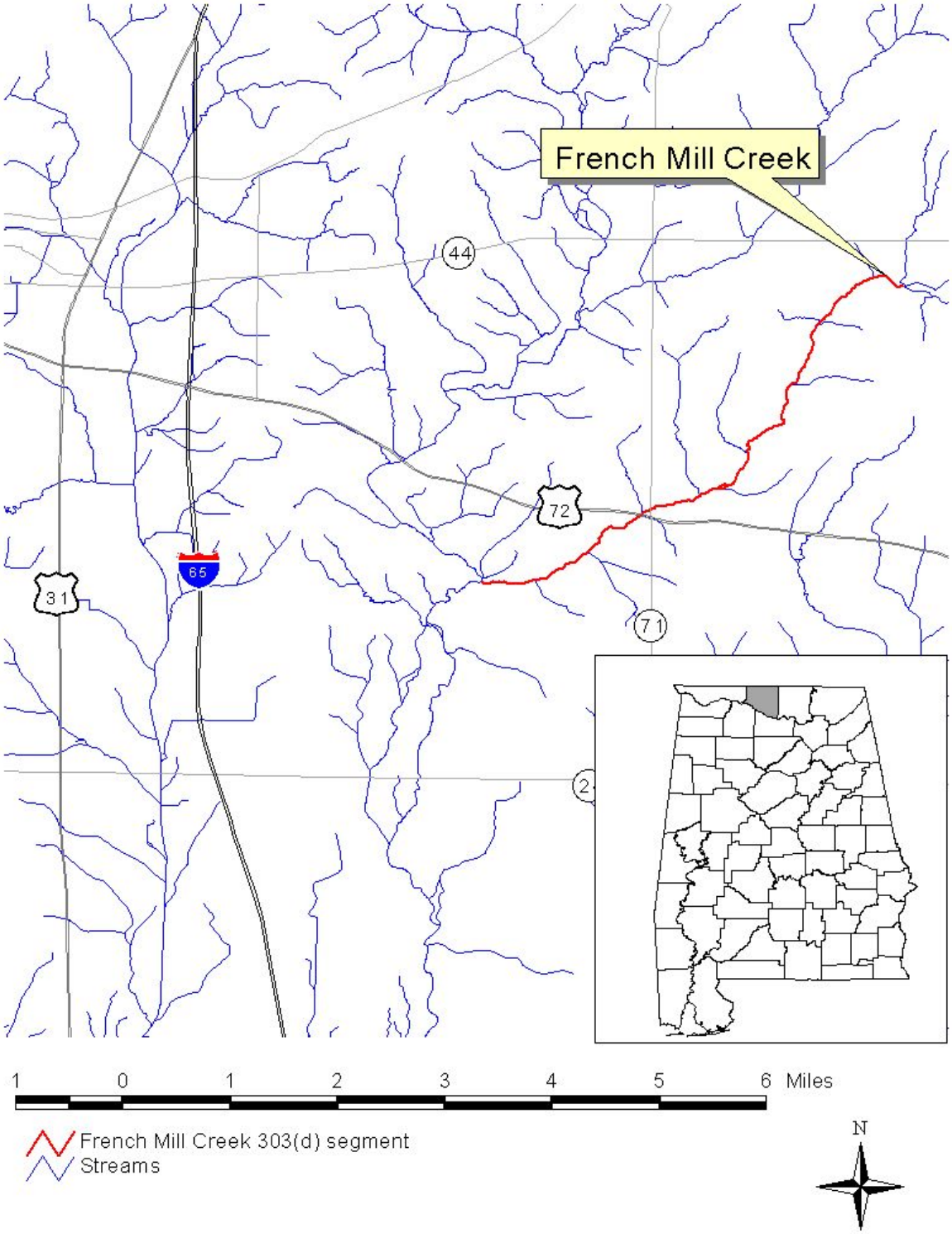
Final

Total Maximum Daily Load (TMDL)
for
French Mill Creek
Waterbody ID # AL/06030002-0802-201
Pathogens (fecal coliform)

Alabama Department of Environmental Management
Water Quality Branch
Water Division
December 2006

French Mill Creek in the Tennessee River Basin located in Limestone County, Alabama



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1.0 Executive Summary

Section 303(d) of the Clean Water Act and EPA's Water Quality Planning and Management Regulations (40 CFR Part 130) require states to identify waterbodies which are not meeting their designated use and to determine the Total Maximum Daily Load (TMDL) for pollutants causing the use impairment. A TMDL is the sum of individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources, including natural background levels, and a margin of safety (MOS).

French Mill Creek is a tributary to Piney Creek and is located in Limestone County. French Mill Creek is part of the Piney Creek Subwatershed within the Tennessee River Basin. In 1998, French Mill Creek was placed on the State of Alabama's §303(d) list for pathogens (fecal coliform). Its current use classification is Fish and Wildlife (F&W). The following report addresses TMDL development concerning pathogens (fecal coliform). French Mill Creek was initially listed on the 1998 §303(d) list as the result of 1997 TVA data that revealed a single sample violation of the 2000 col/100 ml criterion. Further sampling of French Mill Creek by ADEM in 2003 also resulted in a violation of the 5 day geometric mean criterion of 200 col/100 ml.

The mass balance approach, which employs conservation of mass, was utilized in determining the needed pathogens TMDL for French Mill Creek. Loads were calculated by multiplying fecal coliform concentrations with corresponding instream flows. Current loading of French Mill Creek was determined by multiplying the highest reported geometric mean concentration times the average measured flow from the sampling event. Allowable loading was calculated using this same flow value times the fecal coliform criterion target value of 180 col/100 ml (200 col/100ml – 10% MOS). Reductions needed to meet the allowable loading were then computed by simply subtracting the allowable loading from current loading. Table 1.1 below is a summary of current loads, allowable loads, and reductions needed to meet the applicable water quality standards for French Mill Creek. Table 1.2 further identifies the various TMDL components.

Table 1.1 – Current Loads, Allowable Loads, and Required Reductions

Source	Current Load (col/day)	Allowable Load with MOS (col/day)	Required Reduction with MOS (col/day)	Required Reduction with MOS (%)
NPS load	5.41E+10	3.48E+10	1.93E+10	36%
Point Source	0.00E+00	0.00E+00	0.00E+00	0%
Total load	5.41E+10	3.48E+10	1.93E+10	36%

Table 1.2 - TMDL for French Mill Creek

TMDL = WLA + LA + MOS			
TMDL	WLA	LA	MOS
(col/day)	(col/day)	(col/day)	(col/day)
3.78E+10	0.00E+00	3.48E+10	3.87E+9

2.0 Basis for §303(d) Listing

2.1 Introduction

Section 303(d) of the Clean Water Act and EPA's Water Quality Planning and Management Regulations (40 CFR Part 130) require states to identify waterbodies which are not meeting their designated uses and to determine the total maximum daily load (TMDL) for pollutants causing use impairment. The TMDL process establishes the allowable loading of pollutants for a waterbody based on the relationship between pollution sources and instream water quality conditions, so that states can establish water-quality based controls to reduce pollution and restore and maintain the quality of their water resources (USEPA, 1991).

In 1998, French Mill Creek was placed on the State of Alabama's §303(d) list for pathogens (fecal coliform). Its current use classification is Fish and Wildlife (F&W). The following report addresses TMDL development concerning pathogens (fecal coliform). French Mill Creek was initially listed on the 1998 §303(d) list as the result of 1997 TVA data that revealed a single sample violation of the 2000 col/100 ml criterion. Further sampling of French Mill Creek by ADEM in 2003 also resulted in a violation of the 5 day geometric mean criterion of 200 col/100 ml.

2.2 Problem Definition

Waterbody Impaired:	French Mill Creek - from Piney Creek to unnamed tributary in Piney Swamp.
Waterbody length:	5.21 miles
Waterbody drainage area:	7.96 square miles
Water Quality Standard Violation:	Fecal Coliform
Pollutant of Concern:	Pathogens (Fecal Coliform)
Water Use Classification:	Fish and Wildlife
Usage related to classification:	Usage of Fish and Wildlife waters is described in ADEM Admin. Code R. 335-6-10-.09(5)(a), (b), (c), and (d) as follows:

(a) Best usage of waters: fishing, propagation of fish, aquatic life, and wildlife, and any other usage except for swimming and water-contact sports or as a source of water supply for drinking or food-processing purposes.

(b) Conditions related to best usage: the waters will be suitable for fish, aquatic life and wildlife propagation. The quality of salt and estuarine waters to which this classification is assigned will also be suitable for the propagation of shrimp and crabs.

(c) Other usage of waters: it is recognized that the waters may be used for incidental water contact and recreation during June through September, except that water contact is strongly discouraged in the vicinity of discharges or other conditions beyond the control of the Department or the Alabama Department of Public Health.

(d) Conditions related to other usage: the waters, under proper sanitary supervision by the controlling health authorities, will meet accepted standards of water quality for outdoor swimming places and will be considered satisfactory for swimming and other whole body water-contact sports.

Fecal Coliform Criterion:

Criterion for acceptable bacteria levels for the Fish and Wildlife use classification are described in ADEM Admin. Code R. 335-6-10-.09(5)(e)7.(i) and (ii) as follows:

(i) In non-coastal waters, bacteria of the fecal coliform group shall not exceed a geometric mean of 1,000 colonies/100 ml; nor exceed a maximum of 2,000 colonies/100 ml in any sample. The geometric mean shall be calculated from no less than five samples collected at a given station over a 30-day period at intervals not less than 24 hours. In coastal waters, bacteria of the enterococci group shall not exceed a maximum of 275 colonies/100 ml in any sample.

(ii) For incidental water contact and recreation during June through September, the bacterial quality of water is acceptable when a sanitary survey by the controlling health authorities reveals no source of dangerous pollution and when the geometric mean fecal coliform organism density does not exceed 200 colonies/100 ml in non-coastal waters. In coastal waters, bacteria of the enterococci group shall not exceed a geometric mean of 35 colonies/100 ml nor exceed a maximum of 158 colonies/100 ml in any sample. The geometric mean shall be calculated from no less than five samples collected at a given station over a 30-day period at intervals not less than 24 hours. When the geometric mean bacterial organism density exceeds these levels, the bacterial water quality shall be considered acceptable only if a second detailed sanitary survey and evaluation discloses no significant public health risk in the use of the waters. Waters in the immediate vicinity of discharges of sewage or other wastes likely to contain bacteria harmful to humans, regardless of the degree of treatment afforded these wastes, are not acceptable for swimming or other whole body water-contact sports.

Criterion Exceeded:

ADEM sampling of French Mill Creek from June 2003 through August 2003 consisted of a total of 10 fecal coliform samples. None of the samples exceeded the single sample maximum criterion of 2000 col/100ml. One out of two geometric mean sampling events did exceed ADEM's F&W criterion of 200 col/100 ml which is applicable during the months of June through September.

3.0 TMDL Technical Basis

3.1 Water Quality Target Identification

For this TMDL, a fecal coliform target of 180 colonies/100 ml was established; which incorporates an additional 10% margin of safety in relation to the geometric mean criterion of 200 colonies/100 ml to ensure against geometric mean single sample exceedances.

3.2 Source Assessment

Point Sources in the French Mill Creek Watershed:

No point sources currently exist within the watershed. Any new point source discharges will require compliance with the 200 col/100 ml criterion for fecal coliform. The French Mill Creek watershed does not presently qualify as a municipal separate stormwater sewer system (MS4) area as defined as an urban area serving 50,000 residents or greater. Stormwater runoff and storm sewer discharges within MS4 designated areas must be assessed during TMDL development.

Nonpoint Sources in the French Mill Creek Watershed:

Based on site observations and the absence of point sources within the watershed, nonpoint sources are believed to be the primary source of fecal coliform bacteria in French Mill Creek. Land use in this watershed is approximately 66.4% agriculture (pasture/hay and row crops), 25.4% forest, and 8.2% other. The following are examples of how different landuses can contribute to fecal coliform bacterial loading:

- Agricultural land can represent a significant source of fecal coliform bacteria. Runoff from pastures, animal operations, improper land application of animal wastes, and animals with access to streams are all mechanisms by which fecal coliform bacteria is introduced to waterbodies. French Mill Creek runs through a cattle pasture and cattle were observed to have access to French Mill Creek during a June 15, 2000 site visit at Capshaw Road (see Photo 3-1). No cattle were observed during a May 5, 2004 site visit (see Photo 3-2); however the site could still be used as a cattle pasture. French Mill Creek has little to no riparian buffer through out this stream reach.

Photo 3-1: Cattle pasture North of Capshaw Road @ French Mill Creek, ADEM Site Visit-June 2000

Photo 3-2: Cattle pasture North of Capshaw Road @ French Mill Creek, ADEM Site Visit-May 2004

- Fecal coliform bacteria can also originate from forested areas due to the presence of wild animals such as deer, raccoons, turkeys, waterfowl, etc. Control of these sources is usually limited to land management best management practices and may be impracticable in most cases. As a result, forested areas are not specifically targeted in this TMDL.

- Leaking septic systems can be another source of fecal coliform bacteria.

The nature and extent of fecal coliform sources will be better identified during the implementation phase of the TMDL.

3.3 Landuse

Table 3.1 below provides further detail of various landuses in the French Mill Creek Watershed while a landuse map of the watershed is presented as Figure 3.1 on page 11. Detailed landuse was derived from Arcview which allows spatial display of existing Geographical Information Systems (GIS) data for a defined watershed. Landuse information was derived from the National Land Cover Dataset (NLCD) 2001.

Table 3.1 Landuse in the French Mill Creek Watershed

Landuse	Sq. Miles	Percentage
Forest	1.43	17.9
Wetlands	0.06	0.8
Urban	0.65	8.1
Shrub/Scrub	0.44	5.5
Open Water	0.01	0.2
Grasslands	0.09	1.1
Pasture/Hay	3.33	41.8
Row Crops	1.95	24.6
Barren Land	0.00	0.0
Total	**7.96**	**100.0**

Grouped Landuses	Sq. Miles	Percentage
Agricultural	5.28	66.4
Forest	2.03	25.4
Other	0.65	8.2
Total	**7.96**	**100.0**

3.4 Linkage Between Numeric Targets and Sources:

The landuses in the French Mill Creek watershed indicate forest and agricultural areas as the likely sources of fecal coliform bacteria. Since the segment consists of such a small drainage area, (7.96 square miles) with diverse landuses, it was not considered practicable to determine individual components of nonpoint source (NPS) loading. As such, individual loads or reductions for various sources such as forest, agriculture, and septic systems will not be specified. Loadings and reductions will only be viewed as a total NPS load. It is envisioned that sources will be better defined during actual implementation.

3.5 Data Availability and Analysis:

In 1998, French Mill Creek was placed on the State of Alabama's §303(d) list for pathogens (fecal coliform). Its current use classification is Fish and Wildlife (F&W). French Mill Creek was initially listed on the 1998 §303(d) list as the result of 1997 TVA data that revealed a single sample violation of the 2000 col/100 ml criterion. Further sampling of French Mill Creek by ADEM in 2003 also resulted in a violation of the 5 day geometric mean criterion of 200 col/100 ml; however, this sampling did not violate the 2000 col/100 ml criterion.

All of the data mentioned above can be found in Appendix B. Sample locations are shown on Figure 3.2, page 12.

3.6 Critical Conditions:

Typically, summer months (June - September) represent critical conditions for fecal coliform. This can be explained by the nature of storm events in summer versus winter. Periods of dry weather interspersed with thunderstorms allow for the accumulation and washing off of fecal coliform bacteria into streams, resulting in spikes of fecal coliform bacteria counts. In winter, frequent low intensity rain events are more typical and do not allow build-up of fecal coliform bacteria on land, resulting in more uniform loading rates. The summer fecal coliform criterion is lower than the winter criterion due to incidental water contact and recreation because people are more likely to come in contact with the creek during summer months, which seems to hold true for the French Mill Creek watershed.

Figure 3.1 – Landuse Map of French Mill Creek Watershed

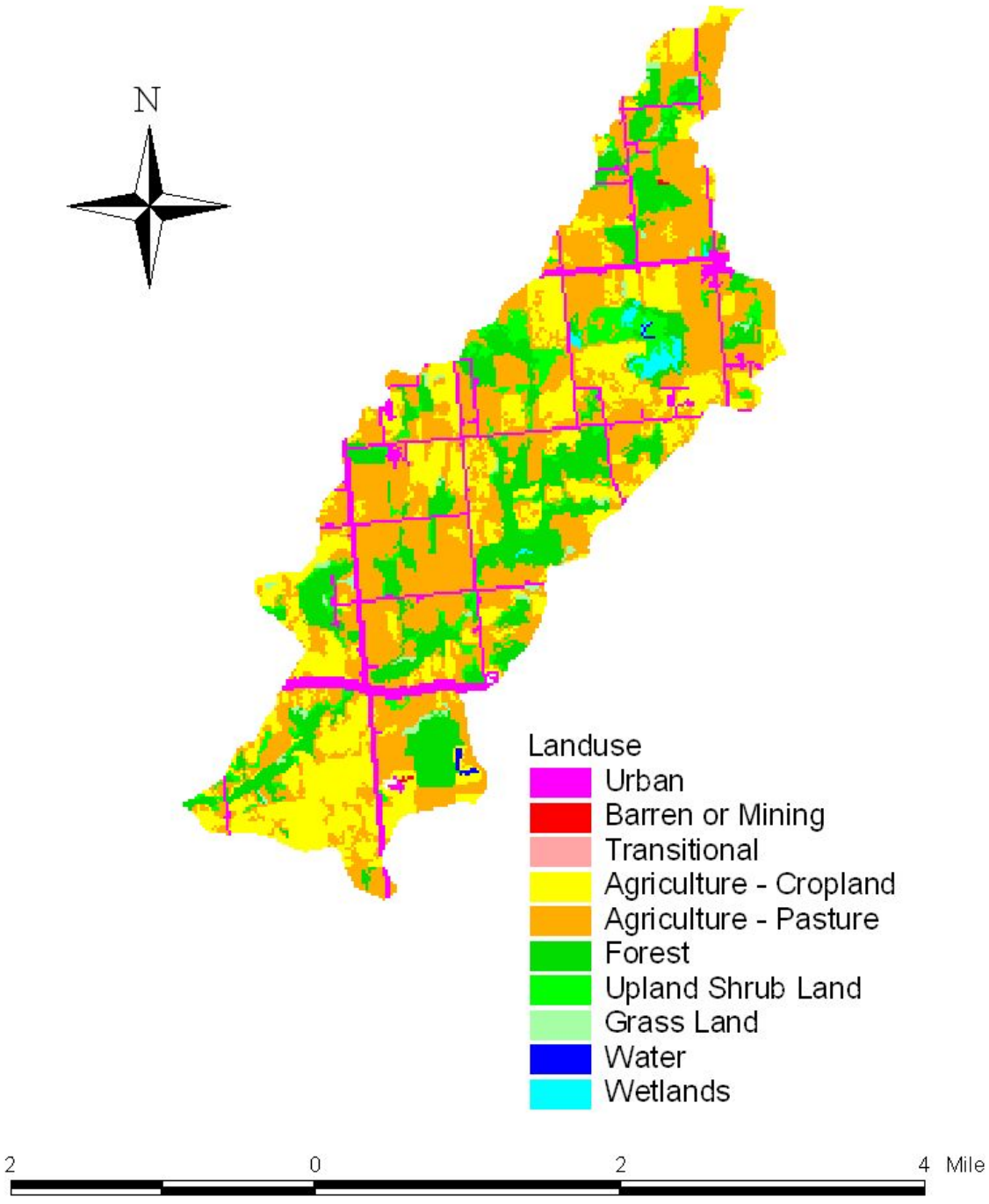
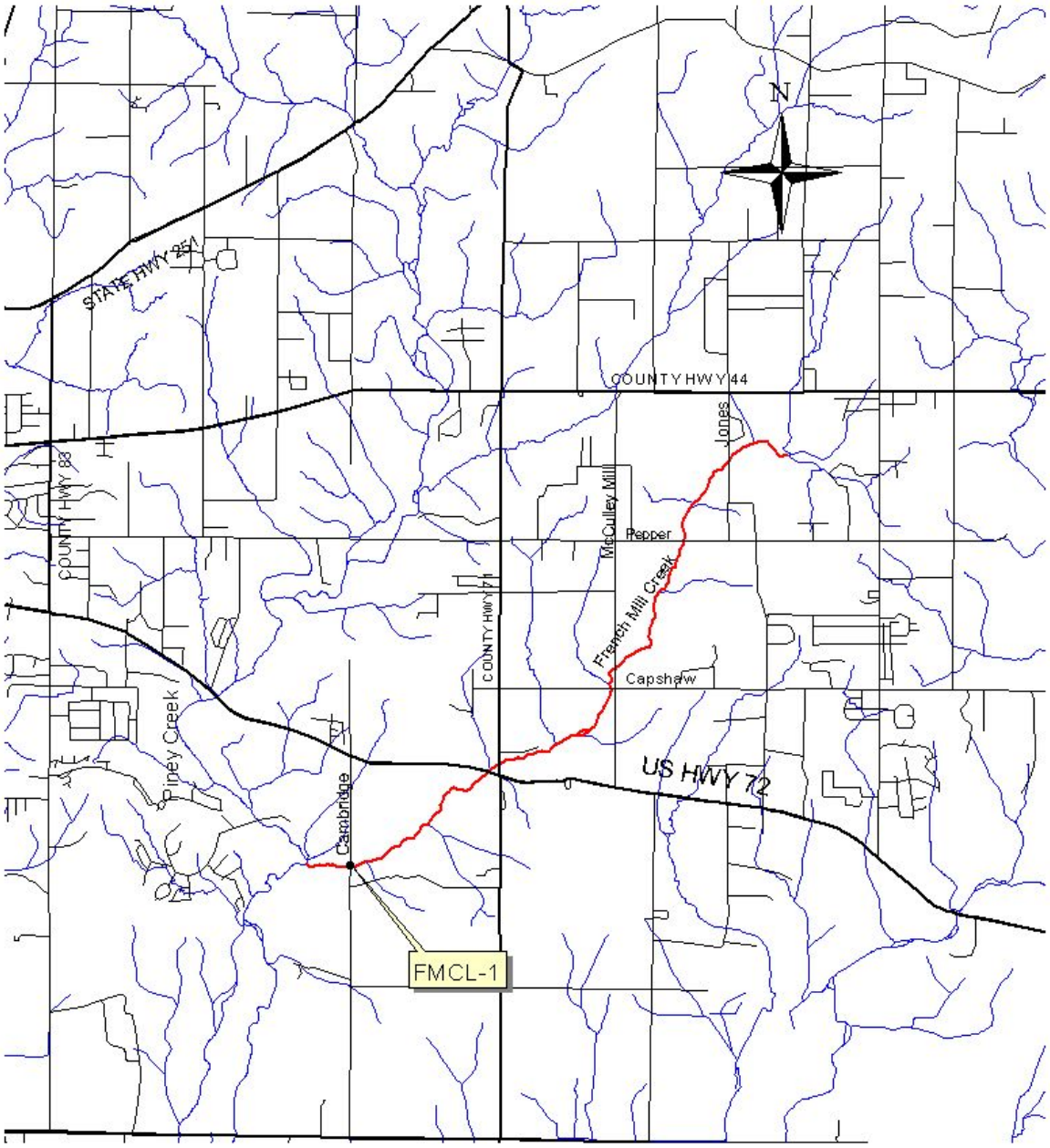


Figure 3.2 Sampling Locations of French Mill Creek



3.7 Margin of Safety (MOS)

There are two methods for incorporating a MOS in the analysis: 1) implicitly incorporate the MOS using conservative modeling assumptions to develop allocations, or 2) by explicitly specifying a portion of the TMDL as the MOS.

An explicit MOS was incorporated in this TMDL. The explicit MOS includes the uncertainty of the fecal coliform data used in this analysis and the uncertainty of selecting an appropriate critical condition from the existing fecal coliform loads. A margin of safety was applied to the TMDL by reducing the target criterion concentration by ten percent. For this TMDL, the summer geometric mean criterion of 200 colonies/100ml was reduced by ten percent to achieve the target concentrations of 180 colonies/100ml, which yields a MOS equal to 20 colonies/100ml.

4.0 TMDL Development

4.1 Definition of a TMDL

A total maximum daily load (TMDL) is the sum of individual wasteload allocations for point sources (WLAs), load allocations (LAs) for nonpoint sources including natural background levels, and a margin of safety (MOS). The margin of safety can be included either explicitly or implicitly and accounts for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. As discussed earlier, the MOS is explicit in this TMDL. A TMDL can be denoted by the equation:

$$TMDL = \Sigma WLAs + \Sigma LAs + MOS$$

The TMDL is the total amount of pollutant that can be assimilated by the receiving waterbody while achieving water quality standards under critical conditions.

For some pollutants, TMDLs are expressed on a mass loading basis (e.g. pounds per day). However, for pathogens, TMDL loads are typically expressed in terms of organism counts per day (colonies/day), in accordance with 40 CFR 130.2(i).

4.2 Load Calculations

A mass balance approach was used to calculate the pathogen TMDL for French Mill Creek. The mass balance approach utilizes the conservation of mass principle. Total mass loads can be calculated by multiplying the fecal coliform concentration times the stream flow.

Two fecal coliform loading scenarios were calculated in this analysis to determine the TMDL. The first scenario was an estimate of the current pathogen loading to the watershed during a violation event. It was done by multiplying the geometric mean sample exceedance concentration of 280 colonies/100 mL times the average flow for all five of the fecal coliform measurements. This concentration was measured at FMCL-1

June 5, 10, 12, 17, and 23, 2003 and can be found in Appendix B. The average of the measured flows for these five events was 7.9 cfs. The product of these two values and a conversion factor gives the current loading to French Mill Creek under exceedance conditions.

The second scenario represents the allowable fecal coliform load to the watershed under the same physical conditions as the first scenario. This is done by taking the product of the same flow times the conversion factor times the allowable geometric mean fecal concentration of 180 colonies/100 mL. The difference between these two loading scenarios, converted to a percent reduction, represents the loading reduction necessary to achieve the fecal coliform water quality criterion under those specific conditions. Calculations for these two loads can be found in Table 4.1.

Table 4.1

Load calculation compared to the geomean criterion of "200 col/100 ml" for French Mill Creek

Average Flow measured at FMCL-1 for Geomean Samples:	7.9 cfs	
Geometric Mean Fecal coliform concentration measured:	280 col/100 mL	
Allowable fecal coliform maximum concentration minus MOS:	180 col/100mL	=200 - 10%
Margin of saftey for the maximum criteria	20 col/100mL	=10% of criteria

Load Calculations:

Load = Fecal Coliform * measured flow * Conversion Factor

Load in col of Fecal Coliform/day

Fecal Coliform in col/100 mL

Measured Flow in cfs

Conversion Factor = 24468984 (ml-s/ft3-day)

Current Load:			conversion		flow		concentration
The current total load =	5.41E+10	col/day	Total Load = 24468984	*	7.9	*	280
Point source	0.00E+00	col/day	there are no point sources in this watershed				

Allowable Load:			conversion		flow		concentration
Allowable total load =	3.48E+10	col/day	Total Load = 24468984	*	7.9	*	180
Point source	0.00E+00	col/day	There are no point sources in this watershed				

Margin of Saftey			conversion		flow		concentration
MOS load =	3.87E+09	col/day	Total Load = 24468984	*	7.9	*	20

Source	Current Load (col/day)	Allowable Load (col/day)	Required Reduction (col/day)	Reduction %	Final Load (col/day)
NPS load	5.41E+10	3.48E+10	1.93E+10	36%	3.48E+10
Point Source	0.00E+00	0.00E+00	0.00E+00	0%	0.00E+00

TMDL = WLA + LA + MOS

TMDL	WLA	LA	MOS
3.87E+10	0.00E+00	3.48E+10	3.87E+09

Percent Reduction to Achieve the Fecal Coliform Standard:

Total reduction: 36% = (current load - allowable load) / current load

The following assumptions are made for calculating the allowable load.

The water quality criterion for fecal coliform for summer geomeans is 200 col/100 mL.

To account for an explicit Margin of Safety (MOS) a target concentration of 180 col/100 ml was used to calculate the allowable load compared to the maximum criterion which = 200- 10% of 200

4.3 TMDL Implementation

French Mill Creek is impaired for fecal coliform solely by nonpoint sources. For 303(d) listed waters impaired solely or primarily by nonpoint source (NPS) pollutants, necessary reductions will be sought during TMDL implementation using a phased approach. Voluntary, incentive-based mechanisms will be used to implement NPS management measures in order to assure that measurable reductions in pollutant loadings can be achieved for the targeted impaired water. Cooperation and active participation by the general public and various industry, business, and environmental groups is critical to successful implementation of TMDLs. Local citizen-led and implemented management measures offer the most efficient and comprehensive avenue for reduction of loading rates from nonpoint sources. Therefore, TMDL implementation activities will be coordinated through interaction with local entities in conjunction with Alabama's Clean Water Partnership efforts.

The primary TMDL implementation mechanism used will employ concurrent education and outreach, training, technology transfer, and technical assistance with incentive-based pollutant management measures. The ADEM Office of Education and Outreach (OEO) will assist in the implementation of TMDLs in cooperation with public and private stakeholders. Planning and oversight will be provided by or coordinated with the Alabama Department of Environmental Management's (ADEM) Section 319 Nonpoint Source Grant Program in conjunction with other local, state, and federal resource management and protection programs and authorities. The CWA Section 319 Grant Program may provide limited funding to specifically ascertain NPS pollution sources and causes, identify and coordinate management programs and resources, present education and outreach opportunities, promote pollution prevention, and implement needed management measures to restore impaired waters.

Depending on the pollutant of concern, resources for corrective actions may be provided, as applicable, by the Alabama Cooperative Extension System (education and outreach); the USDA-Natural Resources Conservation Service (NRCS) (technical assistance) and Farm Services Agency (FSA) (federal cost-share funding); and the Alabama Soil and Water Conservation Committee (state agricultural cost share funding and management measure implementation assistance) through local Soil and Water Conservation Districts, or Resource Conservation and Development Councils (funding, project implementation, and coordination). Additional assistance from such agencies as the Alabama Department of Public Health (septic systems), the Alabama Department of Agriculture and Industries (pesticides), the Alabama Department of Industrial Relations, the Department of the Interior - Office of Surface Mining (abandoned minelands), Natural Heritage Program and the U.S. Fish and Wildlife Service (threatened and endangered species) may also provide practical TMDL implementation delivery systems, programs, and information. Landuse and urban sprawl issues will be addressed through the Nonpoint Source for Municipal Officials (NEMO) education and outreach program. Memorandums of Agreements (MOAs) may be used as a tool to formally define roles and responsibilities.

Additional public/private assistance is available through the Alabama Clean Water Partnership Program (CWP). The CWP program uses a local citizen-based environmental

protection approach to coordinate efforts to restore and protect the state's resources in accordance with the goals of the Clean Water Act. Interaction with the state or river basin specific CWP will facilitate TMDL implementation by providing improved and timely communication and information exchange between community-based groups, units of government, industry, special interest groups, and individuals. The CWP can assist local entities to plan, develop, and coordinate restoration strategies that holistically meet multiple needs, eliminate duplication of efforts, and allow for effective and efficient use of available resources to restore the impaired waterbody or watershed.

Other mechanisms that are available and may be used during implementation of this TMDL include local regulations or ordinances related to zoning, land use, or storm water runoff controls. Local governments can provide funding assistance through general revenues, bond issuance, special taxes, utility fees, and impact fees. If applicable, reductions from point sources will be addressed by the NPDES permit program. The Alabama Water Pollution Control Act empowers ADEM to monitor water quality, issue permits, conduct inspections, and pursue enforcement of discharge activities and conditions that threaten water quality. In addition to traditional "end-of-pipe" discharges, the ADEM NPDES permit program addresses animal feeding operations and land application of animal wastes. For certain water quality improvement projects, the State Clean Water Revolving Fund (SRF) can provide low interest loans to local governments.

Long-term physical, chemical, and biological improvements in water quality will be used to measure TMDL implementation success. As may be indicated by further evaluation of stream water quality, the effectiveness of implemented management may necessitate revisions of this TMDL. The ADEM will continue to monitor water quality according to the rotational river basin monitoring schedule as allowed by resources. In addition, assessments may include local citizen-volunteer monitoring through the Alabama Water Watch Program and/or data collected by agencies, universities, or other entities using standardized monitoring and assessment methodologies. Core management measures will include but not be limited to water quality improvements and designated use support, preserving and enhancing public health, enhancing ecosystems, pollution prevention and load reductions, implementation of NPS controls, and public awareness and attitude/behavior changes.

5.0 Follow Up Monitoring

ADEM has adopted a basin approach to water quality management; an approach that divides Alabama's fourteen major river basins into five groups. Each year, the ADEM water quality resources are concentrated in one of the basin groups. One goal is to continue to monitor §303(d) listed waters. Monitoring will help further characterize water quality conditions resulting from the implementation of best management practices in the watershed. This monitoring will occur in each basin according to the schedule shown in Table 5.1 on page 18.

Table 5.1 Major River Basin Monitoring Schedule

River Basin Group	Schedule
Escatawpa / Upper Tombigbee / Lower Tombigbee / Mobile	2006
Cahaba / Black Warrior	2007
Tennessee	2008
Choctawhatchee / Chipola / Perdido-Escambia / Chattahoochee	2009
Tallapoosa / Alabama / Coosa	2010

6.0 Public Participation

As part of the public participation process, this TMDL was placed on public notice and made available for review and comment. The public notice was prepared and published in the four 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 TMDL was made available on ADEM's Website: www.adem.state.al.us. The public can also request paper or electronic copies of the TMDL by contacting Mr. Chris Johnson at 334-271-7827 or clj@adem.state.al.us. The public was given an opportunity to review the TMDL 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 became part of the administrative record. ADEM considered all comments received by the public prior to finalization of this TMDL and subsequent submission to EPA Region 4 for final review and approval.

Appendix A

References

USEPA. 2001. *Protocol for Developing Pathogen TMDLs*. EPA 841-R-00-001. U.S. Environmental Protection Agency, Office of Water, Washington DC.

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

Alabama Department of Environmental Management's 303(d) Monitoring Program. 2003.

ADEM Administrative Code, 2004. Water Quality Program, Chapter 335-6-10, Water Quality Criteria, and Chapter 335-6-11 Use Classifications for Interstate and Intrastate Waters.

Tennessee Valley Authority Data 1997, TVA

Appendix B

Fecal Coliform and Flow Data 1997 TVA

Stream Name	TVA Station Number	Date	Fecal Coliform (#/100mL)
FRENCH MILL CREEK 0.3	412401	6/10/1997	230
FRENCH MILL CREEK 0.3	412401	7/9/1997	150
FRENCH MILL CREEK 0.3	412401	7/9/1997	INT
FRENCH MILL CREEK 0.3	412401	8/13/1997	INT
FRENCH MILL CREEK 0.3	412401	8/13/1997	INT
FRENCH MILL CREEK 0.3	412401	9/10/1997	3360
FRENCH MILL CREEK 0.3	412401	10/15/1997	
FRENCH MILL CREEK 0.3	**Maximum**		**3360**
	Minimum		**150**
	Mean		**1247**

Fecal Coliform and Flow Data 2003 303 (d) Monitoring Program

Station ID	Date	Fecal Coliform (col/100ml)
FMCL-1	6/5/2003	148
FMCL-1	6/10/2003	252
FMCL-1	6/12/2003	580
FMCL-1	6/17/2003	188
FMCL-1	6/23/2003	420
FMCL-1	8/14/2003	196
FMCL-1	8/18/2003	196
FMCL-1	8/20/2003	160
FMCL-1	8/25/2003	196
FMCL-1	8/26/2003	140

Summer Season Geometric Mean Data Sets

Station I.D.	Date	Time	Fecal Coliform (col/100 ml)		Stream Flow (cfs)
FMCL-1	6/5/2003	1230	148		5.8
FMCL-1	6/10/2003	1240	252		3.4
FMCL-1	6/12/2003	1100	580		17.3
FMCL-1	6/17/2003	1315	188		
FMCL-1	6/23/2003	1135	420		5.1
		Fecal Geomean	**280**	**average flow**	**7.9**

Station I.D.	Date	Time	Fecal Coliform (col/100 ml)		Stream Flow (cfs)
FMCL-1	8/14/2003	1145	196		5.2
FMCL-1	8/18/2003	1225	196		0.0
FMCL-1	8/20/2003	1000	160		5.4
FMCL-1	8/25/2003	1130	196		2.9
FMCL-1	8/26/2003	1130	140		4.0
		Fecal Geomean	**176**	**average flow**	**3.5**