



Assessment Decision Report

Yellowleaf Creek (Lay Lake)

Assessment Unit ID: AL03150107-0205-111

Organic Enrichment (CBOD, NBOD)

Nutrients

Alabama Department of Environmental Management
Water Quality Branch
Water Division
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1.0 Executive Summary

Yellowleaf Creek (Lay Lake), from Lay Lake to the end of embayment, is within Shelby County and is a part of the Coosa River basin. Lay Lake was placed on the State of Alabama's §303(d) impaired waterbodies list in 1996 for nutrients and organic enrichment/low dissolved oxygen (OE/DO). Its use classifications are Public Water Supply (PWS), Swimming and Other Whole Body Water-Contact Sports (S), and Fish and Wildlife (F&W). Location reference can be found in Figure 1.1.

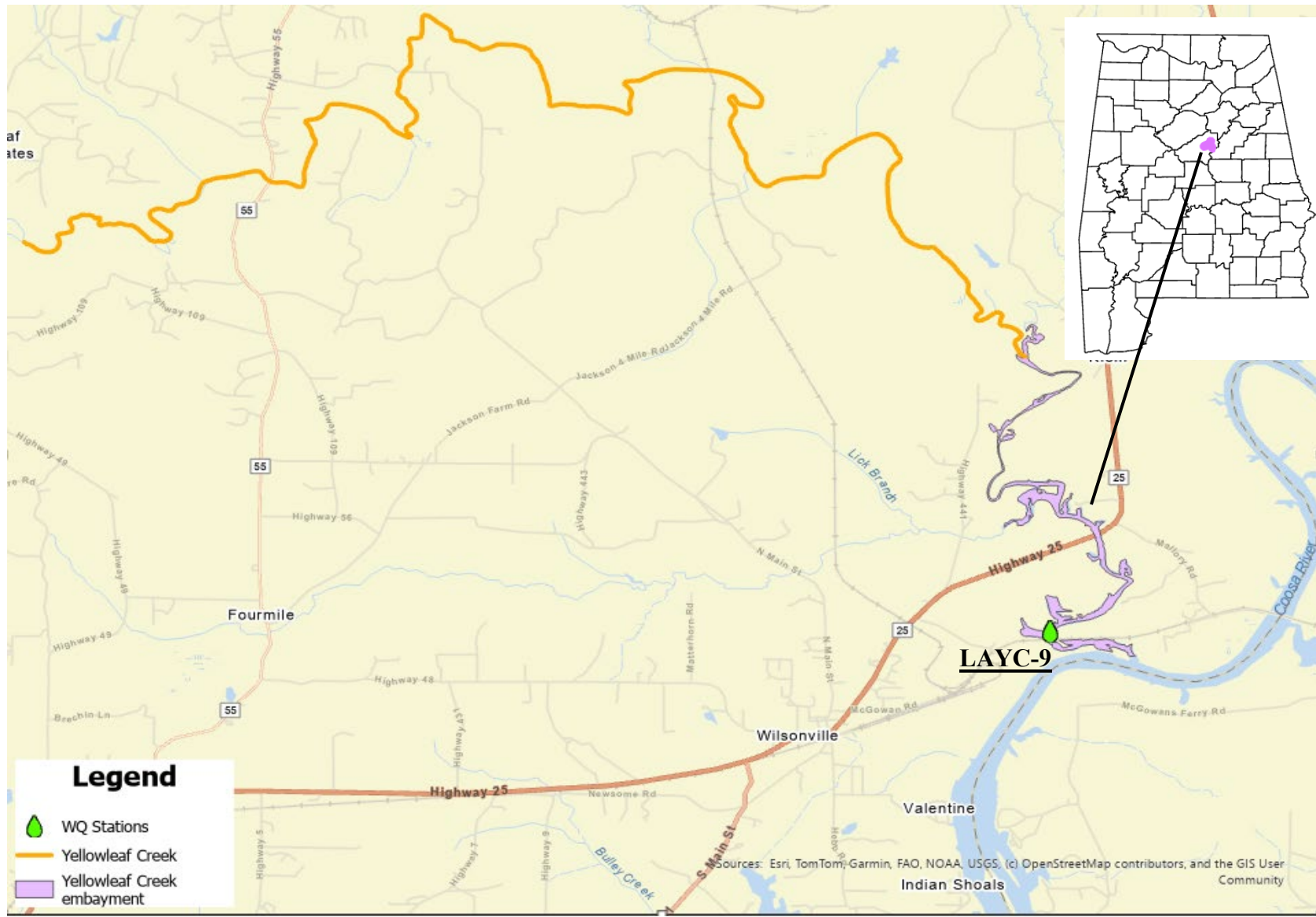
A TMDL for organic enrichment/dissolved oxygen and nutrients was developed and approved in 2008. The TMDL consisted of four lakes on the Coosa River: Neely Henry Lake, Logan Martin Lake, Lay Lake, and Mitchell Lake.

From 2000 through 2025, the Alabama Department of Environmental Management (ADEM) conducted sampling at one station on Yellowleaf Creek embayment. According to Alabama's Water Quality Assessment and Listing Methodology (WQALM), data for the 2026 assessment cycle must have been collected from 2019 through 2024. During this time, no violations of the DO criteria of 5 mg/l occurred.

In 2019 and 2022, the chlorophyll-*a* averages were 8.86 µg/L and 9.62 µg/L, respectively. Both of these values are below the 17 µg/L chlorophyll-*a* criteria value for Lay Lake. The average Total Phosphorus concentrations for 2019 and 2022 were 0.026 mg/L and 0.031 mg/L, respectively, which are both below the eco-reference value.

Based on the analysis of all available water quality data and information collected on the 178-acre segment of Yellowleaf Creek embayment, it has been determined that impairments for dissolved oxygen and nutrients no longer exist.

Figure 1.1: Yellowleaf Creek Map



2.0 Water Quality Target Identification

According to ADEM's Water Quality Criteria (Administrative Code 335-6-10), the minimum dissolved oxygen concentration allowed in a stream classified as Public Water Supply (PWS), Swimming and Other Whole Body Water-Contact Sports (S), and Fish and Wildlife (F&W) is 5.0 mg/L. The target is established at a depth of 5 feet in water 10 feet or greater in depth. For waters less than 10 feet in depth, the dissolved oxygen criterion is applied at mid-depth.

The dissolved oxygen criteria are described in ADEM Admin. Code R. 335-6-10-.09 as follows:

- (i) 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.
- (ii) In coastal waters, surface dissolved oxygen concentrations shall not be less than 5 mg/l, except where natural conditions cause the value to be depressed.
- (iii) In the application of dissolved oxygen criteria referred to above, dissolved oxygen shall be measured at a depth of 5 feet in waters 10 feet or greater in depth; and for those waters less than 10 feet in depth, dissolved oxygen criteria will be applied at mid-depth.

According to ADEM's Water Quality Criteria (Administrative Code 335-6-10), the mean of photic-zone composite chlorophyll-*a* samples shall not exceed 17 µg/L for Lay Lake.

The chlorophyll-*a* criteria for Lay Lake is described in ADEM Admin. Code R. 335-6-10-.11(2)(e)4.(i) as follows:

- (i) Chlorophyll *a* (corrected, as described in Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998): the mean of photic-zone composite chlorophyll *a* samples collected monthly April through October shall not exceed 17 µg/l, as measured at the deepest point, main river channel, dam forebay; or 17 µg/l, as measured at the deepest point, main river channel, immediately downstream of Peckerwood Creek/Coosa River confluence.

Table 2.1 Yellowleaf Creek Assessment Information

Assessment Unit ID	Waterbody Name	Downstream	Upstream	Size	Category	Use Classification
AL03150107-0205-111	Yellowleaf Creek (Lay Lake)	Coosa River	end of embayment	178.73 acres	5	PWS/S/F&W

TMDL Listing	Action Identifier	Approval Date	Pollutants
AL03150107-0401-100	11567	10/28/2008	Nutrients OE/DO
AL03150106-0309-101	11567	10/28/2008	Nutrients OE/DO pH
AL03150106-0309-102	11567	10/28/2008	Nutrients OE/DO pH
AL03150106-0104-101	11567	10/28/2008	Nutrients OE/DO pH
AL03150106-0104-102	11567	10/28/2008	Nutrients OE/DO pH
AL03150106-0801-100	11567	10/28/2008	Nutrients OE/DO
AL03150106-0501-101	11567	10/28/2008	Nutrients OE/DO
AL03150106-0501-102	11567	10/28/2008	Nutrients OE/DO
AL03150107-0101-102	11567	10/28/2008	Nutrients OE/DO
AL03150106-0808-102	11567	10/28/2008	Nutrients OE/DO
AL03150107-0601-100	11567	10/28/2008	Nutrients

3.0 Data Collection & Analysis

The 2000-2025 data compiled in this report was collected at one station (LAYC-9) along the 178-acre embayed segment of Yellowleaf Creek from the Coosa River to the end of embayment. Figure 1.1 shows the location of the sampling station.

According to the WQALM, data for the 2026 assessment cycle must have been collected from 2019 through 2024. Yellowleaf Creek embayment was sampled from 2019 through 2024 at one station (LAYC-9). During this time, no DO data exceeded criteria for any samples. The majority of collected samples had CBOD₅ (Five Day Carbonaceous Biochemical Oxygen Demand) results less than the method detection limit of 2.0 mg/L.

Figure 3.1 displays the yearly average chlorophyll-*a* values for Yellowleaf Creek embayment. Lay Lake has a 17 µg/L chlorophyll-*a* criteria value, and Yellowleaf Creek embayment is meeting this criterion based on data from 2005 through 2025. Figure 3.2 shows the yearly average Total Phosphorus values. Data from 2005 through 2025 shows that the embayment is meeting the Total Phosphorus eco-reference value of 0.052 mg/L for ecoregion 67f.

Data from 2019 and 2022 are the primary basis used in determining that Yellowleaf Creek embayment is no longer impaired for DO or nutrients since it is within the six-year period for monitored assessments used in the WQALM. All readily available DO and nutrient data in table form can be viewed in the Appendices.

Figure 3.1: Average Chlorophyll-a Chart

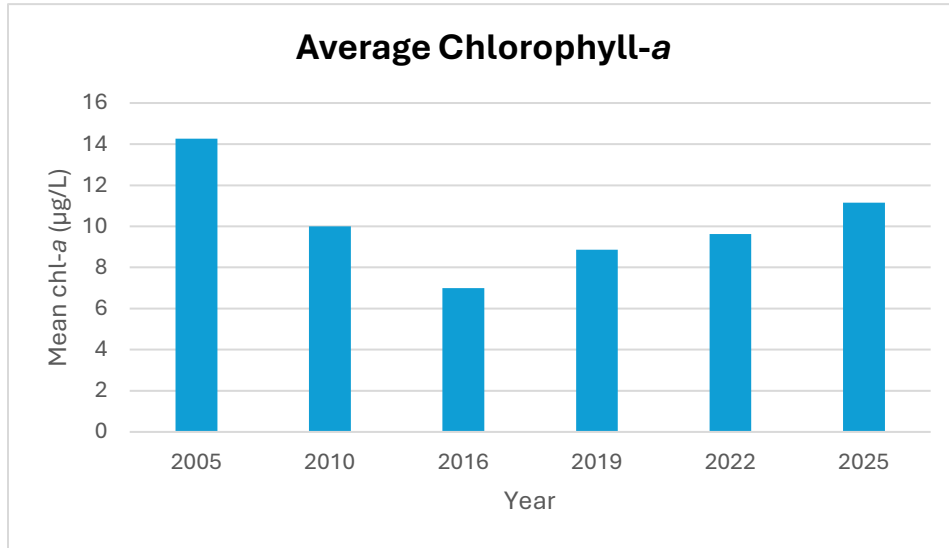
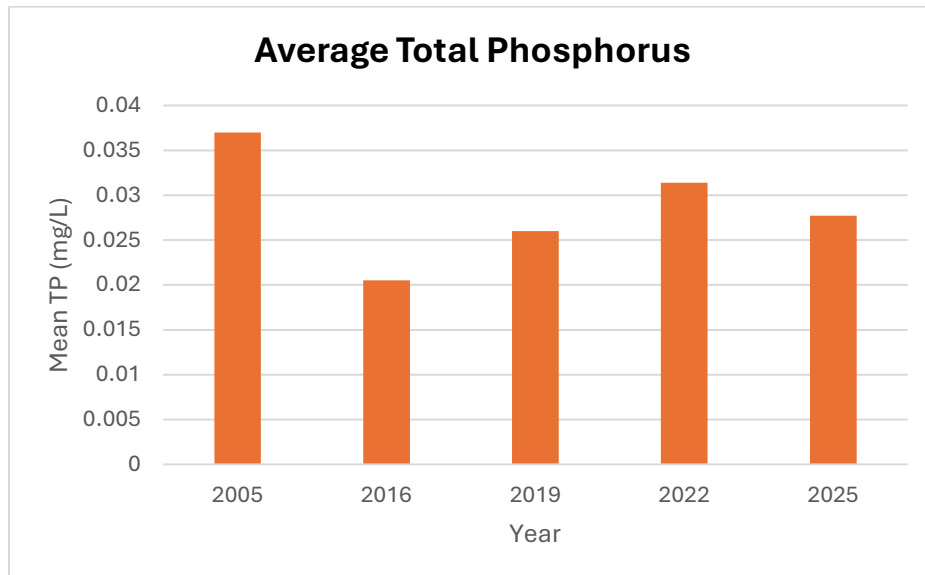


Figure 3.2: Average Total Phosphorus Chart



4.0 Conclusion

Based on the analysis of all available water quality data and information collected on the 178-acre segment of Yellowleaf Creek embayment, there are no longer any issues related to DO or nutrients. Consequently, ADEM has determined that the DO and nutrient impairments on Yellowleaf Creek embayment no longer exist.

5.0 Appendices

Table 5.1 Dissolved Oxygen

Station ID	Date	DO (mg/l)			Station ID	Date	DO (mg/l)
LAYC-9	4/11/2000	9			LAYC-9	9/9/2020	6.3
LAYC-9	6/20/2000	6.2			LAYC-9	4/13/2022	9.1
LAYC-9	8/22/2000	5.9			LAYC-9	5/25/2022	6
LAYC-9	4/20/2005	8.6			LAYC-9	6/28/2022	5
LAYC-9	5/18/2005	6.1			LAYC-9	7/14/2022	5.7
LAYC-9	6/21/2005	6.8			LAYC-9	8/9/2022	6.6
LAYC-9	8/4/2005	7.1			LAYC-9	9/14/2022	7.2
LAYC-9	8/23/2005	5.2			LAYC-9	10/18/2022	6.7
LAYC-9	9/20/2005	5.7			LAYC-9	11/16/2022	7.8
LAYC-9	10/19/2005	7.1			LAYC-9	4/5/2024	7.7
LAYC-9	4/22/2010	7.9			LAYC-9	4/15/2025	8.8
LAYC-9	5/18/2010	5.6			LAYC-9	5/20/2025	6.9
LAYC-9	6/22/2010	6			LAYC-9	7/15/2025	5.9
LAYC-9	7/20/2010	5			LAYC-9	8/19/2025	7.3
LAYC-9	8/19/2010	4.8			LAYC-9	9/16/2025	6.2
LAYC-9	9/21/2010	5.5			LAYC-9	10/15/2025	6.3
LAYC-9	10/19/2010	7.1					
LAYC-9	4/28/2016	7.9					
LAYC-9	5/25/2016	7.5					
LAYC-9	6/29/2016	5					
LAYC-9	8/23/2016	4.9					
LAYC-9	9/27/2016	7					
LAYC-9	10/26/2016	7.7					
LAYC-9	11/20/2018	9.7					
LAYC-9	4/24/2019	9					
LAYC-9	5/21/2019	8.7					
LAYC-9	6/24/2019	6.2					
LAYC-9	7/25/2019	6.1					
LAYC-9	8/29/2019	6					
LAYC-9	9/24/2019	5.4					
LAYC-9	10/24/2019	6.4					

Table 5.2 Chlorophyll-*a*

Station ID	Date	Chlorophyll- <i>a</i> µg/L				Station ID	Date	Chlorophyll- <i>a</i> µg/L
LAYC-9	6/20/2000	22.78				LAYC-9	4/13/2022	5.34
LAYC-9	8/22/2000	25.99				LAYC-9	5/25/2022	5.87
LAYC-9	4/20/2005	13.88				LAYC-9	6/28/2022	2.14
LAYC-9	5/18/2005	2.14				LAYC-9	7/14/2022	18.2
LAYC-9	6/21/2005	20.65				LAYC-9	8/9/2022	15.5
LAYC-9	7/19/2005	12.28				LAYC-9	9/14/2022	17.1
LAYC-9	8/23/2005	17.44				LAYC-9	10/18/2022	3.2
LAYC-9	9/20/2005	15.31				LAYC-9	4/15/2025	6.1
LAYC-9	10/19/2005	18.16				LAYC-9	5/20/2025	3.2
LAYC-9	4/22/2010	3.2				LAYC-9	6/17/2025	4.27
LAYC-9	5/18/2010	3.74				LAYC-9	7/15/2025	17.5
LAYC-9	6/22/2010	10.7				LAYC-9	8/19/2025	20.3
LAYC-9	7/20/2010	16.6				LAYC-9	9/16/2025	13.9
LAYC-9	8/19/2010	11.2				LAYC-9	10/15/2025	12.8
LAYC-9	9/21/2010	16.6						
LAYC-9	10/19/2010	8.01						
LAYC-9	4/28/2016	5.87						
LAYC-9	5/25/2016	5.87						
LAYC-9	6/29/2016	9.08						
LAYC-9	7/26/2016	7.25						
LAYC-9	8/23/2016	5.87						
LAYC-9	9/27/2016	12.3						
LAYC-9	10/26/2016	2.67						
LAYC-9	4/24/2019	3.2						
LAYC-9	5/21/2019	17.6						
LAYC-9	6/24/2019	4.81						
LAYC-9	7/25/2019	9.61						
LAYC-9	8/29/2019	15						
LAYC-9	9/24/2019	5.34						
LAYC-9	10/24/2019	6.48						

Table 5.3 Total Phosphorus

Station ID	Date	Total Phosphorus mg/l	TP Detection Condition				Station ID	Date	Total Phosphorus mg/l	TP Detection Condition
LAYC-9	4/11/2000	0.05					LAYC-9	9/14/2022	0.035	
LAYC-9	6/20/2000	0.285					LAYC-9	10/18/2022	0.027	
LAYC-9	8/22/2000	0.024					LAYC-9	4/15/2025	0.031	
LAYC-9	4/20/2005	0.012					LAYC-9	5/20/2025	0.032	
LAYC-9	5/18/2005	0.057					LAYC-9	6/17/2025	0.018	Jl
LAYC-9	6/21/2005	0.026					LAYC-9	7/15/2025	0.025	
LAYC-9	7/19/2005	0.07					LAYC-9	8/19/2025	0.03	
LAYC-9	8/23/2005	0.004	< MDL .004				LAYC-9	9/16/2025	0.033	
LAYC-9	9/20/2005	0.07					LAYC-9	10/15/2025	0.025	
LAYC-9	10/19/2005	0.021								
LAYC-9	4/28/2016	0.024								
LAYC-9	5/25/2016	0.016								
LAYC-9	6/29/2016	0.019								
LAYC-9	7/26/2016	0.017								
LAYC-9	8/23/2016	0.017								
LAYC-9	9/27/2016	0.026								
LAYC-9	10/26/2016	0.025								
LAYC-9	4/24/2019	0.022								
LAYC-9	5/21/2019	0.022								
LAYC-9	6/24/2019	0.019								
LAYC-9	7/25/2019	0.047								
LAYC-9	8/29/2019	0.02								
LAYC-9	9/24/2019	0.032								
LAYC-9	10/24/2019	0.023								
LAYC-9	4/13/2022	0.018								
LAYC-9	5/25/2022	0.022								
LAYC-9	6/28/2022	0.027								
LAYC-9	7/14/2022	0.069								
LAYC-9	8/9/2022	0.022	JQI							