



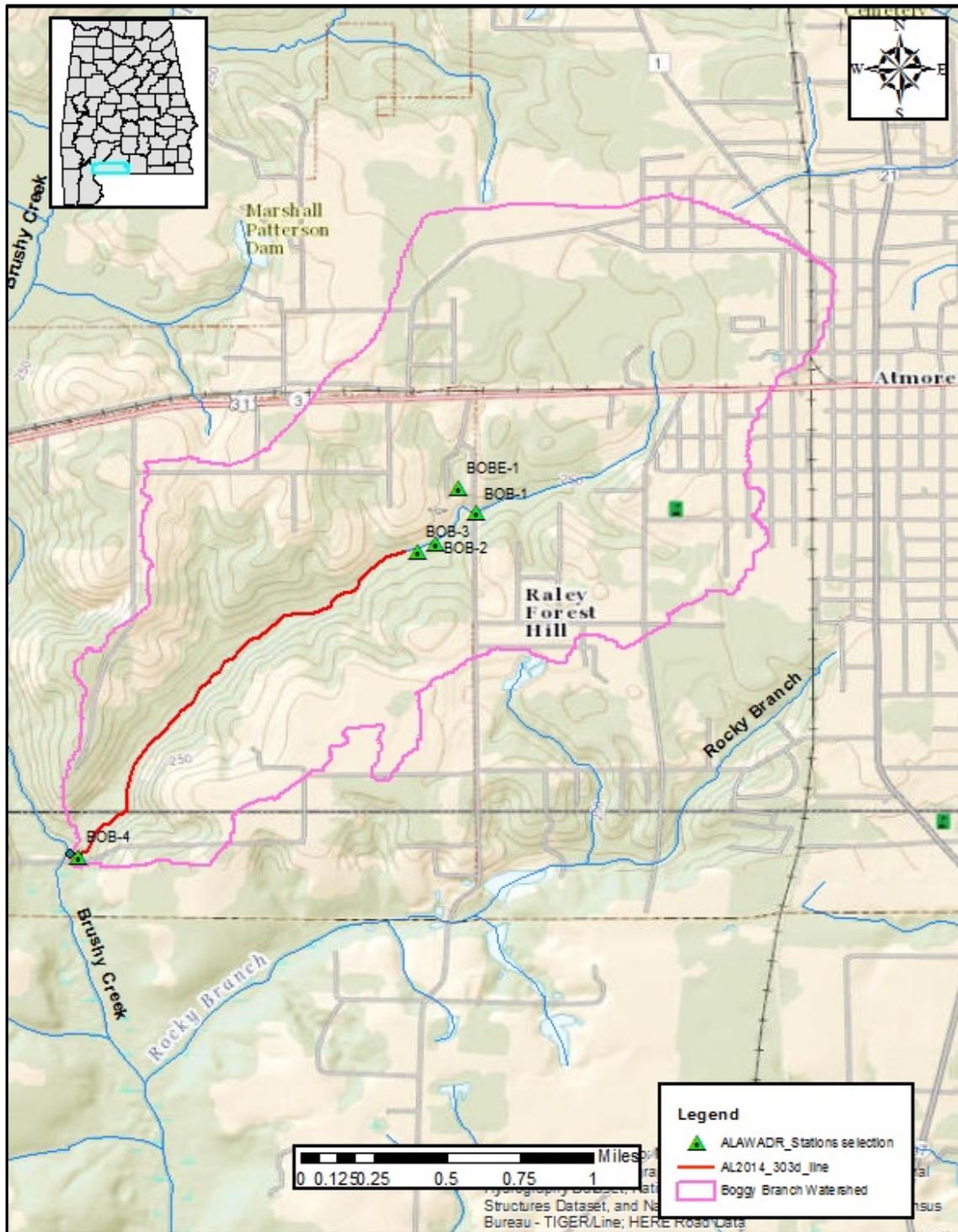
**Draft
Delisting Decision
for
Boggy Branch**

Assessment Unit ID AL03140106-0302-201

Metals (Cu, Pb)

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 southern Escambia County, and runs southwest 2.68 miles before draining into Brushy Creek, which is a tributary to the Perdido River. The Boggy Branch watershed consists of agriculture, forested land, developed land and grassland/shrubs. Boggy Branch has a use classification of Fish & Wildlife (F&W).

In 2006, Boggy Branch was originally listed for metals (Copper, Lead) on the State of Alabama's §303(d) list. The 1.54 mile length of the impaired segment was from Brushy Creek to the Atmore WWTP. The original listing was reportedly based on data collected in 2004 by the Alabama Department of Environmental Management (ADEM). The data was collected from BOB-4. Boggy Branch has subsequently been listed on Alabama's 2008, 2010, 2012 and 2014 §303(d) lists of impaired waterbodies.

Over the last two 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 Brushy Creek to the Atmore WWTP, now fully supports its use classification with respect to Copper (Cu) and Lead (Pb).

The following report addresses the results of the delisting analysis of Boggy Branch for copper and lead. Based on an assessment of all available data, ADEM has determined that a water quality impairment due to metals (Cu, Pb) 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 current §303(d) list states that Boggy Branch is impaired for a length of 1.54 miles from Brushy Creek to the Atmore WWTP. The original listing was reportedly based on data collected in 2004 by ADEM. Habitat quality was assessed as Sub-Optimal for Boggy Branch at station BOB-3. One EPT family was collected, indicating the macroinvertebrate community to be in poor condition. Intensive water quality data were collected from Boggy Branch at BOB-3 and BOB-4 from March through October of 2004 and 2005. Copper and lead were periodically elevated; subsequently Boggy Branch has been listed on the 2006, 2008, 2010, 2012, and 2014 §303(d) lists of impaired waterbodies. 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.

For copper and lead, acute and chronic aquatic life criteria are hardness dependent. Hardness values must be entered into equations that are specific to each metal. These equations are provided in Appendix 6.3. Copper and lead criteria for Boggy Branch were calculated using individual hardness values from each sampling event at each sampling station. Table 3.3 of Section 3.4 depicts specific water quality targets for each metal of concern at each station sampled.

3.2 Source Assessment

3.2.1 Point Sources in the Boggy Branch Watershed

Continuous Point Sources

Currently there are two active individual NPDES Permits within the listed portion of the Boggy Branch watershed.

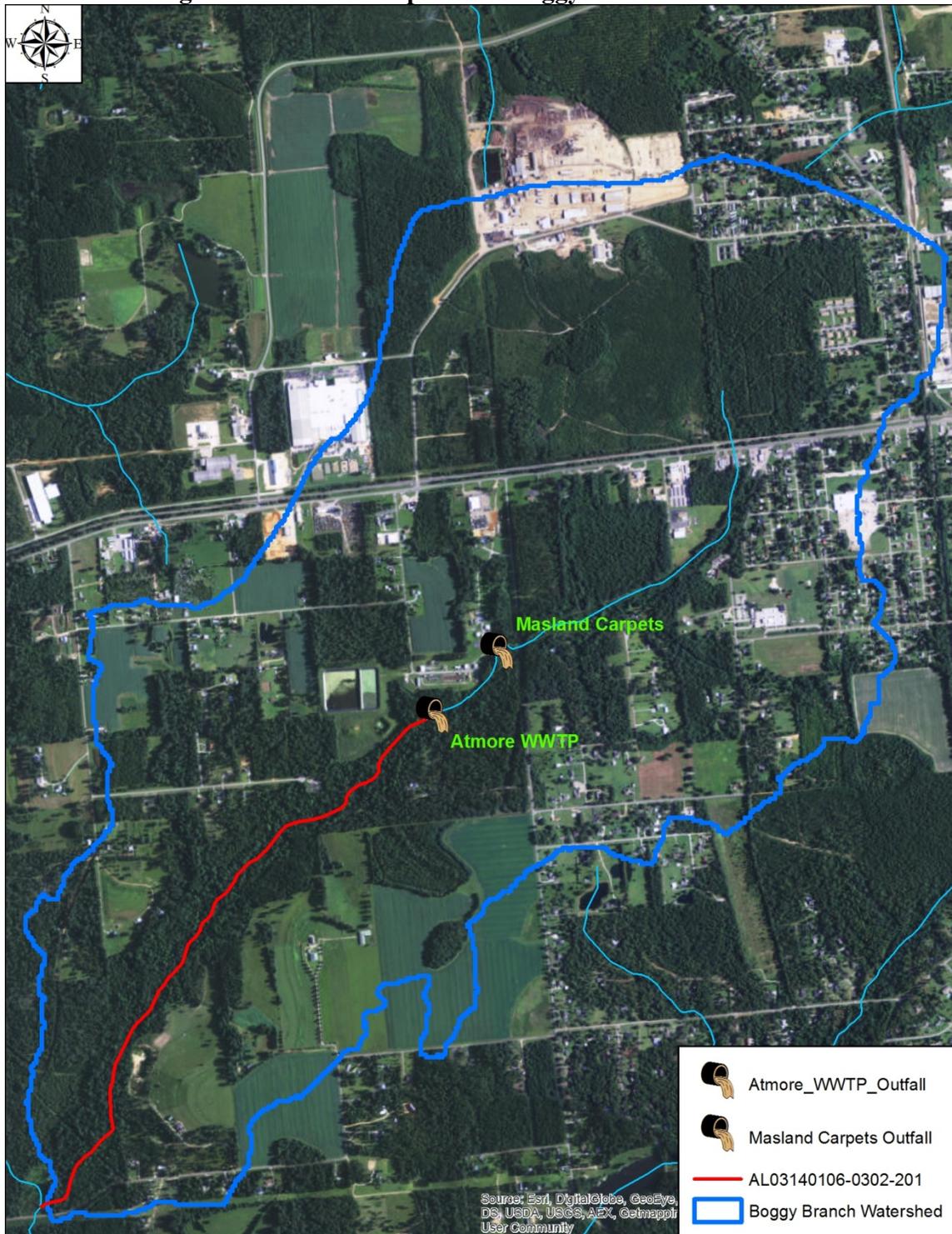
Non-Continuous Point Sources

Boggy Branch has no active NPDES regulated stormwater permits. Table 3.1 and Figure 3.1 display the point sources in the Boggy Branch watershed. 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.

Table 3.1 Point Sources in the Boggy Branch Watershed

Name	Permit Number	Type
Utilities Board of the City of Atmore	AL0049557	Municipal
Masland Carpets Inc	AL0021997	Industrial

Figure 3.1 Source Map for the Boggy Branch Watershed



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 Copper or Lead 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 Agriculture, Grassland/Shrubs, and Developed, which accounts for 75.67%. Developed land includes commercial and residential land uses.

Figure 3.2 Land Use Map for the Boggy Branch Watershed

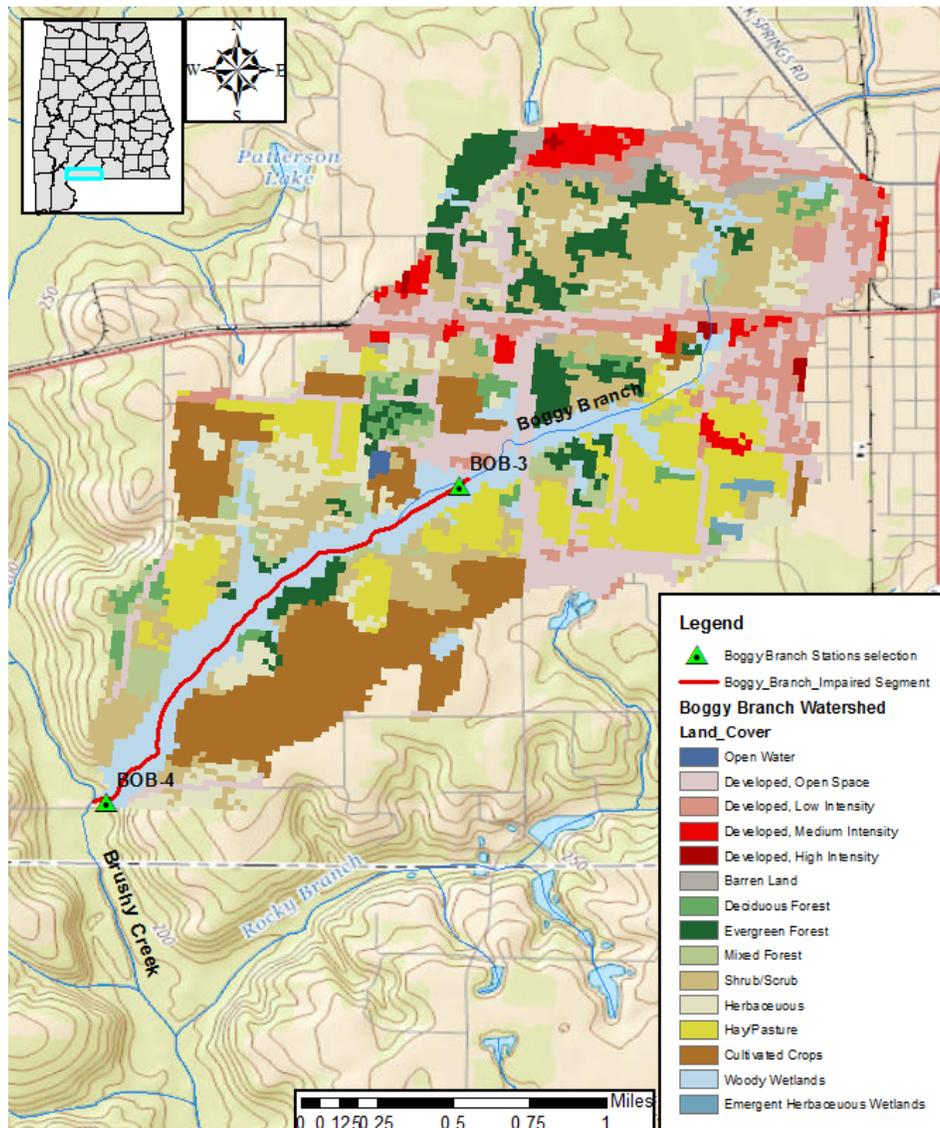
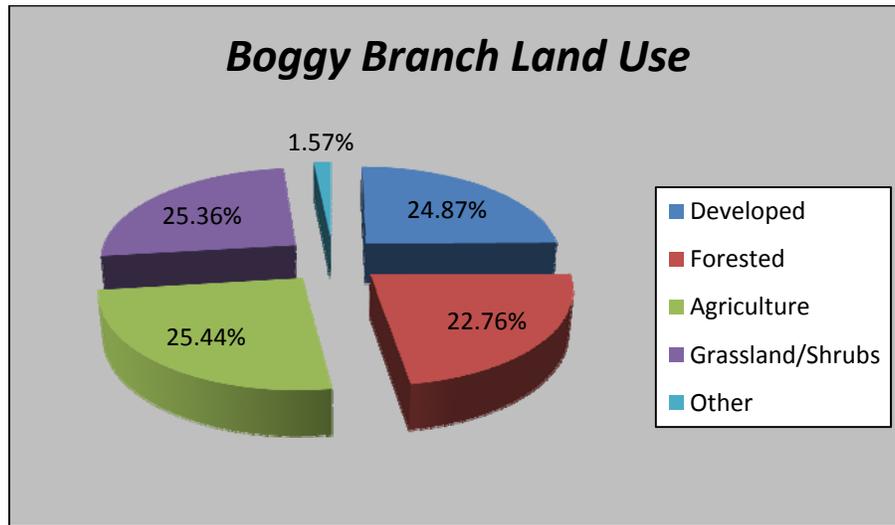


Table 3.2 Land Use Areas for the Boggy Branch Watershed

Class Description	Mi²	Acres	Percent
Agriculture	0.70	450.57	25.44
Grassland/Shrubs	0.70	449.24	25.36
Developed	0.69	440.56	24.87
Forested	0.63	403.20	22.76
Other	0.04	27.80	1.57
TOTALS →	2.77	1771.37	100.00%

Figure 3.3 Land Use Graph of 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 sampling station BOB-3. 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.

ADEM collected 8 copper samples at station BOB-3 during the 2014 sampling events. Of the 8 samples collected, there were no copper violations reported at BOB-3. Based on review of the data, ADEM has determined that no violations of copper are present. Please refer to Table 3.3 and Table 3.5 for a summary of the copper (Cu) results.

ADEM collected 8 lead samples at station BOB-3 during the 2014 sampling events. Of the 8 samples collected, there were no lead violations reported at BOB-3. Based on review of the data, ADEM has determined that no violations of lead are present. Please refer to Table 3.3 and Table 3.5 for a summary of the lead (Pb) results.

Table 3.3 Summary of Copper and Lead Analysis for Boggy Branch

Station_ID	Date	Time	Hardness (mg/l)	Hardness Dependent	
				Cu-dis (mg/l)	Pb-dis (mg/l)
EPA Analytical Method				200.7	239.2
Method Detection Limit (MDL)				0.0200	0.0020
Criteria @ sampled hardness				0.0070	0.0018
BOB-3	4/24/2014		74.7	0.0039	0.0005
Criteria @ sampled hardness				0.0065	0.0017
BOB-3	5/22/2014		69	0.0033	0.0003
Criteria @ sampled hardness				0.0059	0.0015
BOB-3	6/12/2014		61.4	0.0048	0.0002
Criteria @ sampled hardness				0.0079	0.0021
BOB-3	7/10/2014		86.1	0.0031	0.0002
Criteria @ sampled hardness				0.0078	0.0021
BOB-3	8/21/2014		85	0.0040	LDL/0.000428
Criteria @ sampled hardness				0.0035	0.0007
BOB-3	9/18/2014		32.9	0.0010	LDL/0.00054
Criteria @ sampled hardness				0.0087	0.0024
BOB-3	10/29/2014		97.2	0.0057	LDL/0.000428
Criteria @ sampled hardness				0.0031	0.0006
BOB-3	11/19/2014		29.3	LDL/0.000218	0.0004

LDL = Less than detection limit

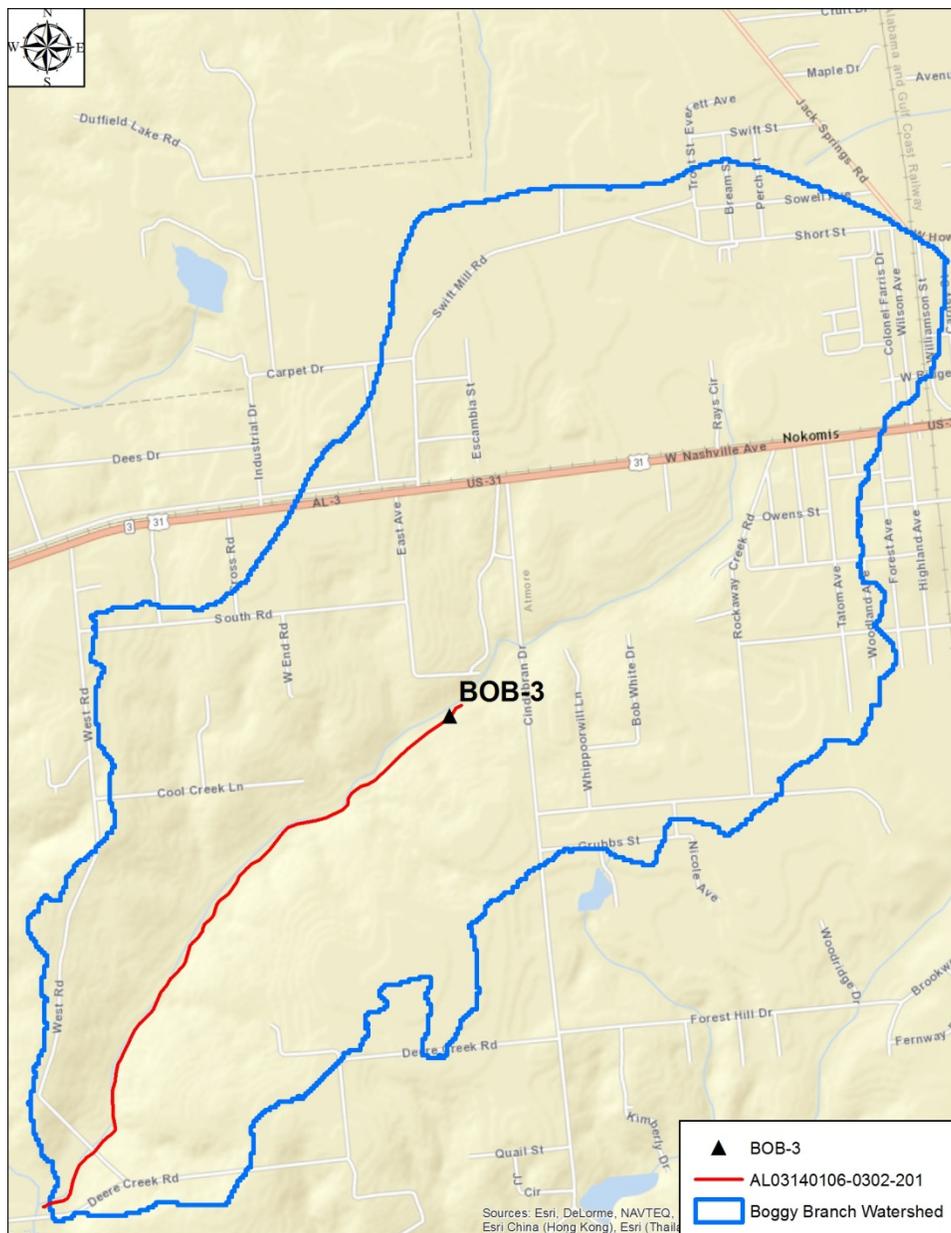
Table 3.4 Boggy Branch Sampling Station

ADEM Station	Latitude	Longitude	Description
BOB-3	31.015693	-87.516472	Boggy Branch Approx 150 ft downstream of Atmore WWTP discharge and 1.65 miles upstream of confluence with Brushy Creek

Table 3.5 Summary of 2014 Boggy Branch Metals (Cu, Pb) Results

Station	Metal	Total # of Samples Collected	Total # of Violations	% of Violations	Support Status
BOB-3	Cu	8	0	0	Full
BOB-3	Pb	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 (Cu, Pb) does not currently exist within Boggy Branch (AL03140106-0302-201). 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. A 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. The public can also request hard or electronic copies of the DD by contacting Ms. Kimberly Minton at 334-271-7826 or 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 comment 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 DD and subsequent submission to EPA Region 4 for final approval.

Appendix 6.1

References

ADEM Administrative Code, 2015. 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, January 2014.

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

Alabama Department of Environmental Management (ADEM). Boggy Branch 2005 Monitoring Summary. 2005.

Alabama Department of Environmental Management (ADEM). 2006 Integrated Water Quality Monitoring and Assessment Report. 2006

Appendix 6.2 Water Quality Data

Data from 2004, 2005 & 2014 Monthly Sampling Metals Station BOB-3

Station ID	Visit Date	TSS mgl	TSS dc	TDS mgl	Hard mgl	Cu Dis mgl	Cu Dis dc	Cu Tot mgl	Cu Tot dc	Pb Dis ugl	Pb Dis dc	Pb Tot ugl	Pb Tot dc
BOB-3	3/2/2004	7		215	43	0.005		0.007		5	< MDL 5	5	< MDL 5
BOB-3	4/6/2004	39		358	50	0.013		0.015		5	< MDL 5	5	< MDL 5
BOB-3	5/4/2004	5	< MDL 5	335	72	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	2	
BOB-3	6/8/2004	5		315	53	0.008		0.008		2		2.3	
BOB-3	7/6/2004	15		342	37		Not Reported ,X	0.005	< MDL .005		Not Reported , X	3.4	
BOB-3	7/28/2004	61		1360	69	0.005		0.009		3		3.8	
BOB-3	9/7/2004	8		330	41	0.013		0.023		5	< MDL 5	2.4	
BOB-3	10/12/2004	28		372	40	0.005		0.008		2.5		3.1	
BOB-3	3/24/2005	11		347	44	0.005	< MDL .005	0.005	< MDL .005	3		3.2	
BOB-3	4/20/2005	14		329	40	0.005	< MDL .005	0.005	< MDL .005	2.8		3.3	
BOB-3	5/19/2005	16		372	33	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	2.8	
BOB-3	5/24/2005												
BOB-3	6/22/2005	13		341	53	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	2.4	
BOB-3	7/26/2005	10		328	52	0.005	< MDL .005	0.005	< MDL .005	20	< MDL 20	20	< MDL 20
BOB-3	8/23/2005	52		272	60	0.005	< MDL .005	0.016		20	< MDL 20	30	< MDL 30
BOB-3	9/20/2005	19		376	76	0.1	< MDL .1	0.022		20	< MDL 20	20	< MDL 20
BOB-3	10/25/2005	19		351	106	0.01	< MDL .01	0.01	< MDL .01	10	< MDL 10	10	< MDL 10
BOB-3	4/24/2014	1	< MDL 1	195	74.7	0.00389	JI			0.49	JI		
BOB-3	5/22/2014	1	< MDL 1	138	69	0.0033	JI			0.25	JI		
BOB-3	6/12/2014	1	< MDL 1	236	61.4	0.00484	JI			0.23	JI		
BOB-3	7/10/2014	2		236	86.1	0.0031	JI			0.23	JI		
BOB-3	8/21/2014	2		184	85	0.00403	JI			0.428	< MDL .428		
BOB-3	9/18/2014	2		27	32.9	0.001035	JI			0.54	< MDL .54		
BOB-3	10/29/2014	6		290	97.2	0.0057				0.428	< MDL .428		
BOB-3	11/19/2014	1	< MDL 1	44	29.3	0.000218	< MDL .218			0.354	JI		

**Data from 2004 & 2005 Monthly Sampling Metals
 Station BOB-4**

Station ID	Visit Date	TSS mgl	TSS dc	TDS mgl	Hard mgl	Cu Dis mgl	Cu Dis dc	Cu Tot mgl	Cu Tot dc	Pb Dis ugl	Pb Dis dc	Pb Tot ugl	Pb Tot dc
BOB-4	3/2/2004	5		143	37	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	5	< MDL 5
BOB-4	4/6/2004	9		230	45	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	5	< MDL 5
BOB-4	5/4/2004	5	< MDL 5	206	70	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	5	< MDL 5
BOB-4	6/8/2004	5	< MDL 5	216	39	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	5	< MDL 5
BOB-4	7/6/2004	5	< MDL 5	200	39	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	5	< MDL 5
BOB-4	7/28/2004	7		210	63	0.005	< MDL .005	0.005	< MDL .005	2.2		2.8	
BOB-4	9/7/2004	5	< MDL 5	208	37	0.007		0.014		5	< MDL 5	2	
BOB-4	10/12/2004	5	< MDL 5	216	53	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	5	< MDL 5
BOB-4	3/24/2005	5	< MDL 5	256	35	0.005	< MDL .005	0.005	< MDL .005	2.3		2.2	
BOB-4	4/20/2005	5	< MDL 5	211	28	0.005	< MDL .005	0.005	< MDL .005	2.7		2.3	
BOB-4	5/19/2005	5	< MDL 5	239	25	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	5	< MDL 5
BOB-4	6/22/2005	5	< MDL 5	224	47	0.005	< MDL .005	0.005	< MDL .005	5	< MDL 5	5	< MDL 5
BOB-4	7/26/2005	5	< MDL 5	200	39	0.005	< MDL .005	0.005	< MDL .005	20	< MDL 20	20	< MDL 20
BOB-4	8/23/2005	5	< MDL 5	173	71	0.005	< MDL .005	0.005	< MDL .005	20	< MDL 20	30	< MDL 30
BOB-4	9/20/2005	5		238	63	0.01	< MDL .01	0.01	< MDL .01	20	< MDL 20	20	< MDL 20
BOB-4	10/25/2005	5	< MDL 5	260	77	0.01	< MDL .01	0.01	< MDL .01	10	< MDL 10	10	< MDL 10

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 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 7-1 Boggy Branch at BOB-3 June 18, 2014 Looking Upstream



Photo 7-2 Boggy Branch at BOB-3 June 18, 2014 Looking Downstream

