DELISTING DECISION

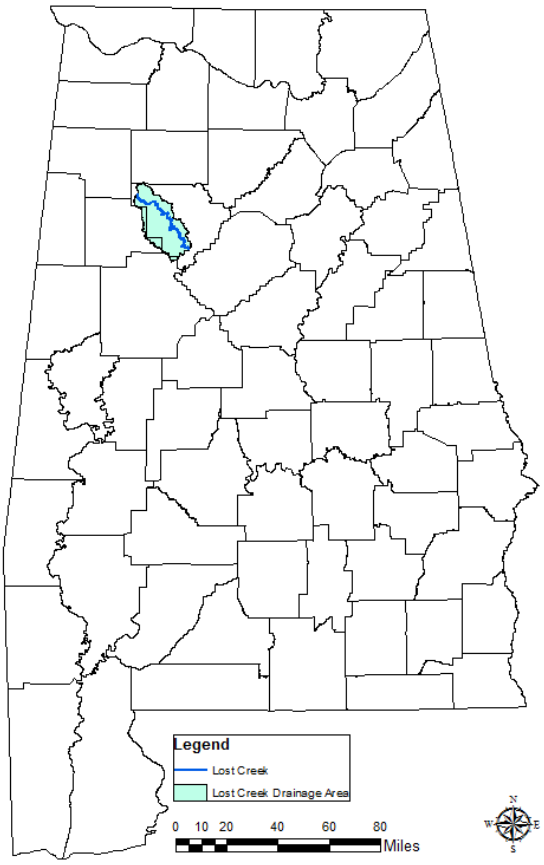
for

Siltation (Habitat Alteration)

for

Lost Creek

(Assessment Unit IDs # AL03160109-0403-103, AL03160109-0405-104)



Alabama Department of Environmental Management

Water Division - Water Quality Branch

October 2017

Lost Creek Watershed in the Black Warrior River Basin

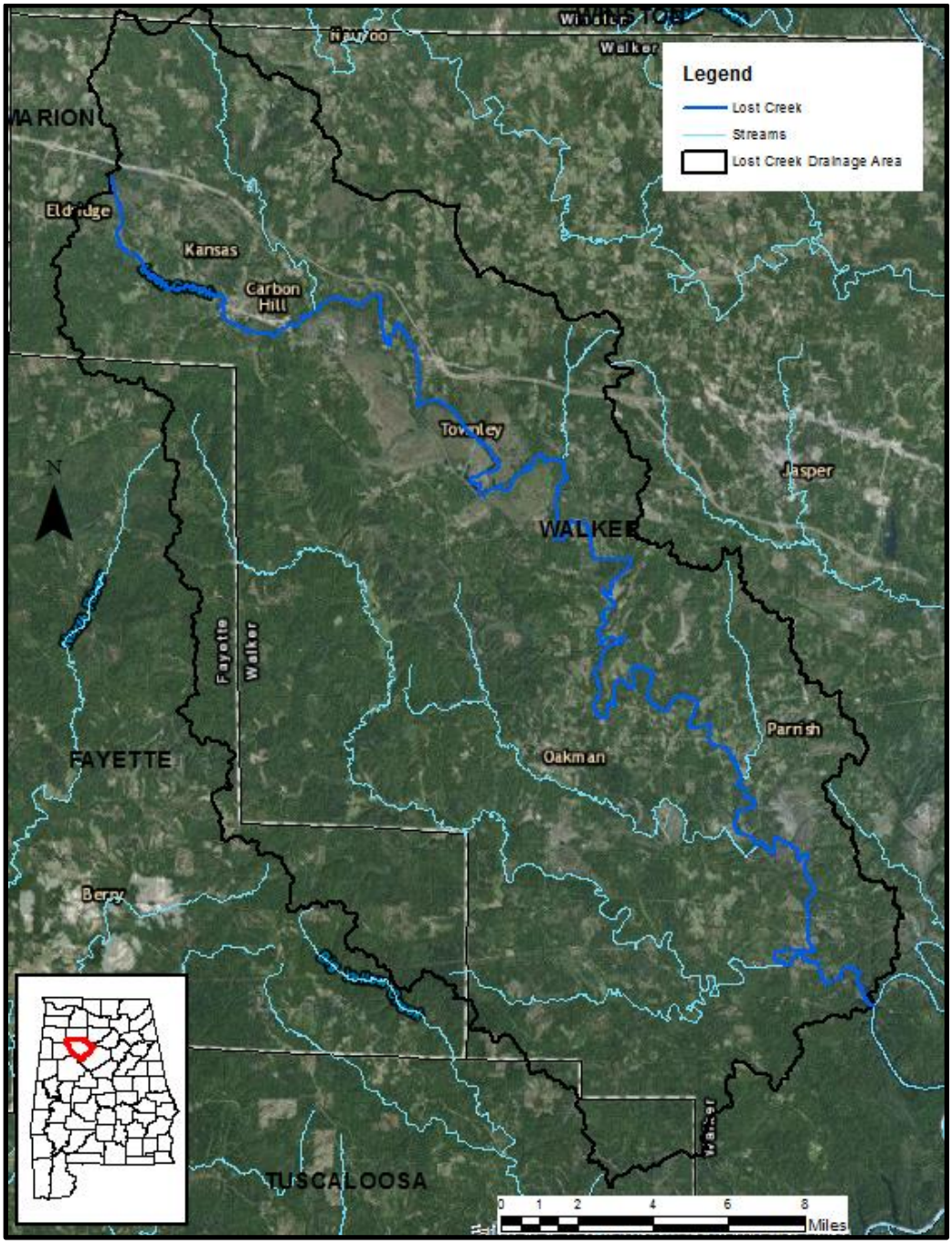


Figure 1: Lost Creek Watershed

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1.0 *Executive Summary*

Lost Creek is a tributary of Mulberry Fork and is located in Walker County in the Black Warrior River Basin. Mulberry Fork is a major tributary of the Black Warrior River. Lost Creek has a total length of 59.44 miles and a total drainage area of 346.58 mi^2. Lost Creek intersects with Mulberry Fork 7.6 miles before Mulberry Fork flows into the Black Warrior River. The entire Lost Creek watershed is located within Ecoregion 68f.

Two segments of Lost Creek were added to the State of Alabama's 1998 §303(d) list of impaired streams for siltation and other habitat alteration: US Highway 78 at Carbon Hill to US Highway 78 North of Cedrum (approximately 6.53 miles), and AL Highway 69 at Oakman to the mill dam at Cedrum (approximately 17.33 miles). Both segments of Lost Creek have a Fish and Wildlife (F&W) use classification. The locations of both segments are shown in Figure 2, and Alabama's current §303(d) Listing of Lost Creek is shown in Table 1.

A delisting analysis was conducted for both impaired segments of Lost Creek, and only the most recent data (within the past 6 years) was used. Water quality data for this analysis was collected from stations LOSW-1, LOSW-2, LOSW-4, and LOSW-5. Recent habitat assessments were conducted at stations LOSW-1 and LOSW-5 (one station for each impaired segment), and for both stations the overall habitat conditions were rated as Sub-optimal. Macroinvertebrate assessments were conducted alongside the habitat assessments, and both stations received a Fair rating for the macroinvertebrate community health. After reviewing the data, it is evident that Lost Creek is currently meeting the water quality criteria applicable to the F&W use classification.

Table 1: 2016 Alabama §303(d) List

Assessment Unit ID	Waterbody Name	Type	River Basin	County	Uses	Causes	Sources	Size	Unit Type	Downstream / Upstream Locations	Year Listed	Priority
AL03160109-0403-103	Lost Creek	R	Black Warrior	Walker	Fish & Wildlife	Siltation (habitat alteration)	Surface mining-abandoned	6.53	miles	US Highway 78 north of Cedrum / US Highway 78 at Carbon Hill	1998	L
AL03160109-0405-104	Lost Creek	R	Black Warrior	Walker	Fish & Wildlife	Siltation (habitat alteration)	Surface mining-abandoned	17.33	miles	Alabama Highway 69 at Oakman / Mill dam at Cedrum	1998	L

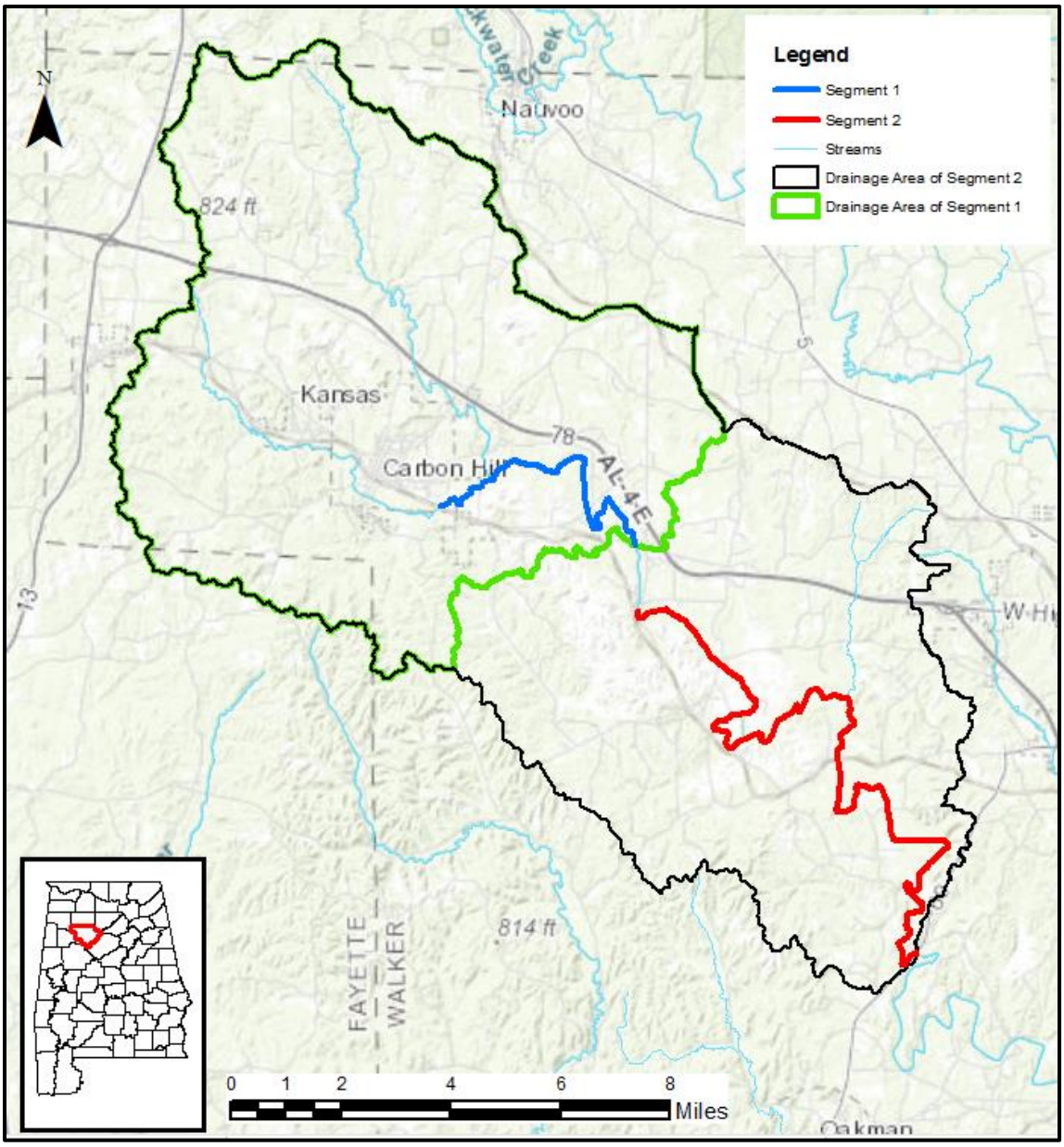


Figure 2: §303(d) listed segments of Lost Creek

2.0 *Basis for §303(d) Listing*

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, and total maximum daily

loads (TMDLs) are determined for pollutants causing the impairment. 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 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).

Both segments of Lost Creek were originally identified by the State of Alabama as impaired for siltation (habitat alteration) by unknown sources, but the source of impairment has since been attributed to abandoned surface mining operations. The data used to list Lost Creek in 1998 was not found for reference in this delisting analysis.

3.0 *Technical Basis for Delisting*

3.1 *Water Quality Target Identification*

The State of Alabama currently has no numeric criteria for siltation; therefore, narrative criteria must be used to assess the siltation impairment. While numeric criteria normally have a quantifiable endpoint for a given parameter, narrative criteria are qualitative statements that establish a set of desired conditions for all State waters. These narrative criteria are commonly referred to as "free form" criteria that enable states a regulatory avenue to address pollutants or problems that may be causing or contributing to a use impairment that otherwise cannot be evaluated against any numeric criteria. Typical pollutants that fall under this category are nutrients and siltation. Historically, in the absence of established numeric criteria, ADEM and/or EPA would use available data and information coupled with best professional judgement to determine overall use support for a given waterbody. Narrative criteria continue to serve as a regulatory basis for determining use support and making listing/delisting decisions of waters in regards to Alabama's §303(d) list. ADEM's Narrative Criteria, as shown in ADEM Admin. Code r. 335-6-10-.06, are as follows:

335-6-10-.06 **Minimum Conditions Applicable to All State Waters**. *The following minimum conditions are applicable to all State waters, at all places and at all times, regardless of their uses:*

(a) State waters shall be free from substances attributable to sewage, industrial wastes or other wastes that settle to form bottom deposits which are unsightly, putrescent or interfere directly or indirectly with any classified water use.

(b) State waters shall be free from floating debris, oil, scum, and other floating materials attributable to sewage, industrial wastes or other wastes in amounts sufficient to be unsightly or which interfere directly or indirectly with any classified water use.

(c) State waters shall be free from substances attributable to sewage, industrial wastes or other wastes in concentrations or combinations, which are toxic or harmful to human, animal or aquatic life to the extent commensurate with the designated usage of such waters.

For the siltation (habitat alteration) impairment status, relative biological health and habitat suitability will be evaluated along with an assessment of the instream total suspended solids (TSS) and turbidity data.

Although ADEM does not currently have numeric criteria for siltation, there is an existing criterion for turbidity. According to ADEM Admin. Code 335-6-10-.09(e)9, the following criterion is applicable for a waterbody classified as Fish and Wildlife:

9. Turbidity: there shall be no turbidity other than of natural origin that will cause substantial visible contrast with the natural appearance of the waters or interfere with any beneficial uses which they serve. Furthermore, in no case shall the turbidity exceed 50 NTU above background. Background will be interpreted as the natural condition of the receiving water without the influence of man-made or man-induced causes. Turbidity caused by natural runoff will be included in establishing background levels.

3.2 Assessment of Ecological Reference Data

In 2010, ADEM published ecoregional reference guidelines for a number of parameters and pollutants. Reference streams, also referred to as “reference reaches” or “ecoregional reference sites,” are defined as relatively homogeneous areas of similar climate, land form, soil, natural vegetation, hydrology, and other ecologically relevant variables (USEPA, 2000b) which have remained comparatively undisturbed or minimally impacted by human activity over an extended period of time in relation to other waters of the State. While not necessarily pristine or completely undisturbed by humans, reference streams do represent desirable chemical, physical and biological conditions for a given ecoregion that can be used for evaluation purposes. The reference streams selected for a particular analysis depends primarily on the available number of reference streams and associated data within a particular ecoregion. Therefore, the total number of reference sites selected and the aerial scale (i.e. Ecoregion Level III, Level IV) used to represent a reference condition will often vary on a case-by-case basis.

ADEM elected to use the 90th percentile of the data distributions from the selected reference sites to establish goals for siltation, specifically TSS and turbidity, on an ecoregional basis. The 90th percentile of the data distribution is considered an appropriate target since it falls within an acceptable range of "least-impacted" conditions (i.e. upper quartile). Median values are used to represent existing TSS conditions within the impaired waterbody, and turbidity values are assessed on an individual sample basis. Alabama's 2010 Ecoregional Reference Guidelines for ecoregion 68 will be used in this analysis and are shown in Appendix 1.

3.3 *Data Availability*

Water quality data was collected from four stations on Lost Creek: LOSW-1, LOSW-2, LOSW-4, and LOSW-5. Descriptions of each station are shown in Table 3. The data collected from these stations are shown in Appendix 2. LOSW-1 and LOSW-2 are located on the longer segment (AL03160109-0405-104), and their locations are shown in Appendix 3. LOSW-4 and LOSW-5 are located on the shorter segment (AL03160109-0403-103), and their locations are shown in Appendix 4. Pictures of each station are shown in Appendix 5.

Table 3: Lost Creek Delisting Station Description

Station	Latitude	Longitude	Ecoregion	Drainage Area (mi^2)	Location Description
LOSW-1	33.76422	-87.35835	68 f	134.1	Lost Cr at Ala Hwy 69
LOSW-2	33.81562	-87.38378	68 f	115.5	Lost Cr at Ala Hwy 124 near Kings Chapel
LOSW-4	33.88121	-87.46363	68 f	66.2	Lost Cr at Ripley Cutoff road
LOSW-5	33.88197	-87.5104	68 f	30.0	Lost Cr at AL 118 southeast of Carbon Hill

In addition, the Department's Field Operations Division conducted macroinvertebrate assessments and habitat assessments at LOSW-1 and LOSW-5 to evaluate the existing aquatic communities. Macroinvertebrate assessments and habitat assessments were conducted during the same station visit. Biological health is rated on macroinvertebrate metrics including taxa richness, composition, and community tolerance. These metrics are site-specific based on observations and data from reference streams similar in hydrology, ecology, and relative size. For the purpose of determining use support for siltation, the following guidelines regarding interpretation of biological data will be used:

- **Fully Supporting -** Macroinvertebrates determined to be Excellent (Unimpaired), Good (Slightly Impaired), and Fair (Moderately Impaired) rating if Chemical/Physical/Field Data indicates compliance.
- **Partial Supporting -** Macroinvertebrates determined to be Fair (Moderately Impaired) and Chemical/Physical/Field Data indicates impairment.
- **Not Supporting** - Macroinvertebrates determined to be Poor (Severely Impaired) and Chemical/Physical/Field Data indicates impairment.

For the habitat assessment, the overall habitat quality is rated as: Optimal, Sub-optimal, Marginal, or Poor. An interpretation of each habitat quality rating is shown in Table 2.

Table 2: Interpretation of Habitat Assessment Ratings

Rating	Interpretation
Optimal	Conditions meet natural expectations
Sub-optimal	Satisfies expectations under most conditions
Marginal	Moderate levels of degradation
Poor	Substantially Altered

4.0 Data Analysis

For the remainder of this analysis the segment of Lost Creek from US Highway 78 at Carbon Hill to US Highway 78 North of Cedrum will be referred to as segment 1, and the segment from AL Highway 69 at Oakman to the mill dam at Cedrum will be referred to as segment 2.

4.1 *Segment 1 Data Analysis*

Water quality data was collected by ADEM in 2012 at station LOSW-5 and also at station LOSW-4 in 2013. The turbidity and TSS data collected from these stations were compared to Alabama's 2010 Ecoregional Reference Guidelines for ecoregion 68. Individual turbidity samples were compared to the applicable numeric criterion (50 NTU plus reference guideline of 10.1 NTU), and the median of the TSS samples was compared to the reference guideline of 14.0 mg/L. Habitat and macroinvertebrate assessments were conducted at station LOSW-5 in 2012 by ADEM.

4.1.1 *Segment 1 Turbidity and TSS Data Analysis*

Data from both stations were used for TSS analysis and the median values for LOSW-4 and LOSW-5 were 1.5 mg/L and 1 mg/L, respectively. Both stations had median values well below the reference

value of 14.0 mg/L. All turbidity values for both stations were less than the applicable criterion. A summary of the TSS data is shown in Table 5. The turbidity data can be found in Appendix 2.

Table 5: TSS Median Values for Stations LOSW-4 and LOSW-5

Station	TSS Median Value (mg/L)	Eco-reference (mg/L)
LOSW-4	1.5	14.0
LOSW-5	1.0	14.0

4.1.2 *Segment 1 Habitat Assessment*

A habitat assessment was conducted by ADEM on October 23, 2012 at station LOSW-5. Results of the physical characteristics evaluation indicate the stream has a very low percentage of fine particles as part of the total substrate composition. The sediment deposition component of the habitat assessment received a rating of Sub-optimal, which indicates very little sediment has accumulated in the stream bottom as a result of deposition. The overall habitat assessment was rated as Sub-optimal, and the results from the habitat assessment are shown in Figure 5.

Physical Characteristics	
Canopy Cover	Shaded
Width (ft)	45
Depth (ft)	
Riffle	0.5
Run	1.5
Pool	4.0
% of Reach	
Riffle	5
Run	10
Pool	85
% Substrate	
Bedrock	60
Boulder	2
Cobble	8
Mud/Muck	2
Gravel	5
Sand	5
Silt	5
Organic Matter	13

Habitat Assessment	%Maximum Score	Rating
RR		
Instream Habitat Quality	47	Marginal (41-58)
Sediment Deposition	68	Sub-optimal (59-70)
Sinuosity	68	Sub-optimal (65-84)
Bank and Vegetative Stability	55	Marginal (35-59)
Riparian Buffer	85	Sub-optimal (70-89)
Habitat Assessment Score	**153**	
% Maximum Score	**64**	**Sub-optimal (59-70)**

Figure 5: Physical characteristics and results of the habitat assessment at LOSW-5

4.1.3 *Segment 1 Macroinvertebrate Assessment*

The results of the macroinvertebrate assessment at LOSW-5 indicated that the overall state of the macroinvertebrate community was in fair condition. Scores from the macroinvertebrate assessment are shown in Figure 6.

Macroinvertebrate Assessment		
	Results	**Scores (0-100)**
Taxa richness measures		
# EPT taxa	14	43
Taxonomic composition measures		
% Non-insect taxa	14	41
% Dominant taxon	17	86
% EPC taxa	20	37
Functional feeding group measures		
% Predators	5	13
Tolerance measures		
% Taxa as Tolerant	39	27
WMB-I Assessment Score	---	**41**
WMB-I Assessment Rating		**Fair (39-58)**

Figure 6: Macroinvertebrate assessment results at LOSW-5

4.2 *Segment 2 Data Analysis*

Water quality data was collected by ADEM in 2012 and 2013 at station LOSW-1 and also at station LOSW-2 in 2013. The turbidity and TSS data collected from these stations were compared to Alabama's 2010 Ecoregional Reference Guidelines for ecoregion 68. Individual turbidity samples were compared to the applicable numeric criterion (50 NTU plus reference 10.1 NTU), and the median of the TSS samples was compared to the reference value of 14.0 mg/L. Habitat and macroinvertebrate assessments were conducted at station LOSW-1 in 2012 by ADEM.

4.2.1 *Segment 2 Turbidity and TSS Data Analysis*

Data from both stations were used for TSS analysis and the median values for LOSW-1 and LOSW-2 were 3.0 mg/L and 3.5 mg/L, respectively. Both stations had median values well below the reference value of 14.0 mg/L. All turbidity values for both stations were less than the applicable criterion. A summary of the TSS data is shown in Table 6. The turbidity data can be found in Appendix 2.

Table 6: TSS Median Values for Stations LOSW-1 and LOSW-2

Station	TSS Median Value (mg/L)	Eco-reference Value (mg/L)
LOSW-1	3.0	14.0
LOSW-2	3.5	14.0

4.2.2 *Segment 2 Habitat Assessment*

A habitat assessment was conducted by ADEM on October 17, 2012 at station LOSW-1. Results of the physical characteristics evaluation indicate the stream has a very low percentage of fine particles as part of the total substrate composition. The sediment deposition component of the habitat assessment received a rating of Sub-optimal, which indicates very little sediment has accumulated in the stream bottom as a result of deposition. The overall habitat assessment was rated as Sub-optimal, and the results from the habitat assessment are shown in Figure 7.

Physical Characteristics	
Width (ft)	60
Canopy Cover	Estimate 50/50
Depth (ft)	
Riffle	0.7
Run	2.6
Pool	1.6
% of Reach	
Riffle	17
Run	60
Pool	23
% Substrate	
Bedrock	40
Boulder	13
Cobble	3
Gravel	7
Sand	27
Fines	7
Stick Wood	3

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	55	Marginal (41-58)
Sediment Deposition	63	Sub-optimal (59-70)
Sinuosity	55	Marginal (45-64)
Bank and Vegetative Stability	44	Marginal (35-59)
Riparian Buffer	80	Sub-optimal (70-89)
ıbitat Assessment Score	**147**	
% Maximum Score	**61**	**Sub-optimal (59-70)**

Figure 7: Macroinvertebrate assessment results at LOSW-1

4.2.3 *Macroinvertebrate Assessment*

The results of the macroinvertebrate assessment at LOSW-1 indicated that the overall state of the macroinvertebrate community was in fair condition. Scores from the macroinvertebrate assessment are shown in Figure 8.

Macroinvertebrate Assessment		
	Results	Scores
Taxa richness measures		(0-100)
# EPT taxa	16	52
Taxonomic composition measures		
% Non-insect taxa	14	45
% Dominant taxon	13	96
% EPC taxa	23	42
Functional feeding group measures		
% Predators	12	46
Tolerance measures		
% Taxa as Tolerant	39	27
WMB-I Assessment Score	---	**51**
WMB-I Assessment Rating		**Fair (39-58)**

Figure 8: Macroinvertebrate assessment results at LOSW-1

5.0 *Conclusion*

Based on the examination of physical and biological data collected within the impaired segments of Lost Creek, ADEM has determined that impairment due to siltation (habitat alteration) does not exist and that both segments are currently meeting applicable water quality standards. Accordingly, ADEM will not develop a TMDL for Lost Creek due to "more recent data," which is just cause for delisting waterbodies according to Title 40 of the Code of Federal Regulations (CFR), Part 130.7(b)(6)(iv).

6.0 *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 document will be made available on ADEM's Website: www.adem.state.al.us. The public can also request paper or electronic copies of the report by contacting Ms. Kimberly Minton at 334-271-7826 or kminton@adem.alabama.gov. 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.

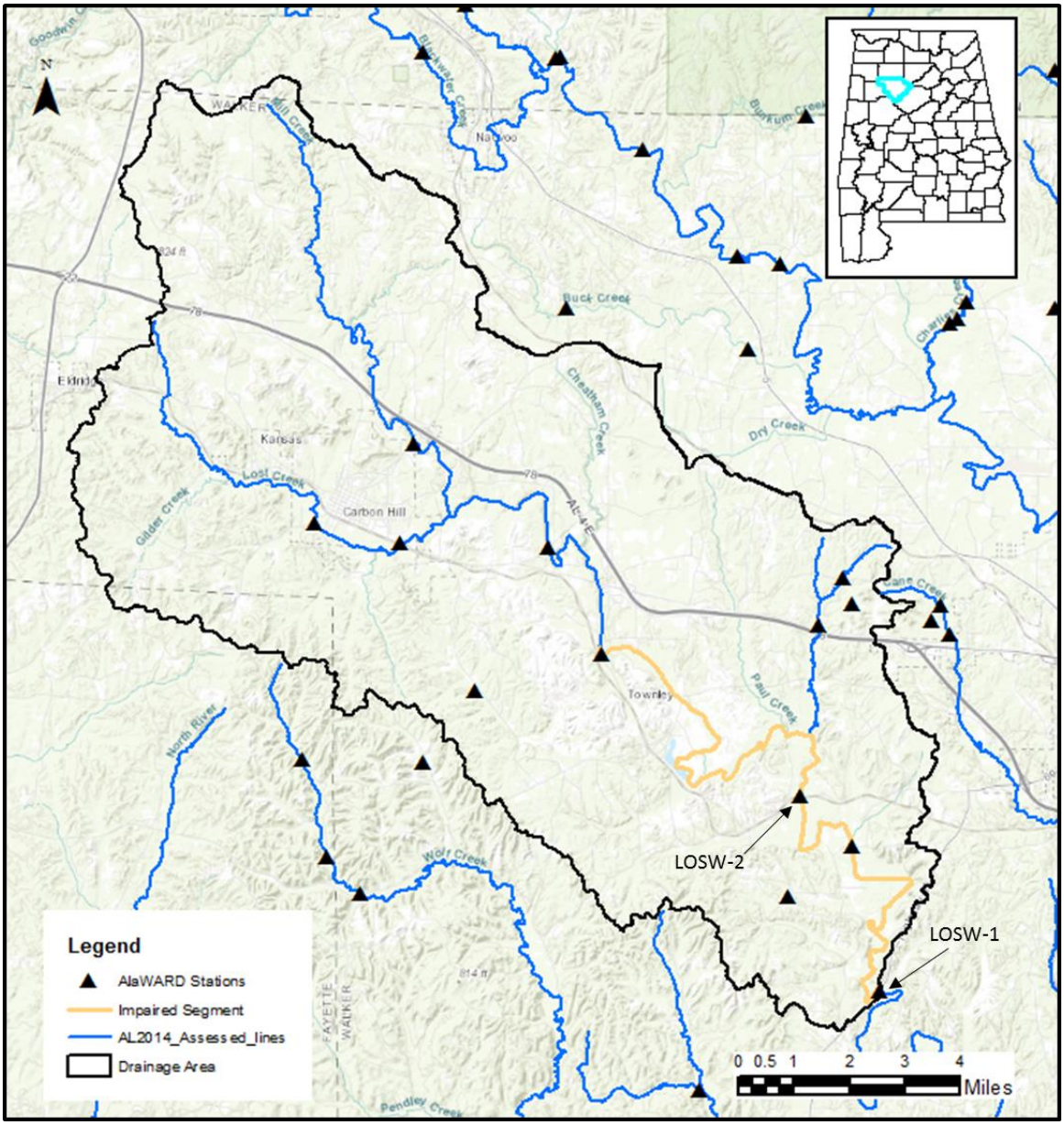
Appendix 1: *Ecoregional Reference Guidelines (Ecoregion 68)*

Alabama's 2010 Ecoregional Reference Guidelines			
			Level 3
Parameters	**Basis of comparison**	**Result to compare**	**68**
Physical			
Temperature (°C)	90th %ile	Median	24
Turbidity (NTU)	90th %ile	INDIVIDUAL	10.1
Total Dissolved Solids (mg/L)	90th %ile	Median	97.2
Total Suspended Solids (mg/L)	90th %ile	Median	14
Specific Conductance (µmhos)	Median	Median	39.15
Hardness (mg/L)	Median	Median	12.15
Alkalinity (mg/L)	90th %ile	Median	42.2
Stream Flow (cfs)			
Chemical			
Dissolved Oxygen (mg/L)	10th %ile	Median	6.79
pH (su)	10th %ile	Median	6.5
pH (su)	90th %ile	Median	7.84
Ammonia Nitrogen (mg/L)	90th %ile	Median	0.1007
Nitrate+Nitrite Nitrogen (mg/L)	90th %ile	Median	0.6191
Total Kjeldahl Nitrogen (mg/L)	90th %ile	Median	0.733
Total Nitrogen (mg/L)	90th %ile	Median	1.41685
Dissolved Reactive Phosphorus (mg/L)	90th %ile	Median	0.0182
Total Phosphorus (mg/L)	90th %ile	Median	0.05
CBOD-5 (mg/L)	90th %ile	Median	1.9
Biological			
Chlorophyll a (µg/L)	90th %ile	Median	2.67
Fecal Coliform (col/100 mL)	90th %ile	Median	320

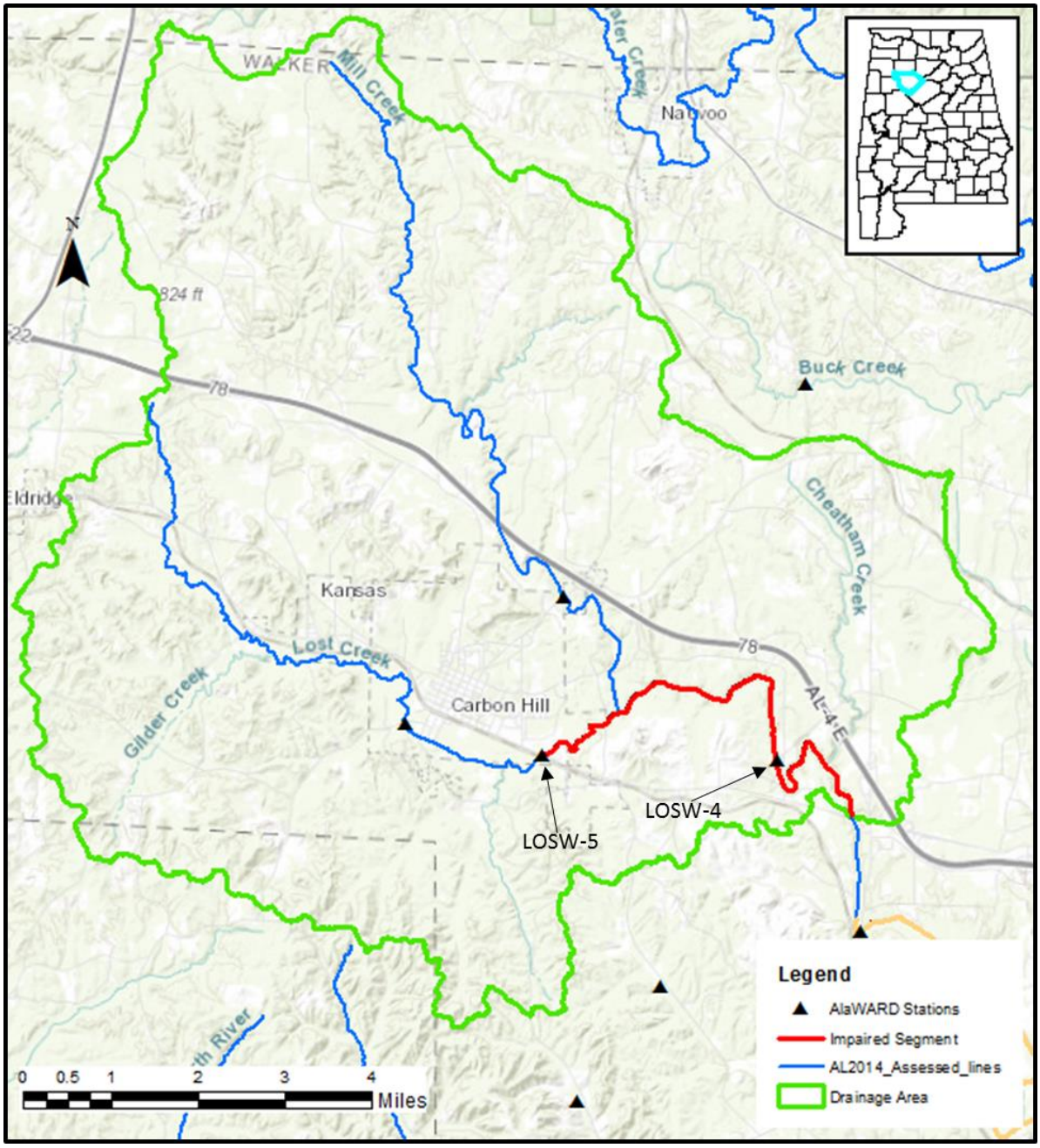
Appendix 2: *Turbidity and TSS Data from LOSW-1, LOSW2, LOSW-4, and LOSW-5*

Station ID	Visit Date	Turb NTU	Turb dc	TSS mgl	TSS dc
LOSW-1	10/17/2012	2.54	NTU		
LOSW-1	3/12/2013	23.8	NTU	19	
LOSW-1	4/9/2013	3.28	NTU	13	
LOSW-1	5/6/2013	19.8	NTU	18	
LOSW-1	6/11/2013	3.64	NTU	1	< MDL 1
LOSW-1	7/17/2013	4.13	NTU	1	< MDL 1
LOSW-1	8/6/2013	4.7	NTU	3	
LOSW-1	9/9/2013	3.58	NTU	1	
LOSW-1	10/9/2013	3.12	NTU	3	
LOSW-2	3/12/2013	19.6	NTU	11	
LOSW-2	4/9/2013	3.65	NTU	12	
LOSW-2	5/6/2013	45.5	NTU	92	
LOSW-2	6/11/2013	2.36	NTU	1	
LOSW-2	7/17/2013	1.96	NTU	1	< MDL 1
LOSW-2	8/6/2013	3.74	NTU	2	
LOSW-2	9/9/2013	1.79	NTU	5	
LOSW-2	10/9/2013	0.82	NTU	2	
LOSW-4	3/12/2013	14.5	NTU	2	
LOSW-4	4/9/2013	1.96	NTU	13	
LOSW-4	5/6/2013	12.9	NTU	5	
LOSW-4	6/11/2013	3.37	NTU	1	< MDL 1
LOSW-4	7/17/2013	3.22	NTU	1	< MDL 1
LOSW-4	8/6/2013	3.8	NTU	3	
LOSW-4	9/9/2013	1.82	NTU	1	< MDL 1
LOSW-4	10/9/2013	1.66	NTU	1	< MDL 1
LOSW-5	5/2/2012	3.52	NTU	1	< MDL 1
LOSW-5	7/18/2012	26.5	NTU	25	
LOSW-5	9/12/2012	3.76	NTU	1	
LOSW-5	10/23/2012	2.68	NTU		
LOSW-5	11/6/2012	2.96	NTU	1	< MDL 1

Appendix 3: *Stations LOSW-1 and LOSW-2 Location Map*



Appendix 4: *Stations LOSW-4 and LOSW-5 Location Map*



Appendix 5: *Station Location Pictures*

LOSW-1 (looking upstream)

LOSW-1 (looking downstream)

LOSW-2 (looking upstream)

LOSW-2 (looking downstream)

LOSW-4 (looking upstream)

LOSW-4 (looking downstream)

LOSW-5 (looking upstream)

LOSW-5 (looking downstream)