



City of Chattanooga Stormwater Management

Total Maximum Daily Load

Siltation and Habitat Alteration Monitoring Plan

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PURPOSE

The purpose of this document is to comply with monitoring requirements associated with the Total Maximum Daily Load (TMDL) for siltation and habitat alteration in the Lower Tennessee River Watershed. Specific items addressed in this document include: sample location, sample frequency and sampling protocols.

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1. Introduction

In accordance with Section 303(d) of the Clean Water Act, each State is required to develop Total Maximum Daily Loads (TMDLs) for water bodies that are not meeting water quality standards. Table 1 lists impaired waterbodies, as identified by the Tennessee Department of Environment and Conservation, Division of Water Pollution Control (TDEC), within Hamilton County, Tennessee.

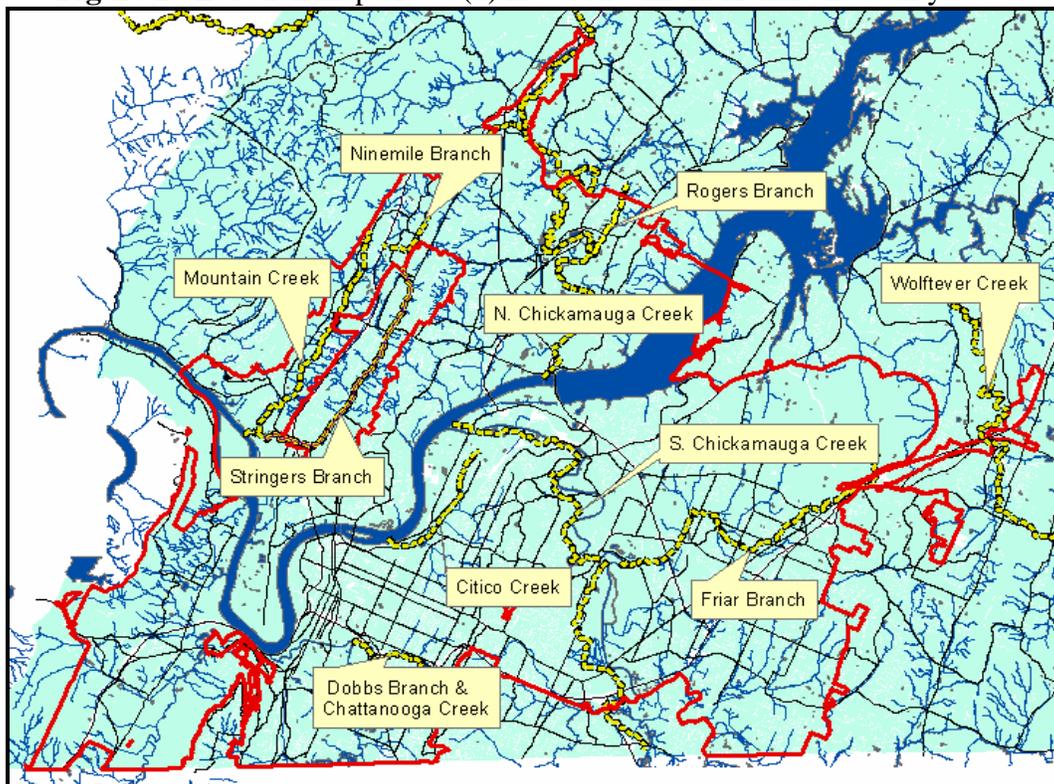
Table 1. List of Impaired Waterbodies in Hamilton County.

Waterbody ID	Waterbody	Miles Impaired	Cause/TMDL Priority
TN06020001001T-0200	North Market St Branch	2.5	Pathogens
TN06020001007-0100	Friar Branch	26.9	Siltation Organic Enrichment Low DO Stream Alterations Pathogens
TN06020001007-0200	Unnamed Trib to S. Chickamauga Creek	1.1	Organic Enrichment/Low DO Pathogens
TN06020001007-0510	Spring Creek	9.6	Pathogens
TN06020001007-1000	South Chickamauga Creek ^b	17.6	Phosphorous Habitat Alteration Pathogens Siltation
TN06020001029-0300	Lewis Branch	1.5	Habitat Alteration Pathogens
TN060200011240-0100	Unnamed Trib to Citico Creek	1.2	Phosphorus Thermal Modifications Pathogens Habitat Alteration
TN060200011240-1000	Citico Creek	6.1	Nutrients Low DO Pathogens Habitat Alteration
TN060200011244-0100	Dobbs Branch	5.3	Organic Enrichment Pathogens Habitat Alteration
TN060200011244-0200	Unnamed Trib to Chattanooga Creek	1.4	Pathogens Habitat Alteration

Waterbody ID	Waterbody	Miles Impaired	Cause/TMDL Priority
TN060200011244-0300	McFarland Springs Branch ^b	1.2	Pathogens
TN0600011244-0400	Gillespie Springs Branch	1.9	Pathogens Habitat Alteration
TN060200011244-100 & 2000	Chattanooga Creek ^b	8.4	PCBs, Dioxin Organic Enrichment/Low DO Pathogens Habitat Alterations Oil & Grease
TN06020001426-0100	Stringers Branch	5.8	Pathogens Habitat Alteration
TN06020001-067-0100	Unnamed Trib to N. Chickamauga Creek	4.3	Siltation Habitat Alteration
TN06020001-067-0210	Ninemile Branch	4.0	Low DO Habitat Alteration

^b Portions of the waterbody is in a different state.

Figure 1. Location map of 303(d) listed streams in Hamilton County.

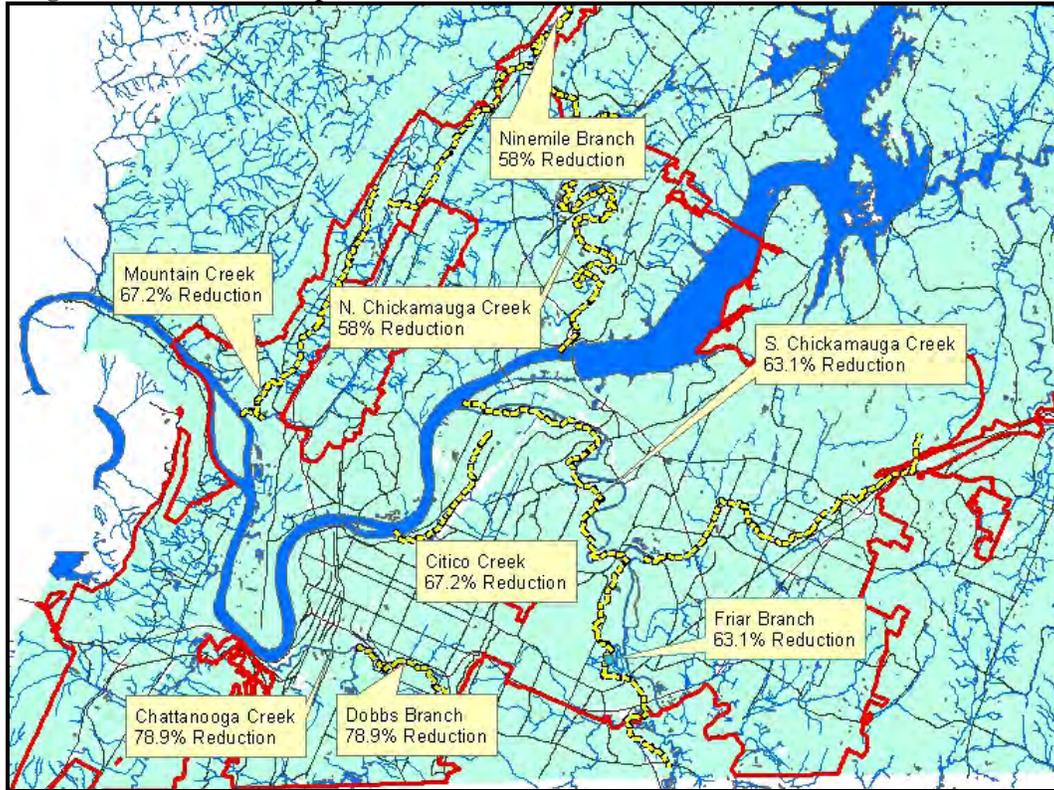


On September 25, 2006, the Environmental Protection Agency (EPA) Region 4 approved the TMDL for siltation and habitat alteration in the Lower Tennessee River Watershed (HUC 06020001). Within the regulatory boundaries of the City of Chattanooga (City), the following water bodies were assigned a TMDL (Table 2):

Table 2. List of siltation and habitat alteration TMDLs for Waterbodies within the City of Chattanooga.

HUC-12 Subwatershed (06020001_) or Drainage Area	Impaired Waterbody Name	Impaired Waterbody ID	TMDL MS4 %Reduction
0502 (DA)	Unnamed Trib of Citico Creek	TN060200011240-0100	67.2
0502 (DA)	Citico Creek	TN060200011240-1000	67.2
0503	Dobbs Branch	TN060200011244-0100	78.9
0502	Mountain Creek	TN06020001426-010	67.2
0503	Chattanooga Creek	TN060200011244-1000	78.9
0701	N. Chickamauga Creek	TN06020001067-2000	58
0702	Unnamed Trib to N. Chickamauga Creek	TN06020001067-0100	58
0702	Ninemile Branch	TN06020001067-0210	58
0804	Friar Branch	TN06020001007-0100	63.1
0804	S. Chickamauga Creek	TN06020001007-1000	63.1

Figure 2. Location map associated with TMDL Siltation and Habitat Alteration.



1.0 Objectives

To meet the monitoring requirements mandated by the TMDL program, the City proposes the following surface water quality monitoring plan. This TMDL water quality monitoring plan consists of three specific objectives:

- **Source Identification** – by identifying sources of pollution, site-specific actions will be developed to resolve problems found during monitoring.
- **Prioritization** – once known causes of pollution are identified, a strategic implementation plan will be developed.
- **Evaluation** – subsequent to implementation of Best Management Practices (BMPs), monitoring will be conducted to evaluate the effectiveness of implemented watershed management strategies.

Sampling protocols will comply with the TDEC document, *Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water, March 2004*. Biological sampling will be conducted utilizing the Semi-Quantitative Single Habitat (SQSH) Method detailed in the TDEC document, *Quality System Standard Operating Procedure for Macroinvertebrate Stream Survey, revised October 2006*.

In addition to surface water sampling, visual stream surveys will be conducted in accordance with *Maryland's Stream Corridor Assessment Survey, SCA Survey Protocols*, (Yetman, 2001). The City will implement a Stream Corridor Evaluation (SCORE) Program which not only focuses on visual assessment, but also incorporates quantifiable tools to analyze the stream corridors.

2.0 Water Quality Assessment

This monitoring plan incorporates key elements of TDEC's TMDL document (2006). Markers used to develop the siltation and habitat alteration TMDL included analysis using the Watershed Characterization System Sediment Tool and predictive target sediment loads extrapolated from biologically healthy watersheds.

3.0 Monitoring Plan

This monitoring plan is organized by HUC Sub-watersheds. The HUC-12 Sub-watershed (06020001_) 0502 (DA) consists of Citico Creek and Mountain Creek. HUC-12 Sub-watershed (06020001_) 0503 consists of Dobbs Branch and Chattanooga Creek. HUC-12 Sub-watershed (06020001_) 0702 consists of North Chickamauga Creek and Ninemile Branch. HUC-12 Sub-watershed (06020001_) 084 consists of FriarBranch and South Chickamauga Creek. The City will be conducting TMDL monitoring only on waterbody sections within the City limits. Waterbodies contained in Hamilton County, but not within the City of Chattanooga boundary, will be monitored by a different agency.

A. Monitoring Locations

Citico Creek

Figure 3. Area map depicting sampling location at Citico Creek

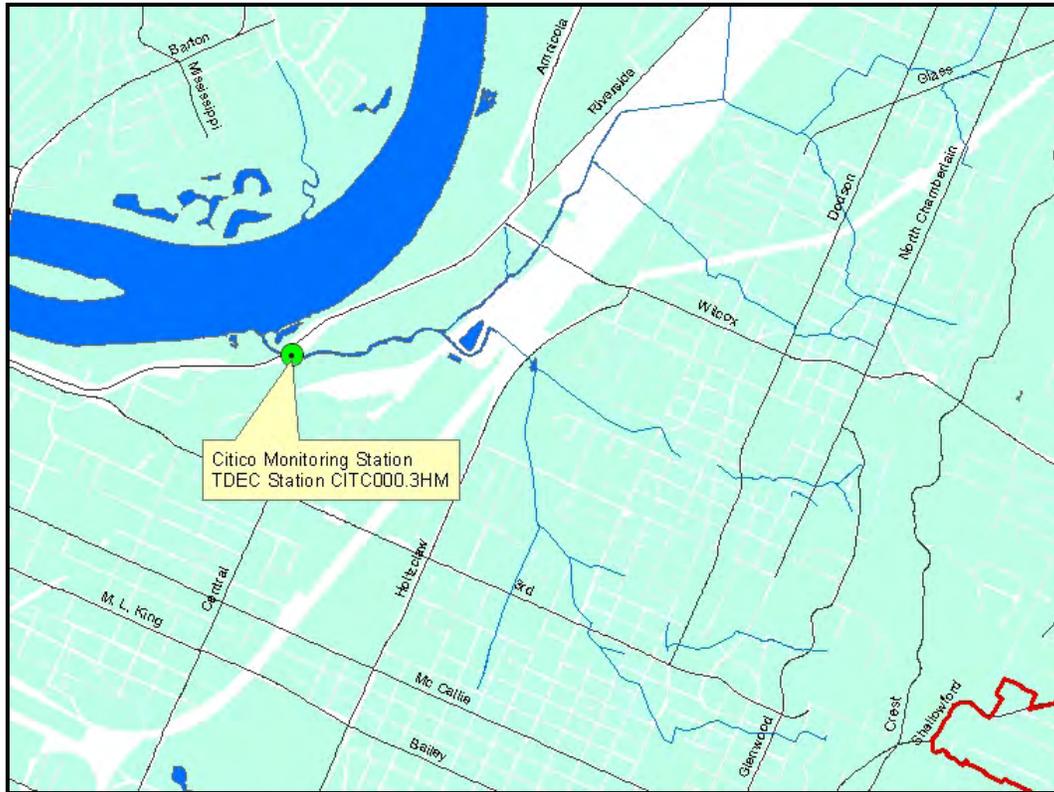


Table 3. TMDL sampling location for Citico Creek

City Station #	Location	Stream Section	TDEC ID	TMDL
CMS 1	Citico Creek @ Cannon Properties	Citico Creek	CITIC000.3HM	<i>Sediment & Habitat Alteration</i>

Mountain Creek

Figure 4. Area map depicting sampling location for Mountain Creek

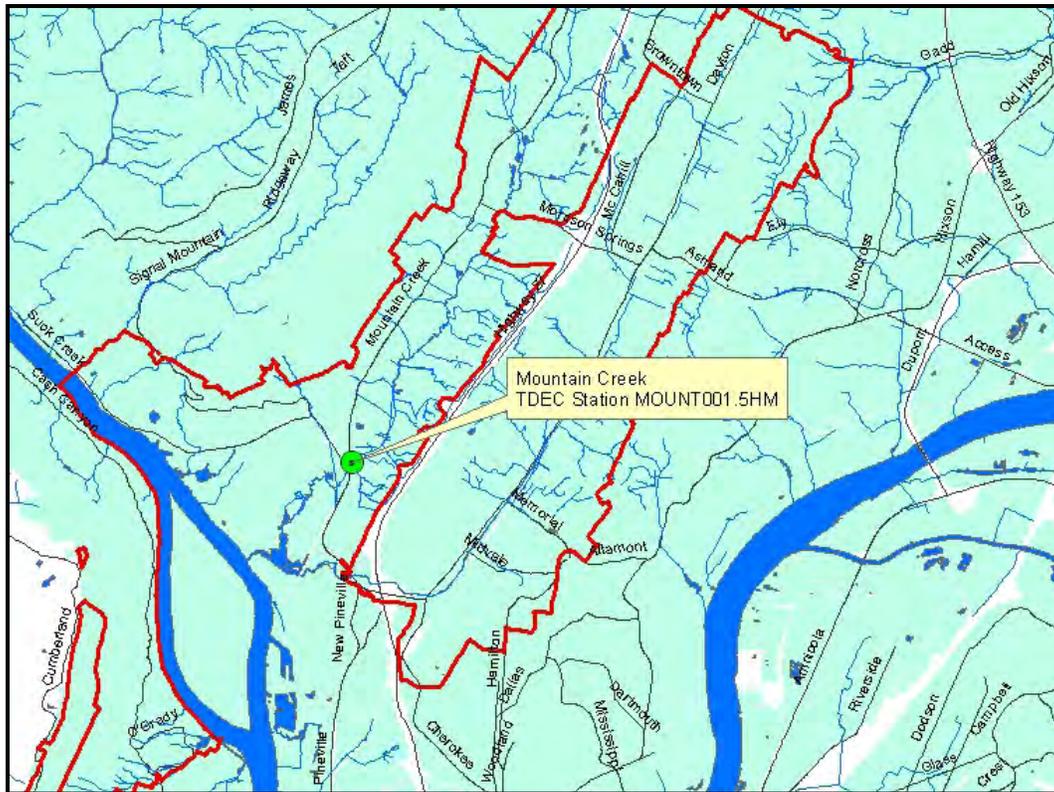


Table 4. TMDL sampling location for Mountain Creek

City Station #	Location	Stream Section	TDEC ID	TMDL
CAS Mount	Mountain Creek Rd @ Kmart	Mountain Creek	MOUNT001.5HM	Siltation & Habitat Alteration

Chattanooga Creek, Unnamed Tributary to Chattanooga Creek, and Dobbs Branch

Figure 5. Area map depicting sampling locations for Chattanooga Creek, Dobbs Branch and Unnamed Tributary to Chattanooga Creek.

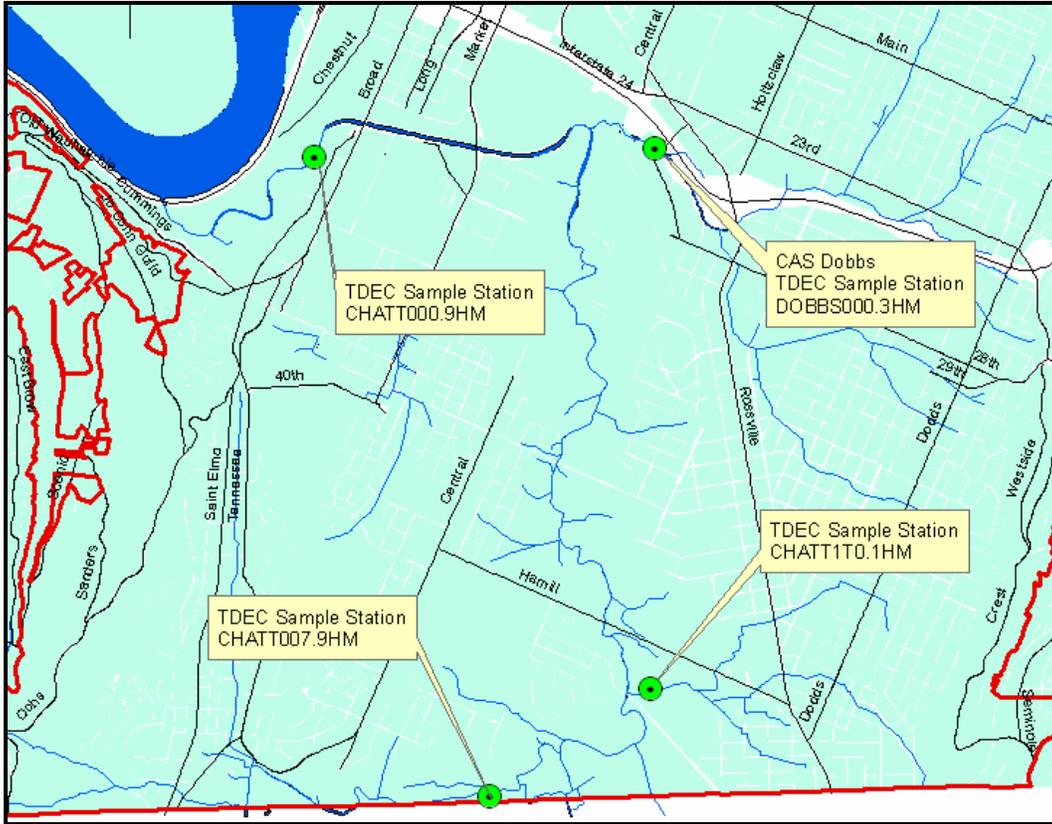


Table 5. TMDL sampling locations for Dobbs Branch, Chattanooga Creek and Unnamed Tributary to Chattanooga Creek

City Station #	Location	Stream Section	TDEC ID	TMDL
CAS Dobbs	Bridge @ Cannon Ave	Dobbs Branch	DOBS000.3HM	Siltation & Habitat Alteration
	Chattanooga Creek @ RR bridge @ rendering plant	Chattanooga Creek	CHATT000.9HM	Siltation & Habitat Alteration
	5200 Block Wilson Rd @ bridge	Chattanooga Creek	CHATT007.9HM	Siltation & Habitat Alteration
	Hooker Road	Unnamed Tributary Chattanooga Creek	CHATT1T0.1HM	Siltation & Habitat Alteration

South Chickamauga Creek and Friar Branch

Figure 6. Area map depicting sampling locations for South Chickamauga Creek and Friar Branch.

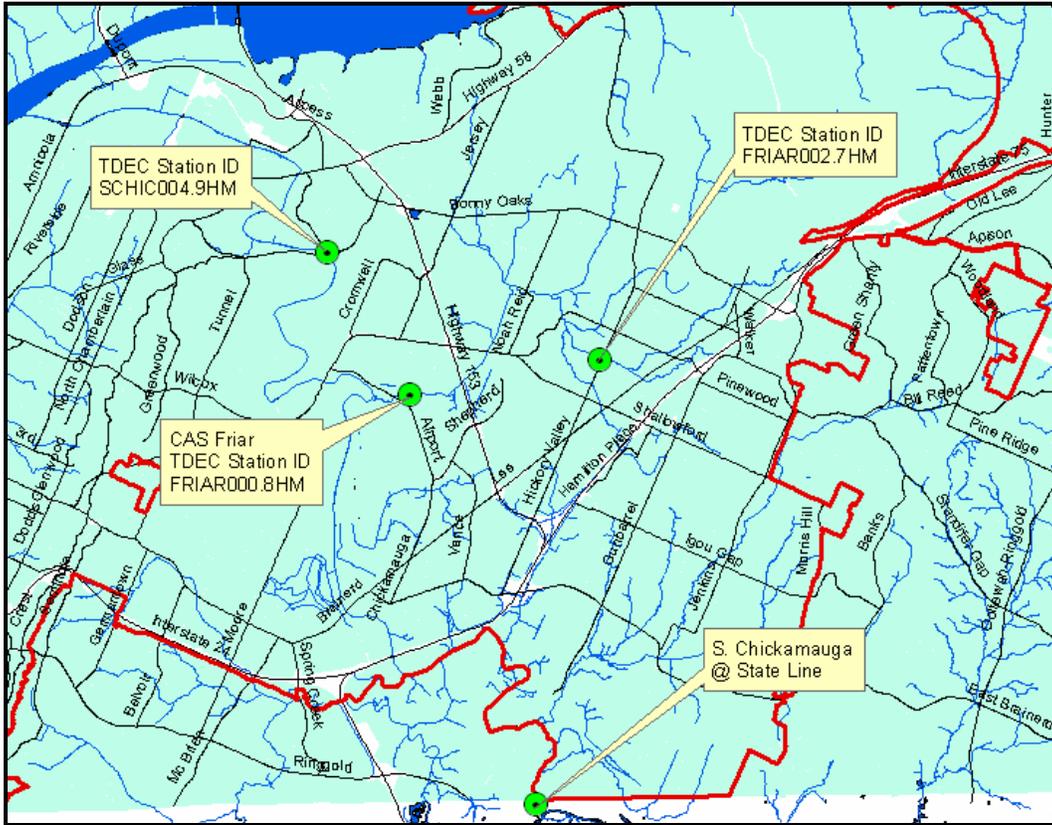


Table 6. TMDL sampling locations for South Chickamauga Creek and Friar Branch.

City Station #	Location	Stream Section	TDEC ID	TMDL
CAS Friar	Friar Branch @ Polymer Dr next to Mayfield	Friar Branch	FRIAR000.8HM	Siltation & Habitat Alteration
	Hickory Valley Rd	Friar Branch	FRIAR002.7HM	Siltation & Habitat Alteration
	South Chickamauga Creek @ State Line	South Chickamauga Creek		Siltation & Habitat Alteration
	South Chickamauga Creek @ Lightfoot Mill Rd	South Chickamauga Creek	SCHIC004.9HM	Siltation & Habitat Alteration

North Chickamauga Creek and Ninemile Branch

Figure 7. Area map depicting sampling locations for North Chickamauga Creek

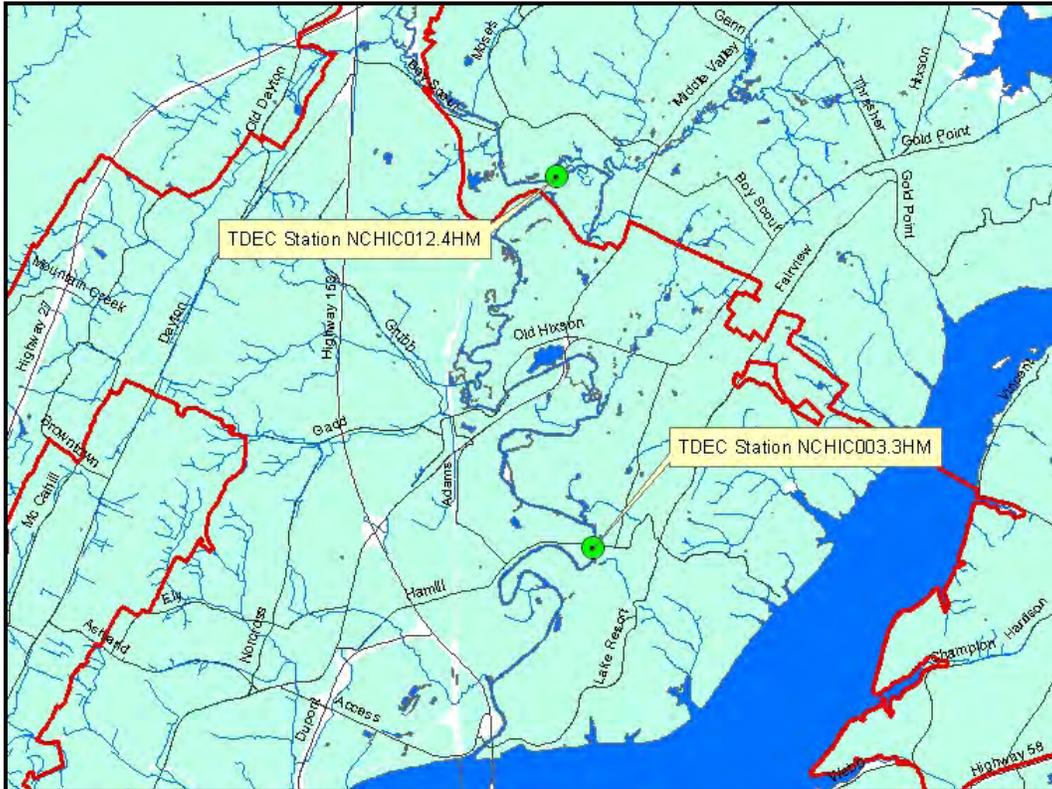


Table 7. TMDL sampling locations for North Chickamauga Creek

City Station #	Location	Stream Section	TDEC ID	TMDL
	Boy Scout Road	North Chickamauga Creek	NCHIC012.4HM	Siltation & Habitat Alteration
	Bridge @ Hamill Road	North Chickamauga Creek	NCHIC003.3HM	Siltation & Habitat Alteration

B. Sampling Protocol

Surface water sampling will be conducted in accordance with the State of Tennessee's Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water, March 2004.

Surface water samples will be collected, labeled, placed in a Ziploc-type bag and stored on ice in a cooler until delivered to the Moccasin Bend Waste Water Treatment (MBWWT) Laboratory for analysis. Appropriate Chain-of-Custody (COC) forms will be completed and transported with the sample. In addition to water sample collection, a suite of field measurements will be collected. Field measurements will include: visual observation, Temperature, pH, Dissolved Oxygen (DO), Specific Conductivity, and flow.

Total Suspended Solids (TSS) samples analysis will be conducted using method 2540D from the American Public Health Association, American Waterworks Association, Water Environment Federation. 20th Edition, Standard Methods for Examination of Water and Wastewater (Clesceri, Greenberg, and Eaton).

Macroinvertebrate monitoring will be conducted in streams by which a siltation and habitat alteration TMDL has been established. Macroinvertebrate sampling will be conducted using the protocols specified in TDEC's Quality System Standard Operating Procedure for Macroinvertebrate Stream Surveys, Revised October 2006.

C. Sampling Protocol – Visual Stream Surveys

Visual stream assessments will be conducted in accordance with Maryland's Stream Corridor Assessment Survey SCA Survey Protocols, (Yetman, 2001). Data collected during stream assessment activity will be electronically stored in a database and accessible by ArcGIS.

D. Sampling Frequency

Sample sets will be collected once during a five (5) year period. Visual stream assessments will be conducted on a continuum basis (SCORE, 2007). Macro-invertebrate sampling will be conducted once during a five (5) year period.

4.0 Project Milestones

- Sampling will be conducted at the designated sample locations.
- Data will be compiled and analyzed to assist with: source identification, prioritization and BMP deployment.
- Watershed data will be used to evaluate program effectiveness.

5.0 References

City of Chattanooga (2007). Chattanooga Stream Corridor Evaluation (SCORE) Program.

Clesceri, L.S., Greenberg, A.E., & Eaton, A.D. (Eds). Standard Methods for the Examination of Water and Wastewater, 20th Edition. American Public Works Association. Washington, DC.

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