

# 2019 Monitoring Summary



## Cahaba River at new U.S. 82 bridge in Centreville in Bibb County (32.95780/-87.13970)

### BACKGROUND

Cahaba River at CAHB-1 is one of a network of 94 sites monitored annually by the Alabama Department of Environmental Management (ADEM) to identify long-term trends in water quality and to provide data for the development of TMDLs and water quality criteria. Habitat and a fish community assessments were conducted on Cahaba River in 2019 to assess the biological integrity of the site.

Cahaba River is within one of 50 Strategic Habitat Units (SHU) by the U.S. Fish and Wildlife Service (USFWS) and the Alabama Rivers & Streams Network (ARSN). SHUs are recognized as high quality habitats occupied by federally listed and state imperiled species.



Figure 1. Cahaba River at CAHB-1, aerial image, April , 2024.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Cahaba River at CAHB-1 (Figure 1) lies within the Fall Line Hills (65i) ecoregion. It is a *Fish & Wildlife (F&W)* stream located in Bibb County. According to the 2021 National Land Cover Dataset, land use within the watershed is mixture of primarily forest (53%) and urban development (27%). There are 2630 permitted outfalls in the watershed, the majority of them being construction stormwater permits. This indicates increasing development within the watershed and may require future monitoring.

### REACH CHARACTERISTICS

General observations (Figure 1, Table 2) and a habitat survey (Table 3) were completed during the macroinvertebrate assessment. In comparison with reference reaches in the same ecoregion, they give an indication of the physical condition of the site as well as the quality and availability of habitat. Cahaba River Creek at CAHB-1 is a high-gradient stream with boulder, cobble and gravel bottom substrates. Overall habitat quality was categorized as *optimal*.

Table 1. Summary of general watershed characteristics: CAHB-1.

| Watershed Characteristics                             |                     |
|-------------------------------------------------------|---------------------|
| Basin                                                 | Cahaba              |
| Drainage Area (mi <sup>2</sup> )                      | 310.9               |
| Ecoregion <sup>o</sup>                                | 65i                 |
| Assessment Unit                                       | AL03150202-0503-102 |
| Use Class                                             | F&W                 |
| AU Category                                           | 3                   |
| 12-digit Hydrologic Unit Code (HUC)                   | 31502020503         |
| Conservation Status                                   |                     |
| Strategic Habitat Unit †                              | 27 Cahaba River     |
| Landuse Categories (2021 National Land Cover Dataset) |                     |
| Open Water (%)                                        | 0.9                 |
| Wetland, Total (%)                                    | 2.3                 |
| Wetlands, Woody (%)                                   | 2.3                 |
| Emergent Herbaceous Wetlands (%)                      | 0.1                 |
| Forested, Total (%)                                   | 53.4                |
| Forested, Deciduous (%)                               | 23.4                |
| Forested, Evergreen (%)                               | 18.9                |
| Forested, Mixed (%)                                   | 11.1                |
| Shrub/Scrub (%)                                       | 4.0                 |
| Grassland/Herbaceous (%)                              | 3.5                 |
| Cultivated Crops (%)                                  | 0.1                 |
| Pasture/Hay (%)                                       | 8.1                 |
| Developed, Total (%)                                  | 26.9                |
| Developed, Open Space (%)                             | 13.0                |
| Developed, Low Intensity (%)                          | 8.8                 |
| Developed, Medium Intensity (%)                       | 4.1                 |
| Developed, High Intensity (%)                         | 1.0                 |
| Barren Land (Rock/Sand/Clay)(%)                       | 0.8                 |
| Population/km (2020 US Census Data)                   | 571.8               |
| NPDES outfalls (NPDES database)                       |                     |
| Total # of Permitted Outfalls                         | 2,630               |
| # of Construction Stormwater Permits                  | 1,768               |
| # of Industrial General                               | 435                 |
| # of Industrial Individual                            | 41                  |
| # of Mining Permits                                   | 28                  |
| # of MS4 Permits                                      | 283                 |
| # of Municipal Permits                                | 60                  |
| # of SID Permits                                      | 15                  |

<sup>o</sup> Fall Line Hills

† 12-digit HUC located in a Strategic Habitat Unit.

Table 2. Physical characteristics of Cahaba River at CAHB-1, June 18, 2019.

| Physical Characteristics |             |
|--------------------------|-------------|
| Width (ft)               | 150         |
| Canopy Cover             | Mostly Open |
| Depth (ft)               |             |
| Riffle                   | 0.5         |
| Run                      | 1.5         |
| Pool                     | 1.5         |
| % of Reach               |             |
| Riffle                   | 30          |
| Run                      | 50          |
| Pool                     | 20          |
| % Substrate              |             |
| Bedrock                  | 3           |
| Boulder                  | 35          |
| Cobble                   | 25          |
| Gravel                   | 20          |
| Sand                     | 7           |
| Organic Matter           | 10          |

**Table 3.** Results of the habitat assessment survey conducted on Cahaba River at CAHB-1, June 18, 2019.

| Habitat Survey                  | % Max Score | Rating                          |
|---------------------------------|-------------|---------------------------------|
| Instream Habitat Quality        | 81          | Optimal (80-100)                |
| Sediment Deposition             | 85          | Optimal (80-100)                |
| Riffle Frequency                | 75          | Sub-optimal/Optimal (75-79.999) |
| Bank Vegetative Stability       | 81          | Optimal (80-100)                |
| Riparian Zone Measurements      | 90          | Optimal (80-100)                |
| <b>Habitat Assessment Score</b> | <b>166</b>  |                                 |
| <b>% Maximum Score</b>          | <b>83</b>   | <b>Optimal (70-84.999)</b>      |

## BIOASSESSMENT RESULTS

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, community tolerance/intolerance, and organism abundance, condition, and reproduction to assess the overall health of the fish community, based on conditions expected for Wadeable streams and rivers in the Hills and Coastal Terraces Ichthyoregion. The final IBI score is the sum of all individual metrics on a 60-point scale. The fish community survey conducted at CAHB-1 rated the site *Good* (Table 4).

**Table 4.** Results of the fish survey conducted on Cahaba River at CAHB-1, June 18, 2019.

| Fish Assessment                                       | Results | Scores      |
|-------------------------------------------------------|---------|-------------|
| <b>Taxonomic richness and diversity metrics</b>       |         |             |
| Total Native Species                                  | 29      | 1           |
| Number Cyprinid species                               | 10      | 3           |
| Number of Sucker Species                              | 4       | 3           |
| Number Lepomis species                                | 2       | 5           |
| Number of darter+madtom species                       | 7       | 3           |
| <b>Tolerance metrics</b>                              |         |             |
| Percent dominant species                              | 41      | 5           |
| Percent of tolerant species                           | 3       | 5           |
| Percent Lepomis                                       | 4       | 5           |
| <b>Trophic metrics</b>                                |         |             |
| Percent insectivorous Cyprinids                       | 71      | 5           |
| Percent top carnivores                                | 3       | 5           |
| <b>Abundance, condition, and reproductive metrics</b> |         |             |
| Percent DELT+hybrids                                  | 0       | 5           |
| Percent simple lithophils                             | 30      | 3           |
| <b>IBI Survey Score</b>                               |         | <b>48</b>   |
| <b>IBI Survey Rating</b>                              |         | <b>Good</b> |

**Table 5.** Summary of *in-situ* water quality data collected monthly June 18, 2019. 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.

| CAHB-1 AL03150202-0503-102      | N | Min | Max | Med | Avg   | SD | 10thP | 90thP |
|---------------------------------|---|-----|-----|-----|-------|----|-------|-------|
| <b>Physical</b>                 |   |     |     |     |       |    |       |       |
| Temperature (°C)                | 1 |     |     |     | 25.9  |    | 25.9  | 25.9  |
| Turbidity (NTU)                 | 1 |     |     |     | 3.9   |    | 3.9   | 3.9   |
| Specific Conductance (µmhos/cm) | 1 |     |     |     | 269.6 |    | 269.6 | 269.6 |
| Measured Stream Flow (cfs)      | 1 |     |     |     | 438.0 |    | 438.0 | 438.0 |
| <b>Chemical</b>                 |   |     |     |     |       |    |       |       |
| Dissolved Oxygen (mg/L)         | 1 |     |     |     | 7.8   |    | 7.8   | 7.8   |
| pH (SU)                         | 1 |     |     |     | 7.8   |    | 7.8   | 7.8   |

N=# samples.

## WATER CHEMISTRY

Results of *in-situ* water quality sampling are presented in Table 5. In situ measurements were collected on June 18, 2019 during the fish community assessment to help identify potential stressors to the biological communities. Measurements indicated that Cahaba River at CAHB-1 was meeting its *F&W* water use classification.

## SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data.

Bioassessment results indicated the fish community to be in *good* condition. Overall habitat quality was categorized as *optimal*. *In-situ* water quality measurements indicated that Cahaba River at CAHB-1 was meeting its *F&W* water use classification.

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