

# 2013 Monitoring Summary



## Black Creek at Noccalula Road (Etowah County) 34.04118/-86.01998

### BACKGROUND

The Alabama Department of Environmental Management selected the Black Creek watershed as part of its 2005 and 2010 Basin Assessments of the Alabama, Coosa, and Tallapoosa River Basins. Monitoring of Black Creek continued in 2013 to provide additional biological, chemical, and physical data to fully assess the use support status for the 2016 Integrated Report.



Figure 1. Black Creek at BLKE-4 on September 26, 2013, facing upstream.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Black Creek is classified for *Fish and Wildlife (F&W)* from Lake Gadsden upstream 2.1 miles to its source. Based on the 2006 National Landuse Cover Dataset landuse within the watershed is primarily forested (63%), agriculture (19%), and development (7%). The watershed is located in the *Southern Table Plateaus* subecoregion and has a drainage area of approximately 54 square miles. As of September 1, 2012, eight NPDES permits have been issued in this watershed.

### REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (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 and the quality and availability of habitat. Black Creek at BLKE-4 is a shallow, wide, riffle/run stream with an open canopy. Although the bottom substrate was dominated by bedrock, there was enough diversity in substrates and flow regime to provide *sub-optimal* habitat for macroinvertebrate communities.

Table 1. Summary of watershed characteristics.

| Watershed Characteristics        |                         | Coosa River |
|----------------------------------|-------------------------|-------------|
| Basin                            |                         | 54          |
| Drainage Area (mi <sup>2</sup> ) |                         | 68d         |
| Ecoregion <sup>a</sup>           |                         |             |
| % Landuse                        |                         |             |
| Open water                       |                         | <1          |
| Wetland                          | Woody                   | 1           |
|                                  | Emergent herbaceous     | <1          |
| Forest                           | Deciduous               | 34          |
|                                  | Evergreen               | 14          |
|                                  | Mixed                   | 15          |
| Shrub/scrub                      |                         | 6           |
| Grassland/herbaceous             |                         | 2           |
| Pasture/hay                      |                         | 16          |
| Cultivated crops                 |                         | 3           |
| Development                      | Open space              | 6           |
|                                  | Low intensity           | 1           |
|                                  | Moderate intensity      | <1          |
| Barren                           |                         | <1          |
| Population/km <sup>2b</sup>      |                         | 155         |
| # NPDES Permits <sup>c</sup>     | TOTAL                   | 8           |
|                                  | Construction Stormwater | 6           |
|                                  | Municipal Individual    | 2           |

a. Southern Table Plateaus

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, September 1, 2012.

Table 2. Physical characteristics of Black Creek at BLKE-4, May 21, 2013.

| Physical Characteristics |                |
|--------------------------|----------------|
| Width (ft)               | 50             |
| Canopy Cover             | Mostly Open    |
| Depth (ft)               |                |
|                          | Riffle         |
|                          | Run            |
|                          | Pool           |
| % of Reach               |                |
|                          | Riffle         |
|                          | Run            |
|                          | Pool           |
| % Substrate              |                |
|                          | Bedrock        |
|                          | Boulder        |
|                          | Cobble         |
|                          | Gravel         |
|                          | Sand           |
|                          | Silt           |
|                          | Organic Matter |

**Table 3. Results of the habitat assessment conducted on Black Creek at BLKE-4, May 21, 2013.**

| Habitat Assessment              | %Maximum Score | Rating                     |
|---------------------------------|----------------|----------------------------|
| Instream Habitat Quality        | 63             | Sub-optimal (59-70)        |
| Sediment Deposition             | 69             | Sub-optimal (59-70)        |
| Sinuosity                       | 90             | Optimal (>84)              |
| Bank and Vegetative Stability   | 66             | Sub-optimal (60-74)        |
| Riparian Buffer                 | 58             | Marginal (50-69)           |
| <b>Habitat Assessment Score</b> | <b>163</b>     |                            |
| <b>% Maximum Score</b>          | <b>68</b>      | <b>Sub-optimal (59-70)</b> |

**Table 4. Results of the macroinvertebrate assessment conducted in Black Creek at BLKE-4, May 21, 2013.**

| Macroinvertebrate Assessment             |          |                     |
|--|----------|---------------------|
|  | Results  | Scores (#-100)      |
| <b>Taxa richness measures</b>            |          |                     |
| # EPT taxa                               | 18       | 61                  |
| <b>Taxonomic composition measures</b>    |          |                     |
| % Non-insect taxa                        | 13       | 48                  |
| % Dominant taxon                         | 28       | 53                  |
| % EPC taxa                               | 31       | 59                  |
| <b>Functional feeding group measures</b> |          |                     |
| % Predators                              | 8        | 31                  |
| <b>Tolerance measures</b>                |          |                     |
| % Taxa as Tolerant                       | 30       | 56                  |
| <b>WMB-I Assessment Score</b>            | <b>—</b> | <b>51</b>           |
| <b>WMB-I Assessment Rating</b>           |          | <b>Fair (39-58)</b> |

## BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). The WMB-I uses measures of taxonomic richness, community composition, and community tolerance to assess the overall health of the macroinvertebrate community. Each metric is scored on a 100 point scale. The final score is the average of all individual metric scores in comparison to reference reaches in the same ecoregion. Metric results indicated the macroinvertebrate community to be in *fair* condition (Table 4).

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. Samples were collected monthly during March through October of 2013. *In situ* parameters indicated that Black Creek at BLKE-4 was meeting water quality criteria for a *Fish & Wildlife (F&W)* use classification. Dissolved oxygen concentrations ranged from 7.9-11.0 mg/L. Median concentrations of nutrients, total and dissolved solids, and chlorides were similar to the concentrations obtained at ADEM's least-impaired ecoregional reference reaches located in the Southern Table Plateaus subecoregion. Specific conductance was higher than expected when compared to ecoregional values.

**Table 5. Summary of water quality data collected March-October, 2013. 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. Metals results were compared to ADEM's chronic aquatic life use criteria adjusted for hardness.**

| Parameter   | N        | Min              | Max         | Med               | Avg         | SD          |
|---|----------|------------------|-------------|-------------------|-------------|-------------|
| <b>Physical</b>                                   |          |                  |             |                   |             |             |
| Temperature (°C)                                  | 9        | 12.1             | 23.4        | 20.0              | 19.6        | 3.4         |
| Turbidity (NTU)                                   | 9        | 5.4              | 46.6        | 6.5               | 11.4        | 13.3        |
| Total Dissolved Solids (mg/L)                     | 8        | 23.0             | 137.0       | 41.5              | 52.0        | 35.6        |
| Total Suspended Solids (mg/L)                     | 8        | < 1.0            | 47.0        | 3.0               | 8.1         | 15.8        |
| Specific Conductance (µmhos)                      | 9        | 41.0             | 94.0        | 51.0 <sup>G</sup> | 55.6        | 16.2        |
| Alkalinity (mg/L)                                 | 8        | 7.2              | 20.8        | 11.9              | 12.6        | 4.6         |
| Stream Flow (cfs)                                 | 8        | 1.2              | 120.5       | 52.5              | 53.8        | 40.6        |
| <b>Chemical</b>                                   |          |                  |             |                   |             |             |
| Dissolved Oxygen (mg/L)                           | 9        | 7.9              | 11.0        | 8.9               | 9.0         | 0.9         |
| pH (su)   | 9        | 6.7              | 8.5         | 7.4               | 7.4         | 0.5         |
| <sup>J</sup> Ammonia Nitrogen (mg/L)              | 8        | < 0.015          | 0.095       | 0.011             | 0.023       | 0.030       |
| Nitrate+Nitrite Nitrogen (mg/L)                   | 8        | 0.027            | 0.155       | 0.074             | 0.078       | 0.036       |
| Total Kjeldahl Nitrogen (mg/L)                    | 8        | 0.192            | 0.600       | 0.260             | 0.310       | 0.136       |
| Total Nitrogen (mg/L)                             | 8        | 0.255            | 0.679       | 0.340             | 0.389       | 0.155       |
| <sup>J</sup> Dissolved Reactive Phosphorus (mg/L) | 8        | < 0.005          | 0.011       | 0.006             | 0.006       | 0.003       |
| <sup>J</sup> Total Phosphorus (mg/L)              | 8        | 0.011            | 0.019       | 0.012             | 0.014       | 0.003       |
| CBOD-5 (mg/L)                                     | 8        | < 2.0            | < 2.0       | 1.0               | 1.0         | 0.0         |
| <sup>J</sup> Chlorides (mg/L)                     | 8        | 1.8              | 3.1         | 2.4               | 2.4         | 0.4         |
| <b>Biological</b>                                 |          |                  |             |                   |             |             |
| <b>Chlorophyll a (µg/L)</b>                       | <b>8</b> | <b>&lt; 1.00</b> | <b>3.20</b> | <b>0.78</b>       | <b>1.21</b> | <b>0.99</b> |

G= eco-ref parameters that are above median of data in ecoregion 68d; J= estimate; N= # of samples

## 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 macroinvertebrate community in Black Creek at BLKE-4 to be in *fair* condition. In stream habitat was dominated by bedrock and found to be *sub-optimal*. Specific conductance was higher than background levels based on ecoregional data.

FOR MORE INFORMATION, CONTACT:  
Amanda L. Farrell, Birmingham Field Office  
110 Vulcan Road, Birmingham AL 35209  
(205) 942-6168 afarrell@adem.state.al.us