



Final
Delisting Decision
for
Bear Creek (Upper Bear Creek Lake)

Assessment Unit ID # AL06030006-0102-102

Organic enrichment (BOD)

Franklin and Winston Counties

Alabama Department of Environmental Management
Water Quality Branch
Water Division
March 2026

Figure 1: Bear Creek (Upper Bear Creek Lake) Watershed

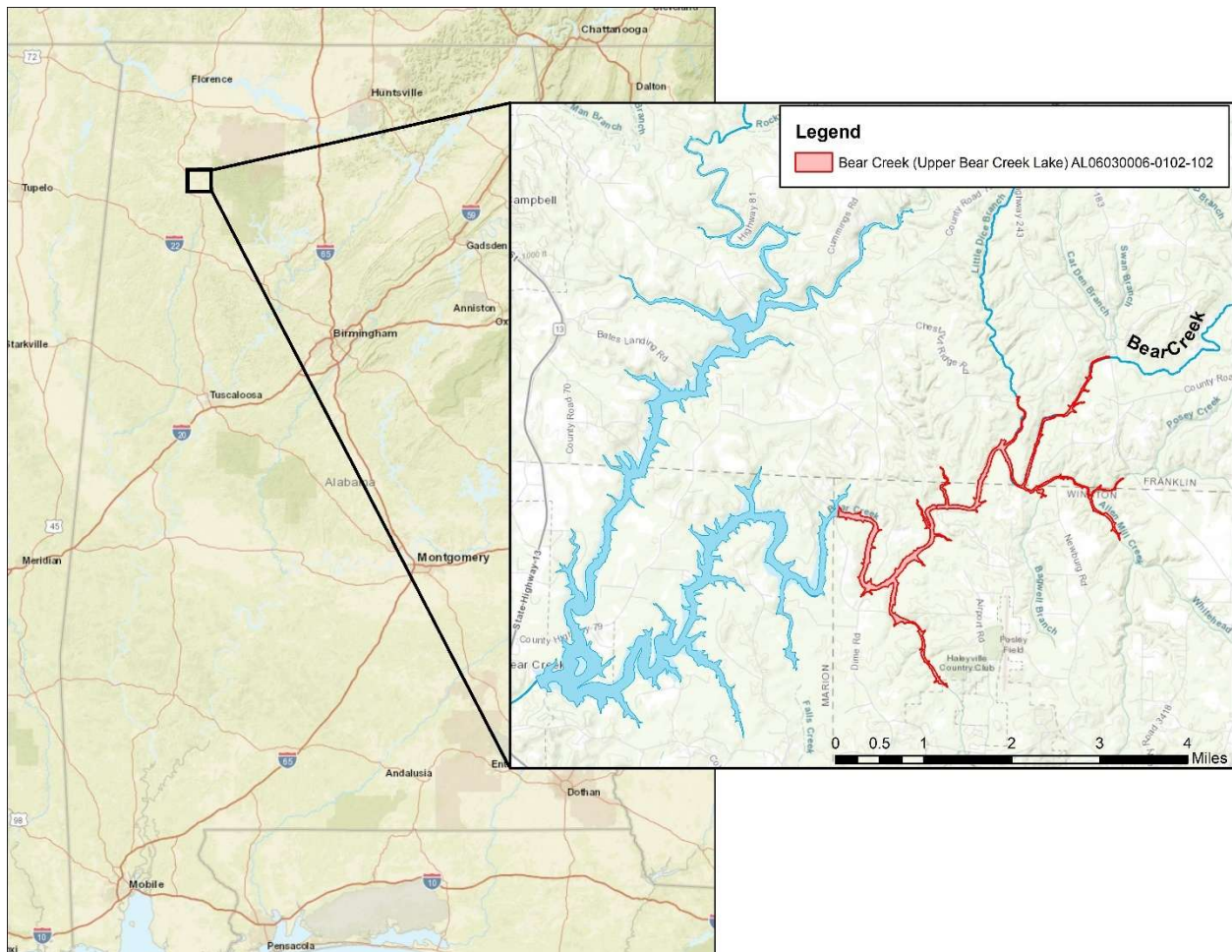


Table of Contents	Page
1.0 Executive Summary.....	1
2.0 Basis for §303(d) Listing.....	2
3.0 Land Use Assessment.....	3
4.0 Technical Basis for Delisting Decision.....	6
4.1 Water Quality Target Identification.....	6
4.2 Data Availability and Analysis.....	6
5.0 Conclusion.....	9
6.0 Public Participation.....	9
7.0 Appendices.....	10
7.1 References.....	10
7.2 Water Quality Data.....	11
7.3 Station Photographs.....	14

List of Figures

Figure 1	Bear Creek (Upper Bear Creek Lake) Watershed.....	ii
Figure 2	Bear Creek (Upper Bear Creek Lake) Listing.....	3
Figure 3	Land Use Map for the Bear Creek (Upper Bear Creek Lake) Watershed.....	4
Figure 4	Primary Land Uses in the Bear Creek (Upper Bear Creek Lake) Watershed.....	5
Figure 5	Map of ADEM Sampling Stations on Bear Creek (Upper Bear Creek Lake).....	7
Figure 6	BERW-1 Upstream (8/16/2023).....	14
Figure 7	BERW-1 Downstream (8/16/2023).....	14
Figure 8	PSYF-1 Upstream (8/3/2023).....	15
Figure 9	PSYF-1 Downstream (8/3/2023).....	15

List of Tables

Table 1	ADEM 2016 §303(d) Fact Sheet - Bear Creek (Upper Bear Creek Lake) Listing.....	2
Table 2	Land Use Areas for the Bear Creek (Upper Bear Creek Lake) Watershed.....	4
Table 3	Bear Creek (Upper Bear Creek Lake) Sampling Station Descriptions.....	7
Table 4	2023 Diurnal Study DO Data Summary for Bear Creek (Upper Bear Creek Lake).....	8
Table 5	Discrete DO Data for Bear Creek (Upper Bear Creek Lake).....	8
Table 6	Summary of DO Data for Bear Creek (Upper Bear Creek Lake).....	9
Table 7	ADEM DO Data Collected on Bear Creek (Upper Bear Creek Lake).....	11
Table 8	2023 Conventional Water Quality Data.....	13

1.0 Executive Summary

Upper Bear Creek Lake is an impounded reservoir on Bear Creek constructed by the Tennessee Valley Authority (TVA) in 1978. The reservoir was built to provide flood damage control, recreational opportunities, and water supply for the surrounding region. The reservoir is located northwest of Haleyville, Alabama and contains 1,850 acres of water at full pool. The use classification is Public Water Supply/Swimming/Fish and Wildlife.

The upstream segment of Bear Creek (Upper Bear Creek Lake) was originally added to Alabama's §303(d) list as being impaired for organic enrichment (CBOD, NBOD) in 2016. The listing was based on water quality data collected at station PSYF-1, which is on a small tributary embayment of Upper Bear Creek Lake, that indicated that Bear Creek (Upper Bear Creek Lake) was not meeting its use classification with respect to organic enrichment. The listing cause was updated to organic enrichment (BOD) in 2018.

The impaired segment of Bear Creek (Upper Bear Creek Lake) extends from the confluence with Pretty Branch upstream to Alabama Highway 243. The source of the organic enrichment impairment on the 2024 §303(d) list is given as agriculture. Bear Creek (Upper Bear Creek Lake) has been included on Alabama's §303(d) list of impaired streams for organic enrichment from 2016 through 2024.

In 2023, ADEM collected data on Bear Creek (Upper Bear Creek Lake) to further assess the water quality of the stream. An assessment of the 2023 data indicates that Bear Creek (Upper Bear Creek Lake) is no longer impaired for organic enrichment.

Based on the assessment of all available water quality data obtained on Bear Creek (Upper Bear Creek Lake), ADEM has concluded that a water quality impairment due to organic enrichment does not exist. Accordingly, ADEM will not proceed in developing a Total Maximum Daily Load (TMDL) for this stream due to "more recent or accurate data," which is a just cause for delisting a waterbody in conformance with Title 40 of the Code of Federal Regulations (CFR), Part 130.7(b)(6)(iv).

2.0 Basis for §303(d) Listing

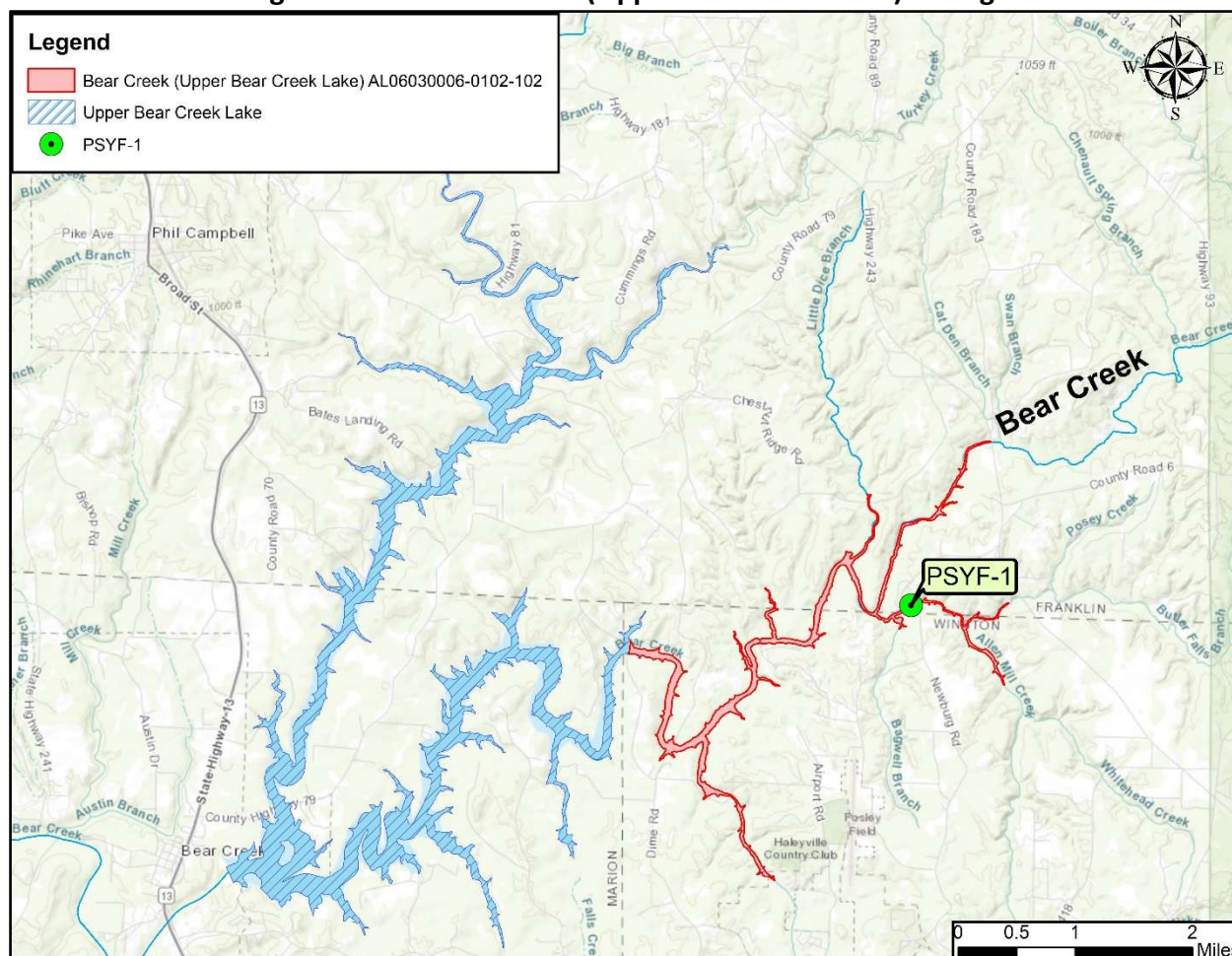
Section 303(d) of the Clean Water Act (CWA), as amended by the Water Quality Act of 1987, and the Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (Title 40 of the Code of Federal Regulations (CFR), Part 130), require states to identify waterbodies which are not 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. 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).

The upstream segment of Bear Creek (Upper Bear Creek Lake) was originally added to Alabama's §303(d) list as being impaired for organic enrichment (CBOD, NBOD) in 2016. The listing was based on water quality data collected at station PSYF-1, which is on a small tributary embayment of Upper Bear Creek Lake (see figure 2 on the following page), that indicated that Bear Creek (Upper Bear Creek Lake) was not meeting its use classification with respect to organic enrichment. See the excerpt from Alabama's 2016 §303(d) Fact Sheet below.

Table 1. ADEM 2016 §303(d) Fact Sheet - Bear Creek (Upper Bear Creek Lake) Listing

Assessment Unit	Waterbody Name	River Basin	County	Causes	Basis for Addition to the List	Source / Date of Data
AL06030006-0102-102	Bear Creek (Upper Bear Creek Lake)	Tennessee	Franklin/Winston	Organic enrichment (CBOD, NBOD)	Records at ADEM Station PSYF-1 from 2013 show that the dissolved oxygen criterion was exceeded in 4 out of 8 samples.	ADEM 2013

Figure 2. Bear Creek (Upper Bear Creek Lake) Listing



3.0 Land Use Assessment

Land use for the Bear Creek (Upper Bear Creek Lake) watershed was determined using ArcMap with land use datasets derived from the 2021 National Land Cover Dataset (NLCD). Figure 3 and Table 2 display the land use areas for the Bear Creek (Upper Bear Creek Lake) watershed. Figure 4 is a graph depicting the primary land use in the Bear Creek (Upper Bear Creek Lake) watershed. The majority of the watershed is forest (58%) and agriculture (24%). Other land uses within the watershed include 8% developed land and 6% grassland/shrub.

Figure 3. Land Use Map for the Bear Creek (Upper Bear Creek Lake) Watershed

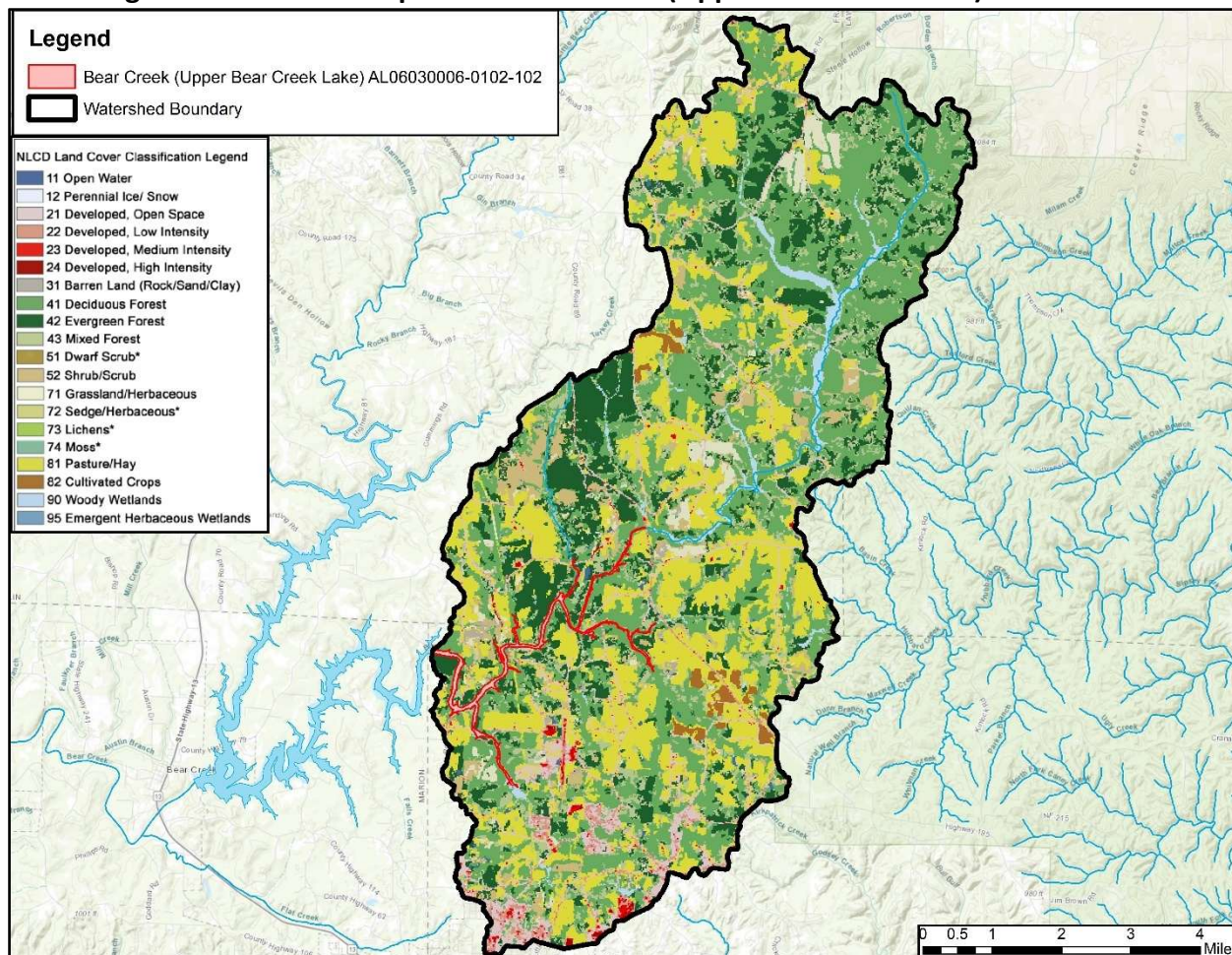
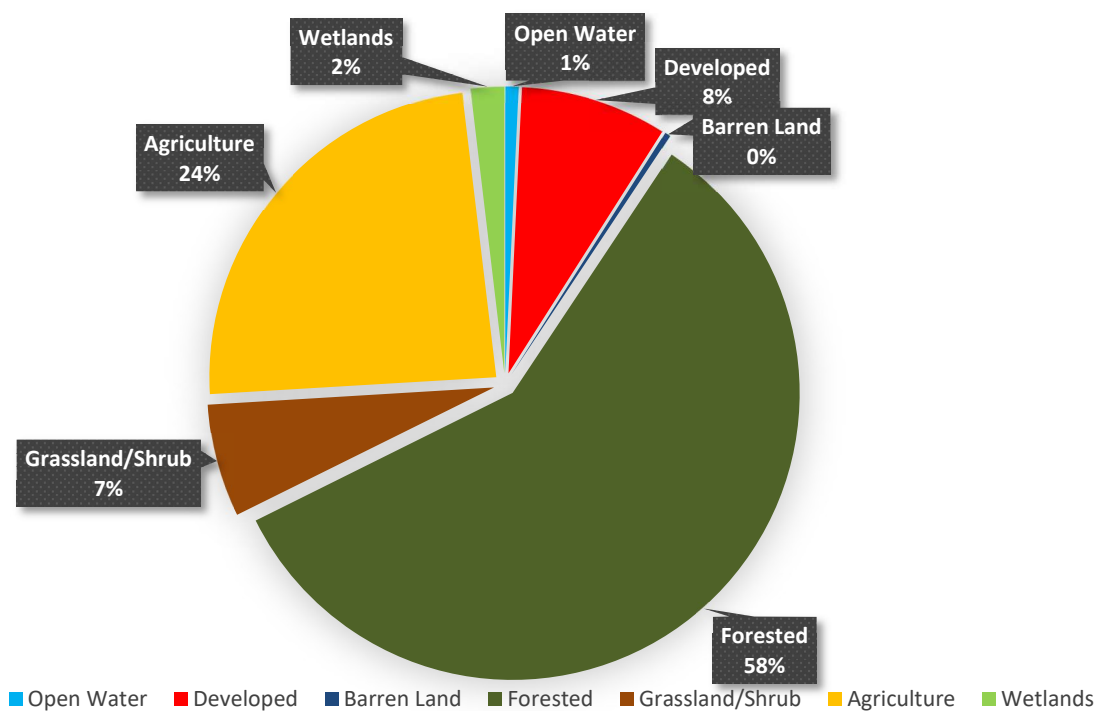


Table 2. Land Use Areas for the Bear Creek (Upper Bear Creek Lake) Watershed

2021 NLCD Land Cover	NLCD Legend	Area (square miles)	%
Open Water	11	0.412	0.74%
Developed, Open Space	21	3.148	5.62%
Developed, Low Intensity	22	1.109	1.98%
Developed, Medium Intensity	23	0.300	0.53%
Developed, High Intensity	24	0.079	0.14%
Barren Land	31	0.180	0.32%
Deciduous Forest	41	18.703	33.40%
Evergreen Forest	42	8.527	15.23%
Mixed Forest	43	5.439	9.71%
Shrub/Scrub	52	2.179	3.89%
Herbaceous	71	1.390	2.48%
Hay/Pasture	81	12.986	23.19%
Cultivated Crops	82	0.489	0.87%
Woody Wetlands	90	1.034	1.85%
Emergent Herbaceous Wetlands	95	0.028	0.05%

Cumulative Land Cover	NLCD Legend	Area (square miles)	%
Open Water	11	0.412	0.74%
Developed	21,22,23,24	4.635	8.28%
Barren Land	31	0.180	0.32%
Forested	41,42,43	32.669	58.34%
Grassland/Shrub	52,71	3.569	6.37%
Agriculture	81,82	13.474	24.06%
Wetlands	90,95	1.062	1.90%

Figure 4. Primary Land Uses in the Bear Creek (Upper Bear Creek Lake) Watershed



4.0 Technical Basis for Delisting Decision

4.1 Water Quality Target Identification

Alabama's dissolved oxygen (DO) criteria (ADEM Admin. Code R. 335-6-10-.09) are as follows for segments classified as Public Water Supply/Swimming/Fish and Wildlife:

For a diversified warm water biota, including game fish, daily dissolved oxygen concentrations shall not be less than 5 mg/l at all times; except under extreme conditions due to natural causes, it may range between 5 mg/l and 4 mg/l, provided that the water quality is favorable in all other parameters. The normal seasonal and daily fluctuations shall be maintained above these levels. In no event shall the dissolved oxygen level be less than 4 mg/l due to discharges from existing hydroelectric generation impoundments. All new hydroelectric generation impoundments, including addition of new hydroelectric generation units to existing impoundments, shall be designed so that the discharge will contain at least 5 mg/l dissolved oxygen where practicable and technologically possible. The Environmental Protection Agency, in cooperation with the State of Alabama and parties responsible for impoundments, shall develop a program to improve the design of existing facilities.

In order to determine if an organic enrichment impairment exists in Bear Creek (Upper Bear Creek Lake), the Department will evaluate measured DO concentrations against the above criteria.

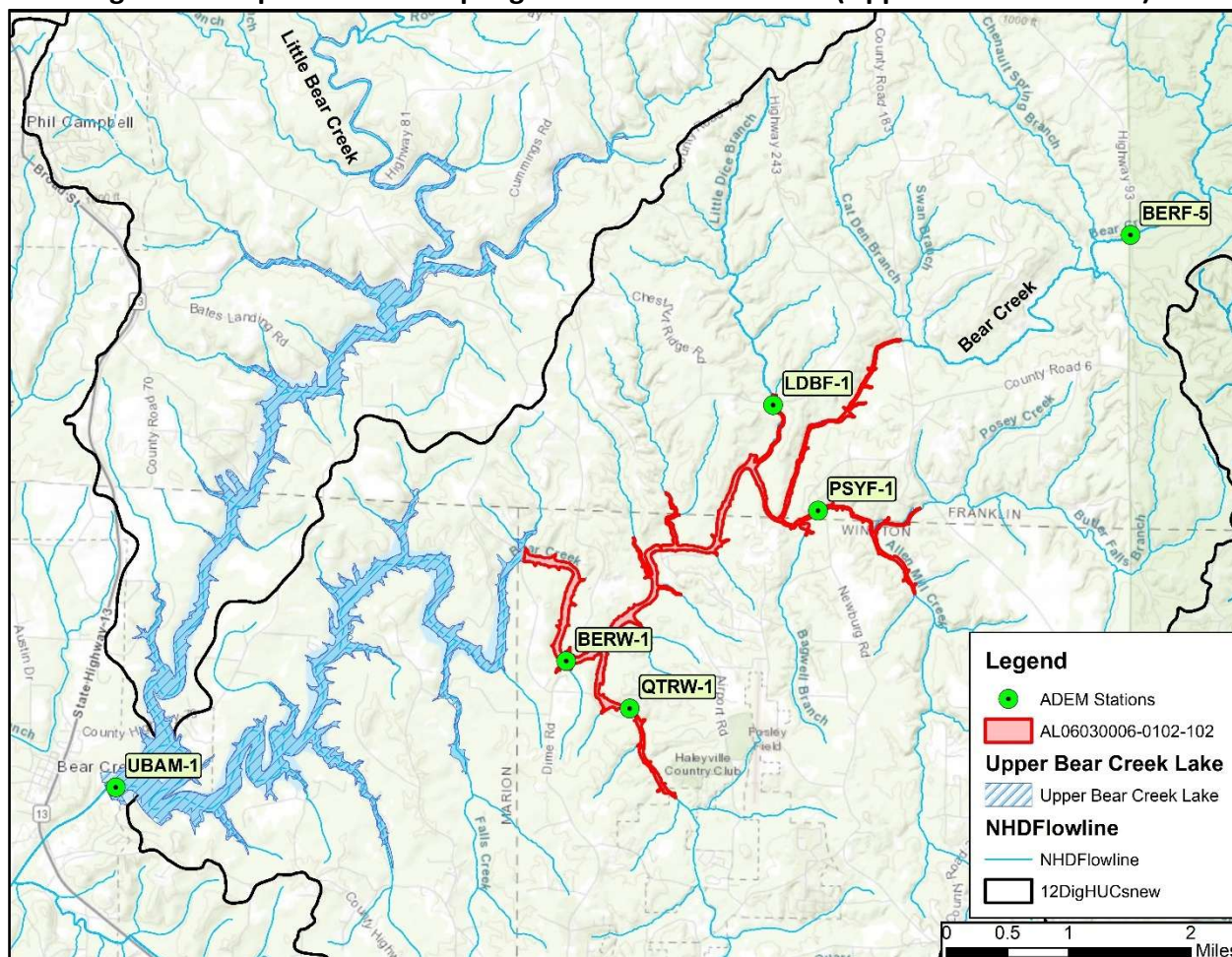
4.2 Data Availability and Analysis

A diurnal study was conducted in Upper Bear Creek Lake during 2023. YSI EXO2 multiparameter datasondes were deployed at four stations (PYSF-1, LDBF01, QTRW-1, and BERW-1) on the impaired segment of Bear Creek (Upper Bear Creek Lake). A datasonde was deployed in the wadeable portion of Bear Creek (BERF-5) upstream of the impairment segment, and an additional datasonde was deployed in the Upper Bear Creek Lake forebay (UBAM-1) downstream of the impaired reach. Table 3 and Figure 5 show the descriptions and locations, respectively, of the stations.

Table 3. Bear Creek (Upper Bear Creek Lake) Sampling Station Descriptions

Station ID	Waterbody	Station Location	Latitude	Longitude
BERF-5	Bear Creek	Bear Creek at Franklin County Road 93	34.339633	-87.547311
BERW-1	Bear Creek (Upper Bear Creek Lake)	Upper Bear Creek Lake (east fork) at Dime Road	34.288639	-87.627799
LDBF-1	Little Dice Branch	Little Dice Branch at Franklin County Road 185 SW of Posey Mill	34.319201	-87.598393
PSYF-1	Posey Creek	Posey Creek at Franklin County Road 11	34.306695	-87.591863
QTRW-1	Quarter Creek	Quarter Creek at Winston County Road 54	34.283064	-87.618641
UBAM-1	Bear Creek (Upper Bear Creek Lake)	Upper Bear Creek Reservoir dam forebay area. Upper Bear Creek mile 115	34.273306	-87.692167

Figure 5. Map of ADEM Sampling Stations on Bear Creek (Upper Bear Creek Lake)



The datasondes were programmed to collect DO measurements at 15-minute intervals during the study. The in-situ data was then post-processed and aggregated to hourly values (i.e., the hourly values were calculated as the average of the four measured 15-minute samples within each hour). During the diurnal study, there were zero measured DO concentrations less than 5.0 mg/L, as shown in Table 4. The full results from the diurnal study can be found in Appendix 7.2.

Table 4. 2023 Diurnal Study DO Data Summary for Bear Creek (Upper Bear Creek Lake)

Station	Waterbody	Date/Time First Sample	Date/Time Last Sample	# of Samples	Mean DO (mg/l)	Minimum DO (mg/l)	Maximum DO (mg/l)	# of Samples < 5 mg/l
BERF-5	Bear Creek	8/14/2023 16:00	8/17/2023 14:00	71	7.26	6.71	7.84	0
BERW-1	Bear Creek (Upper Bear Creek Lake)	8/14/2023 10:00	8/17/2023 9:00	72	9.01	7.89	10.48	0
LDBF-1	Little Dice Branch	8/14/2023 15:00	8/17/2023 13:00	71	6.47	6.05	7.02	0
PSYF-1	Posey Creek	9/21/2023 12:00	9/25/2023 8:00	93	9.92	5.41	15.10	0
QTRW-1	Quarter Creek	8/14/2023 14:00	8/17/2023 12:00	71	6.79	5.34	9.03	0
UBAM-1	Bear Creek (Upper Bear Creek Lake)	8/14/2023 12:00	8/17/2023 11:00	72	8.41	7.91	9.04	0

During 2023, ADEM's Field Operations Division also collected monthly discrete DO grab samples at two stations (BERW-1 and PSYF-1) on the impaired segment of Bear Creek (Upper Bear Creek Lake). These results are shown below in Table 5.

Table 5. Discrete DO Data for Bear Creek (Upper Bear Creek Lake)

STATION	Waterbody	Date/Time	DO (mg/l)
BERW-1	Bear Creek (Upper Bear Creek Lake)	4/27/2023 9:55	9.6
BERW-1	Bear Creek (Upper Bear Creek Lake)	5/18/2023 13:30	10
BERW-1	Bear Creek (Upper Bear Creek Lake)	6/21/2023 14:40	9.6
BERW-1	Bear Creek (Upper Bear Creek Lake)	7/19/2023 14:05	8.9
BERW-1	Bear Creek (Upper Bear Creek Lake)	8/16/2023 13:45	8.9
BERW-1	Bear Creek (Upper Bear Creek Lake)	9/20/2023 13:05	8.9
BERW-1	Bear Creek (Upper Bear Creek Lake)	10/18/2023 14:00	9
PSYF-1	Posey Creek	4/12/2023 8:10	7.6
PSYF-1	Posey Creek	6/8/2023 8:16	5.6
PSYF-1	Posey Creek	8/3/2023 9:54	4
PSYF-1	Posey Creek	10/11/2023 10:54	2.9

In accordance with *Alabama's Water Quality Assessment and Listing Methodology (2024)*, hourly DO data collected using continuous monitoring equipment are assessed using the same binomial distribution function used for discrete sampling. Therefore, at station BERW-1, a total of 79 DO samples (72 samples from the diurnal study and seven discrete samples) were collected during 2023. At station PSYF-1, a total of 97 DO samples (93 samples from the diurnal study and four discrete samples) were collected during 2023. When evaluated in accordance with Table 19 of *Alabama's Water Quality Assessment and Listing Methodology (2024)*, the 2023 DO data provides indication that Bear Creek (Upper Bear Creek Lake) is not impaired due to organic enrichment.

Table 6. Summary of DO Data for Bear Creek (Upper Bear Creek Lake)

Station	# of DO Samples	# of DO samples < 5 mg/L	Allowable # of DO samples < 5 mg/L
BERF-5	71	0	4
BERW-1	79	0	5
LDBF-1	71	0	4
PSYF-1	97	2	6
QTRW-1	71	0	4
UBAM-1	72	0	4

5.0 Conclusion

From examination of all available data, ADEM has determined that a water quality impairment due to organic enrichment does not currently exist within Bear Creek (Upper Bear Creek Lake). Therefore, ADEM will not proceed in developing a TMDL for this stream due to “more recent or accurate data,” which is a just cause for delisting a waterbody in conformance with 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) was placed on public notice and made available for review and comment. The public notice was prepared and published in newspapers in Montgomery, Huntsville, Birmingham, and Mobile, as well as submitted to persons who requested to be on ADEM’s postal and electronic mailing distributions. In addition, the public notice and subject DD were made available on ADEM’s Website: www.adem.alabama.gov. The public could also request paper or electronic copies of the DD by contacting Ms. Kimberly Minton at 334-271-7826 or kminton@adem.alabama.gov. The public was given an opportunity to review the DD and submit comments to the Department in writing. No written comments were received during the public notice period.

7.0 Appendices

7.1 References

ADEM Administrative Code, 2025. Water Division – Water Quality Program, Chapter 335-6-10, Water Quality Criteria.

ADEM Administrative Code, 2025. Water Division – Water Quality Program, Chapter 335-6-11, Use Classifications for Interstate and Intrastate Waters.

Alabama’s Monitoring Program. 2023. ADEM.

Alabama Department of Environmental Management. *Alabama’s Water Quality Assessment and Listing Methodology*, January 2024.

Alabama Department of Environmental Management. 2016 – 2024 §303(d) Lists and Fact Sheets.

Alabama Department of Environmental Management. Standard Operating Procedures #4910, Revision 7.2 - Laboratory Data Qualification. January 2022.

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*. Office of Water. EPA 440/4-91-001.

7.2 Water Quality Data

Table 7. ADEM DO Data Collected on Bear Creek (Upper Bear Creek Lake)

Station	Date/Time	DO (mg/l)	Station	Date/Time	DO (mg/l)	Station	Date/Time	DO (mg/l)
BERF-5	8/14/2023 16:00	7.11	BERW-1	8/14/2023 10:00	8.01	LDBF-1	8/14/2023 15:00	6.63
BERF-5	8/14/2023 17:00	7.04	BERW-1	8/14/2023 11:00	8.26	LDBF-1	8/14/2023 16:00	6.58
BERF-5	8/14/2023 18:00	6.94	BERW-1	8/14/2023 12:00	8.78	LDBF-1	8/14/2023 17:00	6.48
BERF-5	8/14/2023 19:00	6.86	BERW-1	8/14/2023 13:00	9.33	LDBF-1	8/14/2023 18:00	6.38
BERF-5	8/14/2023 20:00	6.80	BERW-1	8/14/2023 14:00	9.81	LDBF-1	8/14/2023 19:00	6.29
BERF-5	8/14/2023 21:00	6.76	BERW-1	8/14/2023 15:00	9.99	LDBF-1	8/14/2023 20:00	6.20
BERF-5	8/14/2023 22:00	6.79	BERW-1	8/14/2023 16:00	10.19	LDBF-1	8/14/2023 21:00	6.20
BERF-5	8/14/2023 23:00	6.74	BERW-1	8/14/2023 17:00	10.48	LDBF-1	8/14/2023 22:00	6.25
BERF-5	8/15/2023 0:00	6.71	BERW-1	8/14/2023 18:00	10.43	LDBF-1	8/14/2023 23:00	6.20
BERF-5	8/15/2023 1:00	6.80	BERW-1	8/14/2023 19:00	10.06	LDBF-1	8/15/2023 0:00	6.12
BERF-5	8/15/2023 2:00	6.75	BERW-1	8/14/2023 20:00	10.13	LDBF-1	8/15/2023 1:00	6.08
BERF-5	8/15/2023 3:00	6.77	BERW-1	8/14/2023 21:00	10.13	LDBF-1	8/15/2023 2:00	6.05
BERF-5	8/15/2023 4:00	6.78	BERW-1	8/14/2023 22:00	10.00	LDBF-1	8/15/2023 3:00	6.09
BERF-5	8/15/2023 5:00	6.87	BERW-1	8/14/2023 23:00	9.91	LDBF-1	8/15/2023 4:00	6.22
BERF-5	8/15/2023 6:00	6.98	BERW-1	8/15/2023 0:00	9.79	LDBF-1	8/15/2023 5:00	6.32
BERF-5	8/15/2023 7:00	7.03	BERW-1	8/15/2023 1:00	9.38	LDBF-1	8/15/2023 6:00	6.39
BERF-5	8/15/2023 8:00	7.06	BERW-1	8/15/2023 2:00	9.33	LDBF-1	8/15/2023 7:00	6.39
BERF-5	8/15/2023 9:00	7.11	BERW-1	8/15/2023 3:00	8.94	LDBF-1	8/15/2023 8:00	6.38
BERF-5	8/15/2023 10:00	7.15	BERW-1	8/15/2023 4:00	8.69	LDBF-1	8/15/2023 9:00	6.42
BERF-5	8/15/2023 11:00	7.19	BERW-1	8/15/2023 5:00	8.69	LDBF-1	8/15/2023 10:00	6.47
BERF-5	8/15/2023 12:00	7.24	BERW-1	8/15/2023 6:00	8.77	LDBF-1	8/15/2023 11:00	6.55
BERF-5	8/15/2023 13:00	7.26	BERW-1	8/15/2023 7:00	8.46	LDBF-1	8/15/2023 12:00	6.74
BERF-5	8/15/2023 14:00	7.27	BERW-1	8/15/2023 8:00	8.31	LDBF-1	8/15/2023 13:00	6.85
BERF-5	8/15/2023 15:00	7.25	BERW-1	8/15/2023 9:00	8.20	LDBF-1	8/15/2023 14:00	6.90
BERF-5	8/15/2023 16:00	7.20	BERW-1	8/15/2023 10:00	8.50	LDBF-1	8/15/2023 15:00	6.91
BERF-5	8/15/2023 17:00	7.14	BERW-1	8/15/2023 11:00	8.50	LDBF-1	8/15/2023 16:00	6.87
BERF-5	8/15/2023 18:00	7.11	BERW-1	8/15/2023 12:00	8.70	LDBF-1	8/15/2023 17:00	6.79
BERF-5	8/15/2023 19:00	7.08	BERW-1	8/15/2023 13:00	9.06	LDBF-1	8/15/2023 18:00	6.67
BERF-5	8/15/2023 20:00	7.06	BERW-1	8/15/2023 14:00	9.33	LDBF-1	8/15/2023 19:00	6.56
BERF-5	8/15/2023 21:00	7.07	BERW-1	8/15/2023 15:00	9.64	LDBF-1	8/15/2023 20:00	6.45
BERF-5	8/15/2023 22:00	7.09	BERW-1	8/15/2023 16:00	9.97	LDBF-1	8/15/2023 21:00	6.37
BERF-5	8/15/2023 23:00	7.11	BERW-1	8/15/2023 17:00	10.00	LDBF-1	8/15/2023 22:00	6.31
BERF-5	8/16/2023 0:00	7.14	BERW-1	8/15/2023 18:00	9.65	LDBF-1	8/15/2023 23:00	6.27
BERF-5	8/16/2023 1:00	7.18	BERW-1	8/15/2023 19:00	9.75	LDBF-1	8/16/2023 0:00	6.23
BERF-5	8/16/2023 2:00	7.22	BERW-1	8/15/2023 20:00	9.60	LDBF-1	8/16/2023 1:00	6.20
BERF-5	8/16/2023 3:00	7.27	BERW-1	8/15/2023 21:00	9.33	LDBF-1	8/16/2023 2:00	6.19
BERF-5	8/16/2023 4:00	7.31	BERW-1	8/15/2023 22:00	9.28	LDBF-1	8/16/2023 3:00	6.20
BERF-5	8/16/2023 5:00	7.36	BERW-1	8/15/2023 23:00	9.09	LDBF-1	8/16/2023 4:00	6.20
BERF-5	8/16/2023 6:00	7.41	BERW-1	8/16/2023 0:00	9.01	LDBF-1	8/16/2023 5:00	6.22
BERF-5	8/16/2023 7:00	7.44	BERW-1	8/16/2023 1:00	8.92	LDBF-1	8/16/2023 6:00	6.25
BERF-5	8/16/2023 8:00	7.48	BERW-1	8/16/2023 2:00	8.77	LDBF-1	8/16/2023 7:00	6.28
BERF-5	8/16/2023 9:00	7.53	BERW-1	8/16/2023 3:00	8.65	LDBF-1	8/16/2023 8:00	6.31
BERF-5	8/16/2023 10:00	7.58	BERW-1	8/16/2023 4:00	8.48	LDBF-1	8/16/2023 9:00	6.34
BERF-5	8/16/2023 11:00	7.63	BERW-1	8/16/2023 5:00	8.40	LDBF-1	8/16/2023 10:00	6.37
BERF-5	8/16/2023 12:00	7.67	BERW-1	8/16/2023 6:00	8.31	LDBF-1	8/16/2023 11:00	6.45
BERF-5	8/16/2023 13:00	7.69	BERW-1	8/16/2023 7:00	8.21	LDBF-1	8/16/2023 12:00	6.60
BERF-5	8/16/2023 14:00	7.68	BERW-1	8/16/2023 8:00	8.17	LDBF-1	8/16/2023 13:00	6.80
BERF-5	8/16/2023 15:00	7.65	BERW-1	8/16/2023 9:00	8.16	LDBF-1	8/16/2023 14:00	6.93
BERF-5	8/16/2023 16:00	7.58	BERW-1	8/16/2023 10:00	8.52	LDBF-1	8/16/2023 15:00	6.97
BERF-5	8/16/2023 17:00	7.49	BERW-1	8/16/2023 11:00	8.81	LDBF-1	8/16/2023 16:00	6.95
BERF-5	8/16/2023 18:00	7.42	BERW-1	8/16/2023 12:00	9.12	LDBF-1	8/16/2023 17:00	6.90
BERF-5	8/16/2023 19:00	7.35	BERW-1	8/16/2023 13:00	9.29	LDBF-1	8/16/2023 18:00	6.79
BERF-5	8/16/2023 20:00	7.31	BERW-1	8/16/2023 14:00	9.36	LDBF-1	8/16/2023 19:00	6.72
BERF-5	8/16/2023 21:00	7.28	BERW-1	8/16/2023 15:00	9.51	LDBF-1	8/16/2023 20:00	6.64
BERF-5	8/16/2023 22:00	7.26	BERW-1	8/16/2023 16:00	9.68	LDBF-1	8/16/2023 21:00	6.59
BERF-5	8/16/2023 23:00	7.26	BERW-1	8/16/2023 17:00	9.86	LDBF-1	8/16/2023 22:00	6.54
BERF-5	8/17/2023 0:00	7.27	BERW-1	8/16/2023 18:00	9.63	LDBF-1	8/16/2023 23:00	6.50
BERF-5	8/17/2023 1:00	7.29	BERW-1	8/16/2023 19:00	9.41	LDBF-1	8/17/2023 0:00	6.46
BERF-5	8/17/2023 2:00	7.32	BERW-1	8/16/2023 20:00	9.23	LDBF-1	8/17/2023 1:00	6.44
BERF-5	8/17/2023 3:00	7.36	BERW-1	8/16/2023 21:00	8.88	LDBF-1	8/17/2023 2:00	6.42
BERF-5	8/17/2023 4:00	7.40	BERW-1	8/16/2023 22:00	8.50	LDBF-1	8/17/2023 3:00	6.41
BERF-5	8/17/2023 5:00	7.45	BERW-1	8/16/2023 23:00	8.23	LDBF-1	8/17/2023 4:00	6.41
BERF-5	8/17/2023 6:00	7.50	BERW-1	8/17/2023 0:00	8.24	LDBF-1	8/17/2023 5:00	6.41
BERF-5	8/17/2023 7:00	7.55	BERW-1	8/17/2023 1:00	8.12	LDBF-1	8/17/2023 6:00	6.42
BERF-5	8/17/2023 8:00	7.60	BERW-1	8/17/2023 2:00	8.28	LDBF-1	8/17/2023 7:00	6.44
BERF-5	8/17/2023 9:00	7.65	BERW-1	8/17/2023 3:00	8.34	LDBF-1	8/17/2023 8:00	6.46
BERF-5	8/17/2023 10:00	7.71	BERW-1	8/17/2023 4:00	8.03	LDBF-1	8/17/2023 9:00	6.47
BERF-5	8/17/2023 11:00	7.76	BERW-1	8/17/2023 5:00	7.94	LDBF-1	8/17/2023 10:00	6.50
BERF-5	8/17/2023 12:00	7.80	BERW-1	8/17/2023 6:00	7.89	LDBF-1	8/17/2023 11:00	6.58
BERF-5	8/17/2023 13:00	7.84	BERW-1	8/17/2023 7:00	7.96	LDBF-1	8/17/2023 12:00	6.77
BERF-5	8/17/2023 14:00	7.83	BERW-1	8/17/2023 8:00	7.96	LDBF-1	8/17/2023 13:00	7.02
			BERW-1	8/17/2023 9:00	8.13			

Table 7. ADEM DO Data on Bear Creek (Upper Bear Creek Lake) (cont.)

Station	Date/Time	DO (mg/l)	Station	Date/Time	DO (mg/l)	Station	Date/Time	DO (mg/l)
QTRW-1	8/14/2023 14:00	8.57	PSYF-1	9/21/2023 12:00	11.89	UBAM-1	8/14/2023 12:00	8.23
QTRW-1	8/14/2023 15:00	8.76	PSYF-1	9/21/2023 13:00	13.48	UBAM-1	8/14/2023 13:00	8.41
QTRW-1	8/14/2023 16:00	8.91	PSYF-1	9/21/2023 14:00	14.01	UBAM-1	8/14/2023 14:00	8.49
QTRW-1	8/14/2023 17:00	8.99	PSYF-1	9/21/2023 15:00	13.15	UBAM-1	8/14/2023 15:00	8.74
QTRW-1	8/14/2023 18:00	9.03	PSYF-1	9/21/2023 16:00	13.97	UBAM-1	8/14/2023 16:00	8.80
QTRW-1	8/14/2023 19:00	8.82	PSYF-1	9/21/2023 17:00	14.28	UBAM-1	8/14/2023 17:00	8.91
QTRW-1	8/14/2023 20:00	8.46	PSYF-1	9/21/2023 18:00	12.40	UBAM-1	8/14/2023 18:00	9.04
QTRW-1	8/14/2023 21:00	8.06	PSYF-1	9/21/2023 19:00	12.18	UBAM-1	8/14/2023 19:00	8.94
QTRW-1	8/14/2023 22:00	7.38	PSYF-1	9/21/2023 20:00	11.64	UBAM-1	8/14/2023 20:00	8.84
QTRW-1	8/14/2023 23:00	6.07	PSYF-1	9/21/2023 21:00	11.17	UBAM-1	8/14/2023 21:00	8.85
QTRW-1	8/15/2023 0:00	5.86	PSYF-1	9/21/2023 22:00	10.64	UBAM-1	8/14/2023 22:00	8.57
QTRW-1	8/15/2023 1:00	6.38	PSYF-1	9/21/2023 23:00	10.21	UBAM-1	8/14/2023 23:00	8.63
QTRW-1	8/15/2023 2:00	6.39	PSYF-1	9/22/2023 0:00	9.84	UBAM-1	8/15/2023 0:00	8.73
QTRW-1	8/15/2023 3:00	6.26	PSYF-1	9/22/2023 1:00	9.37	UBAM-1	8/15/2023 1:00	8.18
QTRW-1	8/15/2023 4:00	6.18	PSYF-1	9/22/2023 2:00	9.00	UBAM-1	8/15/2023 2:00	8.19
QTRW-1	8/15/2023 5:00	6.09	PSYF-1	9/22/2023 3:00	8.66	UBAM-1	8/15/2023 3:00	8.15
QTRW-1	8/15/2023 6:00	6.11	PSYF-1	9/22/2023 4:00	8.39	UBAM-1	8/15/2023 4:00	8.08
QTRW-1	8/15/2023 7:00	6.16	PSYF-1	9/22/2023 5:00	8.10	UBAM-1	8/15/2023 5:00	7.99
QTRW-1	8/15/2023 8:00	6.37	PSYF-1	9/22/2023 6:00	7.74	UBAM-1	8/15/2023 6:00	7.92
QTRW-1	8/15/2023 9:00	6.69	PSYF-1	9/22/2023 7:00	7.37	UBAM-1	8/15/2023 7:00	7.91
QTRW-1	8/15/2023 10:00	6.88	PSYF-1	9/22/2023 8:00	7.14	UBAM-1	8/15/2023 8:00	7.95
QTRW-1	8/15/2023 11:00	6.91	PSYF-1	9/22/2023 9:00	6.57	UBAM-1	8/15/2023 9:00	8.05
QTRW-1	8/15/2023 12:00	6.90	PSYF-1	9/22/2023 10:00	6.57	UBAM-1	8/15/2023 10:00	8.19
QTRW-1	8/15/2023 13:00	6.91	PSYF-1	9/22/2023 11:00	7.07	UBAM-1	8/15/2023 11:00	8.29
QTRW-1	8/15/2023 14:00	6.95	PSYF-1	9/22/2023 12:00	9.71	UBAM-1	8/15/2023 12:00	8.37
QTRW-1	8/15/2023 15:00	6.98	PSYF-1	9/22/2023 13:00	10.98	UBAM-1	8/15/2023 13:00	8.56
QTRW-1	8/15/2023 16:00	6.99	PSYF-1	9/22/2023 14:00	13.15	UBAM-1	8/15/2023 14:00	8.59
QTRW-1	8/15/2023 17:00	6.94	PSYF-1	9/22/2023 15:00	13.36	UBAM-1	8/15/2023 15:00	8.60
QTRW-1	8/15/2023 18:00	6.78	PSYF-1	9/22/2023 16:00	13.99	UBAM-1	8/15/2023 16:00	8.56
QTRW-1	8/15/2023 19:00	6.63	PSYF-1	9/22/2023 17:00	14.10	UBAM-1	8/15/2023 17:00	8.55
QTRW-1	8/15/2023 20:00	6.23	PSYF-1	9/22/2023 18:00	12.86	UBAM-1	8/15/2023 18:00	8.64
QTRW-1	8/15/2023 21:00	6.00	PSYF-1	9/22/2023 19:00	11.83	UBAM-1	8/15/2023 19:00	8.62
QTRW-1	8/15/2023 22:00	5.87	PSYF-1	9/22/2023 20:00	11.39	UBAM-1	8/15/2023 20:00	8.58
QTRW-1	8/15/2023 23:00	5.77	PSYF-1	9/22/2023 21:00	9.68	UBAM-1	8/15/2023 21:00	8.58
QTRW-1	8/16/2023 0:00	5.63	PSYF-1	9/22/2023 22:00	9.32	UBAM-1	8/15/2023 22:00	8.56
QTRW-1	8/16/2023 1:00	5.50	PSYF-1	9/22/2023 23:00	9.33	UBAM-1	8/15/2023 23:00	8.53
QTRW-1	8/16/2023 2:00	5.40	PSYF-1	9/23/2023 0:00	8.76	UBAM-1	8/16/2023 0:00	8.49
QTRW-1	8/16/2023 3:00	5.39	PSYF-1	9/23/2023 1:00	8.44	UBAM-1	8/16/2023 1:00	8.46
QTRW-1	8/16/2023 4:00	5.45	PSYF-1	9/23/2023 2:00	8.01	UBAM-1	8/16/2023 2:00	8.40
QTRW-1	8/16/2023 5:00	5.47	PSYF-1	9/23/2023 3:00	7.54	UBAM-1	8/16/2023 3:00	8.34
QTRW-1	8/16/2023 6:00	5.47	PSYF-1	9/23/2023 4:00	7.13	UBAM-1	8/16/2023 4:00	8.26
QTRW-1	8/16/2023 7:00	5.54	PSYF-1	9/23/2023 5:00	6.81	UBAM-1	8/16/2023 5:00	8.18
QTRW-1	8/16/2023 8:00	5.64	PSYF-1	9/23/2023 6:00	6.26	UBAM-1	8/16/2023 6:00	8.12
QTRW-1	8/16/2023 9:00	5.70	PSYF-1	9/23/2023 7:00	6.15	UBAM-1	8/16/2023 7:00	8.11
QTRW-1	8/16/2023 10:00	5.85	PSYF-1	9/23/2023 8:00	5.99	UBAM-1	8/16/2023 8:00	8.13
QTRW-1	8/16/2023 11:00	6.32	PSYF-1	9/23/2023 9:00	5.41	UBAM-1	8/16/2023 9:00	8.11
QTRW-1	8/16/2023 12:00	6.60	PSYF-1	9/23/2023 10:00	5.42	UBAM-1	8/16/2023 10:00	8.20
QTRW-1	8/16/2023 13:00	6.80	PSYF-1	9/23/2023 11:00	5.41	UBAM-1	8/16/2023 11:00	8.30
QTRW-1	8/16/2023 14:00	7.19	PSYF-1	9/23/2023 12:00	7.81	UBAM-1	8/16/2023 12:00	8.46
QTRW-1	8/16/2023 15:00	7.78	PSYF-1	9/23/2023 13:00	10.02	UBAM-1	8/16/2023 13:00	8.52
QTRW-1	8/16/2023 16:00	7.68	PSYF-1	9/23/2023 14:00	11.87	UBAM-1	8/16/2023 14:00	8.64
QTRW-1	8/16/2023 17:00	8.61	PSYF-1	9/23/2023 15:00	13.28	UBAM-1	8/16/2023 15:00	8.71
QTRW-1	8/16/2023 18:00	8.61	PSYF-1	9/23/2023 16:00	15.10	UBAM-1	8/16/2023 16:00	8.74
QTRW-1	8/16/2023 19:00	8.47	PSYF-1	9/23/2023 17:00	14.23	UBAM-1	8/16/2023 17:00	8.77
QTRW-1	8/16/2023 20:00	8.23	PSYF-1	9/23/2023 18:00	13.81	UBAM-1	8/16/2023 18:00	8.82
QTRW-1	8/16/2023 21:00	7.77	PSYF-1	9/23/2023 19:00	12.81	UBAM-1	8/16/2023 19:00	8.79
QTRW-1	8/16/2023 22:00	7.67	PSYF-1	9/23/2023 20:00	11.81	UBAM-1	8/16/2023 20:00	8.74
QTRW-1	8/16/2023 23:00	7.61	PSYF-1	9/23/2023 21:00	11.22	UBAM-1	8/16/2023 21:00	8.67
QTRW-1	8/17/2023 0:00	7.28	PSYF-1	9/23/2023 22:00	10.45	UBAM-1	8/16/2023 22:00	8.60
QTRW-1	8/17/2023 1:00	7.14	PSYF-1	9/23/2023 23:00	9.85	UBAM-1	8/16/2023 23:00	8.53
QTRW-1	8/17/2023 2:00	6.83	PSYF-1	9/24/2023 0:00	9.11	UBAM-1	8/17/2023 0:00	8.46
QTRW-1	8/17/2023 3:00	6.43	PSYF-1	9/24/2023 1:00	8.92	UBAM-1	8/17/2023 1:00	8.39
QTRW-1	8/17/2023 4:00	6.10	PSYF-1	9/24/2023 2:00	8.70	UBAM-1	8/17/2023 2:00	8.28
QTRW-1	8/17/2023 5:00	5.69	PSYF-1	9/24/2023 3:00	8.56	UBAM-1	8/17/2023 3:00	8.18
QTRW-1	8/17/2023 6:00	5.34	PSYF-1	9/24/2023 4:00	8.41	UBAM-1	8/17/2023 4:00	8.17
QTRW-1	8/17/2023 7:00	5.34	PSYF-1	9/24/2023 5:00	8.00	UBAM-1	8/17/2023 5:00	8.08
QTRW-1	8/17/2023 8:00	5.40	PSYF-1	9/24/2023 6:00	7.78	UBAM-1	8/17/2023 6:00	7.99
QTRW-1	8/17/2023 9:00	5.41	PSYF-1	9/24/2023 7:00	7.32	UBAM-1	8/17/2023 7:00	7.92
QTRW-1	8/17/2023 10:00	6.62	PSYF-1	9/24/2023 8:00	6.72	UBAM-1	8/17/2023 8:00	7.96
QTRW-1	8/17/2023 11:00	7.85	PSYF-1	9/24/2023 9:00	5.97	UBAM-1	8/17/2023 9:00	8.07
QTRW-1	8/17/2023 12:00	8.26	PSYF-1	9/24/2023 10:00	5.77	UBAM-1	8/17/2023 10:00	8.26
			PSYF-1	9/24/2023 11:00	6.09	UBAM-1	8/17/2023 11:00	8.09
			PSYF-1	9/24/2023 12:00	8.36			
			PSYF-1	9/24/2023 13:00	11.04			
			PSYF-1	9/24/2023 14:00	11.71			
			PSYF-1	9/24/2023 15:00	13.71			
			PSYF-1	9/24/2023 16:00	13.86			
			PSYF-1	9/24/2023 17:00	13.67			
			PSYF-1	9/24/2023 18:00	12.98			
			PSYF-1	9/24/2023 19:00	12.69			
			PSYF-1	9/24/2023 20:00	12.28			
			PSYF-1	9/24/2023 21:00	11.60			
			PSYF-1	9/24/2023 22:00	11.01			
			PSYF-1	9/24/2023 23:00	10.66			
			PSYF-1	9/25/2023 0:00	10.03			
			PSYF-1	9/25/2023 1:00	9.70			
			PSYF-1	9/25/2023 2:00	9.38			
			PSYF-1	9/25/2023 3:00	8.97			
			PSYF-1	9/25/2023 4:00	8.92			
			PSYF-1	9/25/2023 5:00	8.51			
			PSYF-1	9/25/2023 6:00	8.18			
			PSYF-1	9/25/2023 7:00	7.80			
			PSYF-1	9/25/2023 8:00	7.95			

Table 8. 2023 Conventional Water Quality Data

STATION_ID	ACTIVITY_DATE	Dissolved Oxygen mg/l	Depth,Bottom m	Nitrogen,Ammonia mg/l	DET_COND - Nitrogen,Ammonia mg/l	Nitrogen, NO2+NO3 mg/l	DET_COND - Nitrogen, NO2+NO3 mg/l
BERW-1	4/27/2023 9:55	9.6	6.6	0.05	< MDL .05	0.113	
BERW-1	5/18/2023 13:30	10	6.9	0.05	< MDL .05	0.083	< MDL .083
BERW-1	6/21/2023 14:40	9.6	4.8	0.05	< MDL .05	0.083	< MDL .083
BERW-1	7/19/2023 14:05	8.9	6.8	0.05	< MDL .05	0.083	< MDL .083
BERW-1	8/16/2023 13:45	8.9	6.7	0.05	< MDL .05	0.083	< MDL .083
BERW-1	9/20/2023 13:05	8.9	6.4	0.05	< MDL .05	0.083	< MDL .083
BERW-1	10/18/2023 14:00	9	6.3	0.05	< MDL .05	0.083	< MDL .083
PSYF-1	4/12/2023 8:10	7.6	0.8	0.053		0.552	
PSYF-1	6/8/2023 8:16	5.6	0.9	0.038	< MDL .038	0.004	< MDL .004
PSYF-1	8/3/2023 9:54	4	1.2	0.038	< MDL .038	0.004	< MDL .004
PSYF-1	10/11/2023 10:54	2.9	1.2	0.095		0.075	

STATION_ID	ACTIVITY_DATE	Nitrogen,Total Kjeldahl mg/l	DET_COND - Nitrogen,Total Kjeldahl mg/l	Phosphorus, Dissolved Reactive mg/l	DET_COND - Phosphorus, Dissolved Reactive mg/l	Phosphorus, Total mg/l	DET_COND - Phosphorus, Total mg/l
BERW-1	4/27/2023 9:55	0.939	JQ4	0.006	< MDL .006, JQ4I	0.02	
BERW-1	5/18/2023 13:30	0.732		0.006	< MDL .006	0.033	
BERW-1	6/21/2023 14:40	0.361	Jl	0.006	< MDL .006	0.212	
BERW-1	7/19/2023 14:05	0.375	Jl	0.006	< MDL .006	0.046	
BERW-1	8/16/2023 13:45	0.352	Jl	0.006	< MDL .006	0.026	
BERW-1	9/20/2023 13:05	0.43	JQ	0.006	< MDL .006	0.027	
BERW-1	10/18/2023 14:00	0.421	JQI	0.006	< MDL .006	0.027	
PSYF-1	4/12/2023 8:10	0.296	< MDL .296	0.005	< MDL .005	0.049	
PSYF-1	6/8/2023 8:16	0.385		0.006	Jl	0.049	
PSYF-1	8/3/2023 9:54	0.438		0.005	Jl	0.072	
PSYF-1	10/11/2023 10:54	0.073	Y	0.007	Jl	0.096	

STATION_ID	ACTIVITY_DATE	Chlorophyll a mg/m^3	DET_COND - Chlorophyll a mg/m^3	CBOD-5 mg/l	DET_COND - CBOD-5 mg/l	Temp,Water c
BERW-1	4/27/2023 9:55	6.41	JQ	2	< MDL 2	18.5
BERW-1	5/18/2023 13:30	6.41		2	< MDL 2, JH	26.7
BERW-1	6/21/2023 14:40	13.9		2	< MDL 2	28
BERW-1	7/19/2023 14:05	15.1		2	< MDL 2	30
BERW-1	8/16/2023 13:45	10.7		2	< MDL 2	30.3
BERW-1	9/20/2023 13:05	12.3		2	< MDL 2	25.8
BERW-1	10/18/2023 14:00	31.5		2.1		19
PSYF-1	4/12/2023 8:10	4.58		2	< MDL 2	14.1
PSYF-1	6/8/2023 8:16	39.2		3.7		24.8
PSYF-1	8/3/2023 9:54	60.1		3.7		27.5
PSYF-1	10/11/2023 10:54	126		7.2	G	17.7

Laboratory Qualifiers

JQ: The identification of the analyte is acceptable; the reported value is an estimate. The reported value failed to meet established QC criteria.

JQ4: The identification of the analyte is acceptable; the reported value is an estimate. Matrix spike recovery is outside control limits.

Jl: The identification of the analyte is acceptable; the reported value is an estimate. The reported value is between the method detection limit and the reporting level.

JQI: The identification of the analyte is acceptable; the reported value is an estimate. The reported value failed to meet established QC criteria. The value is between the method detection limit and the reporting level.

Y: The result is physically impossible, but no documented laboratory quality control reason was found for invalidation of the result.

7.3 Station Photographs

Figure 6. BERW-1 Upstream (8/16/2023)



Figure 7. BERW-1 Downstream (8/16/2023)



Figure 8. PSYF-1 Upstream (8/3/2023)



Figure 9. PSYF-1 Downstream (8/3/2023)

