



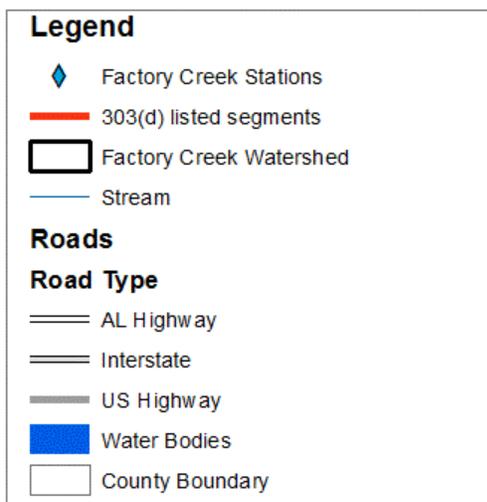
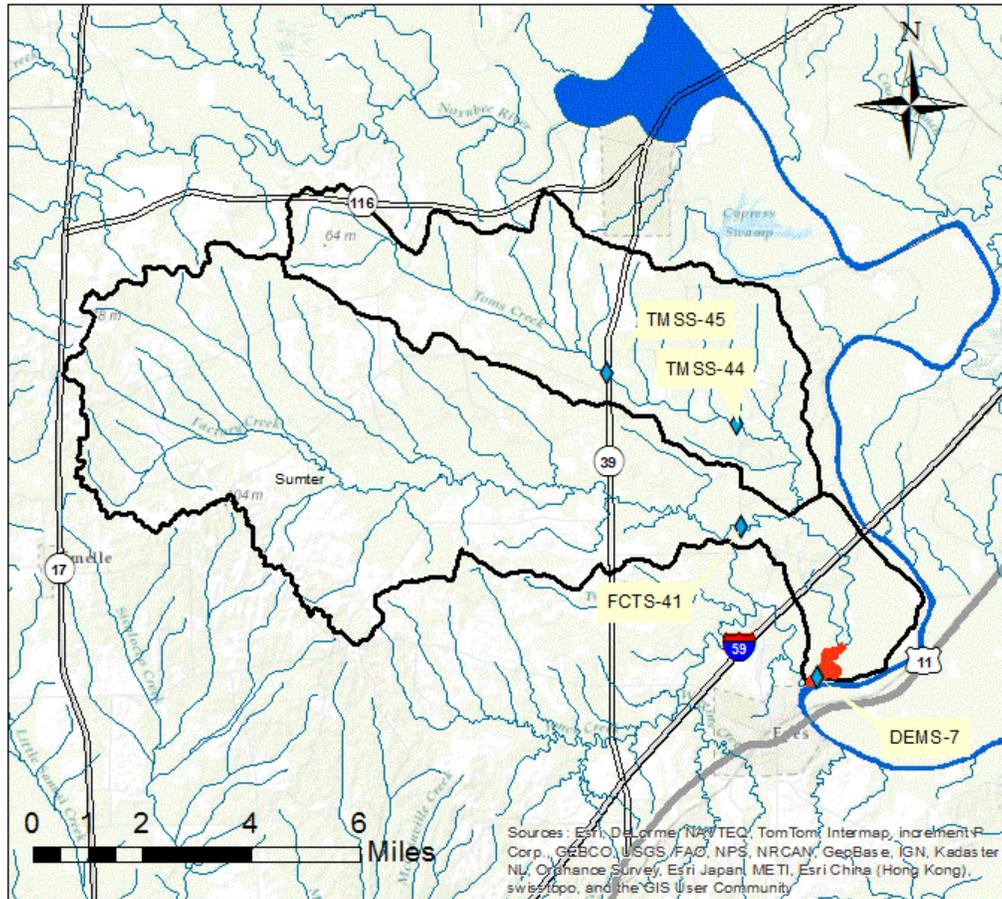
**Draft  
Delisting Decision  
for  
Factory Creek**

**Assessment Unit ID # AL03160106-0702-101**

**Nutrients  
Organic Enrichment (CBOD, NBOD)**

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

**Figure 1-1 Factory Creek Watershed**



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## ***1.0 Executive Summary***

Factory Creek is located north of Epes, Alabama in Sumter County in the Tombigbee River Basin. Factory Creek is a tributary to the Tombigbee River and has a total drainage area of 57.68 square miles. It has a use classification of *Fish and Wildlife (F&W)*. The Factory Creek watershed lies within three level IV eco-regions, 65a, 65b, and 65p.

Factory Creek was added to the State of Alabama's 2004 §303(d) list of impaired streams for nutrients and organic enrichment (OE/DO) by ADEM. The listing was based on four of seven dissolved oxygen measurements being less than 5.0 mg/L. In addition, the average chlorophyll-a concentration was over three times the average of the other embayment stations on Lake Demopolis. The impaired segment extends from the Tombigbee River (Lake Demopolis) to the end of embayment. The source of the impairment is listed as Agriculture. Factory Creek was subsequently listed on Alabama's §303(d) list of impaired streams for organic enrichment and nutrients in 2006, 2008, 2010, 2012, and 2014.

In 2001, 2006, and 2007, ADEM collected physical, chemical, and biological data on Factory Creek at stations FCTS-41 and DEMS-7 in order to assess the water quality of Factory Creek. In 2011, physical, chemical, and biological data were collected at stations FCTS41, DEMS-7, TMSS-44, and TMSS-45 in an effort to more fully evaluate the existing conditions as related to the listing decision. These assessments did not indicate that Factory Creek was impaired for organic enrichment or nutrients. Based on the 2001, 2006, 2007, and 2011 sampling, total phosphorus (TP), total nitrogen (TN), NH<sub>3</sub>, TKN, chlorophyll-*a*, and 5-Day Carbonaceous Biochemical Oxygen Demand (CBOD<sub>5</sub>) concentrations were near or below eco-reference values. 72-hour diurnal studies were conducted on Factory Creek at stations FCSS-41 and DEMS-7 and on Toms Creek at stations TMSS-44 and TMSS-45 in 2011. During that study, the dissolved oxygen (DO) was measured. DEMS-7 was deployed longer than 72 hours (213 hours) due to it being a reservoir station. Toms Creek ran dry at station TMSS-45 approximately halfway through the study (hour 37). All stations had DO swings below the DO standard of 5 mg/l due to the severe low flow conditions at the time of the study.

Biological assessments were also conducted in 2011. Habitat and macroinvertebrate assessments were conducted in 2011. The habitat assessment at FCTS-41 was rated as "Sub-optimal." The macroinvertebrate assessment for FCTS-41 was rated as "Fair."

Based on the assessment of all available water quality data obtained on Factory Creek, inclusive of physical, chemical, and biological data, ADEM concludes that no water quality impairment from organic enrichment or nutrients exists. ADEM has determined that the low dissolved oxygen levels in Factory Creek are due to natural conditions. Accordingly, ADEM will not proceed in developing a TMDL for this stream due to "more recent or accurate data," which is 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 EPA's 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. Total maximum daily loads (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).

Factory Creek was originally added to Alabama's §303(d) list as being impaired for nutrients and OE/DO in 2004. It was listed based on four of seven dissolved oxygen measurements that were less than 5.0 mg/L. The average chlorophyll-a concentration was over three times the average of the other embayment stations on Lake Demopolis.

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

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

#### **3.1.1 Nutrients**

The listing of Factory Creek as being impaired for nutrients and organic enrichment (CBOD/NBOD) was authorized under ADEM's Water Quality Standards Program, which employs both numeric and narrative criteria to ensure adequate protection of designated uses for surface waters of the State. Numeric criteria typically have quantifiable endpoints for a given parameter, such as pH, dissolved oxygen, or a toxic pollutant, whereas narrative criteria are qualitative statements that establish a set of desired conditions for all State waters. These narrative criteria are more commonly referred to as "free from" 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 nutrient criteria, ADEM and/or EPA would use available data and information coupled with best professional judgment 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's Administrative Code, Rule 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.*

ADEM is continuing its efforts to develop comprehensive numeric nutrient criteria for all surface waters throughout Alabama, including rivers/streams, lakes/reservoirs, wetlands, and coastal/estuarine waters. However, until numeric nutrient criteria or some form of quantitative interpretations of ADEM's narrative criteria are developed, the Department will continue to use all available data and information coupled with best professional judgment to make informed decisions regarding overall use support and when establishing numeric targets for TMDLs.

### 3.1.2 Organic Enrichment/Dissolved Oxygen (OE/DO)

Alabama's water quality criteria regulations (ADEM Admin. Code R. 335-6-10-.09) state the following for segments classified as 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.*

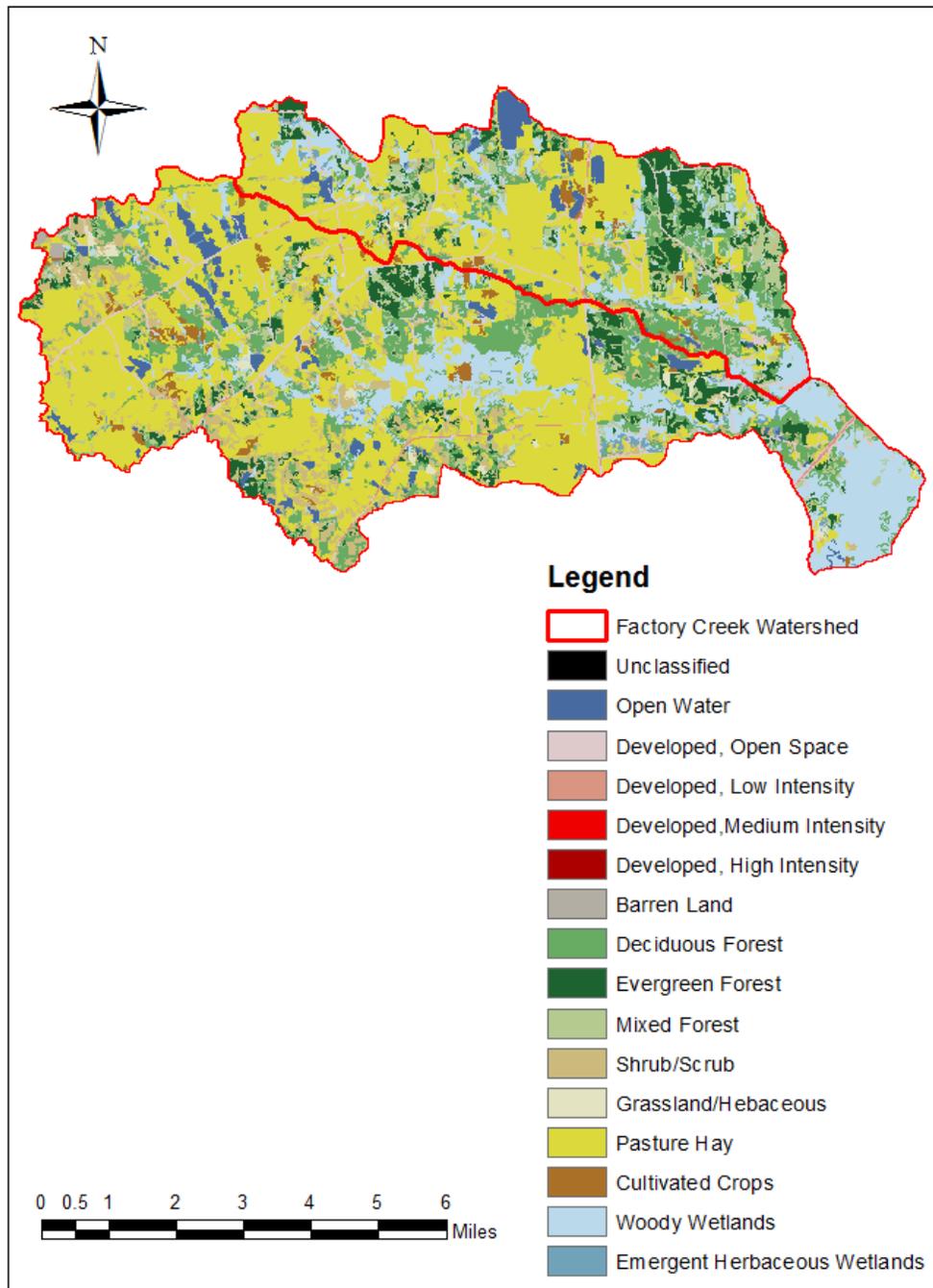
The dissolved oxygen criterion is established at a depth of 5 feet in water 10 feet or greater in depth; for those waters less than 10 feet in depth, the dissolved oxygen criterion is applied at mid-depth. Levels of organic materials may not deplete the daily dissolved oxygen concentration below this level, nor may nutrient loads result in algal growth and decay that causes a violation of the dissolved oxygen criterion.

### ***3.2 Land Use Assessment***

Land use for the Factory Creek watershed was determined using ArcMap with land use datasets derived from the 2011 National Land Cover Dataset (NLCD). Figure 3-1 and Table 3-1 display the land use areas for the Factory Creek watershed. Figure 3-2 is a graph depicting the primary land use in the Factory Creek watershed.

The majority of the watershed is Forest/Natural land at 50.31%. Other land uses within the watershed include 42.66% agricultural, 3.75% developed land, and 3.28% open water.

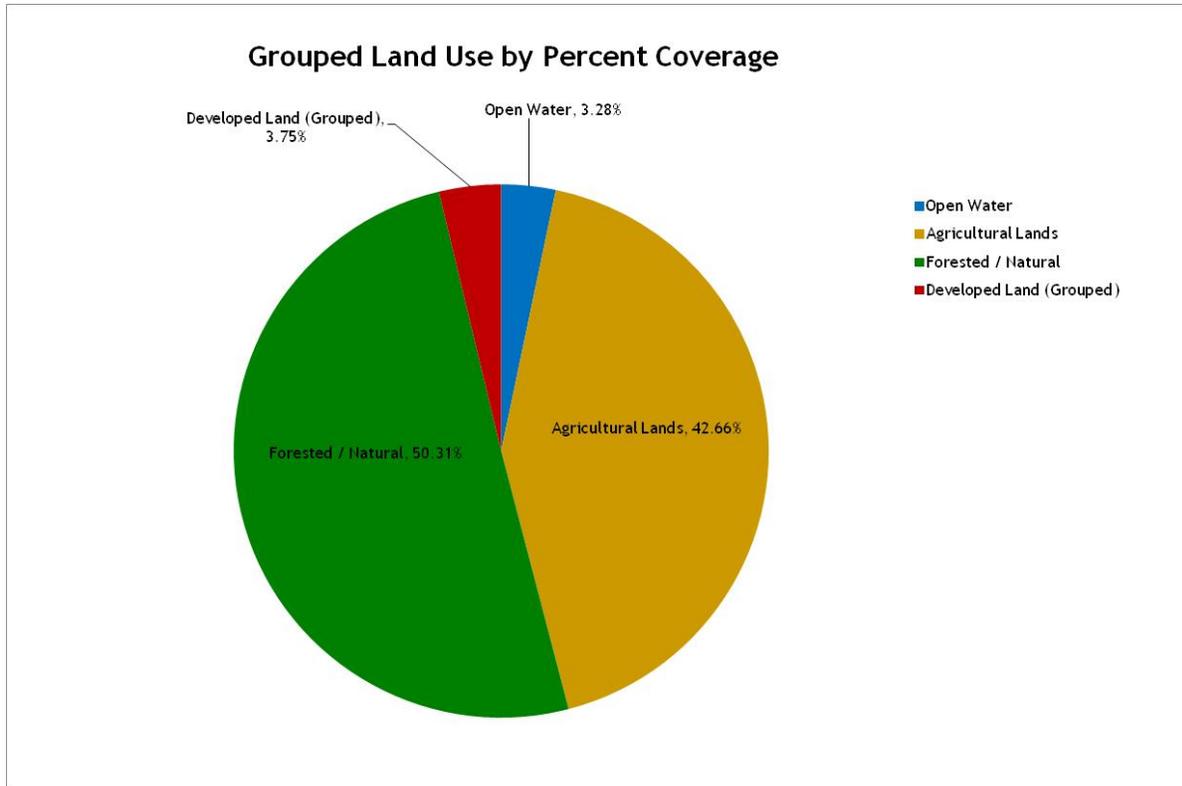
**Figure 3-1 Factory Creek Land Use**



**Table 3-1 Land Use Summary**

<b>Class Description</b>	<b>Mi<sup>2</sup></b>	<b>Acres</b>	<b>Percent</b>
Emergent Herbaceous Wetlands	0.56	357.61	0.97%
Open Water	1.89	1209.61	3.28%
Woody Wetlands	8.48	5424.88	14.71%
Herbaceous	0.42	268.65	0.73%
Hay/Pasture	23.52	15053.24	40.83%
Barren Land	0.01	6.89	0.02%
Evergreen Forest	4.06	2600.24	7.05%
Shrub/Scrub	4.37	2799.26	7.59%
Cultivated Crops	1.05	672.74	1.82%
Mixed Forest	3.25	2078.06	5.64%
Deciduous Forest	7.84	5020.12	13.62%
Developed, Medium Intensity	0.01	3.34	0.01%
Developed, Low Intensity	0.23	146.11	0.40%
Developed, Open Space	1.92	1226.29	3.33%
<b>TOTALS →</b>	<b>57.60</b>	<b>36867.06</b>	<b>100.00%</b>
<b>Class Description</b>	<b>Mi<sup>2</sup></b>	<b>Acres</b>	<b>Percent</b>
Open Water	1.89	1209.61	3.28%
Agricultural Lands	24.57	15725.98	42.66%
Forested / Natural	28.98	18548.84	50.31%
Developed Land (Grouped)	2.16	1382.63	3.75%
<b>TOTALS →</b>	<b>57.60</b>	<b>36867.06</b>	<b>100.00%</b>

**Figure 3-2 Grouped Land Use**



## ***4.0 Data Availability and Analysis***

### ***4.1 Methodology for Evaluating Nutrient Impacts***

In determining appropriate or acceptable levels of nutrients necessary to support Factory Creek’s designated use, ADEM elected to use a “reference condition” approach. This approach is based on the use of ambient water quality data from candidate reference streams located in characteristically similar types of watersheds known as ecoregions. ADEM considers the “reference condition” approach for determining appropriate nutrient levels to be reasonable, consistent with USEPA guidance, protective of designated uses, and scientifically defensible in assessing and evaluating nutrient influences or impacts.

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.

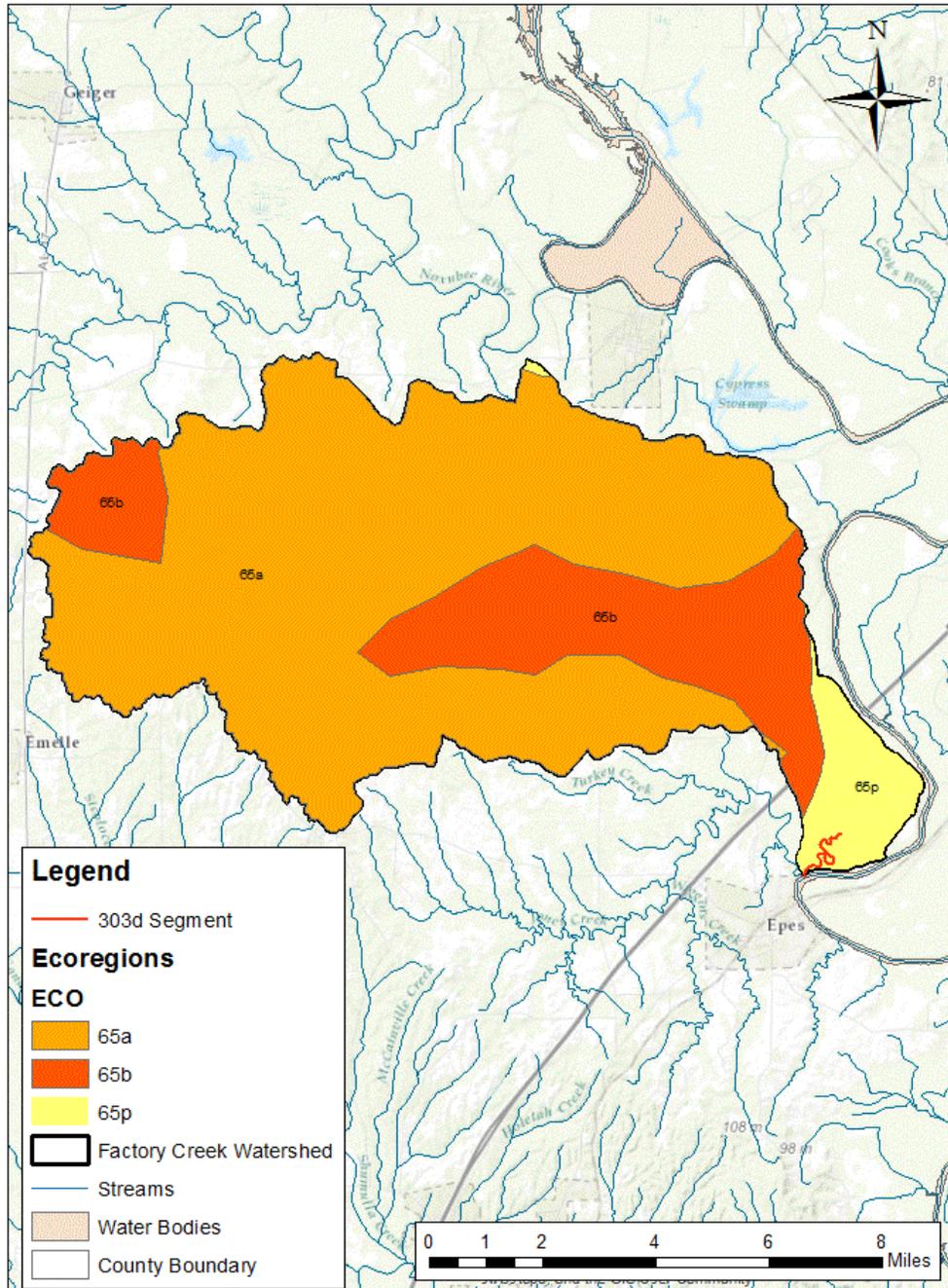
In developing and establishing reference conditions from best available data, frequency distributions are recommended by the *Nutrient Criteria Technical Guidance Manual for Rivers and Streams* (USEPA, 2000b) as the preferred method for setting nutrient criteria. ADEM elected to use the 90<sup>th</sup> percentile of the data distributions from the selected reference sites to be used to establish goals for Total Phosphorus (TP) and Total Nitrogen (TN) on an ecoregional basis. Median values were used to represent existing conditions of TP and TN within the impaired waterbody. The 90<sup>th</sup> percentile of the data distribution was considered an appropriate target, since it falls within an acceptable range of “least-impacted” conditions (i.e. upper quartile). If the TP and TN concentrations within the impaired stream are shown to be above the reference conditions, then other water quality data and information are used in the evaluation. The additional data and information that can be used includes, but is certainly not limited to, chlorophyll-*a* (Chl-*a*) data, diurnal dissolved oxygen readings, algal biomass measurements (periphyton or suspended algae), habitat assessments, and macroinvertebrate and fish community indices.

#### ***4.2 Assessment of Ecoregion Reference Data***

Based upon EPA recommended procedures outlined in the *Nutrient Criteria Technical Guidance Manual: Rivers and Streams* (USEPA, 2000b), data from selected reference sites have been compiled and analyzed for the entire State of Alabama. Through much peer review, every effort was made to use the highest quality least-impaired reference reach data to accurately define background conditions. The reference reaches and their associated watersheds were established by ADEM using various methods to characterize their condition and determine if they were good candidates. Such methods include, but are not limited to, watershed surveys, landuse coverage, collecting chemical, physical, and biological data to ensure their condition and verifying the streams are of high quality and fully meet designated uses. The current data is included in a table referred to as “Alabama’s 2010 Ecoregional Reference Guidelines.” This table of relevant ecoreference data can be found in Appendix 7.2, Table 7-13.

The Factory Creek watershed lies within three Level IV ecoregions (65a, 65b and 65p), as depicted in Figure 4-1 below. Typically, when a watershed covers three Level IV ecoregions, a weighted average is calculated for each parameter (TP, TN, & Chl-*a*); however, since Alabama’s 2010 Ecoregional Reference Guidelines do not have values for ecoregion 65p and ecoregions 65a and 65b are combined, the reference values for ecoregion 65a/b alone will be used.

**Figure 4-1 Level IV Ecoregions within the Factory Creek Watershed**



### 4.3 Data Analysis

In 2001, 2006, and 2007 ADEM collected chemical, physical, and biological data on Factory Creek at stations FCTS-41 and DEMS-7. In 2011, ADEM collected chemical, physical, and biological data at stations FCTS-41, TMSS-44, TMSS-45, and DEMS-7. In order to be consistent with Alabama’s Water Quality Assessment and Listing Methodology (ADEM, 2014), the data from 2011 will be used in this analysis since it is the only data that is approximately six years in age or less. During the 2011 sampling periods, ADEM collected 4 TP samples from FCTS-41, 4 TP samples from TMSS-44, 4 TP samples from TMSS-45, and 7 TP samples from DEMS-7. There were 4 TN samples collected at FCTS-41, 4 TN samples collected at TMSS-44, 4 TN samples collected at TMSS-45, and 7 TN samples from DEMS-7. There were also 4 Chl-*a* samples collected at FCTS-41, 4 Chl-*a* samples collected at TMSS-44, 4 Chl-*a* samples collected at TMSS-45, and 7 Chl-*a* samples from DEMS-7. Site visit comments indicate that on several occasions Factory Creek and/or Toms Creek were either dry or made up of broken pools or flow was not measurable at the sampling locations (FCTS-41, TMSS-44, and TMSS-45).

The median values of the samples from FCTS-41, TMSS-44, and TMSS-45 were compared to the eco-reference values for each parameter. The median values for TP, TN, Chl-*a*, NH<sub>3</sub>, and CBOD<sub>5</sub> were well below the eco-reference values. ADEM does not currently have eco-reference values for ecoregion 65p, where DEMS-7 is located; however, the median values for TP, TN, Chl-*a*, NH<sub>3</sub>, and CBOD<sub>5</sub> from DEMS-7 are similar to the median values of other tributary embayment stations to the Demopolis Reservoir. A summary of the 2011 median sample values compared to the eco-reference values at each station are shown in Table 4-2, Table 4-3, Table 4-4 and Table 4-5.

**Table 4-1 Location Descriptions of ADEM Sampling Stations**

Station ID	Local Name	Station Description	Latitude	Longitude	County	Ecoregion/ Sub region
FCTS-41	Factory Creek	Factory Cr @ Sumter Co. Rd. 21 crossing.	32.7377	-88.1325	Sumter	65a
TMSS-44	Toms Creek	Toms Creek @ Sumter Co. Rd. 21 crossing.	32.7608	-88.1333	Sumter	65b
TMSS-45	Toms Creek	Toms Creek @ AL Hwy 39 crossing.	32.7720	-88.1681	Sumter	65a
DEMS-7	Factory Creek	Deepest point, main creek channel, Factory Creek embayment, approx. 0.5 miles upstream of confluence with Tombigbee River.	32.7040	-88.1122	Sumter	65p

**Table 4-2 Data Summary at FCTS-41**

Data Summary at FCTS-41						
	TP (mg/L)	NH3 (mg/l)	TKN (mg/l)	TN (mg/L)	Chl-a (µg/L)	CBOD5 (mg/l)
Median:	0.139	0.003	0.823	0.876	4.54	1.0
Eco Ref 90th %tile:	0.201	0.0482	0.887	1.163	5.181	3.2

**Table 4-3 Data Summary at TMSS-44**

Data Summary at TMSS-44						
	TP (mg/L)	NH3 (mg/l)	TKN (mg/l)	TN (mg/L)	Chl-a (µg/L)	CBOD5 (mg/l)
Median:	0.054	0.018	0.825	0.95	1.87	1.0
Eco Ref 90th %tile:	0.201	0.0482	0.887	1.163	5.181	3.2

**Table 4-4 Data Summary at TMSS-45**

Data Summary at TMSS-45						
	TP (mg/L)	NH3 (mg/l)	TKN (mg/l)	TN (mg/L)	Chl-a (µg/L)	CBOD5 (mg/l)
Median:	0.057	0.003	1.014	1.185	1.425	1.0
Eco Ref 90th %tile:	0.201	0.482	0.887	1.163	5.181	3.2

**Table 4-5 Data Summary at DEMS-7**

Data Summary at DEMS-7						
	TP (mg/L)	NH3 (mg/l)	TKN (mg/l)	TN (mg/L)	Chl-a (µg/L)	CBOD5 (mg/l)
Median:	0.066	0.003	0.639	0.746	11.75	1.0
Eco Ref 90th %tile:	NA	NA	NA	NA	NA	NA

In 2011, ADEM also conducted a 72-hr diurnal study on Factory Creek. The study was conducted between August 1, 2011 and August 4, 2011. During that study, the dissolved oxygen (DO) was measured. DEMS-7 was deployed longer than 72 hours (213 hours) due to it being a reservoir station. Toms Creek ran dry at station TMSS-45 approximately halfway through the study (hour 37). All stations had DO swings below the DO standard of 5 mg/l due to the severe low flow conditions at the time of the study. (Field personnel were unable to measure the flow due to the low flow conditions.)

Both diurnal study and monthly DO values were below 5.0 mg/l at DEMS-7. DEMS-7 is the embayment station from Factory Creek to the Demopolis Reservoir. This location is wide and shallow; the deepest 2011 profile depth is 3.0 m at the deepest part of the channel. This combined with the low flows in Factory Creek causes higher water temperatures and lower water column DOs.

Biological assessments were also conducted in 2011. Habitat and macroinvertebrate assessments were conducted in 2011. The habitat assessment at FCTS-41 was rated as “Sub-optimal.” The macroinvertebrate assessment for FCTS-41 was rated as “Fair.”

Based on the instream TP, TN, TKN, and NH<sub>3</sub> values, chlorophyll-*a* values, CBOD<sub>5</sub> concentrations, and habitat and macroinvertebrate assessments, ADEM does not consider Factory Creek to be impaired as a result of nutrient or organic over-enrichment. The available data that was utilized to support this delisting decision can also be found in Appendix 7.2.

## ***5.0 Conclusion***

From examination of all available data, ADEM has determined that a water quality impairment due to nutrients and organic enrichment does not currently exist within Factory Creek. The low dissolved oxygen values are believed to be a result of natural conditions. Therefore, ADEM will not develop a TMDL due to “more recent or accurate data,” which is just cause for delisting waterbodies according to Title 40 of the Code of Federal Regulations (CFS), 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 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.

## **7.0 Appendices**

### **7.1 References**

ADEM Administrative Code, 2014. 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, 2004, 2008, 2010, 2012, 2014 §303(d) Lists. ADEM.

Alabama Department of Environmental Management, *Alabama's 2010 Ecoregional Reference Guidelines*. 2010. ADEM

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

ALAWADR Database (Water Quality Data). ADEM.

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 1986*, Office of Water Regulations and Standards, EPA 440/5-86-001.

United States Environmental Protection Agency. 2000a. Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria. Rivers and Streams in Ecoregion XI. Office of Water. EPA 822-B-00-020.

United States Environmental Protection Agency. 2000b. Nutrient Criteria Technical Guidance Manual: River and Streams. Office of Water. EPA 822-B-00-002.

## 7.2 ADEM Water Quality Data

**Table 7-1 Total Phosphorus (TP) Data**

Station ID	Visit Date	TP (mg/L)	TP Detect Condition
FCTS-41	5/3/2001	0.082	
FCTS-41	9/12/2001	0.02	
FCTS-41	3/27/2006	0.076	
FCTS-41	4/18/2006	0.011	
FCTS-41	5/8/2006	0.046	
FCTS-41	5/31/2006	0.1	< MDL .1
FCTS-41	6/27/2006		
FCTS-41	7/12/2006		
FCTS-41	8/16/2006		
FCTS-41	9/20/2006		
FCTS-41	10/25/2006	0.129	
FCTS-41	3/13/2007	0.036	
FCTS-41	4/10/2007	0.036	
FCTS-41	5/2/2007	0.031	
FCTS-41	5/22/2007		
FCTS-41	6/6/2007	0.034	
FCTS-41	7/9/2007	0.044	
FCTS-41	3/8/2011	0.141	
FCTS-41	4/5/2011	0.136	
FCTS-41	5/5/2011	0.042	
FCTS-41	5/18/2011		
FCTS-41	7/7/2011		
FCTS-41	8/1/2011		
FCTS-41	9/8/2011	0.175	
FCTS-41	10/13/2011		
TMSS-44	3/8/2011	0.059	
TMSS-44	4/5/2011	0.087	
TMSS-44	5/5/2011	0.033	
TMSS-44	5/18/2011		
TMSS-44	7/7/2011		
TMSS-44	9/8/2011	0.049	
TMSS-44	10/13/2011		
TMSS-45	3/8/2011	0.065	
TMSS-45	4/5/2011	0.091	
TMSS-45	5/5/2011	0.034	
TMSS-45	5/18/2011		
TMSS-45	7/7/2011		
TMSS-45	8/1/2011		
TMSS-45	9/8/2011	0.048	
TMSS-45	10/13/2011		

MDL: Minimum Detection Limit

**Table 7-2 Total Phosphorus (TP) Data (cont)**

Station ID	Visit Date	TP (mg/L)	TP Detect Condition
DEMS-7	4/19/2001	0.13	
DEMS-7	5/23/2001	0.1	
DEMS-7	6/20/2001	0.1	
DEMS-7	7/25/2001	0.06	
DEMS-7	8/14/2001	0.03	
DEMS-7	9/19/2001	0.09	
DEMS-7	10/24/2001	0.11	
DEMS-7	4/27/2006	0.044	
DEMS-7	5/24/2006	0.075	
DEMS-7	6/28/2006	0.1	< MDL .1
DEMS-7	7/26/2006	0.1	< MDL .1
DEMS-7	8/30/2006	0.1	< MDL .1
DEMS-7	9/27/2006	0.052	
DEMS-7	10/24/2006	0.142	
DEMS-7	3/31/2011	0.061	
DEMS-7	5/12/2011	0.079	
DEMS-7	5/25/2011	0.08	
DEMS-7	6/29/2011	0.063	
DEMS-7	7/28/2011	0.066	
DEMS-7	8/23/2011	0.036	
DEMS-7	10/18/2011	0.077	

MDL: Minimum Detection Limit

**Table 7-3 Total Nitrogen (TN) Data**

Station ID	Visit Date	NH3 (mg/l)	NH3 Detect Condition	NO3 NO2 N (mg/L)	NO3 NO2 N Detect Condition	TKN (mg/L)	TKN Detect Condition	TN (mg/L)
FCTS-41	5/3/2001	0.015	< MDL 0.015	0.016		0.15	< MDL .15	0.166
FCTS-41	9/12/2001	0.05		0.1		0.6		0.7
FCTS-41	3/27/2006	0.019		0.003	< MDL .003	0.997		1
FCTS-41	4/18/2006	0.044		0.007		0.568		0.575
FCTS-41	5/8/2006	0.023		0.02		0.331		0.351
FCTS-41	5/31/2006	0.03		0.057		0.685		0.742
FCTS-41	6/27/2006							
FCTS-41	7/12/2006							
FCTS-41	8/16/2006							
FCTS-41	9/20/2006							
FCTS-41	10/25/2006	0.015	< MDL 0.005	0.114		0.649		0.763
FCTS-41	3/13/2007	0.015	< MDL 0.015	0.003	< MDL .003	0.466		0.469
FCTS-41	4/10/2007	0.015	< MDL 0.015	0.003	< MDL .003	0.519		0.522
FCTS-41	5/2/2007							
FCTS-41	5/22/2007	0.015	< MDL 0.015	0.003	< MDL .003	0.7		0.703
FCTS-41	6/6/2007	0.015	< MDL 0.015	0.003	< MDL .003	1.177		1.18
FCTS-41	7/9/2007	0.044		0.878		0.808		1.686
FCTS-41	3/8/2011	0.051		0.064		0.764		0.828
FCTS-41	4/5/2011	0.005	< MDL 0.005	0.016	JI	0.451		0.467
FCTS-41	5/5/2011	0.005	< MDL 0.005	0.043		0.881		0.924
FCTS-41	5/18/2011							
FCTS-41	7/7/2011							
FCTS-41	9/8/2011	0.005	< MDL 0.005	0.155		1.04		1.195
FCTS-41	10/13/2011							
TMSS-44	3/8/2011	0.032		0.196		0.821		1.017
TMSS-44	4/5/2011	0.005	< MDL 0.005	0.013	JI	0.433		0.446
TMSS-44	5/5/2011	0.047		0.054		0.829		0.883
TMSS-44	5/18/2011							
TMSS-44	7/7/2011							
TMSS-44	9/8/2011	0.005	< MDL 0.005	2.785		1.12		3.905
TMSS-44	10/13/2011							
TMSS-45	3/8/2011	0.109		0.33		1.114		1.444
TMSS-45	4/5/2011	0.005	< MDL 0.005	0.018	JI	0.448		0.466
TMSS-45	5/5/2011	0.005	< MDL 0.005	0.012	JI	0.914		0.926
TMSS-45	5/18/2011							
TMSS-45	7/7/2011							
TMSS-45	9/8/2011	0.005	< MDL 0.005	5.841		1.12		6.961
TMSS-45	10/13/2011							0

MDL: Minimum Detection Limit

JI: The identification of the analyte is acceptable; the reported value is an estimate. The reported value is between the method detection limit and the practical Quantitation limit.

**Table 7-4 Total Nitrogen (TN) Data (cont)**

Station ID	Visit Date	NH3 (mg/l)	NH3 Detect Condition	NO3 NO2 N (mg/L)	NO3 NO2 N Detect Condition	TKN (mg/L)	TKN Detect Condition	TN (mg/L)
DEMS-7	4/19/2001	0.019		0.193		1.19		1.383
DEMS-7	5/23/2001	0.027		0.08		0.196		0.276
DEMS-7	6/20/2001	0.1		0.049		0.332		0.381
DEMS-7	7/25/2001	0.015	< MDL 0.015	0.038		0.514		0.552
DEMS-7	8/14/2001	0.005		0.061		0.15	< MDL .15	0.211
DEMS-7	9/19/2001	0.16		0.126		0.8		0.926
DEMS-7	10/24/2001	0.015	< MDL 0.015	0.153		0.56		0.713
DEMS-7	4/27/2006	0.105		0.064		0.741		0.805
DEMS-7	5/24/2006	0.033		0.021		1.023		1.044
DEMS-7	6/28/2006	0.015	< MDL 0.015	0.003	< MDL .003	0.793		0.796
DEMS-7	7/26/2006	0.015	< MDL 0.015	0.006		0.731		0.737
DEMS-7	8/30/2006	0.015	< MDL 0.015	0.003	< MDL .003	0.614		0.617
DEMS-7	9/27/2006	0.015	< MDL 0.015	0.008		0.556		0.564
DEMS-7	10/24/2006	0.015	< MDL 0.015	0.458		1.518		1.976
DEMS-7	10/24/2006	0.015	< MDL 0.015					
DEMS-7	3/31/2011	0.005	< MDL 0.005	0.025		0.956		0.981
DEMS-7	5/12/2011	0.044		0.087		1.11		1.197
DEMS-7	5/25/2011	0.005	< MDL 0.005	0.004	< MDL .004	0.87		0.874
DEMS-7	6/29/2011	0.005	< MDL 0.005	0.005	Jl	0.617		0.622
DEMS-7	7/28/2011	0.005	< MDL 0.005	0.05		0.583		0.633
DEMS-7	8/23/2011	0.005	< MDL 0.005	0.002	< MDL .002	0.604		0.606
DEMS-7	10/18/2011	0.007	< MDL 0.007	0.107		0.639		0.746

MDL: Minimum Detection Limit

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 practical Quantitation limit.

**Table 7-5 Chlorophyll-*a* Data**

Station ID	Visit Date	Chl- <i>a</i> (µg/L)	Chl- <i>a</i> Detect Condition
FCTS-41	5/3/2001		
FCTS-41	9/12/2001		
FCTS-41	3/27/2006	16.55	
FCTS-41	4/18/2006	2.67	
FCTS-41	5/8/2006	0.53	
FCTS-41	5/31/2006	6.76	
FCTS-41	6/27/2006		
FCTS-41	7/12/2006		
FCTS-41	8/16/2006		
FCTS-41	9/20/2006		
FCTS-41	10/25/2006	38.45	
FCTS-41	3/13/2007	0.53	JH
FCTS-41	4/10/2007	2.67	
FCTS-41	5/2/2007	5.87	
FCTS-41	6/6/2007	48.7	
FCTS-41	7/9/2007	7.48	
FCTS-41	3/8/2011	5.34	
FCTS-41	4/5/2011	0.1	< MDL .1
FCTS-41	5/5/2011	3.74	
FCTS-41	5/18/2011		
FCTS-41	7/7/2011		
FCTS-41	9/8/2011	13.35	
FCTS-41	10/13/2011		
TMSS-44	3/8/2011	2.14	
TMSS-44	4/5/2011	0.1	< MDL .1
TMSS-44	5/5/2011	4.81	
TMSS-44	5/18/2011		
TMSS-44	7/7/2011		
TMSS-44	9/8/2011	1.6	
TMSS-44	10/13/2011		
TMSS-45	3/8/2011	1.07	
TMSS-45	4/5/2011	1.78	
TMSS-45	5/5/2011	0.1	< MDL .1
TMSS-45	5/18/2011		
TMSS-45	7/7/2011		
TMSS-45	9/8/2011	2.67	
TMSS-45	10/13/2011		

MDL: Method Detection Limit

JH: The identification of the analyte is acceptable; the reported value is an estimate. The analytical holding times for analysis are exceeded. Micro: Reported

**Table 7-6 Chlorophyll-*a* Data (cont)**

Station ID	Visit Date	Chl- <i>a</i> (µg/L)	Chl- <i>a</i> Detect Condition
DEMS-7	4/19/2001	15.26	
DEMS-7	5/23/2001	45.92	
DEMS-7	6/20/2001	16.02	
DEMS-7	7/25/2001	12.46	
DEMS-7	8/14/2001	46.99	
DEMS-7	9/19/2001	16.78	
DEMS-7	10/24/2001	25.63	
DEMS-7	4/27/2006	8.54	
DEMS-7	5/24/2006	33.11	
DEMS-7	6/28/2006	25.6	
DEMS-7	7/26/2006	8.01	
DEMS-7	8/30/2006	12.5	
DEMS-7	9/27/2006	17.8	
DEMS-7	10/24/2006	6.68	
DEMS-7	10/24/2006		
DEMS-7	3/31/2011	6.41	
DEMS-7	5/12/2011	8.01	
DEMS-7	5/25/2011	25.37	
DEMS-7	6/29/2011	11.75	
DEMS-7	7/28/2011	21.36	
DEMS-7	8/23/2011	20.43	
DEMS-7	10/18/2011	1.07	

**Table 7-7 Temperature (Temp) and Dissolved Oxygen (DO) Data**

Station ID	Visit Date	Collection Depth	Temperature	DO
FCTS-41	5/3/2001	0.3	21	6.9
FCTS-41	9/12/2001	0.2	26.26	7.2
FCTS-41	3/27/2006	0.2	15	10.4
FCTS-41	4/18/2006	0.1	24	6.5
FCTS-41	5/8/2006	0.1	22	8.5
FCTS-41	5/31/2006	0.1	28.9	7.35
FCTS-41	6/27/2006			
FCTS-41	7/12/2006			
FCTS-41	8/16/2006			
FCTS-41	9/20/2006			
FCTS-41	10/25/2006	0.2	11.89	9.44
FCTS-41	3/13/2007	0.1	18	8.78
FCTS-41	4/10/2007	0.1	14.13	9.44
FCTS-41	5/2/2007	0.1	25.69	8.67
FCTS-41	5/22/2007	0.1	22.28	6.9
FCTS-41	6/6/2007	0.2	29.12	7.38
FCTS-41	7/9/2007	0.1	26.83	5.81
FCTS-41	3/8/2011	0.3	11.6	10.58
FCTS-41	4/5/2011	0.5	14.81	9.08
FCTS-41	5/5/2011	0.1	15.84	8.51
FCTS-41	5/18/2011	0.2	18.89	8.94
FCTS-41	7/7/2011			
FCTS-41	9/8/2011	0.2	20.2	7.84
FCTS-41	10/13/2011			
TMSS-44	3/8/2011	0.3	10.95	10.45
TMSS-44	4/5/2011	0.5	14.58	9.44
TMSS-44	5/5/2011	0.2	14.27	8.4
TMSS-44	5/18/2011	0.1	16.08	8.46
TMSS-44	7/7/2011			
TMSS-44	9/8/2011		19.02	6.97
TMSS-44	10/13/2011			
TMSS-45	3/8/2011		10.69	10.6
TMSS-45	4/5/2011		15.44	9.05
TMSS-45	5/5/2011		16.02	8.56
TMSS-45	5/18/2011		19.28	8.7
TMSS-45	7/7/2011			
TMSS-45	9/8/2011			
TMSS-45	10/13/2011			

**Table 7-8 Temperature (Temp) and Dissolved Oxygen Data (cont)**

Station ID	Visit Date	Collection Depth	Temperature	DO
DEMS-7	4/19/2001	1.5	19	6.81
DEMS-7	5/23/2001	1.5	25.01	5.85
DEMS-7	6/20/2001	1.5	27.97	3.4
DEMS-7	7/25/2001	1.4	30.65	4.12
DEMS-7	8/14/2001	1.5	29.44	6.26
DEMS-7	9/19/2001	1.5	26.22	3.37
DEMS-7	10/24/2001	1.5	19.21	4.47
DEMS-7	4/27/2006	1.5	22.22	2.88
DEMS-7	5/24/2006	1.4	25.21	3.45
DEMS-7	6/28/2006	1.0	29.58	5.6
DEMS-7	7/26/2006	1.0	30.19	4.91
DEMS-7	8/30/2006	1.3	30.62	5.47
DEMS-7	9/27/2006	1.5	24.63	6.84
DEMS-7	10/24/2006	1.3	14.16	6.81
DEMS-7	3/31/2011	1.5	15.55	6.81
DEMS-7	5/12/2011	0.8	23.56	7.15
DEMS-7	5/25/2011	0.7	25.93	2.58
DEMS-7	6/29/2011	1.0	29.87	6.62
DEMS-7	7/28/2011	1.0	31.08	4.54
DEMS-7	8/23/2011	0.8	31.79	3.23
DEMS-7	10/18/2011	1.0	20.94	5.22

**Table 7-9 CBOD Data**

Station ID	Visit Date	CBOD-5 mgL	CBOD-5 dc
FCTS-41	5/3/2001	1	
FCTS-41	9/12/2001	0.2	
FCTS-41	3/27/2006	4.2	
FCTS-41	4/18/2006	3	
FCTS-41	5/8/2006	2.3	
FCTS-41	5/31/2006	1.4	
FCTS-41	6/27/2006		
FCTS-41	7/12/2006		
FCTS-41	8/16/2006		
FCTS-41	9/20/2006		
FCTS-41	10/25/2006	2.9	
FCTS-41	3/13/2007	1.4	
FCTS-41	4/10/2007	1	< MDL 1
FCTS-41	5/2/2007	1	< MDL 1
FCTS-41	5/22/2007		
FCTS-41	6/6/2007	1	< MDL 1
FCTS-41	7/9/2007	1	< MDL 1
FCTS-41	3/8/2011	2	< MDL 2
FCTS-41	4/5/2011	2	< MDL 2
FCTS-41	5/5/2011	2.2	
FCTS-41	5/18/2011		
FCTS-41	7/7/2011		
FCTS-41	8/1/2011		
FCTS-41	9/8/2011	2	< MDL 2
FCTS-41	10/13/2011		
TMSS-44	3/8/2011	2	< MDL 2
TMSS-44	4/5/2011	2	< MDL 2
TMSS-44	5/5/2011	2	< MDL 2
TMSS-44	5/18/2011		
TMSS-44	7/7/2011		
TMSS-44	9/8/2011	2	< MDL 2
TMSS-44	10/13/2011		
TMSS-45	3/8/2011	2	< MDL 2
TMSS-45	4/5/2011	2.4	
TMSS-45	5/5/2011	2	< MDL 2
TMSS-45	5/18/2011		
TMSS-45	7/7/2011		
TMSS-45	8/1/2011		
TMSS-45	9/8/2011	2	< MDL 2
TMSS-45	10/13/2011		

**Table 7-10 CBOD Data (cont)**

Station ID	Visit Date	CBOD-5 mgL	CBOD-5 dc
DEMS-7	4/19/2001		
DEMS-7	5/23/2001		
DEMS-7	6/20/2001		
DEMS-7	7/25/2001		
DEMS-7	8/14/2001		
DEMS-7	9/19/2001		
DEMS-7	10/24/2001		
DEMS-7	4/27/2006	3.3	
DEMS-7	5/24/2006	2.2	
DEMS-7	6/28/2006	1.28	
DEMS-7	7/26/2006	1.26	
DEMS-7	8/30/2006	0.99	
DEMS-7	9/27/2006	1.6	
DEMS-7	10/24/2006	2.5	
DEMS-7	10/24/2006		
DEMS-7	3/31/2011	4.7	
DEMS-7	5/12/2011	2	< MDL 2
DEMS-7	5/25/2011	2	< MDL 2
DEMS-7	6/29/2011	2.3	
DEMS-7	7/28/2011	2	< MDL 2
DEMS-7	8/23/2011	2	< MDL 2
DEMS-7	10/18/2011	2	< MDL 2

Figure 7-1 Factory Creek (FCTS-41) 72-hr Diurnal Dissolved Oxygen Data

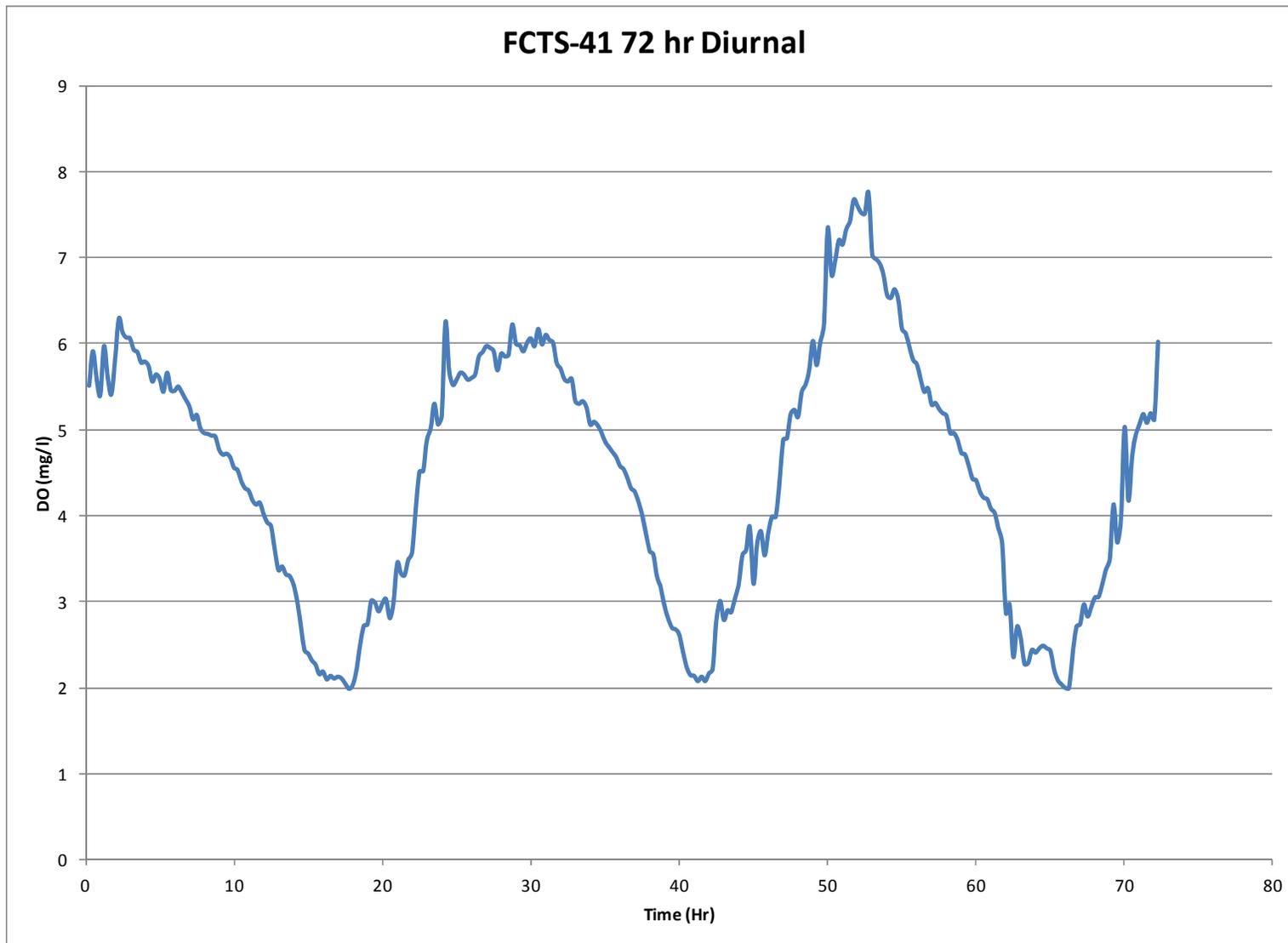


Figure 7-2 Toms Creek (TMSS-44) 72-hr Diurnal Dissolved Oxygen Data

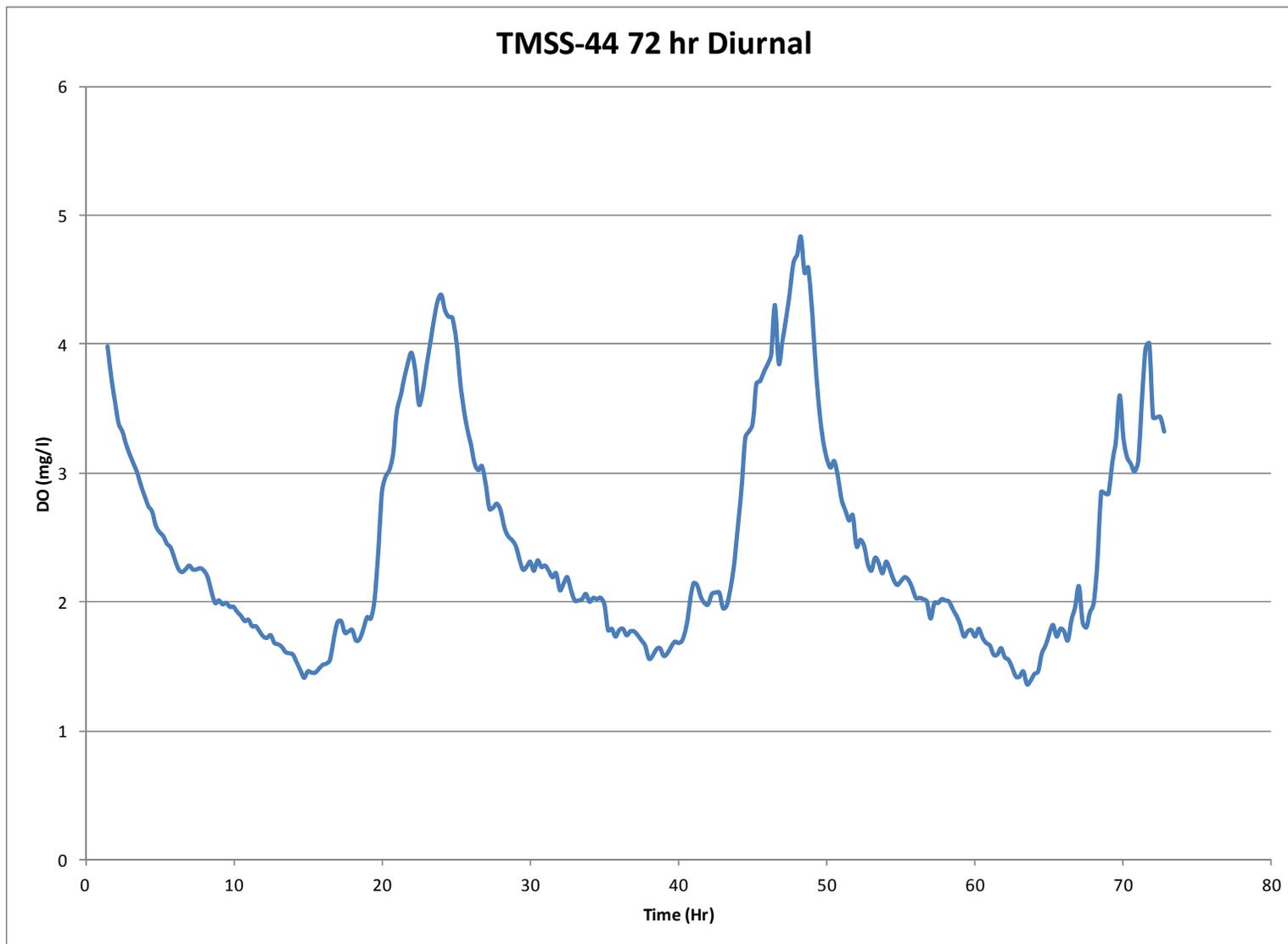


Figure 7-3 Toms Creek (TMSS-45) 72-hr Diurnal Dissolved Oxygen Data

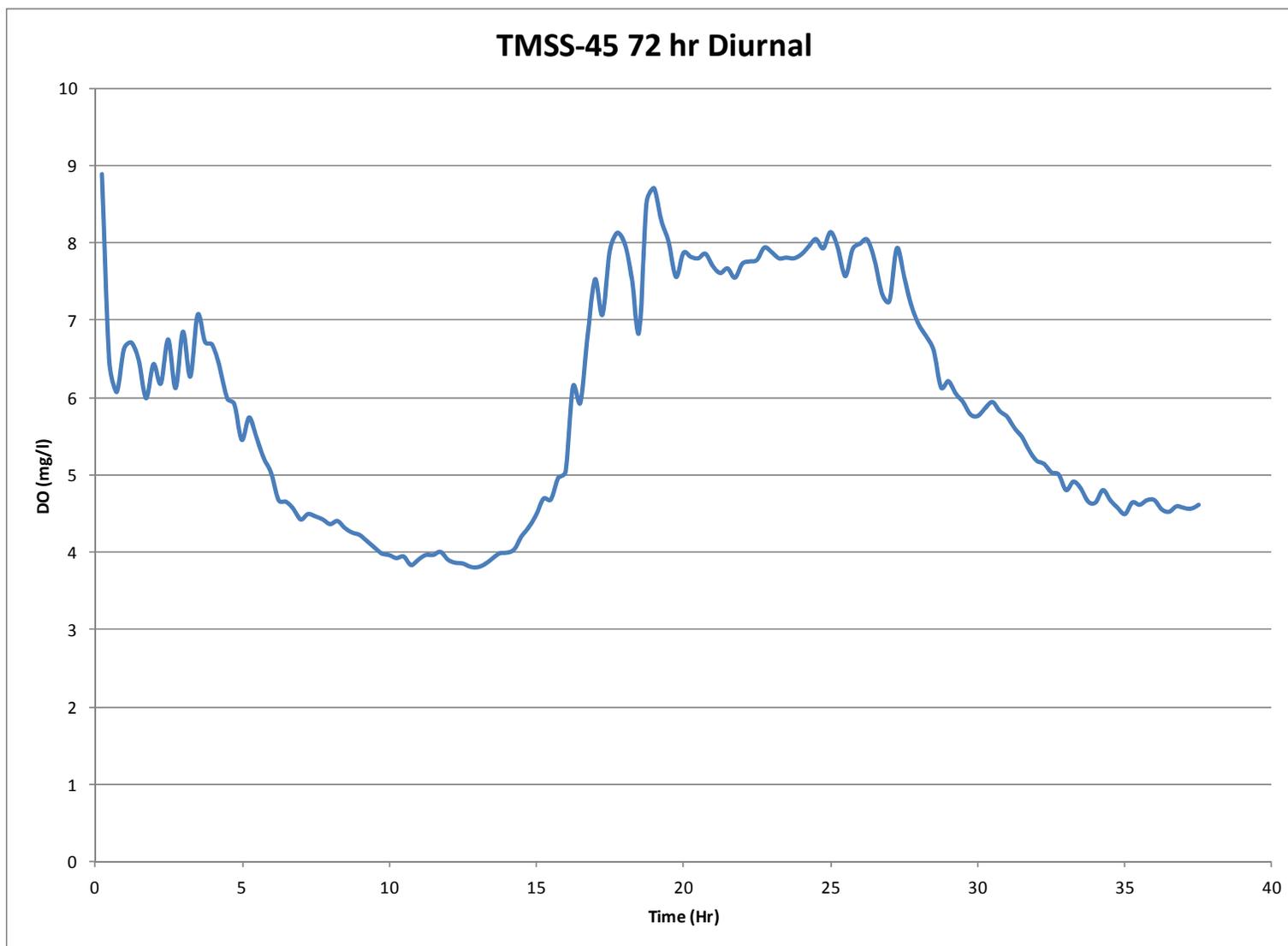
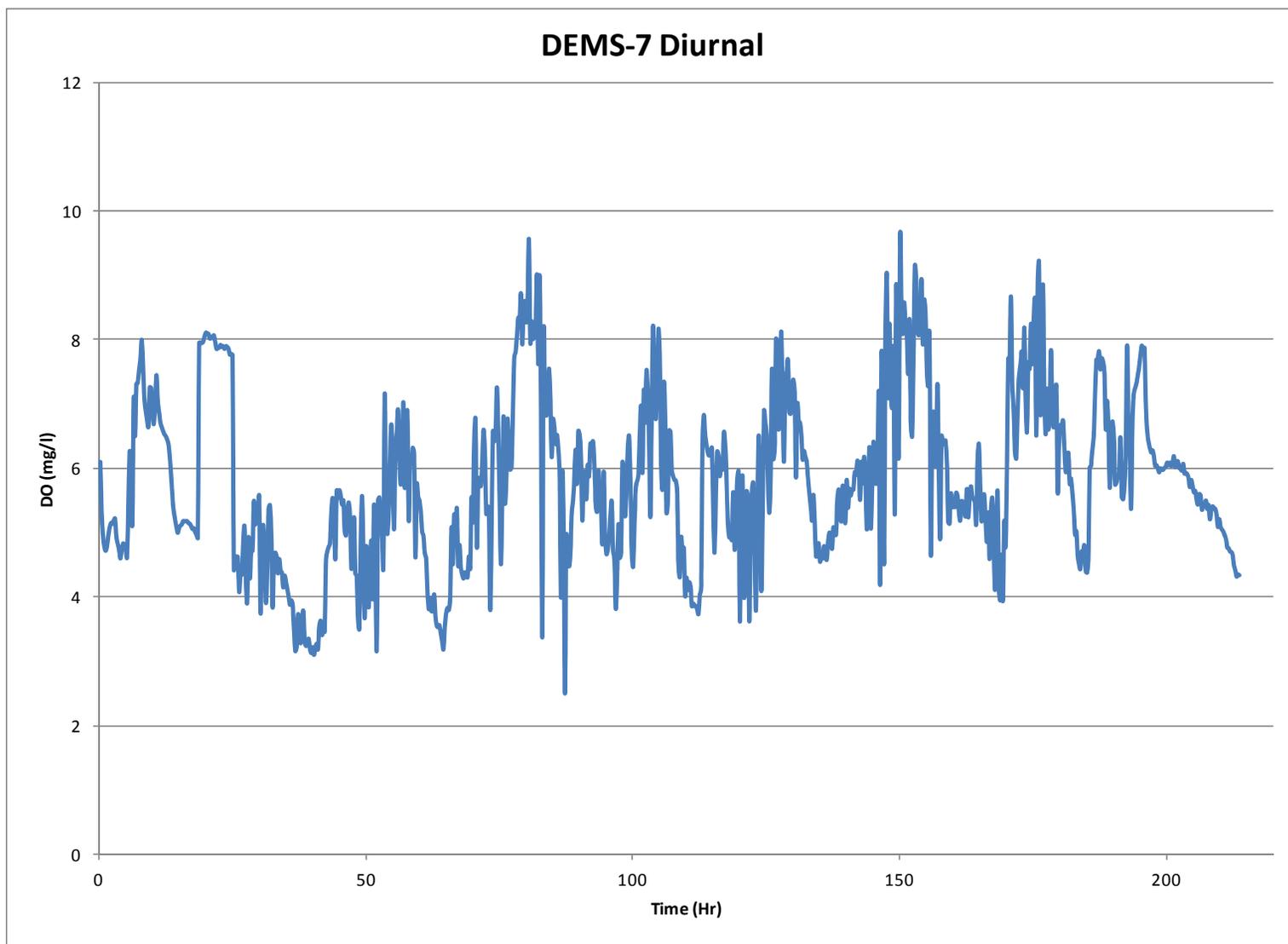


Figure 7-4 Factory Creek (DEMS-7) 72-hr Diurnal Dissolved Oxygen Data



**Table 7-11 Habitat Assessment Results from FCTS-41**

<b>FCTS-41 5/18/2011</b>		
<b>Habitat Assessment</b>	<b>%Maximum Score</b>	<b>Rating</b>
<b>GP</b>		
Instream Habitat Quality	43	Marginal (40-52)
Sediment Deposition	84	Optimal >65
Sinuosity	28	Poor < 45
Bank and Vegetative Stability	54	Marginal (35-59)
Riparian Buffer	65	Marginal (50-65)
<b>Habitat Assessment Score</b>	<b>121</b>	
<b>% Maximum Score</b>	<b>55</b>	Sub-optimal (53-65)

**Table 7-12 Macroinvertebrate Assessment Results from FCTS-41**

<b>FCTS-41 5/18/2011</b>		
<b>Macroinvertebrate Assessment</b>		
	<b>Results</b>	<b>Scores</b>
<b>Taxa richness and diversity measures</b>		<b>(0-100)</b>
# EPT taxa	14	56
<b>Taxonomic composition measures</b>		
% Non-insect taxa	13	60.2
% Plecoptera	2	11.70
% Dominant taxa	24	63.9
<b>Functional composition measures</b>		
% Predators	14	46.9
<b>Community tolerance</b>		
Beck's community tolerance	7	31.8
% Nutrient tolerant organisms	34	60.0
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>47</b>
<b>WMB-I Assessment Rating</b>		<b>Fair (38-56)</b>

Table 7-13 Alabama's 2010 Ecoregional Reference Guidelines

Alabama's 2010 Ecoregional Reference Guidelines																			
Parameters	Basis of comparison	Result to compare	Level 4	Level 4	Level 3	Level 4	Level 3	Level 4	Level 4	Level 3	Level 4	Level 3							
			45a	45d	45	65a/b	65f	65g	65i	65j	65q	67f	67h	67	68d	68e	68	71f	71
<b>Physical</b>																			
Temperature (°C)	90th %ile	Median	24.656	25	25	27	24.6	27	25	24	27	24	26	25.7	25	23.48	24	22.12	22.586
Turbidity (NTU)	90th %ile	INDIVIDUAL	21.7	6.823	15	49.56	3.7	13.05	26.21	10.73	42.3	6.622	10.787	8.824	9.667	9.025	10.1	3.693	11.1
Total Dissolved Solids (mg/L)	90th %ile	Median	67.9	85.4	80	162.8	53.4	97.4	63.3	167.6	103.4	165	79.4	151.2	118	84.8	97.2	79.6	150.5
Total Suspended Solids (mg/L)	90th %ile	Median	16	12	15	45	13.2	16.3	27.5	26.9	104.6	11.3	12.7	12.4	27	10	14	9.6	8.9
Specific Conductance (µmhos)	Median	Median	40.1	37	39.05	129.7	20.4	53.4	25.8	70	72.5	207	34.35	86	49.5	37	39.15	96	109
Hardness (mg/L)	Median	Median	10.65	11.1	11	56	14	14.2	6.52	82.1	34.6	94.05	8.56	42.3	16.2	10	12.15	47.2	56
Alkalinity (mg/L)	90th %ile	Median	21.8	23.5	23.01	84.41	11.8	21.85	21.05	130.64	36.36	121.73	16.54	117.716	21	44.2	42.2	47.492	109.4
Stream Flow (cfs)																			
<b>Chemical</b>																			
Dissolved Oxygen (mg/L)	10th %ile	Median	7.665	7.6	7.6	5.1	6.94	4.484	6.692	7.64	6.8	7.44	7	7	5.609	7.51	6.79	8.113	7.61
pH (su)	10th %ile	Median	6.5	6.787	6.64	6.758	4.436	5.69	5.82	6.31	6.6	6.938	6.69	6.768	6.482	6.522	6.5	7.162	7.345
pH (su)	90th %ile	Median	7.68	7.679	7.7	8.052	6.55	6.815	7.18	8.1	7.74	8.294	8	8.278	7.352	7.852	7.84	8.35	8.34
Ammonia Nitrogen (mg/L)	90th %ile	Median	0.0078	0.0105	0.0105	0.04802	0.046	0.0203	0.0905	0.0932	0.074	0.0228	0.031	0.0346	0.119	0.0945	0.1007	0.023	0.023
Nitrate+Nitrite Nitrogen (mg/L)	90th %ile	Median	0.1241	0.0718	0.0974	0.286	0.3258	0.2432	0.2764	0.3436	0.0634	0.261	0.0888	0.2403	1.202	0.456	0.6191	0.6895	1.42
Total Kjeldahl Nitrogen (mg/L)	90th %ile	Median	0.40482	0.2598	0.28448	0.887	0.4176	0.583	0.6782	0.4858	0.6346	0.431	0.5107	0.5826	1.46	0.6595	0.733	0.624	0.466
Total Nitrogen (mg/L)	90th %ile	Median	0.53114	0.3224	0.40016	1.1634	0.6396	0.773	0.8512	0.8064	0.63205	0.6836	0.69365	0.7109	2.269	0.9185	1.41685	1.235	1.57
Dissolved Reactive Phosphorus (mg/L)	90th %ile	Median	0.0214	0.027	0.0243	0.0618	0.0264	0.0236	0.023	0.0167	0.0193	0.0174	0.0162	0.017	0.0109	0.019	0.0182	0.017	0.0155
Total Phosphorus (mg/L)	90th %ile	Median	0.0663	0.0537	0.0593	0.201	0.04	0.0698	0.0682	0.0577	0.064	0.0514	0.0429	0.0566	0.0491	0.0501	0.05	0.1059	0.0497
CBOD-5 (mg/L)	90th %ile	Median	2.57	2.37	2.4	3.2	1.96	2.65	2	2.53	2.3	1.78	2.58	2.3	1.86	1.9	1.9	1.1	1.1
Chlorides (mg/L)	90th %ile	Median	4.778	4.029	4.495	12.032	6.692	6.066	4.2852	5.247	5.95	4.266	3.61	3.69	9.118	1.051	6.37	2.4112	2.622
<b>Total Metals</b>																			
Aluminum (mg/L)	90th %ile	Median	0.2437	0.1558	0.1954	1.181	0.4886	0.2732	0.801	0.4045	1.561	0.2104	0.356	0.414	0.155	0.265	0.3055	0.1954	0.127
Iron (mg/L)	90th %ile	Median	1.094	0.5648	0.8722	2.362	1.352	3.976	3.548	0.839	2.13	0.893	0.733	0.9603	0.6855	1.047	1.046	0.4085	0.4294
Manganese (mg/L)	90th %ile	Median	0.0554	0.0647	0.057	0.215	0.0436	0.7372	0.8094	0.081	0.113	0.067	0.052	0.0628	0.184	0.0563	0.1553	0.025	0.025
<b>Dissolved Metals</b>																			
Aluminum (mg/L)	90th %ile	Median	0.05485	0.0545	0.0545	0.1365	0.2242	0.0545	0.1	0.11	0.193	0.1	0.1	0.1	0.1	0.1	0.1	0.03	0.03
Antimony (µg/L)	90th %ile	Median	1	1	1	1	3.75	1	5	5	3.75	5	1	5		14	14	5	5
Arsenic (µg/L)	90th %ile	Median	5	5	5	5	5	5	5	5	5	9.2	5	5		5	5	12.1	12
Cadmium (mg/L)	90th %ile	Median	0.0435	0.0435	0.0435	0.0435	0.0394	0.0435	0.0435	0.0435	0.0435	0.0435	0.0435	0.0435		0.0448	0.04415	0.0075	0.0075
Chromium (mg/L)	90th %ile	Median	0.0395	0.0395	0.0395	0.0395	0.0321	0.0395	0.0395	0.0395	0.0395	0.0395	0.0395	0.0395		0.0416	0.04055	0.025	0.025
Copper (mg/L)	90th %ile	Median	0.043	0.043	0.043	0.043	0.0349	0.043	0.043	0.075	0.043	0.043	0.043	0.043	0.043	0.0298	0.043	0.043	0.1
Iron (mg/L)	90th %ile	Median	0.232	0.2248	0.256	0.503	0.6132	0.8042	0.5392	0.2445	1.255	0.1218	0.1885	0.2428	0.1552	0.588	0.588	0.025	0.0579
Lead (µg/L)	90th %ile	Median	1	1	1	1	2.5	1	5	5	2.5	5	1	5	1	5	5	5	5
Manganese (mg/L)	90th %ile	Median	0.02665	0.0235	0.0253	0.1224	0.0328	0.7886	0.8218	0.025	0.1084	0.025	0.0235	0.025		0.05	0.05	0.025	0.025
Mercury (µg/L)	90th %ile	Median	0.15	0.15	0.15	0.15	0.25	0.15	0.25	0.2	0.25	0.2	0.2	0.2	0.18	0.2	0.2	0.15	0.15
Nickel (mg/L)	90th %ile	Median	0.114	0.114	0.114	0.114	0.0936	0.114	0.05	0.114	0.114	0.0884	0.114	0.114		0.114	0.114	0.025	0.025
Selenium (µg/L)	90th %ile	Median	5	5	5	5	5	5	25	23	5	23	5	5		50	50	15	25
Silver (mg/L)	90th %ile	Median	0.058	0.058	0.058	0.058	0.0467	0.058	0.05	0.058	0.058	0.0548	0.058	0.058		0.058	0.058	0.025	0.025
Thallium (µg/L)	90th %ile	Median	0.5	0.5	0.5	0.5	4.5	0.5	5	5	4.5	5	0.5	5		18.5	18.5	5	5
Zinc (mg/L)	90th %ile	Median	0.0345	0.0345	0.0345	0.0345	0.0294	0.0345	0.0345	0.0345	0.0345	0.0345	0.0345	0.0345	0.0345	0.0267	0.0438	0.0345	0.03
<b>Biological</b>																			
Chlorophyll a (µg/L)	90th %ile	Median	5.019	2.14	2.67	5.181	1.755	1.282	4.732	3.31	3.949	2.562	2.086	2.322	1.392	2.458	2.67	3.044	4.255
Fecal Coliform (col/100 mL)	90th %ile	Median	332	116	201.2	1564	400	234	620	582	1025	141.6	152.2	197	829	252	320	200	435

### ***7.3 Factory Creek Watershed Photos***



**Photo 1 – FCTS-41 Looking Upstream**



**Photo 2 – FCTS-41 Looking Downstream**



**Photo 3 – TTSS-44 Looking Upstream**



**Photo 4 – TTSS-44 Looking Downstream**



**Photo 5 – TTSS-45 Looking Upstream**



**Photo 6 – TTSS-45 Looking Downstream**



**Photo 7 – Factory Creek at State Route 39 Looking Upstream**



**Photo 8 – Factory Creek at State Route 39 Looking Downstream**