Wildlife (F&W)* stream located in Dale County. Based on the 2011 National Land Cover Dataset, landuse within the watershed is 26% development, 25% crops, and 12% pasture/hab. Nineteen percent of the watershed is forested. As of April 1, 2016, 189 NPDES outfalls were active in the 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. Little Choctawhatchee River is a low-gradient, sand-bottomed stream, with an average pool depth of 3.5 ft (Figure 1). Overall habitat quality was categorized as *sub-optimal* due to limited instream habitat for aquatic communities.

**Table 1**. Summary of watershed characteristics.

| Watershed Characteristics | | |
|---|---|---|
| **Basin** | | Choctawhatchee R |
| **Drainage Area (mi$^2$)** | | 112 |
| **Ecoregion**[a] | | 65G |
| **% Landuse**[b] | | |
| Open water | | <1% |
| Wetland | Woody | 5% |
| | Emergent herbaceous | <1% |
| Forest | Deciduous | 5% |
| | Evergreen | 13% |
| | Mixed | 1% |
| Shrub/scrub | | 10% |
| Grassland/herbaceous | | <1% |
| Pasture/hay | | 12% |
| Cultivated crops | | 25% |
| Development | Open space | 13% |
| | Low intensity | 8% |
| | Moderate intensity | 3% |
| | High intensity | 2% |
| Barren | | <1% |
| **Population/km$^2$**[c] | | 153 |
| **# NPDES Permits**[d] | **TOTAL** | 189 |
| Construction | | 122 |
| Industrial General | | 43 |
| Industrial Individual | | 2 |
| Mining | | 7 |
| Municipal | | 4 |
| No Exposure | | 2 |
| Small Mining | | 3 |
| Underground Injection Control | | 6 |

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 Little Choctawhatchee River at LCHH-4, August 5, 2014.

| Physical Characteristics | | |
|---|---|---|
| **Width (ft)** | | 100 |
| **Canopy Cover** | | Mostly Open |
| **Depth (ft)** | | |
| | Run | 2.5 |
| | Pool | 3.5 |
| **% of Reach** | | |
| | Run | 40 |
| | Pool | 60 |
| **% Substrate** | | |
| | Cobble | 2 |
| | Mud/Muck | 11 |
| | Sand | 65 |
| | Silt | 11 |
| | Organic Matter | 11 |

## BIOASSESSMENT RESULTS

The fish community in Little Choctawhatchee River at LCHH-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 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 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 final IBI score is the sum of all individual metrics on a 60 point scale. The IBI score for Little Choctawhatchee River at LCHH-4 was 42, indicating the fish community to be in *fair* condition (Table 4).

**Table 3.** Results of the habitat assessment conducted on Little Choctawhatchee River at LCHH-4, August 5, 2014.

| Habitat Assessment | Maximum Score | Rating |
|---|---|---|
| Instream Habitat Quality | **44** | Marginal (31-55) |
| Sediment Deposition | **50** | Marginal (31-55) |
| Sinuosity | **48** | Marginal (31-55) |
| Bank and Vegetative Stability | **64** | Sub-optimal (58-81) |
| Riparian Buffer | **70** | Sub-optimal (60-84) |
| **Habitat Assessment Score** | **100** | |
| **% Maximum Score** | **55** | **Sub-optimal (53-65)** |

**Table 4.** Results of the fish community assessment conducted in Little Choctawhatchee River at LCHH-4, August 5, 2014.

| Fish Community Assessment | | |
|---|---|---|
| | **Results** | **Score** |
| **Species Richness & Diversity** | | |
| Total native species | 23 | 3 |
| Number shiner species | 4 | 3 |
| Number of sucker species | 1 | 3 |
| Number of centrarchid species | 5 | 3 |
| Number of darter+madtom species | 7 | 5 |
| **Tolerance & Intolerance Measures** | | |
| Percent of tolerant species | 2.16 | 5 |
| Percent Green Sunfish & Yellow Bullhead | 0 | 5 |
| **Trophic Measures** | | |
| Percent insectivorous cyprinids | 83.33 | 5 |
| Percent invertivores | 18.52 | 1 |
| Percent top carnivores | 0.31 | 1 |
| **Abundance, Condition & Reproductive Measures** | | |
| Percent DELT+hybrids | 0 | 5 |
| Number of lithophilic spawners | 12 | 3 |
| **IBI Assessment Score** | | **42** |
| **Condition** | | **Fair** |

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. When possible, in situ measurements and water samples are collected monthly during March through October to help identify any stressors to the biological communities. Although samples of total dissolved arsenic exceeded the F&W human health criterion, The current criterion is expressed as dissolved trivalent arsenic (arsenite – As III). Studies are being conducted to provide a better understanding of the prevalence and areal distribution of dissolved trivalent arsenic to total dissolved arsenic in Alabama.

FOR MORE INFORMATION, CONTACT:
Cal C. Johnson, ADEM Field Operations Division
2715 Sandlin Road Decatur, Al 35603-1333
(256) 432-2162 cal.johnson@adem.alabama.gov

## 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 shows arsenic and lead to be higher than expected compared to reference streams found in the same ecoregion. Upon conclusion of the dissolved arsenic study, the Little Choctawhatchee River will be reassessed for arsenic violations.

Monitoring of this site should continue to ensure the habitat quality remains stable and water quality conditions are being met as a *Fish & Wildlife* designated water use classification.

**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) | 10 | 14.7 | 26.0 | 22.9 | 21.8 | 4.2 | |
| Turbidity (NTU) | 10 | 8.0 | 38.9 | 14.2 | 17.4 | 9.5 | |
| Total Dissolved Solids (mg/L) | 8 | 42.0 | 97.0 | 69.0 | 70.2 | 16.2 | |
| Total Suspended Solids (mg/L) | 8 | 5.0 | 15.0 | 9.5 | 9.6 | 3.0 | |
| Specific Conductance (µmhos) | 10 | 58.1 | 104.4 | 83.5[G] | 81.4 | 17.0 | |
| Hardness (mg/L) | 4 | 18.7 | 32.8 | 25.2[G] | 25.5 | 6.7 | |
| Alkalinity (mg/L) | 8 | 13.1 | 33.4 | 26.0[M] | 24.2 | 8.4 | |
| Monthly Stream Flow (cfs) | 5 | 114.7 | 240.9 | 125.4 | 150.3 | 52.3 | |
| Stream Flow during Sample Collection (cfs) | 5 | 114.7 | 240.9 | 125.4 | 150.3 | 52.3 | |
| **Chemical** | | | | | | | |
| Dissolved Oxygen (mg/L) | 9 | 7.0 | 9.3 | 7.4 | 7.7 | 0.8 | |
| pH (su) | 10 | 6.4 | 7.2 | 7.0[M] | 7.0 | 0.2 | |
| Ammonia Nitrogen (mg/L) | 8 | < 0.006 | 0.168 | 0.003 | 0.026 | 0.058 | |
| Nitrate+Nitrite Nitrogen (mg/L) | 8 | 0.468 | 1.005 | 0.737[M] | 0.708 | 0.181 | |
| Total Kjeldahl Nitrogen (mg/L) | 8 | 0.291 | 1.150 | 0.356 | 0.554 | 0.339 | |
| Total Nitrogen (mg/L) | 8 | 0.927 | 1.653 | 1.260[M] | 1.263 | 0.252 | |
| Dissolved Reactive Phosphorus (mg/L) | 8 | 0.015 | 0.178 | 0.033[M] | 0.052 | 0.053 | |
| Total Phosphorus (mg/L) | 8 | 0.062 | 0.215 | 0.092[M] | 0.101 | 0.049 | |
| [J] CBOD-5 (mg/L) | 8 | < 2.0 | < 2.0 | 1.0 | 1.0 | 0.0 | |
| Chlorides (mg/L) | 8 | 3.7 | 8.4 | 6.3[M] | 6.4 | 1.6 | |
| Atrazine (µg/L) | 1 | | | | 0.26 | | |
| **Total Metals** | | | | | | | |
| [J] Aluminum (mg/L) | 4 | 0.105 | 0.830 | 0.477[M] | 0.472 | 0.346 | |
| Iron (mg/L) | 4 | 1.200 | 2.540 | 1.525 | 1.698 | 0.584 | |
| Manganese (mg/L) | 4 | 0.060 | 0.235 | 0.098 | 0.123 | 0.077 | |
| **Dissolved Metals** | | | | | | | |
| 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 | |
| [J] Arsenic (µg/L) | 4 | 0.4 | 0.6[H] | 0.5 | 0.5 | 0.1 | 4 |
| Cadmium (µg/L) | 4 | < 0.246 | < 0.390 | 0.123 | 0.141 | 0.036 | |
| [J] Chromium (µg/L) | 4 | 0.350 | 1.178 | 0.415 | 0.556 | 0.429 | |
| [J] Copper (mg/L) | 4 | 0.0005 | 0.001 | 0.0005 | 0.001 | 0.0001 | |
| Iron (mg/L) | 4 | 0.643 | 0.814 | 0.702 | 0.715 | 0.078 | |
| Lead (µg/L) | 4 | < 0.2 | < 0.5[S] | 0.2 | 0.2 | 0.1 | 1 |
| [J] Manganese (mg/L) | 4 | 0.041 | 0.089 | 0.060 | 0.062 | 0.020 | |
| [J] Nickel (mg/L) | 4 | 0.0004 | 0.001 | 0.0005 | 0.0006 | 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 | 0.004 | 0.006 | 0.006 | 0.005 | 0.001 | |
| **Biological** | | | | | | | |
| Chlorophyll a (ug/L) | 8 | 0.10 | 4.58 | 1.13 | 1.44 | 1.38 | |
| E. coli (col/100mL) | 8 | 93 | 731 | 114 | 231 | 222 | |

G= value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65g; 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= # of uncertain exceedances; S= *F&W* hardness-adjusted aquatic life use criteria exceeded.