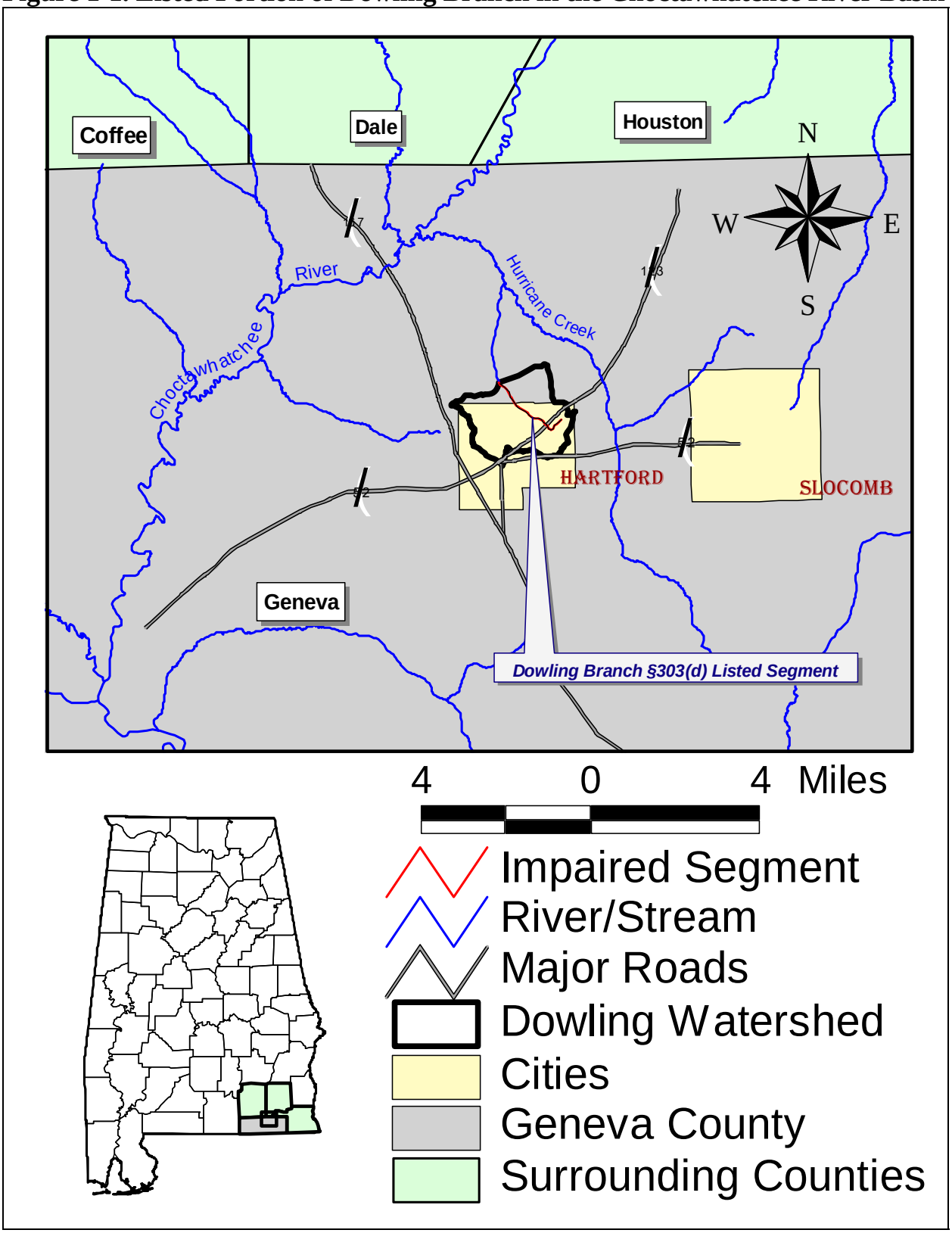
FINAL

Total Maximum Daily Load (TMDL)
for
Dowling Branch
Assessment Unit ID # AL03140201-0704-600
Pathogens (fecal coliform)

Alabama Department of Environmental Management
Water Quality Branch
Water Division
September 2008

Figure 1-1. Listed Portion of Dowling Branch in the Choctawhatchee River Basin



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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 uses and to determine the Total Maximum Daily Load (TMDL) for pollutants causing the use impairment. A 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).

Dowling Branch is on the §303(d) list for pathogens (fecal coliform) and Organic Enrichment / Dissolved Oxygen (OE/DO) from Cox Mill Creek to its source. Dowling Branch is in the Choctawhatchee River Basin and forms in north central Geneva county, within the city limits of Hartford. Dowling Branch is a first order stream that joins with Ham Branch to form Cox Mill Creek. The total length of Dowling Branch is 2.1 miles. The full reach of the stream is on the §303(d) list. The total drainage area of Dowling Branch is 3.9 square miles. Dowling Branch has a use classification of Fish & Wildlife (F&W).

Data collected in 1991 by the Geological Survey of Alabama (GSA) indicated that Dowling Branch was impaired for pathogens (fecal coliform) and dissolved oxygen (DO). Dowling Branch was placed on the Alabama §303(d) list in 1999 for these impairments. This TMDL will only address the pathogen impairment. GSA collected this data from June through October during 1991 for the Alabama Clean Water Strategy, Water Quality Assessment Report, published by ADEM in December of 1992. A sample was taken for each month of the study, totaling five samples. The data can be found in Appendix B, Table 7-1.

In 2004 and 2006, a §303(d) sampling study was performed by ADEM on Dowling Branch for additional water quality assessment. ADEM collected 14 samples from Dowling Branch in 2004 and 12 samples in 2006, 8 of which yielded fecal coliform counts. According to the data collected in 2004, Dowling Branch was not meeting the pathogen criterion applicable to its use classification of Fish and Wildlife. Therefore, a TMDL will be developed for pathogens on the listed reach.

A mass balance approach was used for calculating the pathogen TMDL for Dowling Branch. The mass balance approach utilizes the conservation of mass principle. Loads are calculated by multiplying the fecal coliform concentrations times respective instream flows. The current (impaired) pathogen loading to Dowling Branch was calculated using a single sample exceedance concentration times the measured flow times the conversion factor. The single sample criterion was utilized since it yielded a greater reduction than the geomean criterion. The target loading, defined as the single sample criterion including margin of safety, was calculated using the same flow value times the fecal coliform single sample target of 1800 col/100 mL (2000 col/100 mL – 10% Margin of Safety) times the conversion factor. Reductions to meet the target loading were then calculated by subtracting the target loading from the current loading.

Table 1.1 is a summary of estimated current loads and target loads required to meet the applicable single sample pathogen criterion for Dowling Branch. Table 1.2 lists the TMDL (maximum allowable) pathogen loadings under critical conditions for Dowling Branch. Critical conditions will be represented by the flow on the day of the highest exceedance value.

Table 1-1. Current vs Target Fecal Coliform Loads and Required Reductions

Source	Current Load (col/day)	Target Load (col/day)	Required Reduction (col/day)	Reduction %
NPS load	3.82E+12	1.07E+12	2.75E+12	72%
Point Source	0.00E+00	0.00E+00	0.00E+00	0%

Table 1-2. Fecal Coliform TMDL for Dowling Branch

TMDL = WLA + LA + MOS			
TMDL	**WLA**	**LA**	**MOS**
(col/day)	(col/day)	(col/day)	(col/day)
1.19E+12	0.00E+00	1.07E+12	1.19E+11

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).

The §303(d) listing of Dowling Branch for pathogen impairment was originally reported on Alabama's 1998 List of Impaired Waters based on a 1991 study.

2.2 Problem Definition

Waterbody Impaired:	Dowling Branch from Cox Mill Creek to its source
Impaired Reach Length:	2.1 miles
Impaired Drainage Area:	3.9 square miles
Water Quality Standard Violation:	Fecal Coliform (Pathogens)
Water Use Classification:	Fish and Wildlife

Usage related to classification:
The impaired stream segment is classified as Fish and Wildlife. Usage of waters in this classification is described in ADEM Admin. Code R. 335-6-10-.09(5)(a), (b), (c), and (d).

(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:

7. Bacteria:

(i) In non-coastal waters, bacteria of the fecal coliform group shall not exceed a geometric mean of 1,000 col/100 mL; nor exceed a maximum of 2,000 col/100 mL in any sample. In coastal waters, bacteria of the enterococci group shall not exceed a maximum of 275 col/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.

(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 col/100 mL in non-coastal waters. In coastal waters, bacteria of the enterococci group shall not exceed a geometric mean of 35 col/100 mL nor exceed a maximum of 158 col/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 bacterial coliform 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:

Water quality data collected by GSA in 1991 was used for listing Dowling Branch on Alabama's 1998 §303(d) list. The criterion exceeded in 1991 was the incidental water contact and recreational swimming geometric mean for fecal coliform bacteria from June through September of 200 col/100 ml. The resulting geometric mean concentration of 204 col/100 ml was used as the basis for listing Dowling Branch on the 1998 §303(d) List.

The ADEM §303(d) monitoring program collected data in 2004 which resulted in exceedances both for the single sample maximum criterion of 2000 col/100 ml and the incidental water contact and recreational swimming geometric mean criterion from June through September of 200 col/100 ml. The single sample maximum exceedance was 6,400 col/100 ml and the geometric mean exceedance in July was 245 col/100 ml. The data collected in 2006 by ADEM did not report any exceedances for fecal coliform. This data can be viewed in Appendix B, Table 7.2.

3.0 Technical Basis for TMDL Development

3.1 Water Quality Target Identification

The loadings and reductions were calculated for both of the exceedances reported in 2004. The single sample exceedance and criterion will be used for the purpose of this TMDL as it yielded a greater reduction and will be more protective of the use of F&W. The single sample fecal coliform target of 1800 col/100 mL will be used. This target was derived by using the single sample criterion of 2000 col/100 mL and a 10% (200 col/100 ml) explicit margin of safety. This target is considered protective of water quality standards and should not allow the geometric mean of 200 col/100 mL (June – September), the geometric mean of 1000 col/ 100 ml (October – May), or the single sample maximum of 2000 col/100 mL to be exceeded.

3.2 Source Assessment

Point Sources in the Dowling Branch Watershed

There are no point sources in the Dowling Branch watershed which would cause or contribute to the fecal coliform loading. Therefore, the WLA portion of the TMDL will be zero. The city of Hartford has a lagoon wastewater treatment system directly adjacent to Dowling Branch. The discharge from this lagoon was moved from Dowling Branch to Hurricane Creek in 1989. However, due to the close proximity of the lagoon, there is a possibility that fecal coliform loads from the lagoon could be entering into Dowling Branch. Any newly permitted discharges to this stream must meet an average monthly discharge limit of 200 col/100 mL and a daily maximum limit of 2000 col/100 mL for fecal coliform.

Nonpoint Sources in the Dowling Branch Watershed

Due to the absence of point sources, nonpoint sources are believed to be the primary source of fecal coliform bacteria in the Dowling Branch watershed. Land use in this watershed is highly agricultural, consisting of 58.08% agriculture (pasture/hay and row crops). The following are examples of how different land uses can contribute to fecal coliform bacterial loading:

- Agricultural land can be a source of fecal coliform bacteria due to runoff from pastures, animal operations, improper land application of animal wastes, and animals with access to streams. These mechanisms can significantly contribute to the loading of fecal coliform bacteria.

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

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

3.3 Land Use Assessment

Land uses for the Dowling Branch watershed were determined using ArcView with land use datasets derived from the 2001 National Land Cover Dataset (NLCD). Figure 3-1 displays land use areas, Figure 3-2 displays aerial photography, and Table 3-1 displays land use categories and grouped land uses.

The Dowling Branch watershed is clearly dominated by agricultural land use categories. Approximately 58% of the land use is agricultural. The agriculture category is predominately row crop. If not managed properly, agriculture can have significant nonpoint source impact.

Figure 3-1. Land Use Map for the Dowling Branch Watershed

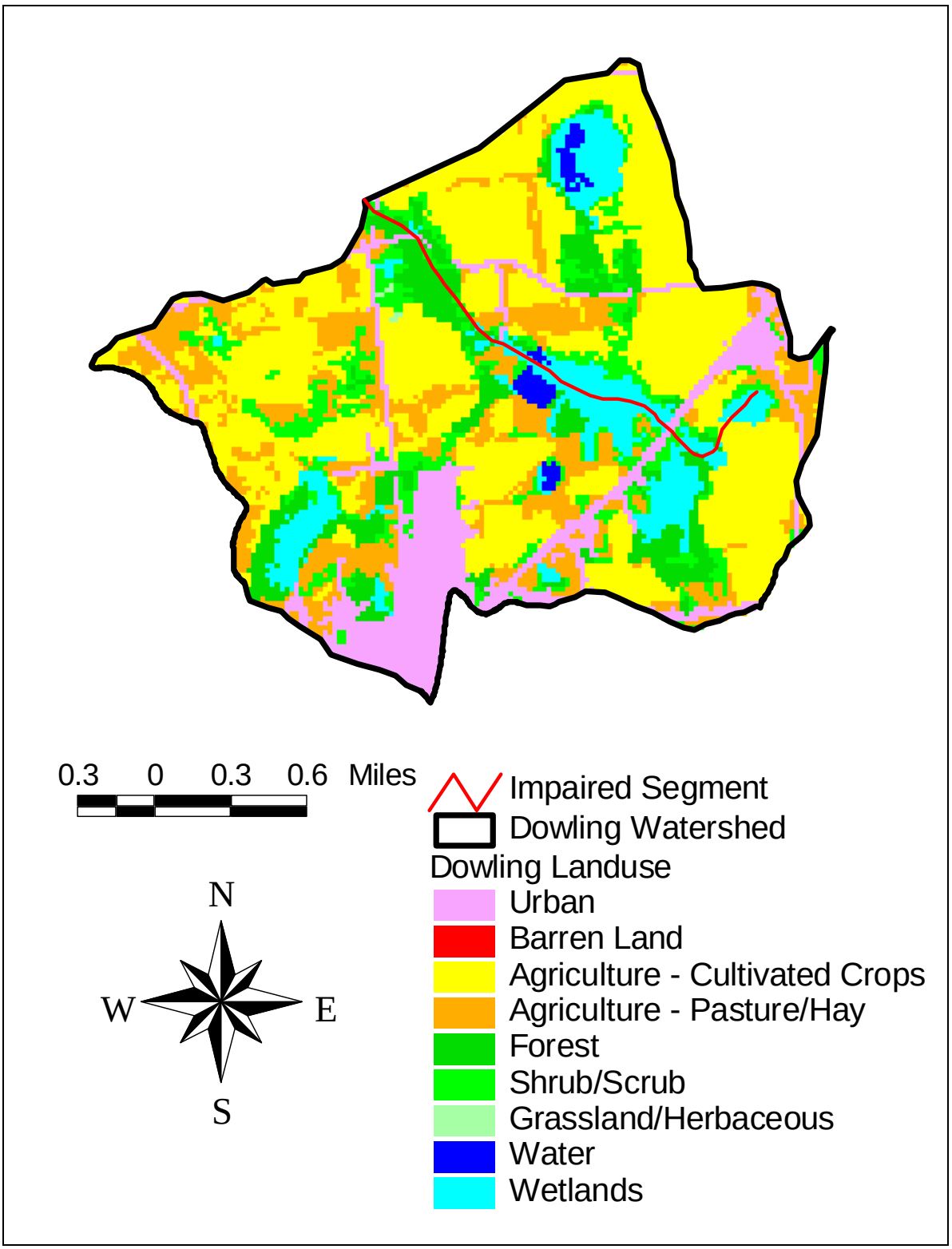
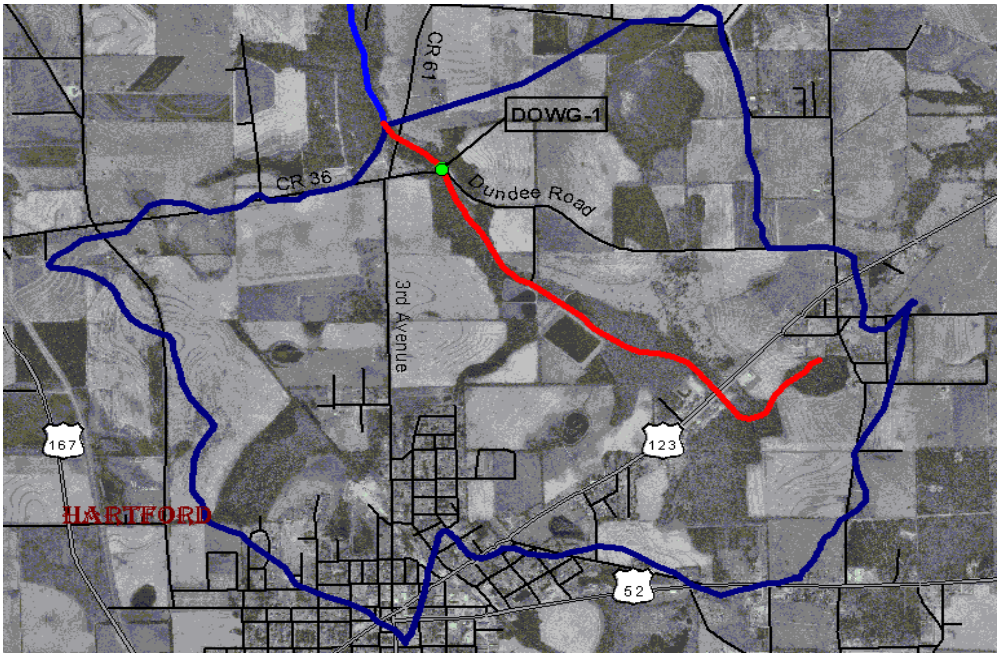


Table 3-1. Land Use Areas for the Dowling Branch Watershed

Land Use	Acres	Sq. Miles	Percentages
Open Water	269	0.0	1.09
Developed, Open Space	1,868	0.3	7.57
Developed, Low Intensity	1,221	0.2	4.94
Developed, Medium Intensity	142	0.0	0.58
Developed, High Intensity	58	0.0	0.23
Deciduous Forest	634	0.1	2.57
Evergreen Forest	1,494	0.2	6.05
Mixed Forest	102	0.0	0.41
Shrub/Scrub	2,328	0.4	9.43
Grassland/Herbaceous	20	0.0	0.08
Pasture/Hay	4,194	0.7	16.99
Cultivated Crops	10,163	1.6	41.16
Woody Wetlands	2,197	0.3	8.90
Emergent Herbaceous Wetlands	27	0.0	0.11
Total	**24,719**	**3.9**	**100.00**

Grouped Landuses	Acres	Sq. Miles	Percentages
Agriculture	14,357	2.2	58.08
Forest	4,428	0.7	17.91
Developed	3,289	0.5	13.31
Other	2,644	0.4	10.70
Total	**24,719**	**3.9**	**100.00**

Figure 3-2. 1997 Aerial Photograph of the Dowling Branch Watershed



3.4 Linkage Between Numeric Targets and Sources

Pollutant loadings from forested areas tend to be low due to their filtering capabilities and will be considered as background conditions. The most likely sources of pathogen loadings in Dowling Branch are from the agricultural land uses, failing septic systems, and/or improper operation/maintenance of the Hartford lagoon. Individual loads and reductions will not be calculated for the wide range of nonpoint sources such as forest, agriculture, and septic systems. Rather, the loadings and reductions will be calculated as a single total nonpoint source load and reduction.

3.5 Data Availability and Analysis

GSA collected monthly water quality data for Dowling Branch at CR 36 during June through October in 1991. A geometric mean of 204 col/100 ml was measured and resulted in Dowling Branch being placed on the 1998 §303(d) list. This data can be viewed in Appendix B, Table 7.1.

ADEM collected water quality data on Dowling Branch in 2004 and 2006 as part of ADEM's §303(d) Monitoring Program at Station DOWG-1 at CR 36 (Dundee Road). Figure 3-3 and Table 3-2 displays the location and description for the GSA and ADEM station. During the 2004 study, 14 samples were collected and in 2006, 8 samples were collected, 8 of which yielded fecal coliform counts. Of the fecal coliform samples collected in 2004, there was one sample that exceeded the single sample maximum criterion of 2000 col/100 mL. The flow data to calculate the TMDL for the single sample exceedance was measured on 10/20/2004 and resulted in a value of 24.4 cfs. The flow data was not measured in July when the geometric mean samples were taken, therefore, a ratio calculation with Cox Mill Creek flow data was performed. The ratio calculation and flow data for the geometric mean exceedance was not included in this document because it was not included in the TMDL calculation.

Figure 3-3. Map of ADEM and GSA Sampling Station on Dowling Branch

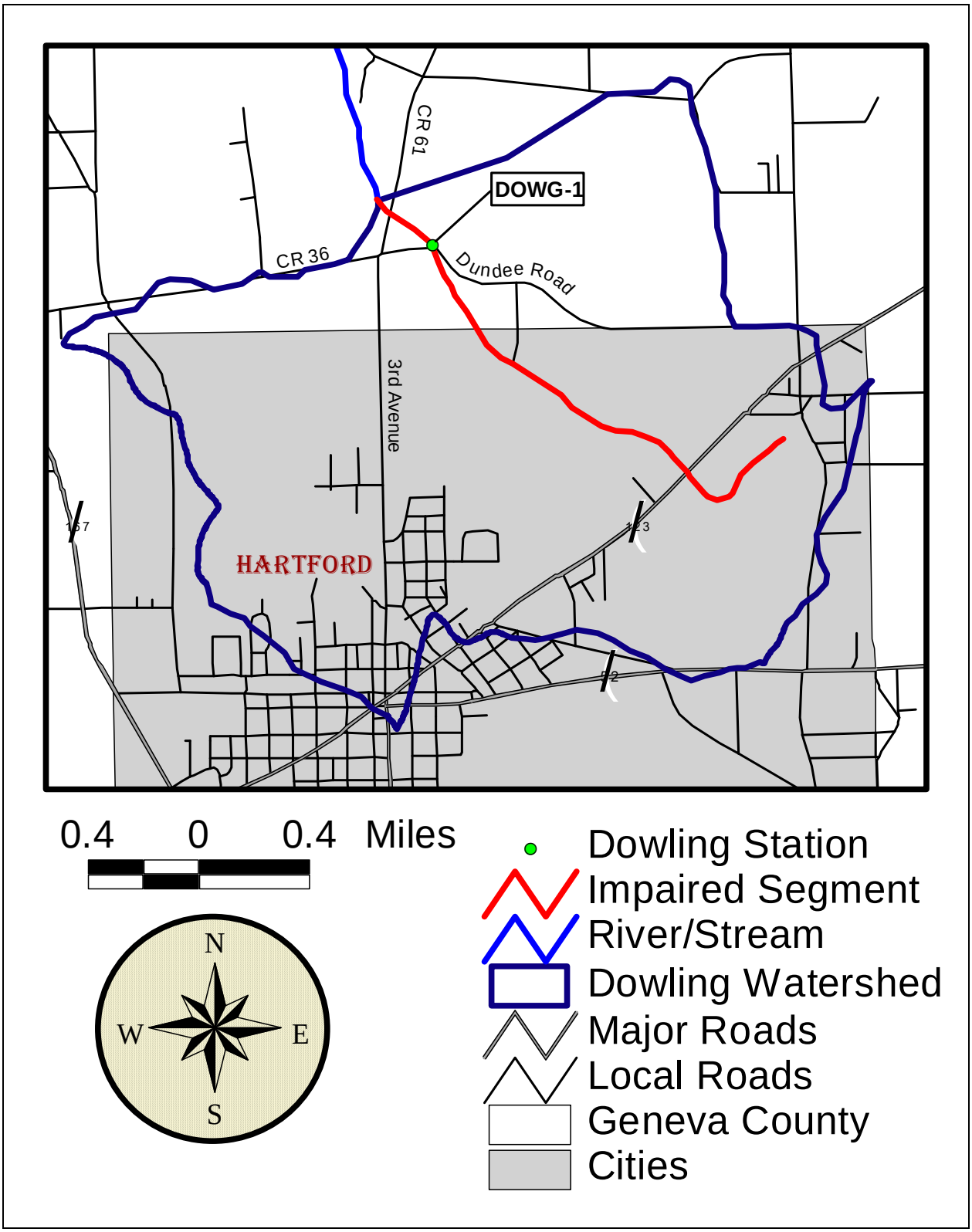


Table 3-2. Dowling Branch Sampling Station Description

Years	Station ID	Data Source	Station Location	Latitude	Longitude
1991 2004, 2006	GSA Station DOWG-1	GSA ADEM	Dowling Branch at Geneva CR 36 (Dundee Rd)	31.12683	-85.6937

3.6 Critical Conditions

Summer months are generally considered critical conditions. This can be explained by the nature of rainfall and storm events in the summer. In summer, 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 for the build-up of fecal coliform bacteria on the land surface, resulting in a more uniform loading rate.

The data collected by ADEM in 2004 in the Dowling Branch watershed follows this trend. The single sample exceedance value of 6,400 col/ 100ml appears to be the result of an extreme rain event in late summer and early fall (October). The majority of the fecal coliform data follow a uniform loading pattern.

3.7 Margin of Safety

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

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 criterion concentration by ten percent to achieve a target concentration of 1800 col/100 mL.

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 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 (col/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 Dowling Branch. 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 times a unit conversion factor.

Three loads were calculated in this analysis to determine the current conditions, the target conditions, and the TMDL. The first calculation represents the current load to the watershed. This was calculated by multiplying the single sample exceedance concentration of 6,400 col/100 mL times the measured flow of 24.4 cfs times the unit conversion factor. This exceedance value was chosen because it yielded the greatest reduction and is therefore the most protective of the streams use classification. The most conservative reduction of 72% resulted from the single sample exceedance. The geometric mean exceedance value resulted in a reduction of 26.5%, therefore the higher of the two values will be used for this TMDL.

The second calculation represents the target loading to the watershed. This was calculated by multiplying the same flow of 24.4 cfs times the target single sample concentration of 1800 col/100 mL times a unit conversion factor. The difference between the current load and the target load, converted to a percent reduction, represents the loading reduction necessary to achieve the fecal coliform water quality target under those specific flow conditions. Calculations for these two loads can be found in Table 4.1.

The third calculation is the TMDL under critical conditions. The TMDL is the total amount of pollutant that can be assimilated by the receiving waterbody while achieving water quality standards under critical conditions. Critical conditions will be represented by the flow on the day of the highest exceedance value. This load was calculated by multiplying the critical condition flow of 24.4 cfs times the maximum allowable fecal concentration of 2000 col/ 100 mL times the conversion factor. This value represents the maximum fecal load that can be discharged to the stream without causing a violation of the single sample F&W criterion of 2000 col/ 100 mL. Calculations for the TMDL load are also in Table 4.1.

Table 4-1. Current, Target, and TMDL Loadings for Dowling Branch

Load Reduction and TMDL Calculations for Dowling Branch

Flow measured at DOWG-1 for single sample:	24.4	cfs	
Single sample Fecal coliform concentration measured:	6400	col/100 mL	
Allowable fecal coliform single sample concentration minus MOS:	1800	col/100mL	= 2000 - 10%
Margin of safety for the single sample criterion	200	col/100mL	= 10% of criterion

Load Calculations:

Load = Fecal Coliform Conc * Measured Flow * Conversion Factor
Load = Colonies of Fecal Coliform/day — Measured Flow = cfs
Fecal Coliform Conc = col/100 mL — Conversion Factor = 24465755 (ml-s/ft3-day)

Current Load:

Nonpoint source load (LA)	3.82E+12	col/day	
Point source load (WLA)	0.00E+00	col/day	There are no point sources in this watershed
Current load =	3.82E+12	col/day	

Target Load:

Nonpoint source load (LA)	1.07E+12	col/day	
Point source load (WLA)	0.00E+00	col/day	There are no point sources in this watershed
Target load =	1.07E+12	col/day	

Margin of Safety:

MOS load =	1.19E+11	col/day

Source	Current Load (col/day)	Target Load (col/day)	Required Reduction (col/day)	Reduction %	Final Load (col/day)
LA	3.82E+12	1.07E+12	2.75E+12	72%	1.07E+12
WLA	0.00E+00	0.00E+00	0.00E+00	0%	0.00E+00
Total	3.82E+12	1.07E+12	2.75E+12	72%	1.07E+12

Total Maximum Daily Load (TMDL): TMDL = WLA + LA + MOS

TMDL (Allowable Load)	WLA	LA	MOS
1.19E+12	0.00E+00	1.07E+12	1.19E+11

Percent Reduction to Achieve the Fecal Coliform Criterion:

Total reduction: 72% = (current load - target load) / current load

The following assumptions are made for calculating the target load.
The water quality criterion for fecal coliform for a single sample is 2000 col/100 ml.
To account for an explicit Margin of Safety (MOS) a target concentration of 1800 col/100 ml was used to calculate the target load compared to the single season criterion which is 2000 col/ 100 ml.

4.3 TMDL Summary

The pathogen impairment in Dowling Branch was documented from the 1991 GSA study and the subsequent §303(d) monitoring performed in 2004 by ADEM. Therefore, a TMDL was developed which specified a 72% reduction to non point sources, targeted primarily to the agricultural uses in the watershed.

With regards to TMDL implementation, the Water Quality Branch of ADEM recommends the Hartford lagoon be inspected to determine the structural integrity of the lagoon and to determine if there is any seepage from the treatment facility that may be causing our contributing to the pathogen impairment of Dowling Branch.

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 five 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 the schedule shown in Table 5-1.

Table 5-1. §303(d) Follow Up Monitoring Schedule

River Basin Group	Year to be Monitored
Chattahoochee / Chipola / Choctawhatchee / Perdido-Escambia	2008
Tennessee	2009
Alabama / Coosa / Tallapoosa	2010
Escatawpa / Mobile / Lower Tombigbee / Upper Tombigbee	2011
Black Warrior / Cahaba	2012

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 cljohnson@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

ADEM Administrative Code, 2007. Water Division - Water Quality Program, Chapter 335-6-10, Water Quality Criterion.

ADEM Administrative Code, 2007. Water Division - Water Quality Program, Chapter 335-6-11, Use Classifications for Interstate and Intrastate Waters.

Alabama's §303(d) Monitoring Program. 2003. ADEM.

Alabama Department of Environmental Management (ADEM), Alabama's Water Quality Assessment and Listing Methodology, December 2005.

Alabama Department of Environmental Management, 1998 - 2008 §§303(d) List. ADEM.

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

Appendix B
Water Quality Data

Table 7-1. GSA Pathogen Data Collected on Dowling Branch

Station ID	Data	Time	Fecal Coliform (col/100ml)
@ CR 36	6/4/1991	10:20	55
@ CR 36	7/9/1991	7:40	240
@ CR 36	8/6/1991	7:50	470
@ CR 36	9/10/1991	7:45	280
@ CR 36	10/8/1991	8:15	670

Table 7-2. ADEM Pathogen Data Collected on Dowling Branch

Station ID	Date	Time (24 hr)	Flow (cfs)	Fecal Coliform (col/100ml)
DOWG-1	3/23/2004	1205	1.7	14
DOWG-1	4/14/2004	1015	visible but not detectable	8
DOWG-1	5/12/2004	925	not wadeable (too deep)	50
DOWG-1	6/3/2004	900	visible but not detectable	2000
DOWG-1	7/7/2004	810	visible but not detectable	950
DOWG-1	7/19/2004	1345	visible but not detectable	360
DOWG-1	7/22/2004	1310	not wadeable (too deep)	200
DOWG-1	7/29/2004	1247	visible but not detectable	130
DOWG-1	8/3/2004	1245	visible but not detectable	100
			Geomean:	**245**
DOWG-1	8/23/2004	1325	visible but not detectable	180
DOWG-1	8/31/2004	1115	visible but not detectable	93
DOWG-1	9/14/2004	915	visible but not detectable	73
DOWG-1	9/30/2004	1300	visible but not detectable	90
DOWG-1	10/20/2004	930	24.4	**6400**
DOWG-1	3/29/2006	1315	visible but not detectable	50
DOWG-1	4/5/2006	1320	1.4	200
DOWG-1	5/17/2006	1330	1.8	20
DOWG-1	6/8/2006	905	1.2	No result
DOWG-1	7/12/2006	1305	1.2	No result
DOWG-1	8/3/2006	925	visible but not detectable	No result
DOWG-1	8/15/2006	1320	visible but not detectable	370
DOWG-1	8/23/2006	1150	5	20
DOWG-1	9/6/2006	1130	0.8	77
DOWG-1	9/7/2006	1030	1.7	40
DOWG-1	9/11/2006	1235	meter malfunction	No result
DOWG-1	10/26/2006	900	visible but not detectable	67