

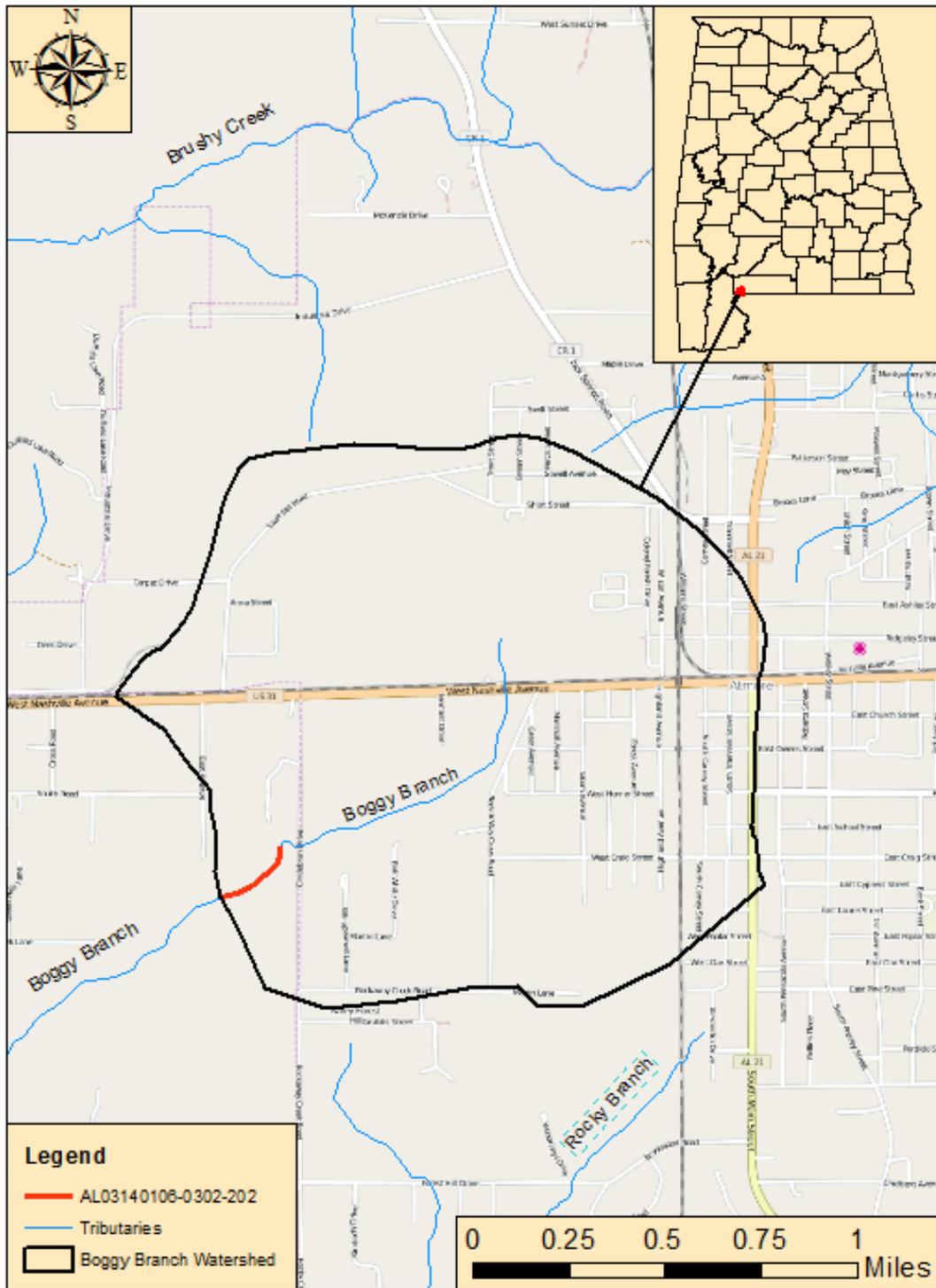


**Draft  
Delisting Decision  
for  
Boggy Branch**

Waterbody ID AL03140106-0302-202  
**Metals (Zn, Hg)**

Alabama Department of Environmental Management  
Water Quality Branch  
Water Division  
February 2016

## Boggy Branch Watershed Map in the Perdido-Escambia River Basin



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## ***1.0 Executive Summary***

Boggy Branch, located in Escambia County, is a part of the Perdido-Escambia River Basin. Boggy Branch originates in west Escambia County and runs southwest into Brushy Creek near the Alabama-Florida state line. Boggy Branch has a use classification of Fish & Wildlife (F&W).

In 1998, Boggy Branch was originally listed for Zinc on the State of Alabama's §303(d) list. The two tenths mile length of the impaired segment was from Atmore WWTP to Masland Carpets WWTP. The original listing was reportedly based on data collected from 1996 through 1997. Boggy Branch has subsequently been listed on Alabama's 2000, 2002, 2004, 2006, 2008, 2010, 2012 and 2014 §303(d) lists of impaired waterbodies.

In 2006, ADEM clarified the impaired segment on the §303(d) list to 0.22 miles in length. The segment boundaries remained from Atmore WWTP to Masland Carpets WWTP.

In 2008, ADEM added the Mercury impairment to the §303(d) list. The basis for the listing was data from the 2005 ADEM §303(d) monitoring at stations BOB-1, BOB-2, and BOB-3.

Over the last six years, additional data has been acquired for Boggy Branch to assess its ability to meet applicable water quality standards. The data indicates that Boggy Branch, from Atmore WWTP to Masland Carpets WWTP, now fully supports its use classification with respect to Zinc (Zn) and Mercury (Hg).

The following report addresses the results of the delisting analysis of Boggy Branch for Zinc and Mercury. Based on an assessment of all available data, ADEM has determined that a water quality impairment due to metals (Zn, Hg) does not exist. Therefore, ADEM will not develop a TMDL due to "more recent or accurate data," which is just cause for delisting a waterbody according to Title 40 of the Code of Federal Regulations (CFR), Part 130.7(b)(6)(iv).

## ***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 standards applicable to their designated use classifications. The identified waters are prioritized based on severity of pollution with respect to designated use classifications. TMDLs for all pollutants causing violation of applicable water quality standards are established for each identified water. Such loads are established at levels necessary to implement the applicable water quality standards 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).

The 2014 §303(d) list states that Boggy Branch (AL03140106-0302-202) is impaired for a length of 0.22 miles from Atmore WWTP to Masland Carpets WWTP. The original 1998 listing for zinc was reportedly based on data collected from 1996 through 1997. The original 2008 listing for mercury was reportedly based on ADEM §303(d) monitoring data collected in 2005. Boggy Branch has a use classification of Fish & Wildlife (F&W).

## ***3.0 Technical Basis for Delisting Decision***

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

According to ADEM's Water Quality Criteria (Administrative Code 335-6-10-.07), both acute and chronic aquatic life criteria and human health (consumption of fish only) criteria are applicable for waterbodies classified as Fish and Wildlife.

Acute and chronic aquatic life criteria for several metals, including zinc, are hardness dependent. Hardness values must be entered into equations that are specific to each metal. These equations are provided in Appendix 6.3. Metals criteria for Boggy Branch were calculated using individual hardness values from each sampling event at each sampling station.

## ***3.2 Source Assessment***

### **3.2.1 Point Sources in the Boggy Branch Watershed**

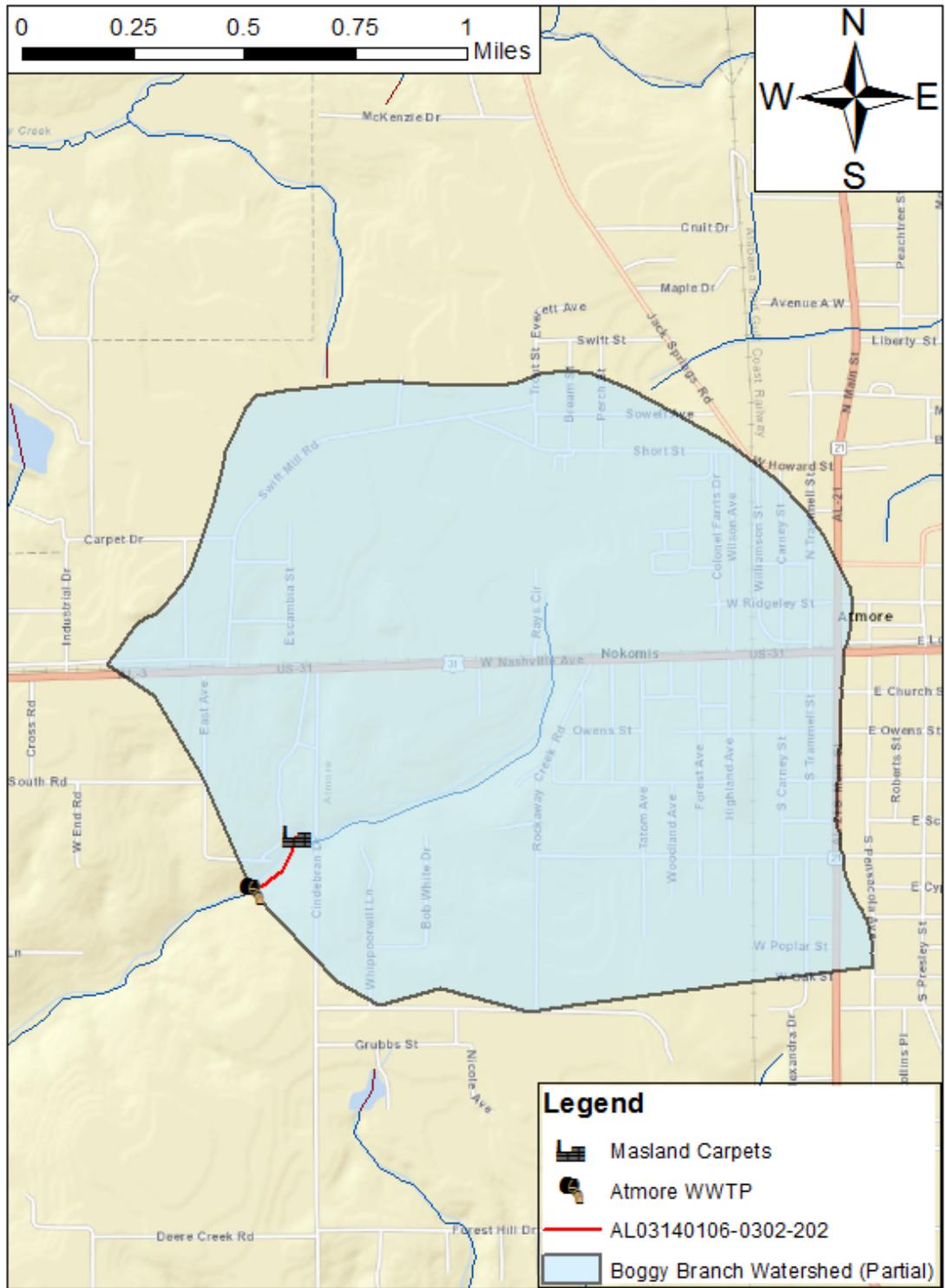
#### ***Continuous Point Sources***

There are two point sources, Atmore WWTP (AL0049557) and Masland Carpets (AL0021997), in the Boggy Branch watershed. The Atmore WWTP discharge is the downstream boundary of the impaired segment. Masland Carpets is the upstream boundary of the impaired segment. Masland Carpets was discharging during the 2014 sampling; however, the facility has recently ceased discharging process wastewater to Boggy Branch.

#### ***Non-Continuous Point Sources***

There are no CAFOs located in the Boggy Branch watershed. Currently, none of the Boggy Branch watershed qualifies as a Municipal Separate Stormwater Sewer System (MS4) area.

**Figure 3-1. Source Map for the Boggy Branch Watershed**



**Table 3-1. Sources for the Boggy Branch Watershed**

Name	Permit Number	Type
Masland Carpets	AL0021997	Industrial
Atmore WWTP	AL0049557	Municipal

### 3.2.2 Nonpoint Sources in the Boggy Branch Watershed

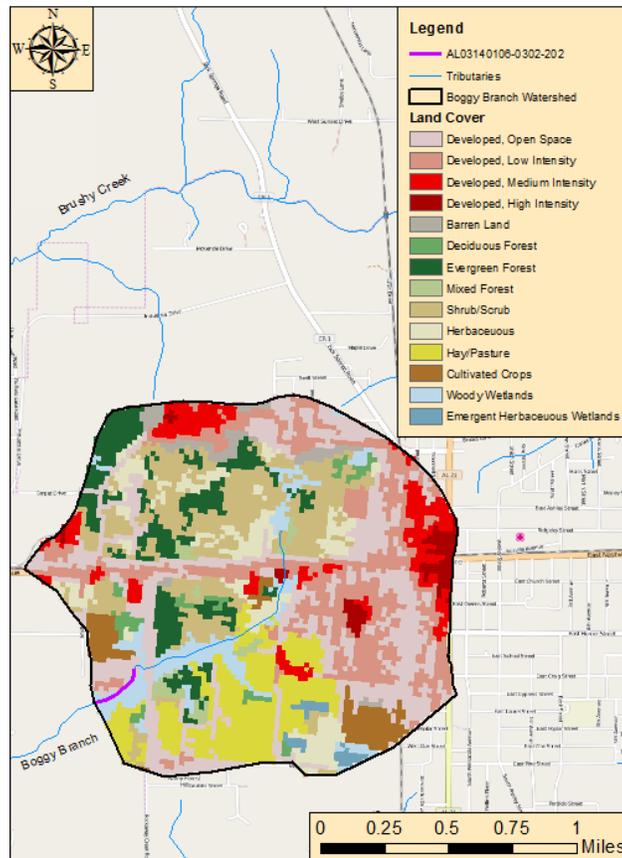
From review of the data collected on Boggy Branch, it is believed that nonpoint sources are not causing or contributing to any Zinc or Mercury issues in Boggy Branch.

## 3.3 Land Use Assessment

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

The majority of the Boggy Branch watershed is 48% developed land (grouped) and 39% forested/natural. Other major land uses within the watershed account for approximately 14% agriculture land and no open water. Developed land includes both commercial and residential land uses.

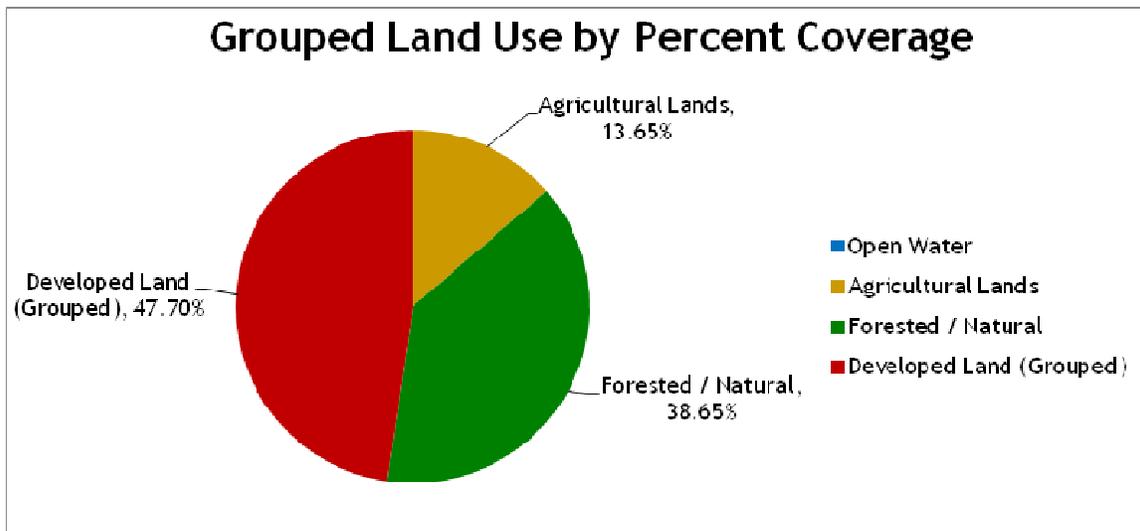
**Figure 3-2. Land Use Map for the Boggy Branch Watershed**



**Table 3-2. Land Use Areas for the Boggy Branch Watershed**

Class Description	Mi <sup>2</sup>	Acres	Percent
Open Water	0.00	0.00	0.00%
Developed, Open Space	0.42	266.43	21.70%
Developed, Low Intensity	0.31	195.71	15.94%
Developed, Medium Intensity	0.11	73.17	5.96%
Developed, High Intensity	0.04	23.57	1.92%
Barren Land	0.04	26.91	2.19%
Deciduous Forest	0.03	18.68	1.52%
Evergreen Forest	0.15	99.19	8.08%
Mixed Forest	0.03	16.68	1.36%
Shrub/Scrub	0.29	182.59	14.87%
Herbaceous	0.13	83.62	6.81%
Hay/Pasture	0.20	126.32	10.29%
Cultivated Crops	0.06	41.37	3.37%
Woody Wetlands	0.10	63.83	5.20%
Emergent Herbaceous Wetlands	0.02	10.01	0.81%
<b>TOTALS →</b>	<b>1.92</b>	<b>1228.06</b>	<b>100.00%</b>
Class Description	Mi <sup>2</sup>	Acres	Percent
Open Water	0.00	0.00	0.00%
Agricultural Lands	0.26	167.69	13.65%
Forested / Natural	0.74	474.59	38.65%
Developed Land (Grouped)	0.92	585.79	47.70%
<b>TOTALS →</b>	<b>1.92</b>	<b>1228.06</b>	<b>100.00%</b>

**Figure 3-3. Graph of Primary Land Uses in the Boggy Branch Watershed**



### 3.4 Data Availability and Analysis

It should be noted that even though Boggy Branch was sampled prior to 2014, only the data that is approximately six years in age or less will be used in this analysis, which is consistent with Alabama’s Water Quality Assessment and Listing Methodology (ADEM, 2014).

The source of data that was utilized in the evaluation of Boggy Branch is from ADEM’s 2014 §303(d) sampling program. Both physical and chemical data were collected at the following sampling station: BOB-2. This data can be found in Appendix 6.2. Refer to Table 3-4 for a location description of the aforementioned sampling station and to Figure 3-4 for a map depicting the location of the sampling station.

In 2014, ADEM collected 8 zinc samples at BOB-2. Of the 8 samples collected, there were no zinc violations. Based on a review of the data, ADEM determined that the Zinc criteria were not exceeded in any samples. Please refer to Tables 3-3 and 3-5 for a summary of the metals (Zn) results.

In 2014, ADEM collected 8 mercury samples at BOB-2. Of the 8 samples collected, there were no mercury violations. Based on a review of the data, ADEM determined that the Mercury criteria were not exceeded in any samples. Please refer to Tables 3-3 and 3-6 for a summary of the metals (Hg) results.

**Table 3-3 Summary of 2014 Metals Analysis for Boggy Branch (BOB-2)**

				Hardness dependent	Non-Hardness dependent
Station_ID	Date	Hardness (mg/l)	TSS (mg/l)	Zn-dis (mg/l)	Hg-dis (ug/l)
<b>EPA Analytical Method</b>				<b>200.7</b>	<b>245.2</b>
<b>Method Detection Limit (MDL)</b>				<b>0.0300</b>	
<b>Criteria @ sampled hardness</b>				<b>0.0738</b>	<b>0.012</b>
BOB-2	4/24/2014	57.4	LDL/1	0.0173	0.0065
<b>Criteria @ sampled hardness</b>				<b>0.0832</b>	<b>0.012</b>
BOB-2	5/22/2014	66.1	LDL/1	0.0154	LDL/0.00158
<b>Criteria @ sampled hardness</b>				<b>0.0479</b>	<b>0.012</b>
BOB-2	6/12/2014	34.5	1	0.0126	0.0107
<b>Criteria @ sampled hardness</b>				<b>0.1009</b>	<b>0.012</b>
BOB-2	7/10/2014	83	2	0.0113	0.0046
<b>Criteria @ sampled hardness</b>				<b>0.0645</b>	<b>0.012</b>
BOB-2	8/21/2014	49	5	0.0076	0.0018
<b>Criteria @ sampled hardness</b>				<b>0.0402</b>	<b>0.012</b>
BOB-2	9/18/2014	28	LDL/1	0.0077	0.0088
<b>Criteria @ sampled hardness</b>				<b>0.0451</b>	<b>0.012</b>
BOB-2	10/29/2014	32.1	12	0.0005	0.0090
<b>Criteria @ sampled hardness</b>				<b>0.0399</b>	<b>0.012</b>
BOB-2	11/19/2014	27.8	2	0.0109	0.0072
Notes:					
(* ) no samples collected					
shaded cells denote method detection limit is greater than the metal criterion					

**Table 3-4 Boggy Branch Sampling Station**

Station	Latitude	Longitude	Description
BOB-2	31.0161	-87.5136	150 ft upstream of the Atmore WWTP discharge

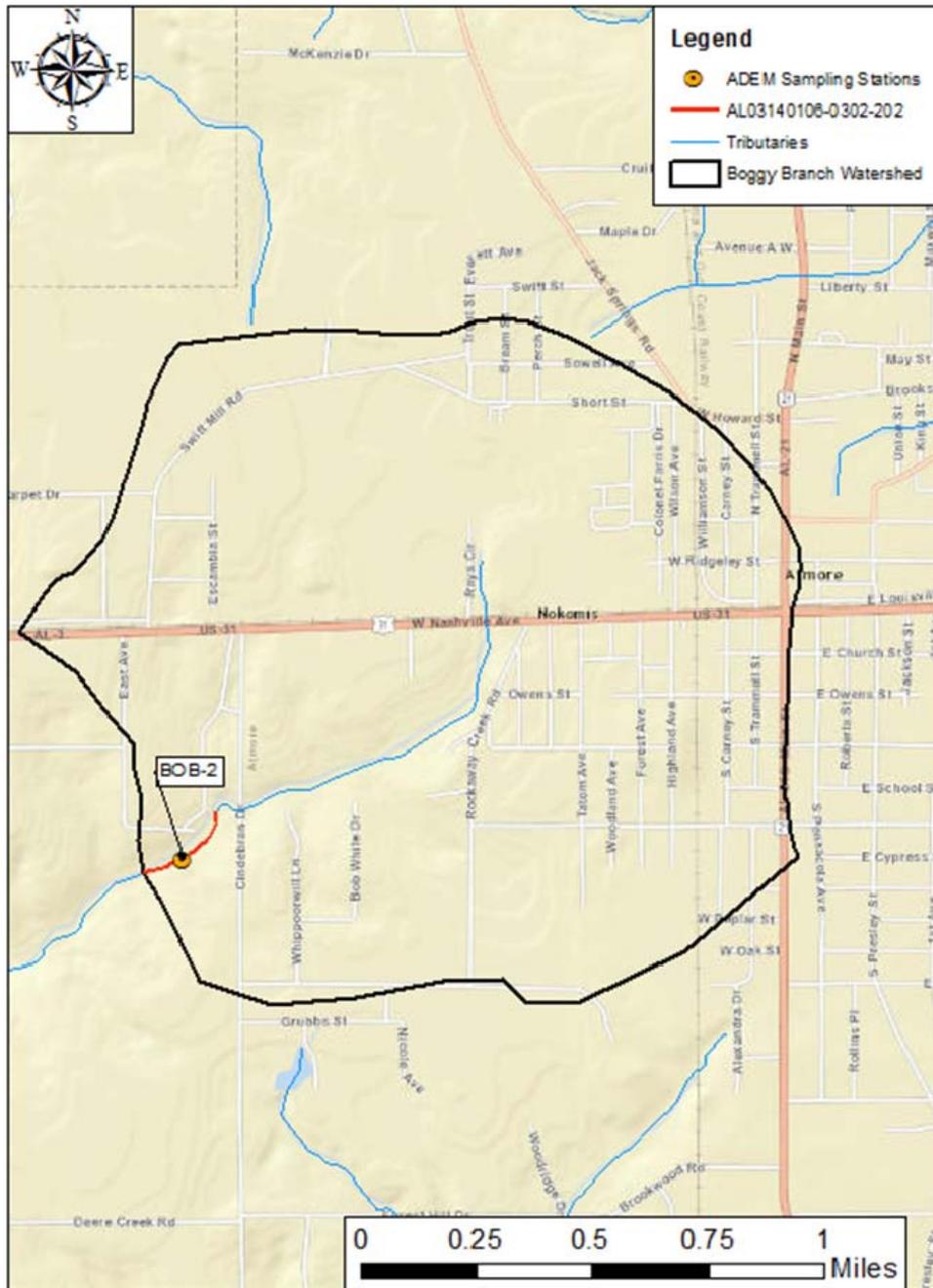
**Table 3-5 Summary of 2014 Boggy Branch Metals (Zn) Results**

Station	Metal	Total # of Samples Collected	Total # of Violations	% of Violations	Support Status
BOB-2	Zn	8	0	0	Full

**Table 3-6 Summary of 2014 Boggy Branch Metals (Hg) Results**

Station	Metal	Total # of Samples Collected	Total # of Violations	% of Violations	Support Status
BOB-2	Hg	8	0	0	Full

**Figure 3-4 - Map of Sampling Location for Boggy Branch**



#### **4.0 Conclusions**

From examination of all available data, ADEM has determined that a water quality impairment due to Metals (Zn, Hg) does not currently exist within Boggy Branch. Therefore, ADEM will not develop a TMDL due to “more recent data,” which is a just cause for delisting waterbodies according to Title 40 of the Code of Federal Regulations (CFR), Part 130.7(b)(6)(iv).

## ***5.0 Public Participation***

As part of the public participation process, this Delisting Decision (DD) will be placed on public notice and made available for review and comment. The public notice will be prepared and published in the 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 DD will be made available on ADEM's Website: [www.adem.state.al.us](http://www.adem.state.al.us). The public can also request paper or electronic copies of the DD by contacting Ms. Kimberly Minton at 334-271-7826 or [kminton@adem.state.al.us](mailto:kminton@adem.state.al.us). The public will be given an opportunity to review the DD 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 finalization of this DD and subsequent submission to EPA Region 4 for final review and approval.

## **Appendix 6.1**

### **References**

ADEM Administrative Code, 2013. Water Quality Program, Chapter 335-6-10, Water Quality Criteria, and Chapter 335-6-11 Use Classifications for Interstate and Intrastate Waters.

Alabama Department of Environmental Management's §303(d) Monitoring Program. 2014.

Alabama Department of Environmental Management (ADEM). Alabama's Water Quality Assessment and Listing Methodology, 2014.

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

## Appendix 6.2 Water Quality Data

### Data from 2014 §303(d) Monthly Sampling Metals Station BOB-2

Station ID	Visit Date	Hardness mgL	TSS mgL	TSS dc	Zn Dis mgL	Zn Dis dc	Hg Tot Low Level Ngl	Hg Tot Low Level Dc
BOB-2	4/24/2014	57.4	1	< MDL 1	0.01725		6.5	
BOB-2	5/22/2014	66.1	1	< MDL 1	0.01544		1.58	< MDL 1.58,
BOB-2	6/12/2014	34.5	1		0.01264		10.7	
BOB-2	7/10/2014	83	2		0.0113		4.64	
BOB-2	8/21/2014	49	5		0.007585		1.79	
BOB-2	9/18/2014	28	1	< MDL 1	0.007671		8.76	
BOB-2	10/29/2014	32.1	12		0.00494	JI	9.01	
BOB-2	11/19/2014	27.8	2		0.010915		7.16	

## Appendix 6.3

### Equations for calculating specific metals criteria

1. Cadmium

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(1.0166[\ln(\text{hardness in mg/l as CaCO}_3)]-3.924)} \text{ (CF) (Eq. 1)}$$

$$\text{conversion factor (CF) = } 1.136672 - [\ln(\text{hardness})(0.041838)]$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(0.7409[\ln(\text{hardness in mg/l as CaCO}_3)]-4.719)} \text{ (CF) (Eq. 2)}$$

$$\text{conversion factor (CF) = } 1.101672 - [\ln(\text{hardness})(0.041838)]$$

2. Chromium (trivalent)

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(0.8190[\ln(\text{hardness in mg/l as CaCO}_3)]+3.7256)} \text{ (CF) (Eq. 3)}$$

$$\text{conversion factor (CF) = } 0.316$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(0.8190[\ln(\text{hardness in mg/l as CaCO}_3)]+0.6848)} \text{ (CF) (Eq. 4)}$$

$$\text{conversion factor (CF) = } 0.860$$

3. Copper

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(0.9422[\ln(\text{hardness in mg/l as CaCO}_3)]-1.700)} \text{ (CF) (Eq. 5)}$$

$$\text{conversion factor (CF) = } 0.960$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(0.8545[\ln(\text{hardness in mg/l as CaCO}_3)]-1.702)} \text{ (CF) (Eq. 6)}$$

$$\text{conversion factor (CF) = } 0.960$$

## 4. Lead

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(1.273[\ln(\text{hardness in mg/l as CaCO}_3)]-1.460)} \text{ (CF) (Eq. 7)}$$

$$\text{conversion factor (CF) = } 1.46203 - [\ln(\text{hardness})(0.145712)]$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(1.273[\ln(\text{hardness in mg/l as CaCO}_3)]-4.705)} \text{ (CF) (Eq. 8)}$$

$$\text{conversion factor (CF) = } 1.46203 - [\ln(\text{hardness})(0.145712)]$$

## 5. Nickel

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(0.8460[\ln(\text{hardness in mg/l as CaCO}_3)]+2.255)} \text{ (CF) (Eq. 9)}$$

$$\text{conversion factor (CF) = } 0.998$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(0.8460[\ln(\text{hardness in mg/l as CaCO}_3)]+0.0584)} \text{ (CF) (Eq. 10)}$$

$$\text{conversion factor (CF) = } 0.997$$

## 6. Pentachlorophenol

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{[1.005(\text{pH})-4.869]} \text{ (Eq. 11)}$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{[1.005(\text{pH})-5.134]} \text{ (Eq. 12)}$$

## 7. Silver

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(1.72[\ln(\text{hardness in mg/l as CaCO}_3)]-6.52)} \text{ (CF) (Eq. 13)}$$

$$\text{conversion factor (CF) = } 0.85$$

## 8. Zinc

(i) freshwater acute aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(0.8473[\ln(\text{hardness in mg/l as CaCO}_3)]+0.884)} (\text{CF}) \quad \text{(Eq. 14)}$$

$$\text{conversion factor (CF)} = 0.978$$

(ii) freshwater chronic aquatic life:

$$\text{conc. } (\mu\text{g/l}) = e^{(0.8473[\ln(\text{hardness in mg/l as CaCO}_3)]+0.884)} (\text{CF}) \quad \text{(Eq. 15)}$$

$$\text{conversion factor (CF)} = 0.986$$

**Equations for the calculation of human health criteria:**

(i) Consumption of water and fish:

$$\text{conc. (mg/l)} = (\text{HBW} \times \text{RfD} \times \text{RSC}) / [(\text{FCR} \times \text{BCF}) + \text{WCR}] \quad \text{(Eq. 16)}$$

(ii) Consumption of fish only:

$$\text{conc. (mg/l)} = (\text{HBW} \times \text{RfD} \times \text{RSC}) / (\text{FCR} \times \text{BCF}) \quad \text{(Eq. 17)}$$

where: HBW = human body weight, set at 70 kg

RfD = reference dose, in mg/(kg-day)

FCR = fish consumption rate, set at 0.030 kg/day

BCF = bioconcentration factor, in l/kg

WCR = water consumption rate, set at 2 l/day

## Appendix 6.4 Boggy Branch Watershed Photos



**Photo 1 – BOB-2 Looking Upstream**



**Photo 2 – BOB-2 Looking Downstream**