



**Draft**

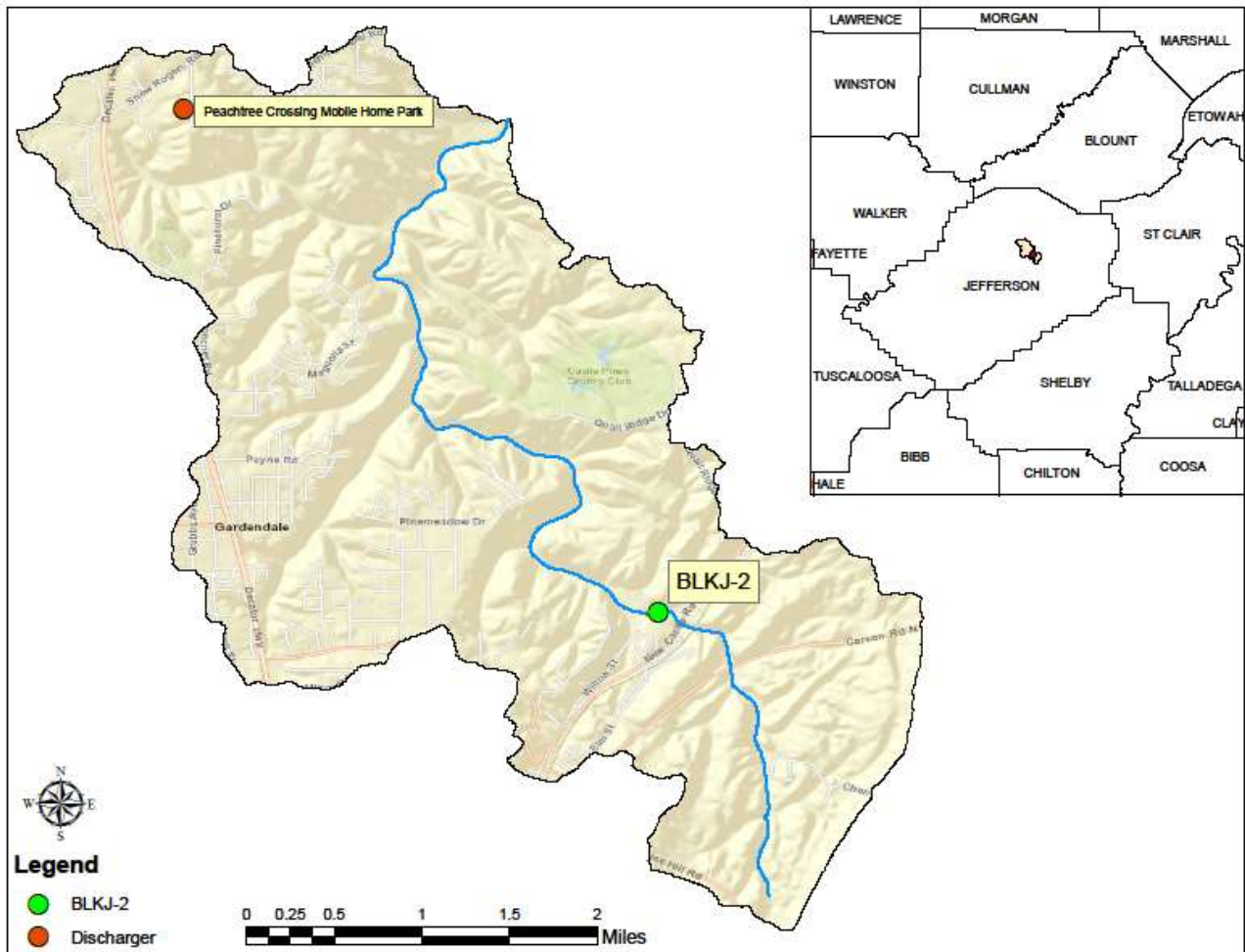
**Total Maximum Daily Load  
For  
Black Creek**

**Assessment Unit ID # AL03160111-0307-400**

**pH**

Alabama Department of Environmental Management  
Water Quality Branch  
Water Division  
March 2019

**Figure 1-1 Black Creek Watershed**



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<b><i>Table of Contents</i></b>	<b><i>Page</i></b>
1.0 Executive Summary .....	1
2.0 Basis for §303(d) Listing .....	2
2.1 Introduction .....	2
2.2 Problem Definition.....	2
3.0 Technical Basis for TMDL Development.....	3
3.1 Water Quality Target Identification .....	3
3.2 Source Assessment.....	4
3.2.1 Point Sources in the Black Creek Watershed .....	4
3.2.2 Nonpoint Sources in the Black Creek Watershed.....	4
3.3 Land Use Assessment.....	4
3.4 Linkage Between Numeric Targets and Sources .....	7
3.5 Data Availability and Analysis .....	7
3.6 Critical Conditions .....	10
3.7 Margin of Safety.....	10
4.0 TMDL Development.....	10
4.1 Definition of a TMDL .....	10
4.2 Load Calculations.....	10
4.3 TMDL Summary .....	10
5.0 Follow Up Monitoring.....	11
6.0 Public Participation.....	12
7.0 Appendices.....	13
7.1 References .....	13
7.2 ADEM Water Quality Data.....	14
7.3 Facility DMR Data .....	17
7.4 Black Creek Watershed Photos .....	19

<b><i>List of Figures</i></b>	<b><i>Page</i></b>
Figure 1-1 Black Creek Watershed.....	i
Figure 3-1. Land Use in the Black Creek Watershed .....	5
Figure 3-2. Land Use in the Black Creek Watershed .....	7
Figure 3-3. Map of Sampling Locations for Black Creek .....	9

***List of Tables***

Table 1-1. pH TMDL for Black Creek .....	1
Table 3-1. MS4 Permits within the Black Creek Watershed .....	4
Table 3-2. Land Use in the Black Creek Watershed.....	6
Table 3-3. pH Exceedances on Black Creek.....	8
Table 3-4. Location Description of ADEM Sampling Station .....	8
Table 4-1. pH TMDL for Black Creek .....	11
Table 7-1. ADEM pH Listing Data at Station BLKJ-2 .....	14
Table 7-2. ADEM 2016 pH Data at Station BLKJ-2.....	14
Table 7-3. Habitat Assessment at Station BLKJ-2, May 2012 .....	15
Table 7-4. Macroinvertebrate Assessment at Station BLKJ-2, May 2012 .....	15
Table 7-5. Habitat Assessment at Station BLKJ-2, May 2016 .....	16
Table 7-6. Macroinvertebrate Assessment at Station BLKJ-2, May 2016 .....	16
Table 7-7. Peachtree Crossing Mobile Home Park WWTP DMR Data.....	17

***List of Photos***

Photo 1 – BLKJ-2 Looking Upstream (Photo Taken 10/2/2007).....	19
Photo 2 – BLKJ-2 Looking Downstream (Photo Taken 10/2/2007).....	20
Photo 3 – BLKJ-2 Looking Upstream (Photo Taken 8/15/2012).....	21
Photo 4 – BLKJ-2 Looking Downstream (Photo Taken 8/15/2012).....	22



## 1.0 Executive Summary

Section 303(d) of the Clean Water Act and EPA’s Water Quality Planning and Management Regulations (40 CFR Part 130) require states to identify waterbodies which are not meeting their designated uses and to determine the Total Maximum Daily Load (TMDL) for pollutants causing the use impairment. A TMDL is the sum of individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources including natural background levels, and a margin of safety (MOS).

Black Creek is located in Jefferson County near Gardendale in the Black Warrior River Basin. The total length of Black Creek is 6.36 miles, and it has a total drainage area of 10.2 square miles. Black Creek is a tributary to Cunningham Creek and has a use classification of Fish and Wildlife (F&W). The entire Black Creek watershed is located within the Level IV Eco-region 68f.

Black Creek was added to the State of Alabama’s 2014 §303(d) list of impaired streams for pH based on data collected by the Alabama Department of Environmental Management (ADEM) in 2012. Black Creek was subsequently listed on Alabama’s §303(d) list of impaired streams from 2016-2018. The impaired segment extends from Cunningham Creek to its source. The source of the impairment is currently listed as abandoned surface mining.

In 2016, ADEM collected data on Black Creek at station BLKJ-2 in an effort to further assess the water quality of the impaired stream. For the purposes of this TMDL, the 2016 data will be used to assess the water quality of Black Creek because it is the most current data and provides the best picture of the current water quality conditions of the stream. The 2018 edition of *Alabama’s Water Quality Assessment and Listing Methodology* section 4.8.2, prepared by ADEM, provides the rationale for the Department to use the most recent data to prepare a TMDL for an impaired waterbody. The pH data collected was compared to Alabama’s water quality standard of 6.0 – 8.5 SU. According to the data, Black Creek was not meeting water quality standards for pH. Because pH is not a load, but rather a measure of acidity and/or alkalinity of a given solution, Alabama’s numeric pH standard is used as the TMDL target. 40 CFR § 130.2(i) provides rationale for TMDLs to be expressed in terms of *other appropriate measure*.

**Table 1-1. pH TMDL for Black Creek**

WLA (Continuous Sources)	WLA (Stormwater Sources)	LA (Stormwater Sources)	Margin of Safety (MOS)	TMDL
6.0 - 8.5 SU <sup>a</sup>	6.0-8.5 SU <sup>b</sup>	6.0 - 8.5 SU	N/A <sup>c</sup>	6.0 - 8.5 SU

- a. Current and future point sources must meet the pH criteria of 6.0-8.5 SU.
- b. TMDL compliance for NPDES-regulated stormwater sources may be demonstrated through implementation and maintenance of best management practices (BMPs).
- c. N/A = not applicable. A Margin of Safety (MOS) was not considered necessary due to the TMDL being established equal to the pH water quality criteria.

Compliance with the terms and conditions of existing and future NPDES permits will effectively implement the WLA and demonstrate consistency with the assumptions and requirements of the TMDL. Required improvements in the LA portion of this TMDL can be implemented through voluntary measures and may be eligible for CWA §319 grants. The Department recognizes that adaptive implementation of the TMDL will be needed to achieve applicable water quality criteria, and we are committed to targeting the improvements necessary to improve the water quality in the Black Creek watershed.

## ***2.0 Basis for §303(d) Listing***

### ***2.1 Introduction***

Section 303(d) of the Clean Water Act (CWA), as amended by the Water Quality Act of 1987 and EPA's Water Quality Planning and Management Regulations [Title 40 of the Code of Federal Regulations (CFR), Part 130], requires states to identify waterbodies which are not meeting water quality criteria applicable to their designated use classifications. The identified waters are prioritized based on severity of pollution with respect to designated use classifications. Total maximum daily loads (TMDLs) for all pollutants causing violation of applicable water quality criteria are established for each identified water. Such loads are established at levels necessary to implement the applicable water quality criteria with seasonal variations and margins of safety. The TMDL process establishes the allowable loading of pollutants, or other quantifiable parameters for a waterbody, based on the relationship between pollution sources and in-stream water quality conditions, so that states can establish water quality based controls to reduce pollution from both point and non-point sources and restore and maintain the quality of their water resources (USEPA, 1991).

Black Creek was originally listed on Alabama's 2014 §303(d) list for pH based on data collected by ADEM in 2012. The source of the impairment is listed on the 2018 §303(d) list as abandoned surface mining.

### ***2.2 Problem Definition***

<u>Waterbody Impaired:</u>	Black Creek – Cunningham Creek to its source
<u>Impaired Reach Length:</u>	6.36 miles
<u>Impaired Drainage Area:</u>	10.23 square miles
<u>Water Quality Standard Violation:</u>	pH
<u>Water Use Classification:</u>	Fish and Wildlife

#### Usage Related to Classification:

The impaired segment of Black Creek is classified as Fish and Wildlife (F&W). Usages of waters in this classification are described in ADEM Admin. Code R. 335-6-10-.09(5)(a), (b), (c), and (d).

- (a) *Best usage of waters: fishing, propagation of fish, aquatic life, and wildlife.*
- (b) *Conditions related to best usage: the waters will be suitable for fish, aquatic life and wildlife propagation. The quality of salt and estuarine waters to which this classification is assigned will also be suitable for the propagation of shrimp and crabs.*
- (c) *Other usage of waters: it is recognized that the waters may be used for incidental water contact year-round and whole body water-contact recreation during the months of May through October, except that water contact is strongly discouraged in the vicinity of discharges or other conditions beyond the control of the Department or the Alabama Department of Public Health.*
- (d) *Conditions related to other usage: the waters, under proper sanitary supervision by the controlling health authorities, will meet accepted standards of water quality for outdoor swimming areas and will be considered satisfactory for swimming and other whole body water-contact sports.*

pH Criteria:

Criteria for acceptable pH levels for the F&W use classification are described in ADEM Admin. Code R. 335-6-10-.09(5)(e)2. as follows:

2. *pH: sewage, industrial wastes or other wastes shall not cause the pH to deviate more than one unit from the normal or natural pH, nor be less than 6.0, nor greater than 8.5. For salt waters and estuarine waters to which this classification is assigned, wastes as herein described shall not cause the pH to deviate more than one unit from the normal or natural pH, nor be less than 6.5, nor greater than 8.5.*

Criteria Exceeded:

The original listing of Black Creek was based on data collected by ADEM in 2012. Of the nine pH samples collected at ADEM sampling station BLKJ-2 in 2012, five samples did not meet the applicable pH criteria.

### ***3.0 Technical Basis for TMDL Development***

#### ***3.1 Water Quality Target Identification***

Alabama's water quality criteria for pH is that sewage, industrial wastes or other wastes shall not cause the pH to deviate more than one unit from the natural pH, nor be less than 6.0 SU, nor greater than 8.5 SU. For the purpose of this TMDL, the 6.0 – 8.5 SU range will be the water quality target. No margin of safety is necessary due to the TMDL being established equal to the water quality criteria. This target is considered protective of water quality standards.

### **3.2 Source Assessment**

#### **3.2.1 Point Sources in the Black Creek Watershed**

Currently, there is one active continuous National Pollutant Discharge Elimination System (NPDES) Permit within the Black Creek watershed, Peachtree Crossing Mobile Home Park WWTP (AL0051055). This discharger has permitted pH limits of 6.0 SU (daily minimum) and 8.5 SU (daily maximum), and DMR data from 2014 to the present indicates that they have been in compliance their pH limits. DMR data for Peachtree Crossing MHP WWTP can be found in Appendix 7.3.

There are no CAFOs located in the Black Creek watershed. Currently, there are three Municipal Separate Storm Sewer System (MS4) permits within the watershed. These permits are listed below in Table 3-1.

**Table 3-1. MS4 Permits within the Black Creek Watershed**

<b>Permittee</b>	<b>Type</b>	<b>Permit Number</b>
City of Gardendale	Phase I	ALS000026
Jefferson County	Phase I	ALS000001
City of Fultondale <sup>a</sup>	Phase II	ALR040037

a. Only the urbanized area of Fultondale is regulated

#### **3.2.2 Nonpoint Sources in the Black Creek Watershed**

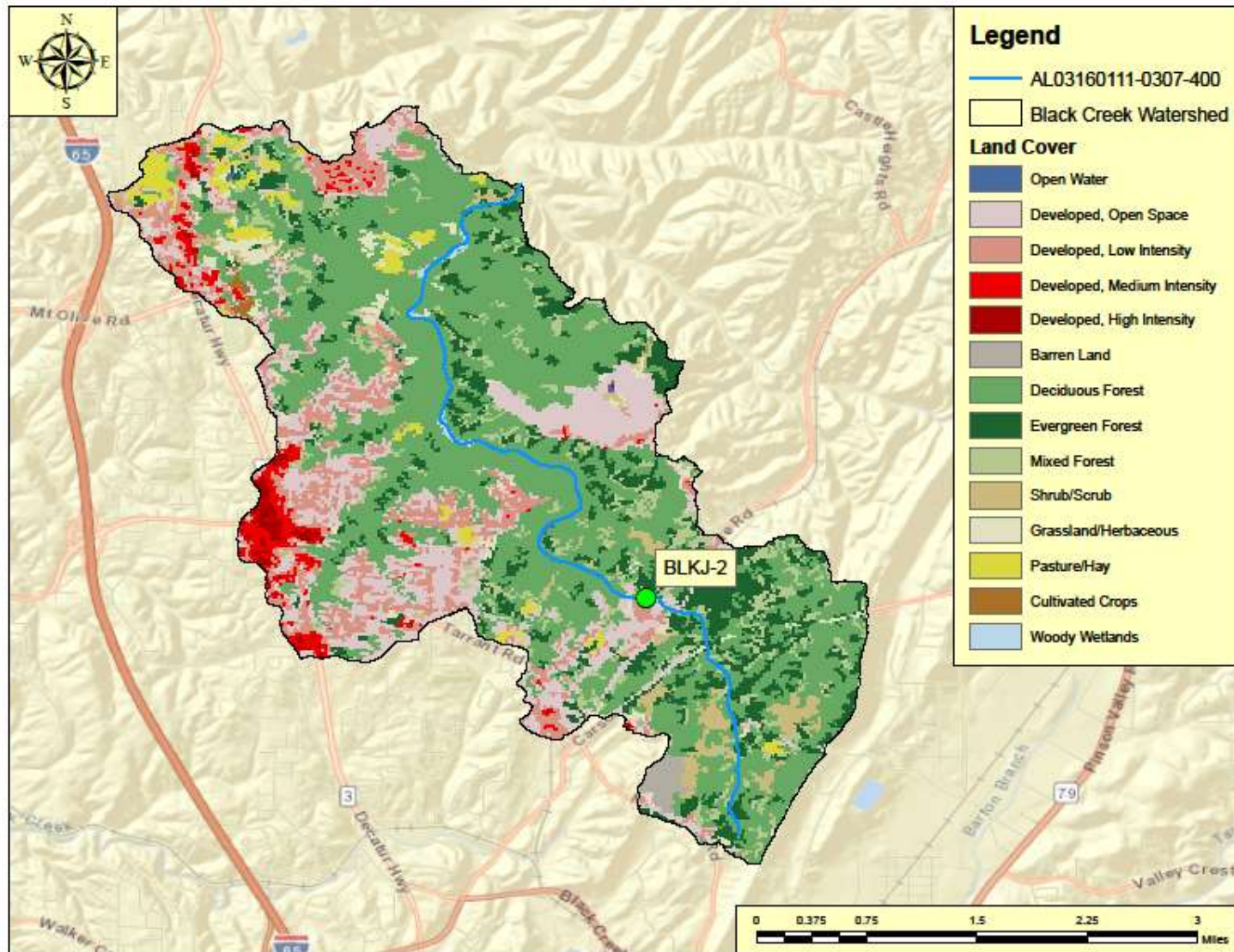
From review of the data collected and land use assessment, it is believed that nonpoint sources are contributing to the pH impairment in Black Creek. There is a history of coal mining in the Black Creek watershed.

### **3.3 Land Use Assessment**

Land use for the Black Creek watershed was determined using ArcMap with land use datasets derived from the 2011 National Land Cover Dataset (NLCD). Figure 3-1 and Table 3-2 display the land use areas for the Black Creek watershed. Figure 3-2 is a graph depicting the primary land uses in the Black Creek watershed.

The majority of the Black Creek watershed is forested/natural (69.33%). Other major land uses within the watershed are 28.10% developed land, 2.51% agricultural land, and 0.05% open water. Developed land includes both commercial and residential land uses.

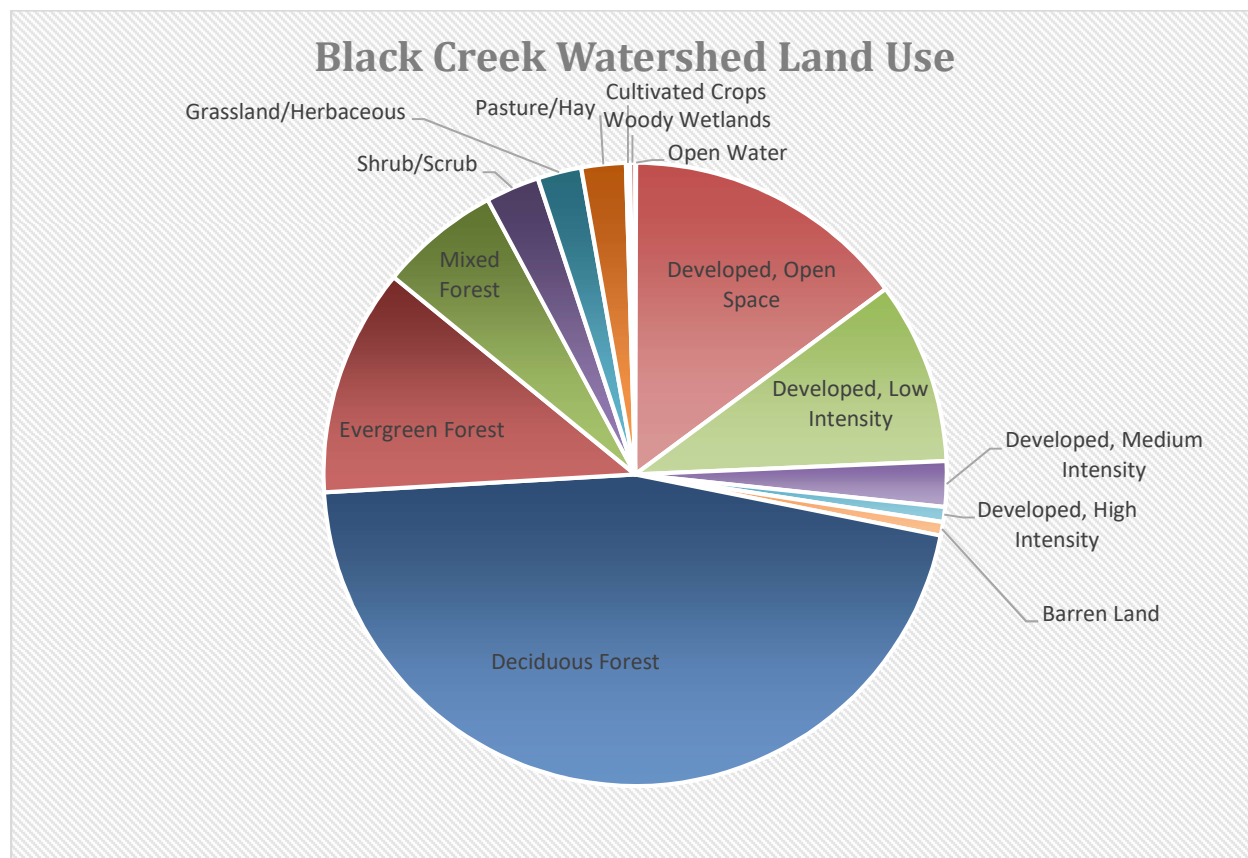
Figure 3-1. Land Use in the Black Creek Watershed



**Table 3-2. Land Use in the Black Creek Watershed**

<b>Class Description</b>	<b>Area (ac)</b>	<b>Area (mi<sup>2</sup>)</b>	<b>Percent</b>
Open Water	3.56	0.00556	0.05%
Developed, Open Space	968.75	1.51367	14.80%
Developed, Low Intensity	618.70	0.96672	9.45%
Developed, Medium Intensity	154.34	0.24116	2.36%
Developed, High Intensity	50.93	0.07958	0.78%
Barren Land	46.04	0.07193	0.70%
Deciduous Forest	3006.11	4.69702	45.94%
Evergreen Forest	772.60	1.20718	11.81%
Mixed Forest	409.65	0.64008	6.26%
Shrub/Scrub	183.03	0.28598	2.80%
Grassland/Herbaceous	148.56	0.23212	2.27%
Pasture/Hay	151.01	0.23595	2.31%
Cultivated Crops	13.57	0.02120	0.21%
Woody Wetlands	17.35	0.02710	0.27%
<b>TOTALS</b>	<b>6544.18</b>	<b>10.23</b>	<b>100%</b>
<b>Class Description</b>	<b>Area (ac)</b>	<b>Area (mi<sup>2</sup>)</b>	<b>Percent</b>
Open Water	3.56	0.00556	0.05%
Agriculture Lands	164.57	0.25714	2.51%
Forested / Natural	4537.29	7.08949	69.33%
Developed Land (Grouped)	1838.76	2.87305	28.10%
<b>TOTALS</b>	<b>6544.18</b>	<b>10.23</b>	<b>100%</b>

**Figure 3-2. Land Use in the Black Creek Watershed**



### ***3.4 Linkage Between Numeric Targets and Sources***

There is a history of mining activities in the Black Creek watershed. Based on the identification of an abandoned mining site in the Black Creek watershed, abandoned mine lands may represent a critical nonpoint source. Abandoned mines can contribute significant amounts of acid mine drainage, which causes low pH in surface and subsurface water in areas where mining activities are or once were present (Lee et al. 2002).

### ***3.5 Data Availability and Analysis***

In 2016, ADEM collected chemical, physical, and biological data on Black Creek at BLKJ-2 to more fully evaluate existing conditions as related to the previous listing decision. There were eight pH samples collected in 2016. Of the eight pH samples collected, seven of those samples were in violation of Alabama's water quality standards. These pH violations are shown in Table 3-3.

**Table 3-3. pH Exceedances on Black Creek**

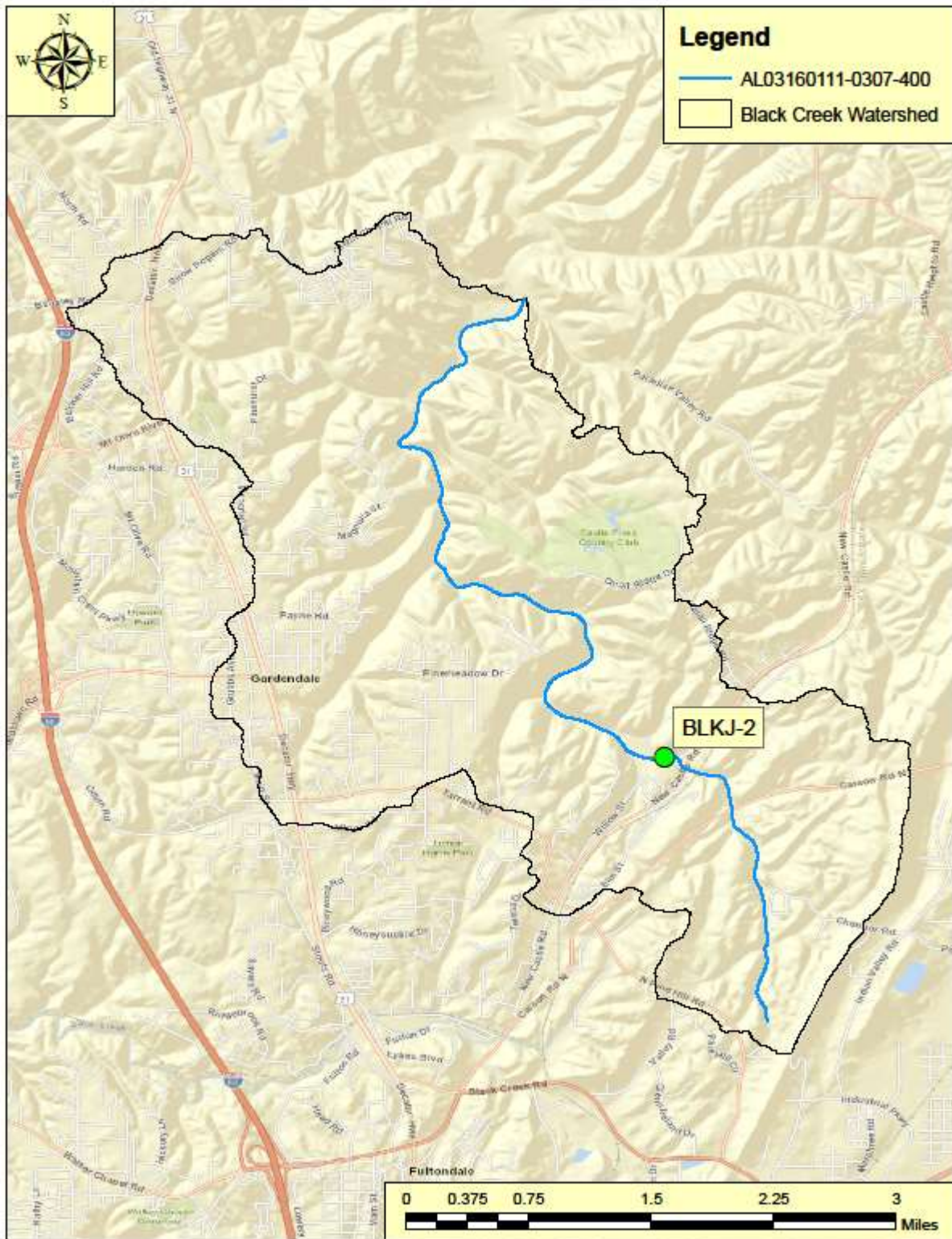
Station ID	Visit Date	pH (SU)	pH Detect Condition	Flow (cfs)
BLKJ-2	3/22/2016	5.87		1.9321
BLKJ-2	4/6/2016	6.22		3.6533
BLKJ-2	5/10/2016	5.26		0.4320
BLKJ-2	5/11/2016	4.78		0.4674
BLKJ-2	6/8/2016	3.49		
BLKJ-2	7/13/2016	5.67		0.3424
BLKJ-2	8/3/2016	5.72		
BLKJ-2	9/15/2016	3.8		

**Table 3-4. Location Description of ADEM Sampling Station**

Station ID	Stream	Station Description	Latitude	Longitude	County	Ecoregion/ Sub region
BLKJ-2	Black Creek	Black Creek at Cottonwood Road	33.644544	-86.774686	Jefferson	68f



**Figure 3-3. Sampling Location for Black Creek**



### ***3.6 Critical Conditions***

Critical conditions for pH in Black Creek exist during periods of low flows, where incremental inflows with very low pH have a greater effect on the water quality of Black Creek. Supporting data can be found in Appendix 7.2.

### ***3.7 Margin of Safety***

There are two methods for incorporating a Margin of Safety (MOS) in the analysis: 1) by implicitly incorporating the MOS using conservative model assumptions to develop allocations, or 2) by explicitly specifying a portion of the TMDL as the MOS and using the remainder for allocations.

For pH, a margin of safety was not considered necessary since the established TMDL was equal to the pH water quality criteria.

## ***4.0 TMDL Development***

### ***4.1 Definition of a TMDL***

A total maximum daily load (TMDL) is the sum of individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources including natural background levels, and a margin of safety (MOS). The margin of safety can be included either explicitly or implicitly and accounts for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. A TMDL can be denoted by the equation:

$$\text{TMDL} = \Sigma \text{WLAs} + \Sigma \text{LAs} + \text{MOS}$$

The TMDL is the total amount of a pollutant that can be assimilated by the receiving waterbody while achieving water quality standards under critical conditions.

For some pollutants, TMDLs are expressed on a mass loading basis (e.g., pounds per day). However, because pH is not a load, but rather a measure of acidity and/or alkalinity of a given solution, Alabama's numeric pH standard is used as the TMDL target. 40 CFR § 130.2(i) provides rationale for TMDLs to be expressed in terms of *other appropriate measure*.

### ***4.2 Load Calculations***

As previously stated, pH is not a load but rather a measure of acidity and/or alkalinity of a given solution; therefore, Alabama's numeric pH criteria of 6.0 – 8.5 SU is used as the TMDL target.

### ***4.3 TMDL Summary***

Black Creek was placed on Alabama's §303(d) list in 2014 based on data collected by ADEM in 2012. In 2016, ADEM collected additional water quality data to fully analyze Black Creek for the

listed impairment. The data collected by ADEM confirmed the pH impairment on Black Creek, and the most recent data (collected in 2016) provided the basis for TMDL development.

Since pH is not a load but rather a measure of acidity and/or alkalinity of a given solution, Alabama’s numeric pH standard (6.0 – 8.5 SU) is used as the TMDL target. This target is considered protective of water quality standards. A summary of the load allocations and TMDL for pH in Black Creek is provided below in Table 4-1. **pH TMDL for Black Creek**

**Table 4-1. pH TMDL for Black Creek**

<b>WLA (Continuous Sources)</b>	<b>WLA (Stormwater Sources)</b>	<b>LA (Stormwater Sources)</b>	<b>Margin of Safety (MOS)</b>	<b>TMDL</b>
6.0 - 8.5 SU <sup>a</sup>	6.0-8.5 SU <sup>b</sup>	6.0 - 8.5 SU	N/A <sup>c</sup>	6.0 - 8.5 SU

- a. Current and future point sources must meet the pH criteria of 6.0-8.5 SU.
- b. TMDL compliance for NPDES-regulated stormwater sources may be demonstrated through implementation and maintenance of best management practices (BMPs).
- c. N/A = not applicable. A Margin of Safety (MOS) was not considered necessary due to the TMDL being established equal to the pH water quality criteria.

Compliance with the terms and conditions of existing and future NPDES permits will effectively implement the WLA and demonstrate consistency with the assumptions and requirements of the TMDL. Required improvements in the LA portion of this TMDL can be implemented through voluntary measures and may be eligible for CWA §319 grants.

The Department recognizes that adaptive implementation of the TMDL will be needed to achieve applicable water quality criteria, and we are committed to targeting the improvements necessary to improve the water quality in the Black Creek watershed.

### ***5.0 Follow Up Monitoring***

ADEM has adopted a statewide approach to water quality management. Each year, ADEM’s water quality resources are divided among multiple priorities statewide including §303(d) listed waterbodies, waterbodies with active TMDLs, and other waterbodies as determined by the Department. Monitoring will help further characterize water quality conditions resulting from the implementation of best management practices and load reductions in the watershed.

## ***6.0 Public Participation***

As part of the public participation process, this TMDL will be placed on public notice and made available for review and comment. The public notice will be prepared and published in the four major daily newspapers in Montgomery, Huntsville, Birmingham, and Mobile, as well as submitted to persons who have requested to be on ADEM's postal and electronic mailing distributions. In addition, the public notice and subject TMDL will be made available on ADEM's Website: [www.adem.alabama.gov](http://www.adem.alabama.gov). The public can also request paper or electronic copies of the TMDL by contacting Ms. Kimberly Minton at 334-271-7826 or [kminton@adem.alabama.gov](mailto:kminton@adem.alabama.gov). The public will be given an opportunity to review the TMDL and submit comments to the Department in writing. At the end of the public review period, all written comments received during the public notice period will become part of the administrative record. ADEM will consider all comments received by the public prior to final completion of this TMDL and subsequent submission to EPA Region 4 for final approval.

## **7.0 Appendices**

### **7.1 References**

ADEM Administrative Code, 2017. Water Quality Program, Chapter 335-6-10, Water Quality Criteria, and Chapter 335-6-11 Use Classifications for Interstate and Intrastate Waters.

Alabama's §303(d) Monitoring Program. 2012 & 2016. ADEM.

Alabama Department of Environmental Management, 2014, 2016, and 2018 §303(d) Lists. ADEM.

Alabama Department of Environmental Management (ADEM), *Alabama's Water Quality Assessment and Listing Methodology*, 2018.

Lee, G., Bigham, J.M., and Faure, G. 2002. *Removal of trace metals by coprecipitation with Fe, Al, and Mn from natural waters contaminated with acid mine drainage in the Ducktown Mining District, Tennessee*. Applied Geochemistry. 17, 569-581.

United States Environmental Protection Agency. 2014. Memorandum: *Revisions to the November 22, 2002 Memorandum "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs."* Office of Water, EPA.

United States Environmental Protection Agency. 1991. *Guidance for Water Quality-Based Decisions: The TMDL Process*, Office of Water, EPA 440/4-91-001.

United States Environmental Protection Agency. 1986. *Quality Criteria for Water 1986*, Office of Water Regulations and Standards, EPA 440/5-86-001.

## 7.2 ADEM Water Quality Data

**Table 7-1. ADEM pH Listing Data at Station BLKJ-2**

Station ID	Visit Date	pH (SU)	pH Detect Condition
BLKJ-2	4/17/2012	6.22	
BLKJ-2	5/1/2012	7.16	
BLKJ-2	5/3/2012	6.49	
BLKJ-2	5/17/2012	5.24	
BLKJ-2	6/21/2012	6.73	
BLKJ-2	8/15/2012	4.7	
BLKJ-2	9/11/2012	4.95	
BLKJ-2	10/10/2012	5.86	
BLKJ-2	11/8/2012	5.94	

**Table 7-2. ADEM 2016 pH Data at Station BLKJ-2**

Station ID	Visit Date	pH (SU)	pH Detect Condition	Flow (cfs)	Comments
BLKJ-2	3/22/2016	5.87		1.9321	
BLKJ-2	4/6/2016	6.22		3.6533	
BLKJ-2	5/10/2016	5.26		0.4320	Bottom section of reach and DS chalky white water color and silt deposits.
BLKJ-2	5/11/2016	4.78		0.4674	Hydrolab reading was taken at station, which was extremely white. Approx 40 feet up stream of station water was clear.
BLKJ-2	6/8/2016	3.49			Water was extremely slow moving. In areas where water appeared to not be moving the water was clear with the white settled on bottom.
BLKJ-2	7/13/2016	5.67		0.3424	
BLKJ-2	8/3/2016	5.72			
BLKJ-2	9/15/2016	3.8			Extremely slow flow.

**Table 7-3. Habitat Assessment at Station BLKJ-2, May 2012**

<b>Table 3.</b> Results of the habitat assessment conducted on Black Creek at BLKJ-2, May 3, 2012. Macroinvertebrates were also collected.		
<b>Habitat Assessment</b>	<b>%Maximum Score</b>	<b>Rating</b>
Instream Habitat Quality	63	Sub-optimal (55-75)
Sediment Deposition	61	Sub-optimal (55-75)
Riffle Frequency	85	Optimal (80-100)
Bank and Vegetative Stability	33	Marginal (30-50)
Riparian Zone Measurements	70	Sub-optimal (60-75)
<b>Habitat Assessment Score</b>	<b>120</b>	
<b>% Maximum Score</b>	<b>60</b>	Sub-optimal (57-75)

**Table 7-4. Macroinvertebrate Assessment at Station BLKJ-2, May 2012**

<b>Macroinvertebrate Assessment (Completed 5/3/2012)</b>	
	<b>Results</b>
<b>Taxa richness &amp; diversity metrics</b>	
Total # taxa	39
# rare and highly sensitive taxa	1
# sensitive taxa	8
# sensitive EPT taxa	2
<b>Percent taxon metrics</b>	
% sensitive EPT taxa	5
% sensitive taxa	21
% rare and highly sensitive taxa	3
% tolerant individuals	35
% tolerant taxa	10
<b>Percent individual metrics</b>	
% rare and highly sensitive individuals	0
% sensitive individuals	3
% sensitive EPT individuals	1
<b>WMB-I Survey Score</b>	<b>4</b>
<b>WMB-I Survey Rating</b>	<b>Fair-poor (4.1-4.25)</b>

**Table 7-5. Habitat Assessment at Station BLKJ-2, May 2016**

<b>Table 3.</b> Results of the habitat assessment conducted on Black Creek at BLKJ-2, May 10, 2016. Macroinvertebrates were also collected.		
<b>Habitat Assessment</b>	<b>%Maximum Score</b>	<b>Rating</b>
Instream Habitat Quality	64	Sub-optimal (55-75)
Sediment Deposition	33	Marginal (30-50)
Riffle Frequency	80	Optimal (80-100)
Bank and Vegetative Stability	58	Sub-optimal (55-75)
Riparian Zone Measurements	64	Sub-optimal (60-75)
<b>Habitat Assessment Score</b>	<b>116</b>	
<b>% Maximum Score</b>	<b>58</b>	Sub-optimal (57-75)

**Table 7-6. Macroinvertebrate Assessment at Station BLKJ-2, May 2016**

<b>Macroinvertebrate Assessment (Completed 5/10/2016)</b>		
	<b>Results</b>	<b>Scores</b>
<b>Taxonomic richness and diversity metrics</b>		
# Ephemeroptera (mayfly) Taxa	<b>4</b>	<b>33</b>
# Plecoptera (stonefly) Taxa	<b>2</b>	<b>33</b>
# Trichoptera (caddisfly) Taxa	<b>3</b>	<b>25</b>
% Non-Insect Taxa	<b>5</b>	<b>79</b>
<b>Taxonomic composition metrics</b>		
% Plecoptera	<b>4</b>	<b>18</b>
% Non-Insect Individuals	<b>3</b>	<b>92</b>
<b>Tolerance metrics</b>		
Becks Community Tolerance Index	<b>4</b>	<b>14</b>
<b>WMB-I Survey Score</b>		<b>42</b>
<b>WMB-I Survey Rating</b>		<b>Poor (23.5-47.4)</b>



### 7.3 Facility DMR Data

**Table 7-7. Peachtree Crossing Mobile Home Park WWTP DMR Data**

Monitoring Period Start	Monitoring Period End	pH Minimum	pH Maximum	Unit
1/1/2014 0:00	1/31/2014 0:00	6.5	6.9	S.U.
2/1/2014 0:00	2/28/2014 0:00	6.5	7.3	S.U.
3/1/2014 0:00	3/31/2014 0:00	6.5	7	S.U.
4/1/2014 0:00	4/30/2014 0:00	6.7	7.6	S.U.
5/1/2014 0:00	5/31/2014 0:00	6.6	7.1	S.U.
6/1/2014 0:00	6/30/2014 0:00	6.6	7.3	S.U.
7/1/2014 0:00	7/31/2014 0:00	6.8	6.8	S.U.
8/1/2014 0:00	8/31/2014 0:00	6.6	7	S.U.
9/1/2014 0:00	9/30/2014 0:00	6.7	7.3	S.U.
10/1/2014 0:00	10/31/2014 0:00	6.8	7.3	S.U.
11/1/2014 0:00	11/30/2014 0:00	6.7	7.1	S.U.
12/1/2014 0:00	12/31/2014 0:00	6.9	7.2	S.U.
1/1/2015 0:00	1/31/2015 0:00	6.4	7.7	S.U.
2/1/2015 0:00	2/28/2015 0:00	6.5	6.7	S.U.
3/1/2015 0:00	3/31/2015 0:00	6.4	6.8	S.U.
4/1/2015 0:00	4/30/2015 0:00	6.7	6.9	S.U.
5/1/2015 0:00	5/31/2015 0:00	6.7	7.1	S.U.
6/1/2015 0:00	6/30/2015 0:00	6.9	7.2	S.U.
7/1/2015 0:00	7/31/2015 0:00	6.7	7	S.U.
8/1/2015 0:00	8/31/2015 0:00	6.6	7.1	S.U.
9/1/2015 0:00	9/30/2015 0:00	6.5	7.5	S.U.
10/1/2015 0:00	10/31/2015 0:00	6.6	7.2	S.U.
11/1/2015 0:00	11/30/2015 0:00	6.5	7.2	S.U.
12/1/2015 0:00	12/31/2015 0:00	6.4	7.5	S.U.
1/1/2016 0:00	1/31/2016 0:00	6.8	7.4	S.U.
2/1/2016 0:00	2/29/2016 0:00	6.4	6.9	S.U.
3/1/2016 0:00	3/31/2016 0:00	6.5	7	S.U.
4/1/2016 0:00	4/30/2016 0:00	6.5	7.2	S.U.
5/1/2016 0:00	5/31/2016 0:00	6.8	7.4	S.U.
6/1/2016 0:00	6/30/2016 0:00	6.6	7.2	S.U.
7/1/2016 0:00	7/31/2016 0:00	6.8	7.1	S.U.
8/1/2016 0:00	8/31/2016 0:00	6.7	7.1	S.U.
9/1/2016 0:00	9/30/2016 0:00	6.8	7.4	S.U.
10/1/2016 0:00	10/31/2016 0:00	7	7.4	S.U.
11/1/2016 0:00	11/30/2016 0:00	6.9	7.5	S.U.
12/1/2016 0:00	12/31/2016 0:00	6.9	7.1	S.U.

Monitoring Period Start	Monitoring Period End	pH Min	pH Max	Unit
1/1/2017 0:00	1/31/2017 0:00	6.9	7.2	S.U.
2/1/2017 0:00	2/28/2017 0:00	7	7.2	S.U.
3/1/2017 0:00	3/31/2017 0:00	6.9	7.2	S.U.
4/1/2017 0:00	4/30/2017 0:00	6.7	7.2	S.U.
5/1/2017 0:00	5/31/2017 0:00	6.5	7.2	S.U.
6/1/2017 0:00	6/30/2017 0:00	6.5	7.5	S.U.
7/1/2017 0:00	7/31/2017 0:00	6.1	7.3	S.U.
8/1/2017 0:00	8/31/2017 0:00	6.4	6.7	S.U.
9/1/2017 0:00	9/30/2017 0:00	6.3	7.5	S.U.
10/1/2017 0:00	10/31/2017 0:00	6.7	7.5	S.U.
11/1/2017 0:00	11/30/2017 0:00	6.5	7.7	S.U.
12/1/2017 0:00	12/31/2017 0:00	6.7	7.4	S.U.
1/1/2018 0:00	1/31/2018 0:00	6.9	7.8	S.U.
2/1/2018 0:00	2/28/2018 0:00	7.2	7.3	S.U.
3/1/2018 0:00	3/31/2018 0:00	7	7.4	S.U.
4/1/2018 0:00	4/30/2018 0:00	7.1	7.3	S.U.
5/1/2018 0:00	5/31/2018 0:00	7.2	7.5	S.U.
6/1/2018 0:00	6/30/2018 0:00	7.7	7.7	S.U.
7/1/2018 0:00	7/31/2018 0:00	7.3	7.5	S.U.
8/1/2018 0:00	8/31/2018 0:00	7	7.2	S.U.
9/1/2018 0:00	9/30/2018 0:00	7.1	7.5	S.U.
10/1/2018 0:00	10/31/2018 0:00	7	7.3	S.U.
11/1/2018 0:00	11/30/2018 0:00	7	7.2	S.U.
12/1/2018 0:00	12/31/2018 0:00	7	7.3	S.U.
1/1/2019 0:00	1/31/2019 0:00	7.1	7.5	S.U.

## ***7.4 Black Creek Watershed Photos***

**Photo 1 – BLKJ-2 Looking Upstream (Photo Taken 5/3/2012)**



**Photo 2 – BLKJ-2 Looking Downstream (Photo Taken 5/3/2012)**





**Photo 3 – BLKJ-2 Looking Upstream (Photo Taken 7/13/2016)**





**Photo 4 – BLKJ-2 Looking Downstream (Photo Taken 7/13/2016)**

