

Shelby County

Stormwater Management Program

Stormwater Management Plan



Department of Roads, Bridges & Engineering
6449 Haley Road
Memphis TN 38134

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TABLE OF CONTENTS

SECTION 1 – STORMWATER MANAGEMENT PLAN

PLAN BACKGROUND 1
 TABLE 1.1 Minimum Control Measures required by MS4 Permit 2
 PURPOSE AND GOALS 2
 AUTHORITY 2
 NPDES PERMIT COVERAGE..... 3
 COVERAGE AREA 4
 FIGURE 1.1 Shelby County Stormwater Program Jurisdictional Boundaries 5
 APPROVED NOTICE OF COVERAGE 4
 FIGURE 1.2 Shelby County Notice of Coverage 6
 SHELBY COUNTY MS4 INFORMATION 4

SECTION 2 – WATERSHED DELINIATIONS

WATERSHED DESCRIPTION 7
 WATERSHED MANAGEMANENT 7
 WATERSHED DESIGNATIONS 7
 TABLE 2.1 HUC Code Watershed Designation 8
 FIGURE 2.1 HUC 8 Watersheds 10
 FIGURE 2.2 HUC 10 and 12 Watersheds 11
 FIGURE 2.3 City of Memphis Drainage Basin Map 12
 WATERSHED BOUNDARIES 8
 Loosahatchie River Watershed 8
 Wolf River Watershed 8
 Horn-Lake Nonconnah Creek Watershed 8
 Lower Mississippi River Watershed 9
 TABLE 2.2 Basins in the Shelby County Stormwater Program Jurisdiction 9
 FIGURE 2.4 Basins in the Shelby County Stormwater Program Jurisdiction .. 13

SECTION 3 – SHELBY COUNTY FEATURES

HYDROLOGIC FEATURES 14
 Perennial Streams 14
 Intermittent Streams 14
 Ephemeral Streams 14
 Ditches, Canals or Wet Weather Conveyances 15
 Exceptional Waters of the State 15
 Outstanding National Resource Waters 15
 FIGURE 3.1 Shelby County Hydrologic Features 16
 FIGURE 3.2 Shelby County Exceptional Waters 17
 TOPOGRAPHIC FEATURES 18

TABLE OF CONTENTS

POTENTIAL POLLUTANT SOURCES 18
 FIGURE 3.3 Shelby County Topography 19
 FIGURE 3.4 Unincorporated Zoning Map..... 20
 FIGURE 3.5 Shelby County Facilities Map 21

SECTION 4 – SPECIAL CONDITIONS

DISCHARGES TO WATER QUALITY IMPAIRED WATERS..... 22
 TABLE 4.1 Impaired Streams and Other Water Bodies 22
 TABLE 4.2 Shelby County MS4-Impaired Stream Segments 25
DISCHARGES INTO WATER BODIES WITH APPROVED TMDLS 26
 TABLE 4.3 TMDLs Affecting the SC Stormwater Program 27
 FIGURE 4.4 Stream Segments with TMDLs 28
 TABLE 4.5.1 WLA for Nonconnah Creek - Chlordane, Dioxins & PCBs 29
 TABLE 4.5.2 WLA for Nonconnah Creek - E. Coli 30
 TABLE 4.5.3 WLA for Loosahatchie River - Chlordane, Dioxins & PCBs 32
 TABLE 4.5.4 WLA for Loosahatchie River – E. Coli 33
 TABLE 4.5.5 WLA for Wolf River – E. Coli 35
 TABLE 4.5.6 WLA for Wolf River - Metals 37
 TABLE 4.5.7 WLA for Wolf River - Chlordane & PCBs 41
 TABLE 4.5.8 WLA for Wolf River - Dioxins 42
 TABLE 4.5.9 WLA for Mississippi River - Chlordane, Dioxins & PCBs 43
PROTECTION OF STATE OR FEDERALLY LISTED SPECIES 27
CO-PERMITTEES AND COORDINATED PROGRAMS 44

SECTION 5 - STORM WATER MANAGEMENT PROGRAM

PROGRAM BACKGROUND..... 45
 TABLE 5.1 - Minimum Control Measures Implementation Timelines 46
MINIMUM CONTROL MEASURES..... 47
 Public Education and Outreach..... 47
 Public Involvement/Participation..... 48
 Method of Advertising Public Opportunities 49
 TABLE 5.2 – Sample Notification List of Media Outlets 49
 Pollutants of Concern 49
 Illicit Discharge Detection and Elimination..... 51
 Construction Site Storm Water Runoff Control..... 55
 Permanent Storm Water Management in New Development and
 Redevelopment..... 56
 Pollution Prevention and Good Housekeeping for Municipal
 Operations... 56
QUALIFYING TRIBES, STATE OR LOCAL PROGRAM (QLP)..... 57
STORM WATER MANAGEMENT PROGRAM REVIEW AND UPDATE..... 57
ENFORCEMENT RESPONSE PLAN..... 58

SECTION 6 - MONITORING, RECORDING, AND REPORTING

ANALYTICAL MONITORING.....	62
Biological Sampling.....	62
Bacteriological Sampling.....	62
TMDL Sampling.....	63
Reporting.....	63
NON-ANALYTICAL MONITORING.....	64
Figure 6.1 - Stream Segments to be Visually Assessed	64
RECORD KEEPING.....	63
REPORTING.....	64

APPENDIX

1	SC MS4 NPDES General Permit for Discharges from Small MS4s
2	Listed Streams within SC MS4
3.1	Mississippi River TMDL for Chlordane, Dioxins and PCBs
3.2	Loosahatchie River TMDL for E. Coli
3.3	Loosahatchie River TMDL for Chlordane, Dioxins and PCBs
3.4	Wolf River TMDL for E. Coli
3.5	Wolf River TMDL for Chlordane and PCBs
3.6	Wolf River TMDL for Metals
3.7	Wolf River TMDL for Dioxin
3.8	Nonconnah Creek TMDL for Chlordane, Dioxins and PCBs
3.9	Nonconnah Creek TMDL for E. Coli
4	State and Federal Listed Species in Shelby County
5	SC Stormwater Management Program
6	Public Information and Education Plan
7	Enforcement Response Plan
8	Quality System Standard Operating Procedure for Macroinvertebrate Stream Survey
9	Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water
10	EPA Scorecard
11	Copies of Annual Reports

SECTION 1 – STORMWATER MANAGEMENT PLAN

Plan Background

Water from rain events can be captured by trees and vegetation and evaporate back into the air or be soaked into the ground and enter the water table. Stormwater runoff is excess water that “runs off” across the land. Runoff usually flows into the nearest ditch, storm drain or creek. From there, the water runs into streams, rivers, or lakes. The runoff is not treated in any way. Polluted runoff generally happens anywhere people use or alter the land. In developed areas, there is less vegetation to intercept the rain water and none of the water that falls on hard surfaces like roofs, driveways, parking lots or roads can seep into the ground. This increases the amount and timing of runoff entering the waterways. On the way, the runoff water can pick up and carry many substances that pollute water.

Some - like pesticides, fertilizers, metal dust and oil – immediately change the chemistry of the water. Others – like sediment from construction, bare soil, or agricultural land, or pet waste, grass clippings and leaves – break down or carry pathogens which affect living organisms including humans over time. Plastic containers, tires and trash may take a very long time to break down and can affect habitat besides being unsightly. In addition to rain, various human activities like watering, car washing, and malfunctioning septic tanks can also put contaminated water onto the land surface. Runoff not only pollutes the environment, but erodes stream banks and causes flooding.

Polluted stormwater runoff is the number one cause of water pollution in Shelby County. Polluted water affects the wildlife in creeks, streams, rivers and lakes and impacts the quality of life of citizens. The increased quantity of stormwater runoff caused by urbanization has also caused significant, adverse impacts on the safety and welfare of residents.

The United States government began regulating water pollution in 1948 by passing the Federal Water Pollution Control Act. The Act was significantly reorganized and expanded in 1972 and became known as the "Clean Water Act". The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating sources that discharge pollutants into waters of the United States. In Tennessee, the NPDES permit program is administered by the Tennessee Department of Environment and Conservation (TDEC).

In accordance with the Federal and State regulations, Selby County obtained a permit from the TDEC’s Division of Water Pollution Control (WPC) for storm water discharges from the County’s Separate Storm Sewer System (MS4). The Shelby County MS4 includes all the ditches, tributaries, drainage pipes, detention ponds and other structures that transport stormwater runoff to Waters of the State. The permit first became effective on July 7, 2003 (tracking number TNS075663). An updated general permit was issued on August 31, 2010 and Shelby County obtained coverage under it effective June 9, 2011.

Generally, the NPDES Permit requires Shelby County to impose controls to reduce the discharge of pollutants in stormwater to the maximum extent practicable using management practices, control techniques and system design and engineering methods, and such other provisions which are determined to be appropriate for the control of such pollutants.

Specifically, the permit requires Shelby County to perform six categories of activities, called Minimum Control Measures (MCMs). These MCM are listed in *Table 1.1* on the next page.

SECTION 1 – STORMWATER MANAGEMENT PLAN

1.	Perform outreach and education about stormwater runoff to County citizens.
2.	Provide opportunities for residents to participate in conversations and activities.
3.	Detect and eliminate illicit discharges.
4.	Control construction site runoff.
5.	Manage permanent stormwater controls.
6.	Perform municipal housekeeping to prevent polluted runoff from County buildings and activities.

TABLE 1.1 - Minimum Control Measures required by MS4 Permit

Purpose and Goals

This Storm Water Management Plan (SWMP or the Plan) establishes the framework and practices that direct Stormwater Management for unincorporated Shelby County. The **purpose** of this plan is to summarize the basic elements of the Shelby County Stormwater Management Program and to provide basic guidance for compliance with the Shelby County, Federal, State and local stormwater regulations. It describes the County’s watersheds, defines Waters of the State and lists the current impairment status of the regulated stream segments and other water bodies. This plan explains the Best Management Practices used by Shelby County to fulfill the six required MCMs and explain special conditions imposed on currently impaired waterbodies. This plan references the other guiding and regulatory documents used to accomplish the goals of the Shelby County Stormwater Program.

The overall **goals** of the Stormwater Management Program are to:

- 1) To implement the requirements of the TDEC NPDES Permit for Discharges from small MS4s.
- 2) To reduce the discharge of pollutants to the maximum extent practicable (MEP).
- 3) To protect water quality.
- 4) To minimize the potential for flooding.

The Stormwater Program provides Shelby County with effective rules, regulations, and projects that reduce the potential for stormwater damage to life, public health, safety, property, and the environment by controlling stormwater drainage and requiring temporary and permanent provisions for its control.

Authority

Shelby County’s Stormwater Management Plan is established as required by section four of the NPDES general permit for small municipal separate storm sewer systems (*Appendix 1*).

Assessment of civil penalties for ordinance violations is authorized pursuant to TCA 68-221-1106 and given as part of Shelby County Ordinance No. 292, the Stormwater Ordinance. Other documents become part of the SWMP by reference. The Director of Public Works is the Stormwater Program Manager and his designee, the Stormwater Program Coordinator, is responsible for the overall management of the SWMP. Other department administrators are responsible for the implementation of policies and procedures contained in the SWMP within their departments.

NPDES Permit Coverage

Shelby County is eligible to discharge approved to discharge **storm water runoff** to **waters of the state** under §1.3 of the NPDES Small MS4 General Permit by the Tennessee Department of Environment and Conservation as it operates a **small MS4** in the State of Tennessee, is located partially within an **urbanized area** as determined by the latest Decennial Census by the Bureau of Census and has been designated for permit authorization pursuant to 40 CFR §122.32.

Stormwater runoff includes any surface runoff or drainage from rainfall or snowmelt. In addition, the permit allows Shelby County to discharge the certain non-stormwater sources of water provided that TDEC has not determined these sources to be substantial contributors of pollutants. These include:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground waters
- Uncontaminated ground water infiltration (infiltration is defined as water other than wastewater that enters a sewer system, including sewer service connections and foundation drains, from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow.)
- Uncontaminated pumped ground water
- Discharges from potable water sources
- Air conditioning condensate
- Irrigation water
- Springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual residential car washing
- Flows from riparian habitats and wetlands
- Dechlorinated swimming pool discharges
- Street wash water
- Discharges or flows from fire fighting activities

Waters of the State is defined in the Tennessee Water Quality Control Act and means any and all water, public or private, on or beneath the surface of the ground, which are contained within, flow through or border upon Tennessee or any portion thereof except those bodies of water confined to and retained within the limits of private property in single ownership which do not combine to effect a junction with natural surface or underground waters.

A **Small Municipal Separate Storm Sewer System (MS4)** is defined as not “large” (municipality with a population of 250,000 or more) or “medium” (municipality with a population of 100,000 or more) and refers to all separate storm sewers, including all conveyance or system of conveyances, such as, roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains:

- Owned or operated by the County
- Designed or used for collecting or conveying stormwater;
- Which is not a combined sewer; and which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

SECTION 1 – STORMWATER MANAGEMENT PLAN

Coverage Area

The permit states that where a county is covered under the permit, the permit covers the “Urbanized Area” of the county and any additional portions of the county, or the whole county, as indicated on the NOC. The MS4 indicates what portion of the county they wish covered under the permit. Urbanized areas are determined by density distribution of census data and shown on US Census Bureau mapping system Topologically Integrated Geographic Encoding & Referencing system (TIGER) maps. The most recent information available is derived from the 2010 census.

Shelby County elected to apply for coverage for the entire unincorporated area in addition to the minimum urbanized area as required by the Tennessee Department of Environment and Conservation. Therefore, the activities required under the NPDES Small MS4 General Permit must be performed and reported throughout the entire unincorporated boundaries of the County. The Shelby County Storm Water Program’s jurisdictional area is the entire unincorporated portion of the County and is depicted by in the combined blue and green areas as shown in *Figure 3.1*.

Approved Notice of Coverage

The notice of coverage (NOC) was approved and acts as the County’s “license” to discharge storm water as permitted in the Permit. A copy of the approved NOC is at *Figure 3.2* with an effective date of June 9, 2011. The permit is valid for 5 years and is automatically extended until an updated permit is issued.

Shelby County MS4 Information

The following basic information was submitted on the NPDES permit Notice of Intent and/or has been corrected as of the update of this SWMP.

PROGRAM CONTACT	TECHNICAL CONTACT
Tom Needham, P.E. Name	Chris Masin, P.E. Name
tom.needham@shelbycountyttn.gov Email Address	chris.masin@shelbycountyttn.gov Email Address
901-222-2083 Phone Number	901-222-7744 Phone Number

**ITEM A
AREA SERVED (IN SQUARE MILES)**

Total area 784 Area unincorporated 299 Unincorporated, urbanized area (UA) 32

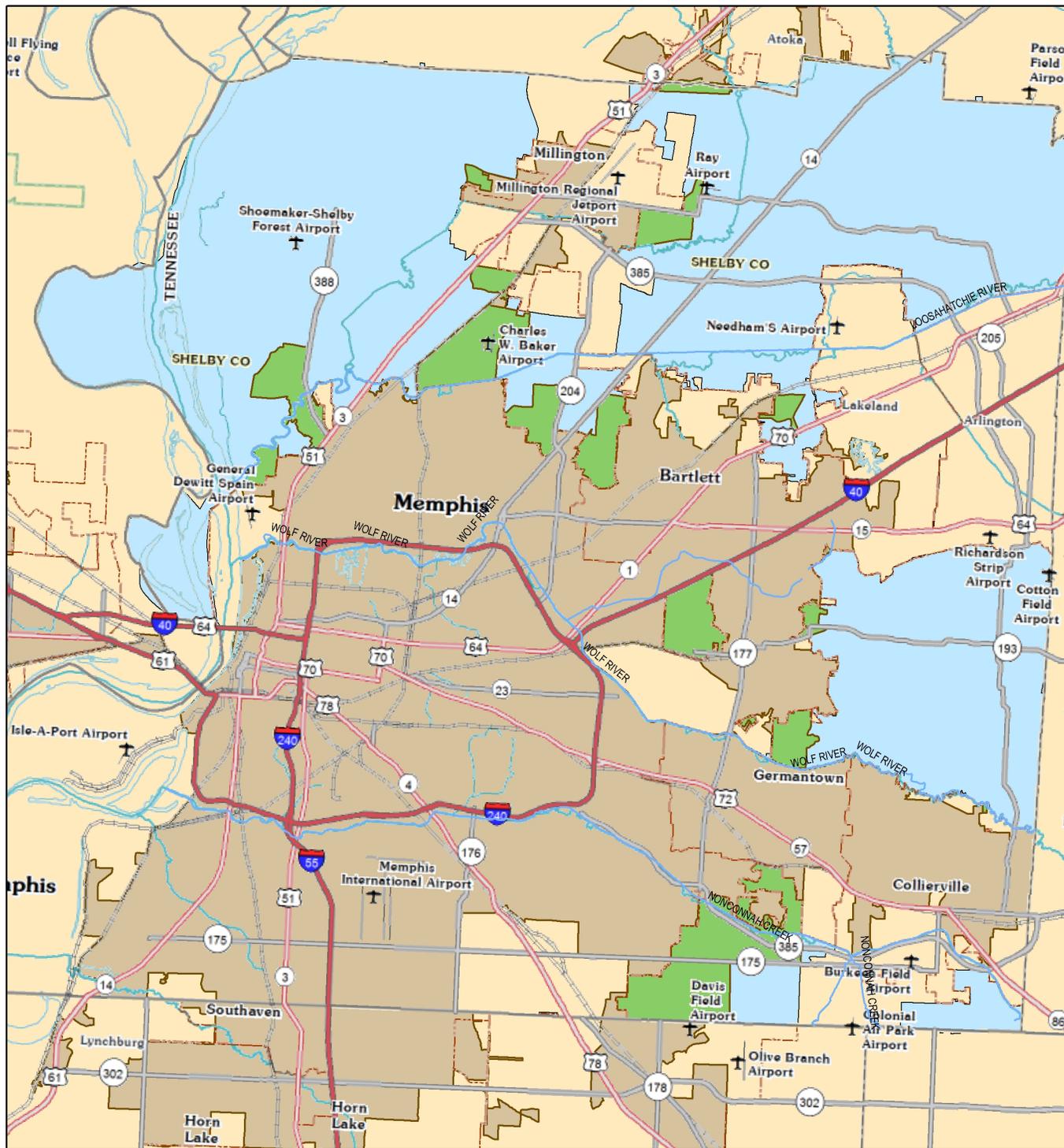
If county, indicate by checking the appropriate box if the permit will be used to regulate non-UA portions of your county:

Entire county (unincorporated) Urbanized area only

**ITEM B
STORM DRAINAGE INFRASTRUCTURE**

Storm Sewers	<u>348 miles</u>	Open Ditches	<u>2500 miles</u>
Culverts	<u>500</u>	Catch Basins	<u>10500</u>
Retention Basins	<u>5 (County-maintained)</u>	Detention Basins	<u>1 (County-maintained)</u>

Unincorporated Shelby County and The Urbanized Area



Legend

- Unincorporated portion of Shelby County
- TIGER Urbanized Area #56116 - Memphis, TN--MS--AR
- Urbanized Area within Unincorporated Shelby County



FIGURE 1.1 - Shelby County Stormwater Program Jurisdictional Boundaries



NPDES GENERAL PERMIT FOR DISCHARGES
From
**SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEM
(MS4)**

Tracking No. TNS075663

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 *et seq.*) and approval from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, *et seq.*) and the Water Quality Act of 1987, P.L. 100-4, the following operator of a small municipal separate storm sewer system is authorized to discharge stormwater runoff into the waters of the State of Tennessee in accordance with the various eligibility criteria, administrative procedures, program requirements, reporting requirements, etc. set forth in parts 1 through 7 of Tennessee small municipal separate storm sewer system NPDES general permit, issued August 31, 2010:

Discharger: **Shelby County**

is authorized to discharge: **stormwater runoff**

from the Shelby County separate storm sewer system located in: **Shelby County**

to waters of the state, in accordance with the required program elements and other conditions set forth in the Tennessee small MS4 general permit:

Coverage under this general permit shall become effective on: **June 9, 2011**

and shall expire on **September 1, 2015**

Notice of Coverage issued: **June 9, 2011**

A handwritten signature in cursive script that reads "Paul E. Davis".

Paul E. Davis, Director
Division of Water Pollution Control

NPDES General MS4 Permit is located at <http://tn.gov/environment/wpc/stormh2o/MS4II.shtml>

CN-0759

RDAs 2352 and 2366

FIGURE 1.2 - Shelby County Notice of Coverage

SECTION 2 – WATERSHED DELINEATIONS

Watershed Description

A watershed is all the land area that drains into a given body of water. Watershed boundaries always follow the highest ridgeline around the stream channels and meet at the bottom or lowest point of the land where water flows out of the watershed. Small watersheds combine to become bigger and bigger watersheds, sometimes called basins, as your reference point moves further downstream. When water from a few acres drains into a little stream, those few acres are its watershed. When that stream flows into a larger stream and that larger stream flows into a bigger river, then that initial small watershed is now part of that river's watershed.

Watershed Management

Watersheds are a logical way to think about the connection between the land and the quality of water running off of it. The Shelby County Stormwater program will utilize the watershed approach to management. This approach studies the relevant characteristics of a watershed aimed at the sustainable distribution of its resources and the process of creating and implementing plans, programs, and projects to sustain and enhance watershed functions that affect the biota and human communities within a watershed boundary. Biota refers to the plants, or *flora*, and animals, or *fauna*, of an area. The flora and fauna of watersheds play important roles in maintaining watershed function and can be important indicators of changes within the system. Features of a watershed that the program will consider include water supply, water quality, drainage, stormwater runoff, and the overall planning and utilization of watersheds.

Watershed Designation

Watershed drainage basins in the United States have been divided and sub-divided at four different levels and each assigned a unique hydrologic unit code (HUC) consisting of eight digits based on these four levels. The four levels from largest to smallest are regions, sub-regions, accounting units, and cataloging units.

The first level of classification divides the nation into 21 major geographic areas. These geographic areas contain either the drainage area of a major river, such as the Missouri region, or the combined drainage areas of a series of rivers, such as the Texas-Gulf region, which includes a number of rivers draining into the Gulf of Mexico.

The second level of classification divides the 21 regions into 222 subregions. A subregion includes the area drained by a river system, a reach of a river and its tributaries in that reach.

The third level of classification subdivides many of the subregions into accounting units. These 352 hydrologic accounting units nest within, or are equivalent to, the subregions. These subdivisions are called basins.

The fourth level of classification is the cataloging unit, the smallest element in the hierarchy of hydrologic units. A cataloging unit is a geographic area representing part of or all of a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature. There are 2150 cataloging units in the nation. Cataloging units level divisions are sometimes referred to as sub-basins.

An eight-digit code (HUC 8) uniquely identifies each of the four levels of classification within four two-digit fields. The first two digits identify the water-resources region; the first four

SECTION 2 - WATERSHED DELINEATIONS

digits identify the sub-region; the first six digits identify the accounting unit, and the addition of two more digits for the cataloging unit completes the eight-digit code. Additional efforts have subdivided these watersheds into smaller units, designated with a 10 digit (HUC 10) and 12 digit code (HUC 12). These represent the fifth and sixth level divisions of the drainage area and are considered to be individual “watersheds” and “sub-watersheds”. A summary of the HUC system is given in *Table 2.1* below.

Name	Level	Digits	Average size (square miles)	Number of HUCs (approximate)
Region	1	2	177,560	21
Subregion	2	4	16,800	222
Basin	3	6	10,596	370
Subbasin	4	8	700	2,200
Watershed	5	10	227	22,000
Subwatershed	6	12	40	160,000

Table 2.1 - HUC Code Watershed Designation

Hydrologic unit codes were initiated by the U.S. Geological Survey's Office of Water Data in the fall of 1972 in cooperation with the U.S. Water Resources Council and supported by the U.S. Geological Survey's Resources and Land Information program. The HUC codes have created a unified system between agencies and water-resource planners. The Shelby County Stormwater Program will utilize the HUC watershed divisions when classifying, evaluating and reporting waterbody conditions. The HUC 8 watersheds within Shelby County are shown in *Figure 2.1* and the HUC 10 and HUC 12 watersheds within Shelby County are shown in *Figure 2.2*.

In order to determine the impacts of runoff from a specific location, like a subdivision, business, parcel or lot, it is necessary to break these four major watersheds into smaller basins and even smaller sub-basins. The City of Memphis has developed a unique drainage basin map for the watersheds within Shelby County designated with a number and letter system in place of the HUC 8 or HUC 12 system. This original system preceded the development of the unified USGS system. Due to its acceptance and availability, this system will be used and required, in lieu of, the HUC system with reference to developers, groups and citizens. The City of Memphis' most recent drainage map dated 1985 is shown in *Figure 2.3*.

Watershed Boundaries

Shelby County has four watersheds within its jurisdiction corresponding to the four major waterways that run through it. The four major waterways both transport flow generated from outside the jurisdiction and collect runoff from the unincorporated areas of Shelby County and the other municipal jurisdictions. The areas where the runoff flows into the waterway define its watershed basin.

Three of the waterways bisect the county from east to west. The northern waterway, originating in Hardeman County, collects runoff from Fayette County, Tipton County and Shelby County and is the **Loosahatchie River Canal**. The middle waterway is the **Wolf River**, which carries runoff from Fayette County and Hardeman County to the east and DeSoto County, Marshall County, Benton County and Tippah County in the State of Mississippi from the south. Two waterways are included in the southern most watershed with the majority of the runoff flowing to **Nonconnah Creek** in Shelby County and Marshall County, Mississippi. This creek and **Horn Lake Creek** within DeSoto County, Mississippi, make up the watershed. The three

SECTION 2 - WATERSHED DELINEATIONS

watersheds associated with these waterways are called the **Loosahatchie** (HUC 08010209), the **Wolf** (HUC 08010210) and **Horn Lake-Nonconnah Creek** (HUC 08010211).

These watersheds deposit their water into the **Mississippi River** along the western boundary of the County. The Mississippi River has a length of 2,320 Miles and has the third largest drainage basin in the world, exceeded in size only by the watersheds of the Amazon and Congo Rivers. With its many tributaries, the Mississippi's watershed drains all or parts of 31 U.S. states between the Rocky and Appalachian Mountains and even reaches into southern Canada. The portion of runoff flow from within Shelby County that leads directly to the Mississippi River is in the watershed called the **Lower Mississippi River** (HUC 08010100). This watershed flows from the North to the South includes a minor portion of the Northwest corner of Shelby County, in and around Meeman-Shelby Forest State Park, as well as the bluffs in North and South Shelby County and a small are of the pinch and downtown area of Memphis.

Within the City of Memphis' drainage basin system, there has been 180 sub-basins delineated within Shelby County and have been classified with a number and letter according to their relationship in the basin and sub-basin. A map showing the basins and their designation is shown as Figure 2.3. There are 51 portions of the basins that collect runoff from within the Stormwater Program's jurisdictional area; 30 in the Loosahatchie Watershed, 4 in the Lower Mississippi Watershed, 6 in the Wolf Watershed and 11 in the Horn Lake- Nonconnah Watershed. Each sub-basin within unincorporated Shelby County is shown in *Figure 2.4* and listed in *Table 2.2*.

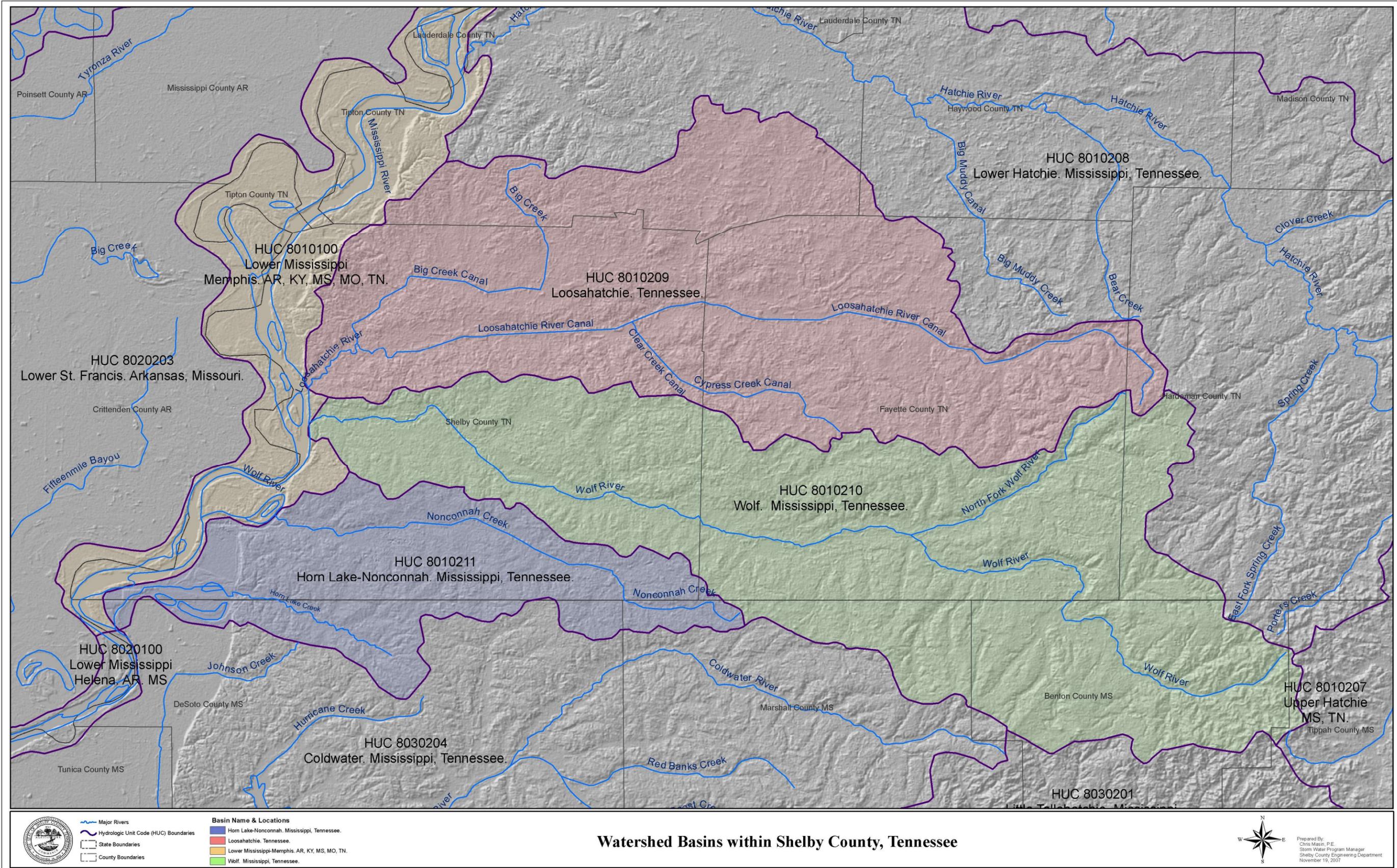
Loosahatchie Watershed			Lower Mississippi Watershed		
	Basin Name	Designation		Basin Name	Designation
1	Loosahatchie	8 - A	1	Mississippi River	1 - A
2	W.M.P.S	8 - D	2	Upper Mississippi River	1 - V
3	Todd Creek	8 - E	3	Lower Mississippi River	1 - W
4	Carrolton	8 - G	4	Shelby Forest	14 - A
5	Denver	8 - H			
6	Hwy. 51	8 - I			
7	Point Church	8 - J			
8	Harrington	8 - M			
9	Forest Lake	8 - O			
10	Mimosa	8 - P			
11	McCallum	8 - Q			
12	Spring Lake	8 - R			
13	Ranger Creek	8 - S			
14	Franks Branch	8 - T			
15	Oliver Creek	8 - U			
16	Scotts Creek	8 - V			
17	Young	12 - C			
18	Northhaven	14 - B			
19	Robison Lake	14 - C			
20	Woodstock	14 - D			
21	Lucy	14 - E			
22	Noahs	14 - F			
23	Gildfield	14 - G			
24	Rocky Branch	14 - H			
25	Middle Big Creek	14 - I			
26	Upper Big Creek	14 - J			
27	Lower Big Creek	15 - A			
28	Middle Beaver Creek	19 - A			
29	West Beaver Creek	19 - B			
30	East Beaver Creek	19 - C			

Wolf Watershed		
	Basin Name	Designation
1	Fletcher	12 - A
2	Walnut Grove Lake	13 - C
3	Grays Creek	16 - A
4	East Grays Creek	16 - B
5	Marys Creek	17 - A
6	Wolf River	19 - A

Horn Lake - Nonconnah Watershed		
	Basin Name	Designation
1	Cross	9 - H
2	Valley	9 - J
3	Windyke	9 - K
4	Bailey Station	9 - N
5	Johns Creek	10 - B
6	King	18 - B
7	Lean	18 - C
8	Hacks Cross	18 - D
9	Meadow	18 - E
10	Irene	18 - F
11	Center	18 - G

Table 2.2 – Basins in the Shelby County Stormwater Program Jurisdiction

SECTION 2 - WATERSHED DELINEATIONS



SECTION 2 - WATERSHED DELINEATIONS

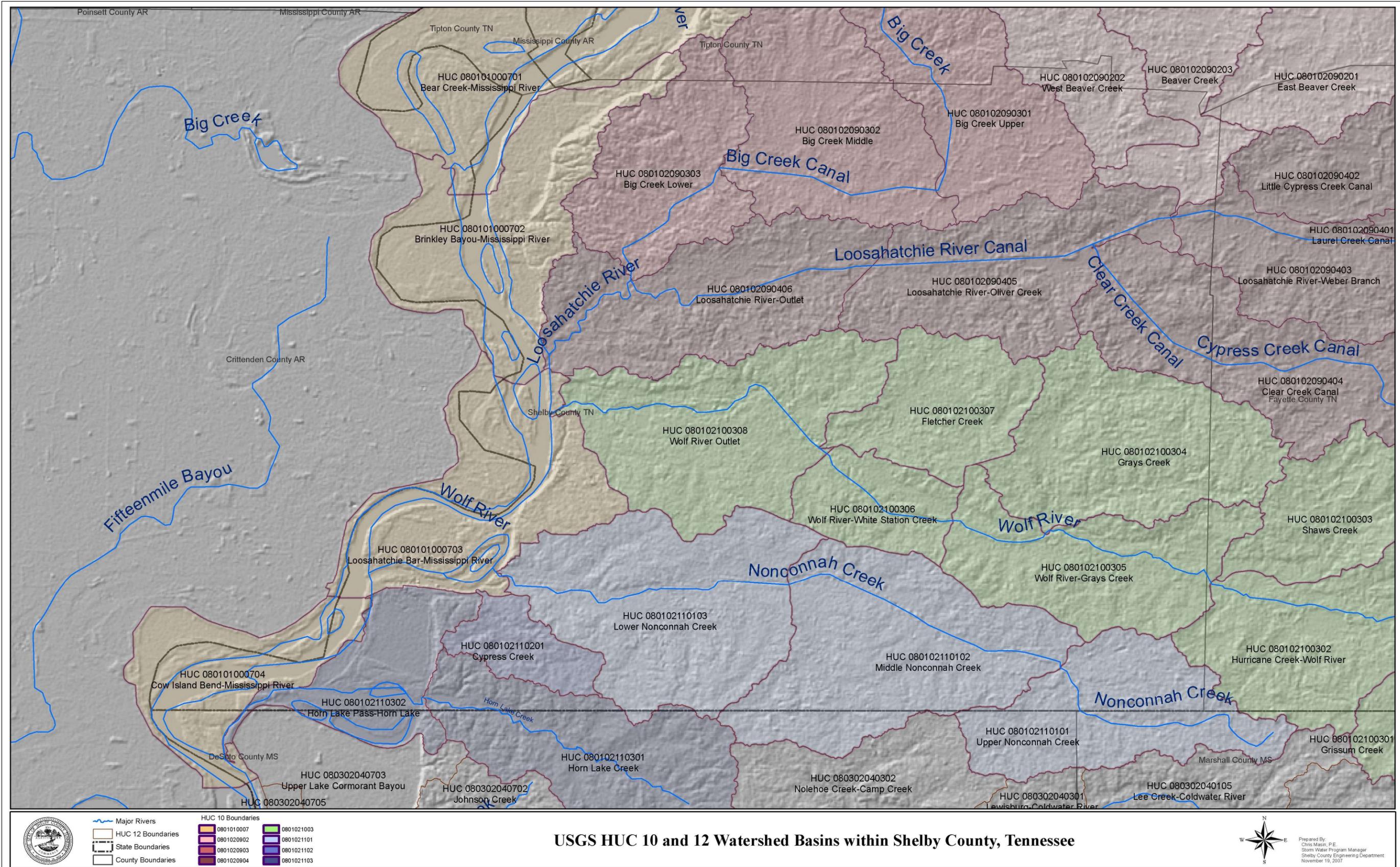


FIGURE 2.2 - HUC 10 and 12 Watersheds

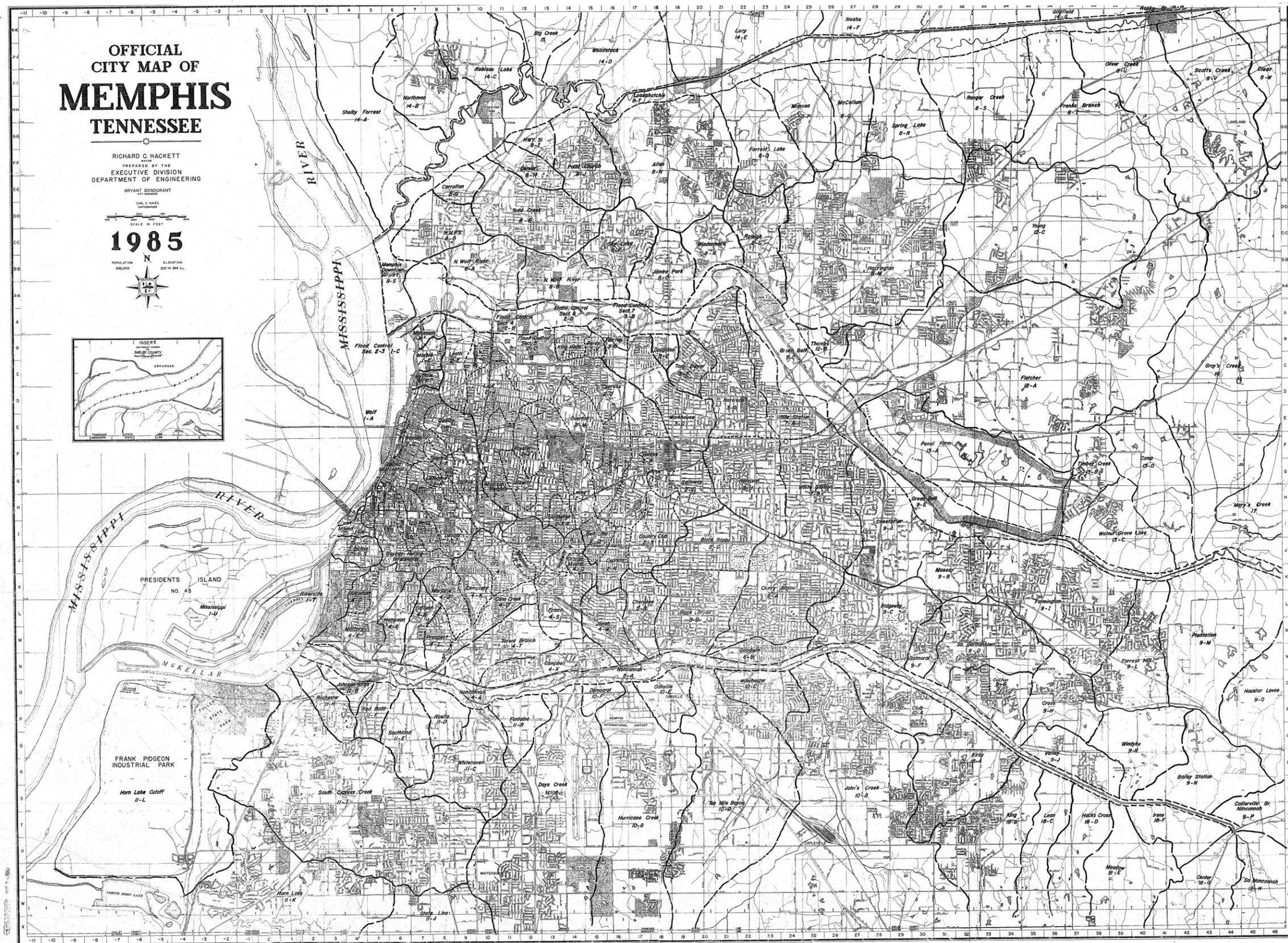


FIGURE 2.3 - City of Memphis Basin Map

SECTION 2 - WATERSHED DELINEATIONS

Lower Mississippi Watershed

Basin Name	Designation
Upper Mississippi River	19-A
Shelby Forest	14-A
Mississippi River	1-C
Lower Mississippi River	11-U

Loosahatchie Watershed

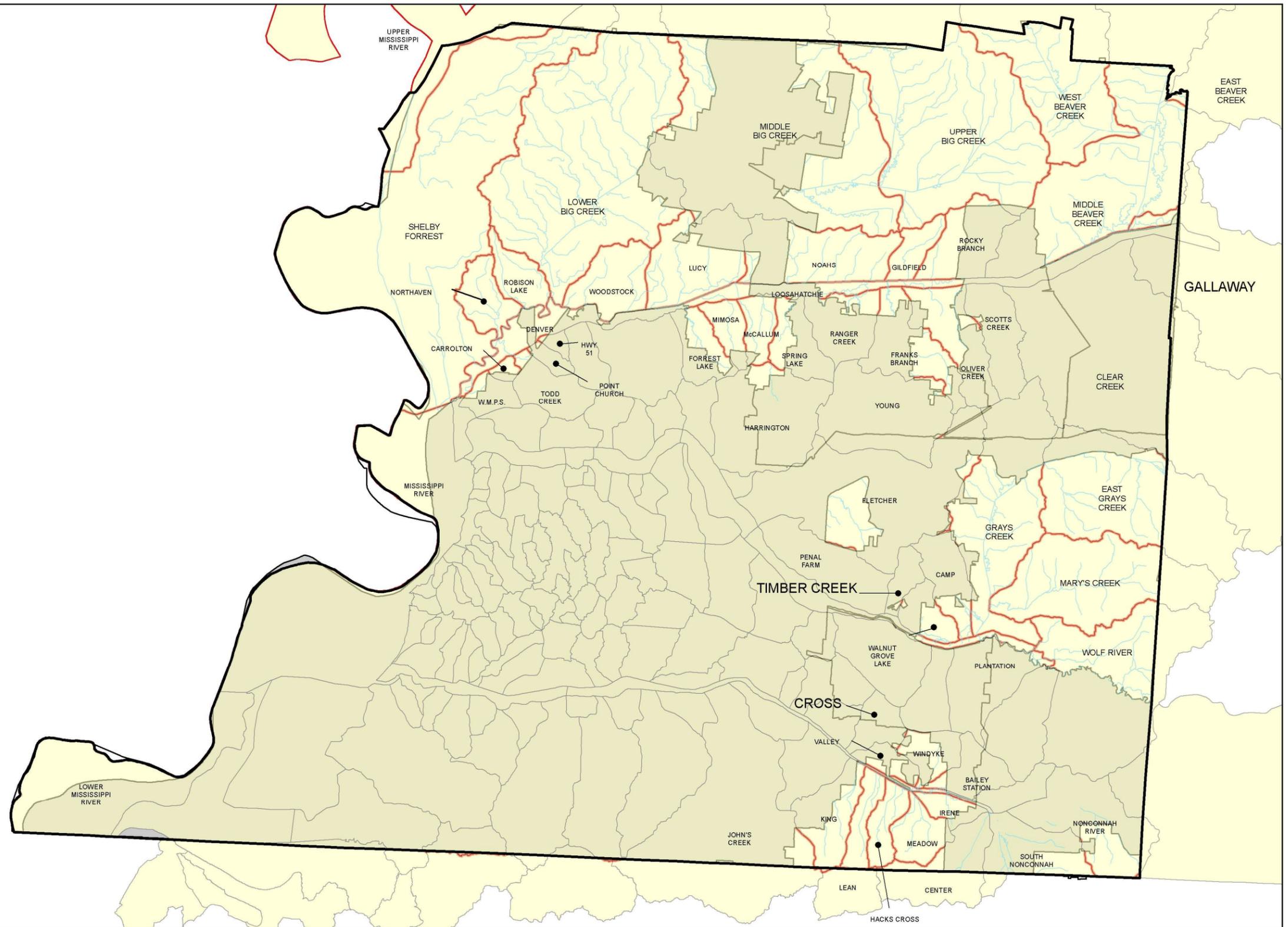
Basin Name	Designation
Carrolton	8-G
W.M.P.S	8-D
Northhaven	14-B
Todd Creek	8-E
Robison Lake	14-C
Denver	8-H
Point Church	8-J
Hwy. 51	8-I
Lower Big Creek	15-A
Woodstock	14-D
Lucy	14-E
Loosahatchie	8-T
Middle Big Creek	14-I
Forest Lake	8-G
Mimosa	8-P
McCallum	8-Q
Spring Lake	8-R
Harrington	8-M
Ranger Creek	8-S
Noahs	14-F
Gildfield	14-G
Franks Branch	8-T
Young	12-C
Oliver Creek	8-U
Scotts Creek	8-V
Rocky Branch	14-H
Upper Big Creek	14-J
West Beaver Creek	18-B
Middle Beaver Creek	18-A
East Beaver Creek	18-C
Galloway	18-D

Wolf Watershed

Basin Name	Designation
Fletcher	12-A
Walnut Grove Lake	13-C
Grays Creek	16-A
East Grays Creek	16-B
Marys Creek	17-A
Wolf River	17-B

Horn Lake-Nonconnah Watershed

Basin Name	Designation
Johns Creek	10-B
King	18-B
Lean	18-C
Hacks Cross	18-D
Center	18-G
Meadow	18-E
Irene	18-F
Bailey Station	9-N
Windyke	9-K
Cross	9-H
Valley	9-J



Major Rivers
 Hydrologic Unit Code (HUC) Boundaries
 State Boundaries
 County Boundaries

Basin Name & Locations
 Horn Lake-Nonconnah, Mississippi, Tennessee.
 Loosahatchie, Tennessee.
 Lower Mississippi-Memphis, AR, KY, MS, MO, TN.
 Wolf, Mississippi, Tennessee.

Watershed Basins within Shelby County, Tennessee



Prepared By:
 Chris Mason, P.E.
 Storm Water Program Manager
 Shelby County Engineering Department
 November 19, 2007

FIGURE 2.4 - Basins in the Shelby County Stormwater Program Jurisdiction

SECTION 3 – SHELBY COUNTY FEATURES

Hydrologic Features

As part of the stormwater management planning process Shelby County has identified the important features within the County that are related to the routing and flow of stormwater and the pollutants that it may pick-up in route to waters of the state. These features have been divided into categories and mapped using the stormwater program geographic information system (GIS). The following pages include information for and maps of Regulated Hydrologic Features, Shelby County MS4 system, Roads and Topography, Zoning and Facilities.

A crucial piece of information to protecting waters of the state is to know where they are. As defined previously, waters of the state include any stream, river, brook, swamp, lake, sound, tidal estuary, bay, creek, reservoir, waterway, or other body or accumulation of water. They can be surface or underground, public or private, natural or artificial. This definition does not provide an unambiguous, clear-cut way to tell who has jurisdiction over a water feature. TDEC's division of WPC determines the presence and location of waters of the State, including streams. The U.S. Army Corps of Engineers determines waters of the U.S. For the purposes of the program, any regulated water feature will be considered waters of the state. The Shelby County stormwater program manager may make stream determinations for the purposes of buffer rules under the riparian buffer protection program.

Stormwater runoff travels to waters of the state via two methods; through natural water courses and through man-made drainage systems. Natural water courses are bodies of concentrated flowing water in a natural low area or natural channel on the land surface. This plan will refer to these as rivers, streams or creeks. There are three types: perennial, intermittent, and ephemeral.

- **Perennial streams** have a well-defined channel that contains water year round during a year with normal rainfall. Groundwater is the primary source of water, but they also carry stormwater. They exhibit the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water. These features are regulated by TDEC and typically regulated by the U.S. Army Corps of Engineers.
- **Intermittent streams** have a well-defined channel that contains water for only part of the year (typically during winter and spring). The flow may be heavily supplemented by stormwater. When dry, they typically lack the biological and hydrological characteristics commonly associated with continuous conveyances of water. These features are typically regulated by TDEC and maybe regulated by the U.S. Army Corps of Engineers.
- **Ephemeral streams** are features that only carry stormwater in direct response to precipitation. They may have a well defined channel, but they typically lack the biological, hydrological, and physical characteristics commonly associated with intermittent or continuous conveyances of water. These features are typically not regulated by TDEC or the U.S. Army Corps of Engineers. These tributaries that are not regulated as waters of the state are designated as part of the County's storm sewer system program.

In addition, there are many open channels or intermittent flowing streams that have been altered by development, but have been left to return to a natural state. These are classified as

SECTION 3 – SHELBY COUNTY FEATURES

modified natural streams. They will still exhibit the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water. For the County, these water courses are not maintained except for risk reduction requirements due to sediment accumulation or damming by fallen trees or other blockages. These features are typically regulated by TDEC.

A **ditch** or **canal** means a man-made channel other than a modified natural stream. They are constructed for drainage purposes and typically dug through inter-stream divide areas. They may exhibit hydrological and biological characteristics similar to streams, but are not typically regulated by TDEC. These features are typically designated as wet weather conveyances. **Wet weather conveyance** means a watercourse;

- (A) That flow only in direct response to precipitation runoff in their immediate locality;
- (B) Whose channels are at all times above the groundwater table;
- (C) That are not suitable for drinking water supplies; and
- (D) In which hydrological and biological analyses indicate that, under normal weather conditions, due to naturally occurring ephemeral or low flow there is not sufficient water to support fish, or multiple populations of obligate lotic aquatic organisms whose life cycle includes an aquatic phase of at least two (2) months.

All of the hydrologic features designated as waters of the state, typically perennial streams and intermittent streams, but not limited to such are shown in *Figure 3.1*. The blue line streams data from the USGS is also shown in this map. A table listing all TDEC-listed blue line streams within or partially within the Shelby County MS4 is given in *Appendix 2*. All other water features not determined to be waters of the state, typically ephemeral streams, ditches, canals and wet weather conveyances are considered part of the Shelby County separate stormwater sewer system and are regulated under the Shelby County Stormwater Program.

Exceptional Tennessee Waters are surface waters of the State of Tennessee that satisfy the characteristics as listed in [Rule 1200-4-3-.06](#) of the official compilation, rules and regulations of the State of Tennessee. Characteristics include waters within state or national parks, wildlife refuges, wilderness or natural areas; State or Federal Scenic Rivers; Federally designated critical habitat; waters within an areas designated as Lands Unsuitable for Mining; waters with naturally reproducing trout; waters with exceptional biological diversity or; other waters with outstanding ecological or recreational value as determined by the department. In general, these are waterbodies with good water quality, important ecological values, valuable recreational uses, and outstanding scenery.

Shelby County has several stream segments and water bodies which are designated as exceptional. All of these stream segments and waterbodies are within Meeman-Shelby Forest State Park located in the northwestern portion of Shelby County. The park covers 13,467 acres and borders the Mississippi River. The Meeman Museum and Nature Center— named for conservationist Edward J. Meeman— is located on the park's grounds. The park is the most visited state park in Tennessee. A map of the County's listed exceptional waters is shown in *Figure 3.2*.

Outstanding National Resource Waters are waters which no new discharges, expansions of existing discharges, or mixing zones will be permitted unless such activity will not result in measurable degradation of the water quality. Shelby County has no designated outstanding National Resource Waters within its jurisdiction.

Shelby County Phase II MS4 Permit Renewal NOI
 MAP 3 B - Hydrographic Features

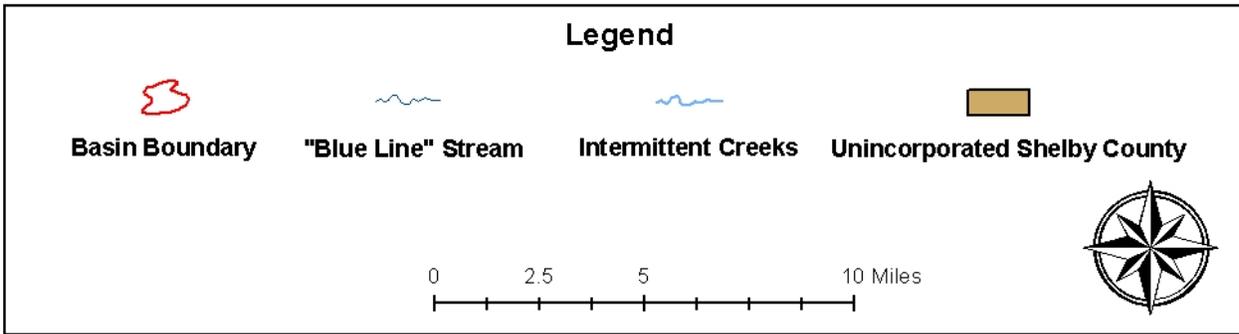
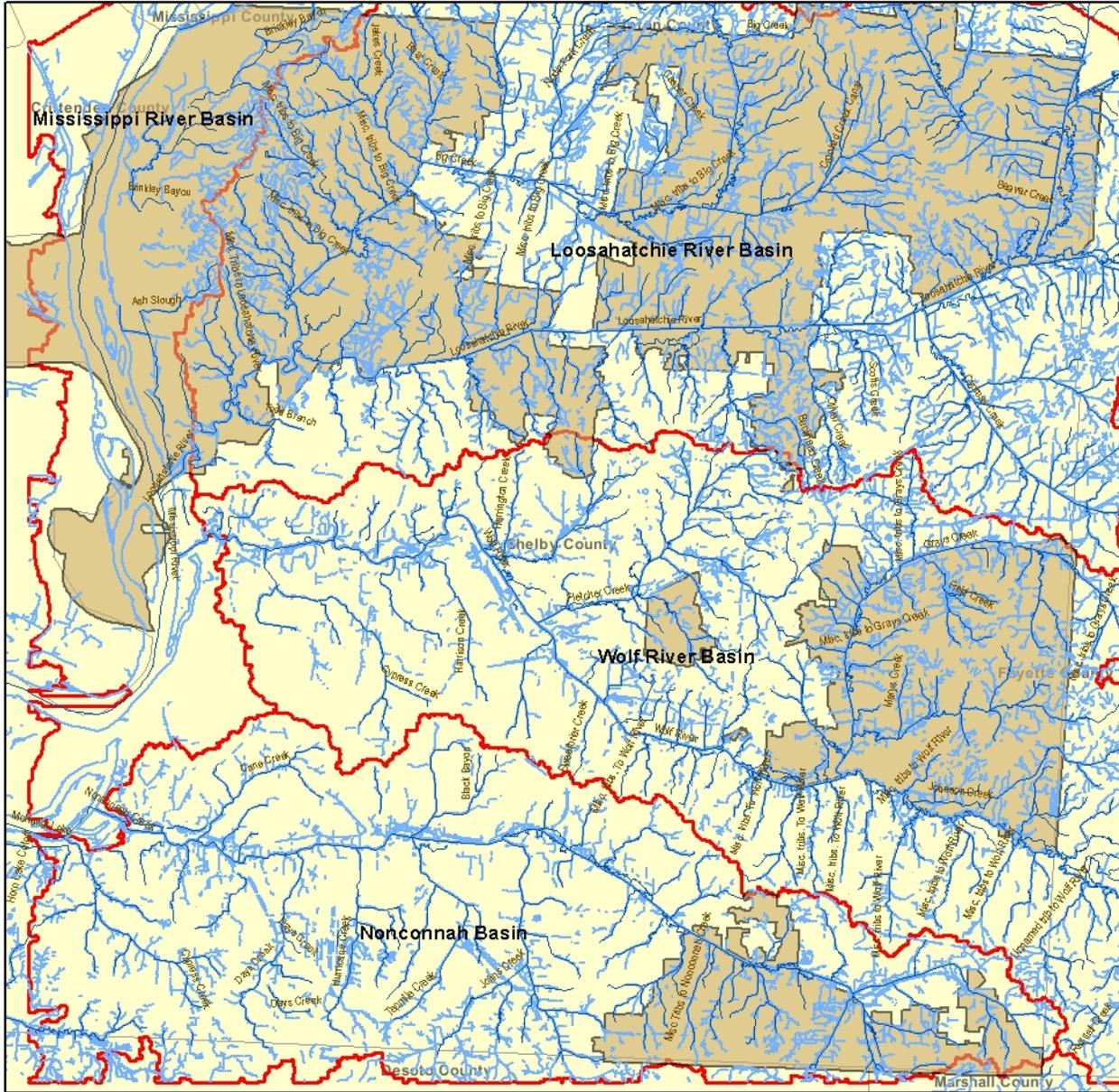
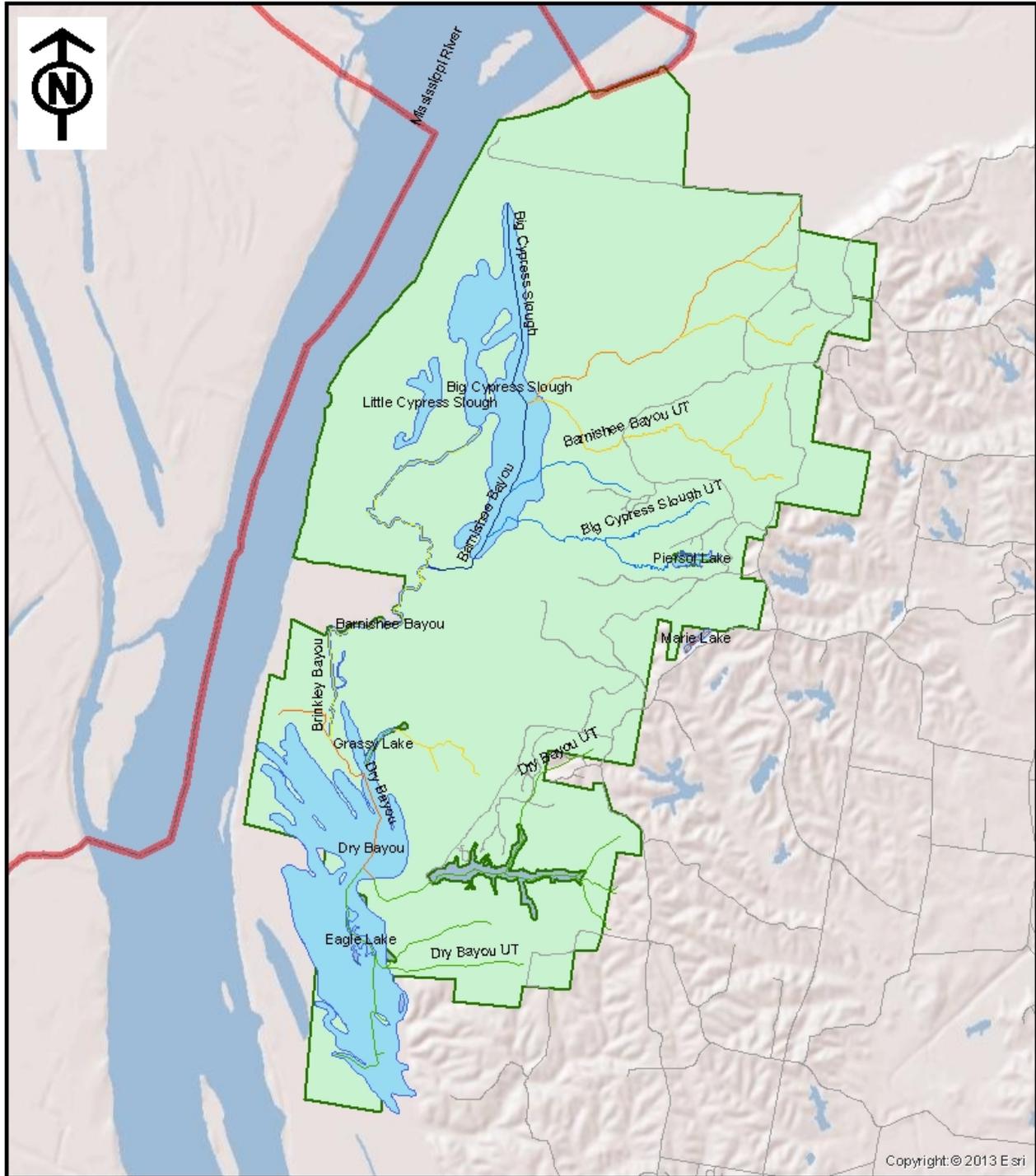


Figure 3.1 - Hydrologic Features



Exceptional Tennessee Waters and Outstanding National Resource Waters

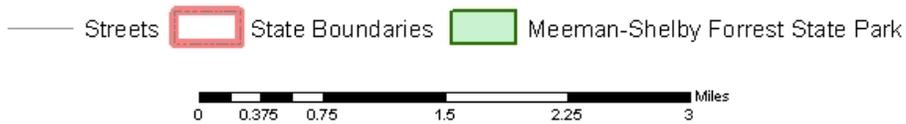


Figure 3.2 - Shelby County Exceptional Waters

Topographic Features

A universal axiom in stormwater management is that runoff will gravitate to areas of lower elevation or that it “will run downhill.” An elevation map is critical to determining drainage areas and slope for any given site. Slope is a critical component of soil generation prediction models, which estimate the amount of sediment that can be expected to move from an area to a point during a storm event. This data is useful in many hydraulic calculations, as well as, investigation flooding and water depth for other non-pollution related items. The elevation data for Shelby County is shown in *Figure 3.3*.

Potential Pollutant Sources

The permit requires the County to target specific sources, or “*hot spots*” that may cause or contribute to impairment of waters of the state. **Hot spots** are areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those activities typically found in stormwater. Examples might include operations producing concrete or asphalt, auto repair shops, auto supply shops, large commercial parking areas and restaurants.

Commercial and industrial areas within the area have a greater potential to contribute more toxic types and higher levels of pollutants to the storm water convenience system. Besides the types of products used by commercial and industrial facilities and the waste or by-products produced as a result of their activities, most commercial and industrial properties have large paved parking lots. These asphalt or concrete surfaces are impervious, which means that almost 100% of the rainfall that hits them is will runoff. The primary potential storm water pollutants associated with parking lots are oil, gasoline, antifreeze, transmission fluid, battery acid, and other fluids leaking from parked vehicles. During winter storms events these lots may also accumulate large concentrations of salt and cinder material spread on roadways by Shelby County and other municipalities to provide traction and melt ice. These types of facilities also tend to be sources of improperly disposed trash and debris. Commercial areas also tend to have landscaped frontages to attract customers. Pollutants associated with commercially landscaped areas include, applied fertilizers, herbicides, and pesticides; grass clippings, leaves, and other natural organic materials. For these reasons, this plan identifies all commercial and industrial properties as “hot spots” and the Shelby County Storm Water Program will focus its management practices in these areas. Areas zoned for commercial and industrial activities are shown in *Figure 3.4*.

Besides commercial and industrial properties, properties under construction have been identified as having an increased potential to cause a significant amount of pollution due to devegetation and grading activities which occur on them. Also construction sites generate a large amount of waste and debris that can be deposited or carried off site if not disposed of properly. **Priority construction activity** shall be defined by the MS4, but shall include, at a minimum, those construction activities discharging directly into or immediately upstream of, waters the state recognizes as impaired (for siltation or habitat alteration) or Exceptional Tennessee Waters.

Other features within Shelby County that are potential Pollutant sources are municipal buildings and fueling stations, as well as, those facilities owned and operated by other governmental entities. The Shelby County Stormwater Program performs inspections and monitoring of municipal-operated facilities as per the general permit which is described in detail in Section 5 of this plan. *Figure 3.5* shows the location of Shelby County-operated properties, including Fleet Maintenance, Fueling Stations, Sewer Pumping Stations and Wastewater Treatment Plants and Sanitary Landfills. Also identified are locations of non-Shelby County mapped as part of the general permit Notice of Intent application, including regional airports, State universities and military installations.

Shelby County Phase II MS4 Permit Renewal NOI
 MAP 3 A - County Roads and Topograpy

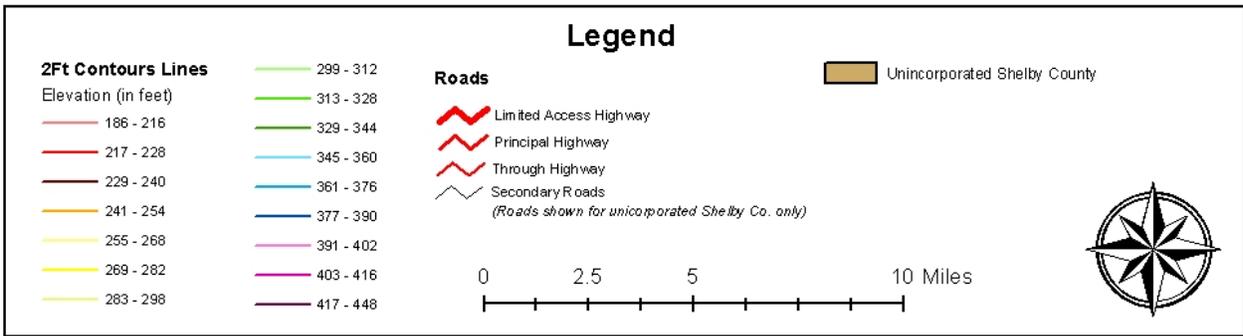
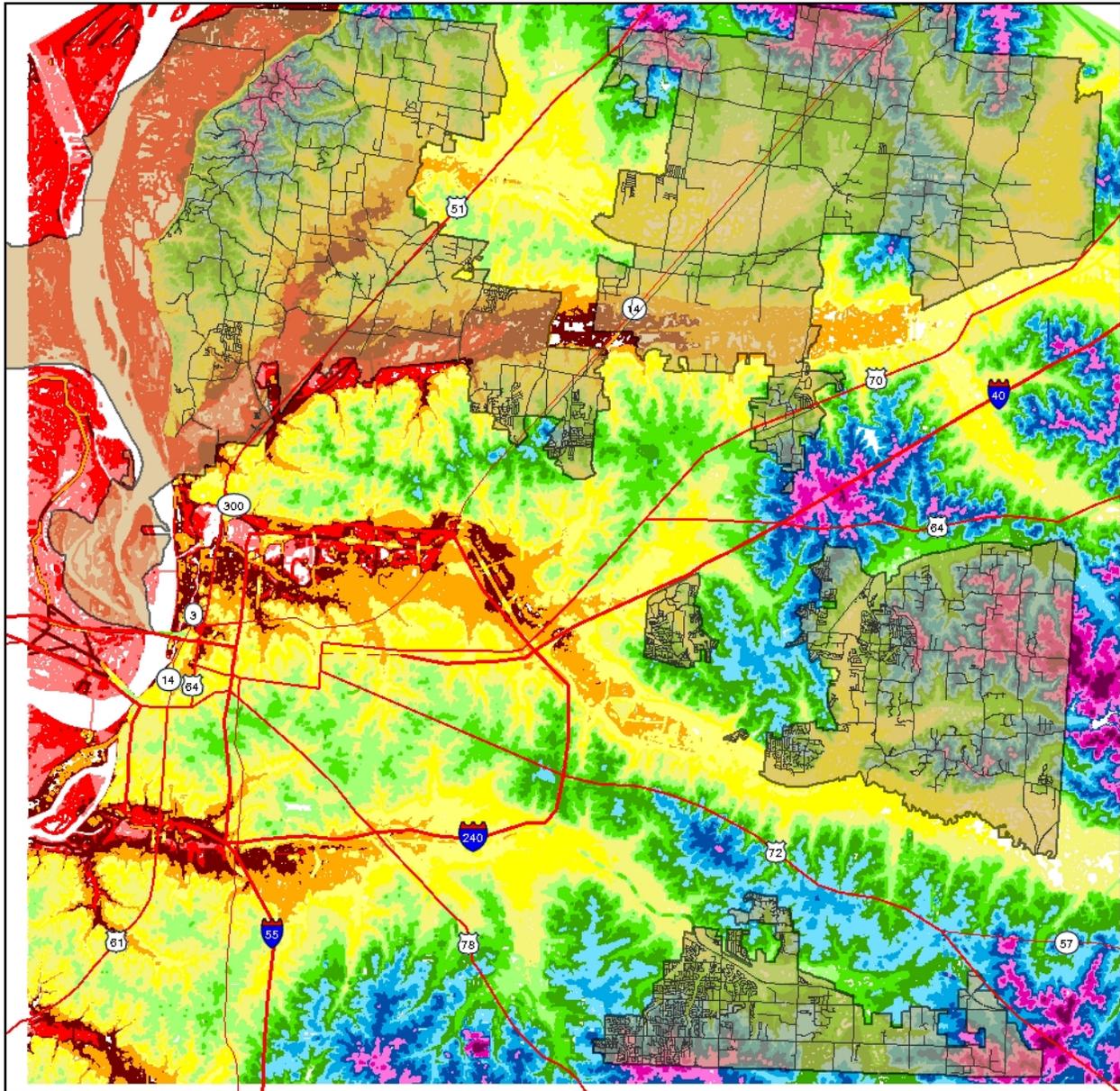
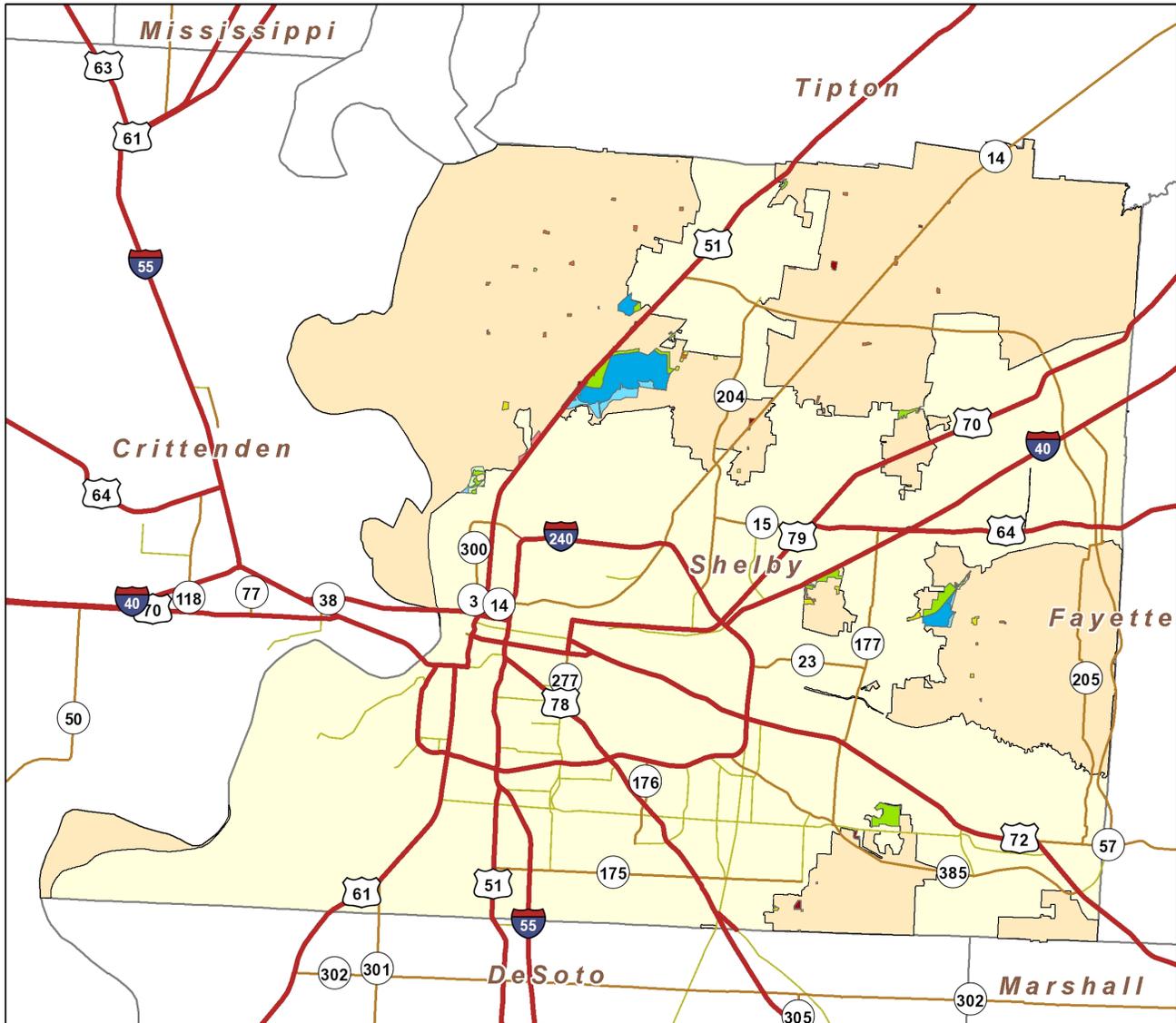


Figure 3.3 - Shelby County Topography

SECTION 3 – SHELBY COUNTY FEATURES

**Shelby County Storm Water Program
Areas Zoned for Commercial and Industrial Activity**



Legend

Commercial Zoned Properties

ZONE TYPE

- C-H
- C-H(FP)
- C-L
- C-L(FP)
- C-P
- C-P(FP)

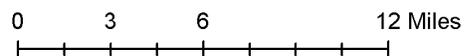
Industrial Zoned Properties

ZONE TYPE

- I-H
- I-H(FP)
- I-L
- I-L(FP)

Unincorporated Shelby County

- Residential, Agricultural, and all other zonings

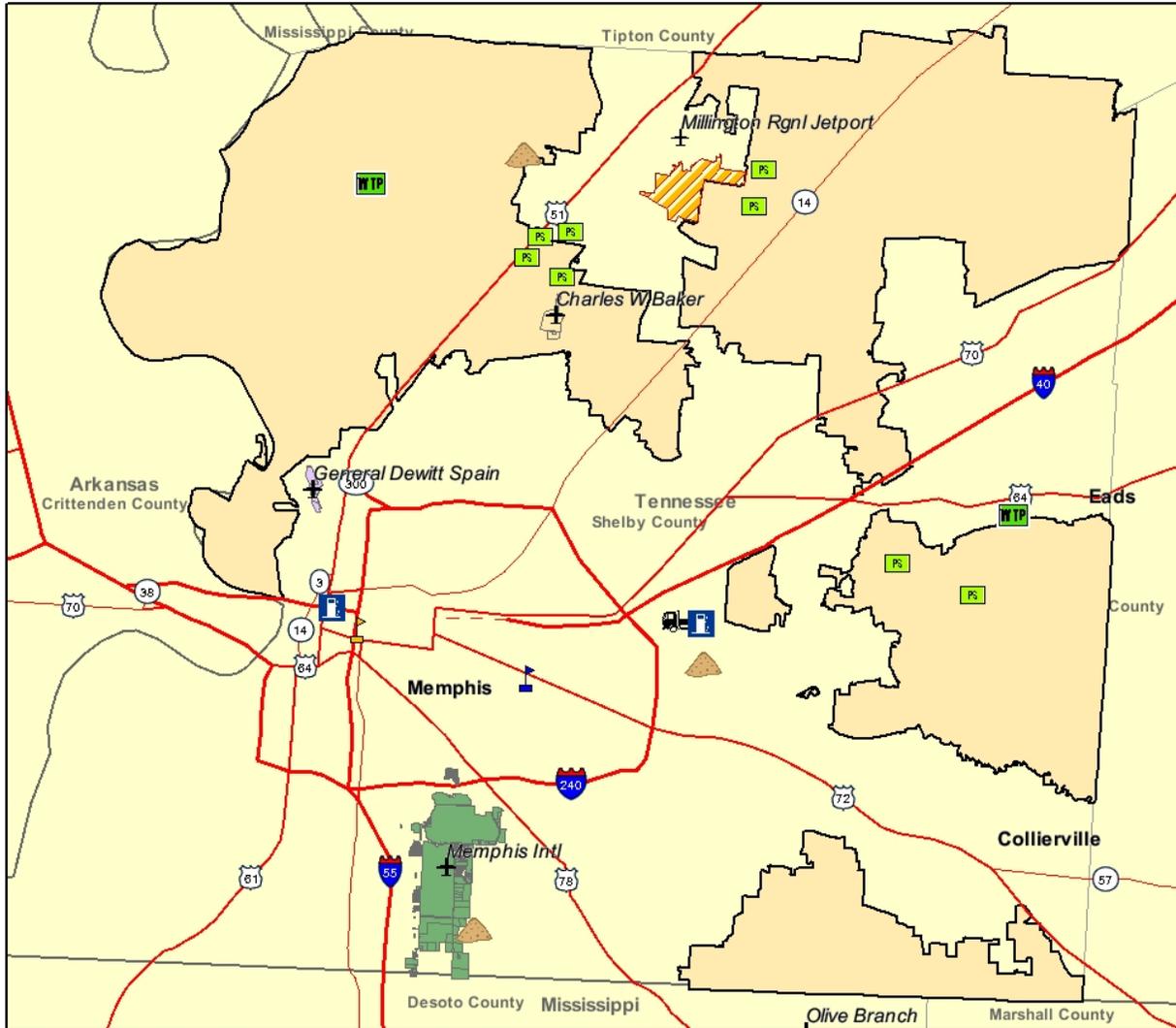


Commercial Summary	: 105 parcels	1.88 sq. miles total
Industrial Summary	: 44 parcels	8.97 sq. miles total
All other zoning Summary	: 40,401 parcels	287.95 sq. miles total

Figure 3.4 - Unincorporated Zoning Map

SECTION 3 – SHELBY COUNTY FEATURES

**Shelby County Phase II MS4 Permit Renewal NOI
MAP 2 - Municipal Owned or Maintained Facilities**



Shelby County Facilities Type

Fleet Maintenance

Address	Street
6200	Haley

Fueling Station

Address	Street
511	Alabama
6401	Haley

Pump Station

Address	Street
6812	Hwy. 51 North
6847	Home Acres
6904	Bucknell
6157	Amheast
7413	Sledge
7983	Armour
1994	Chartidge
1444	N. Pisgah

Legend

Treatment Plant

Address	Street
7662	Benejestown
2890	Bekemeyer Dr.

Landfill

Address	Street	Status
8130	Shake Rag	Closed
8791	Walnut Grove	Closed
0	Jackson Pit	Closed

Memphis-Shelby Co. Airport Authority Parcels
Airport Name

Charles W. Baker

General DeWitt Spain

Memphis International

Military Installations
 Naval Support Activity

State Universities
 Univ. of Memphis
 Univ. of Tennessee - Memphis

0 1 2 4 Miles

Figure 3.5 - Shelby County Facilities Map

SECTION 4 – SPECIAL CONDITIONS

Discharges to Water Quality Impaired Waters

Section 3 of the Small MS4 General NPDES Permit outlines additional hydrologic conditions that require special attention and management.

The Clean Water Act includes two basic approaches for protecting and restoring the nation's waters. One is a technology-based, end-of-pipe approach, whereby EPA promulgates effluent guidelines that rely on technologies available to remove pollutants from waste streams. These guidelines are used to derive individual, technology-based NPDES permit limits. The other approach is water-quality based and is designed to achieve the desired uses of a water.

Water quality standards define the goals for a waterbody by designating its uses, setting criteria to protect those uses, and establishing provisions to protect water quality from pollutants. A water quality standard consists of four basic elements:

1. Designated uses of the waterbody (e.g. recreation, water supply, aquatic life, agriculture),
2. Water quality criteria to protect designated uses (numeric pollutant concentrations and narrative requirements),
3. An antidegradation policy to maintain and protect existing uses and high quality waters, and
4. General policies addressing implementation issues (e.g., low flows, variances, mixing zones).

By adopting water quality standards, states are able to determine which healthy waters need protection, which waters must be restored and how much pollutant reductions are needed. Consequently, these water quality standards set a goal for restoring and protecting a watershed over the long term.

The 303(d) program is at the core of the water-quality based approach and serves to link the water quality goals to the NPDES permit limits. The Clean Water Act requires states to develop a list of impaired waters, which are waters of the state that do not support their designated use. For Shelby County the following *Table 4.1* includes the portion of the state's 303 (d) list that are within the Shelby County Stormwater Program's jurisdictional boundary including the cause and source of their impairment.

TABLE 4.1 - IMPAIRED STREAMS AND OTHER WATER BODIES

WATERBODY ID# AND NAME OF IMPACTED WATERBODY	CAUSE OF IMPAIRMENT	SOURCE OF IMPAIRMENT
TN08010100001_2000 Mississippi River (Tennessee side) from confluence of Loosahatchie River to confluence of Hatchie River.	PCBs, Dioxin, Chlordane, Habitat Alteration	Dredging, Contaminated Sediment
TN08010209001_0100 Todd Branch	Low DO, Habitat Alteration, E. Coli	Discharges from MS4 area, Channelization, Collection System Failure
TN08010209001_1000	Mercury, PCBs, Dioxins, Chlordane,	Atmospheric Deposition, Discharges from MS4 area, Contaminated Sediment,

SECTION 4 – SPECIAL CONDITIONS

Loosahatchie River from mouth on Mississippi River to Big Creek	Siltation, Habitat Alteration, E. Coli	Channelization
TN08010209002_0100 Unnamed Trib to Loosahatchie River	E. Coli	Discharges from MS4 area
TN08010209002_0200 Rocky Branch	E. Coli	Discharges from MS4 area
TN08010209002_0400 Oliver Creek	Phosphorus, Siltation, E. Coli, Siltation	Discharges from MS4 area, Land Development
TN08010209002_0500 Buckhead Creek.	Phosphorus, Low DO, Siltation, E. Coli	Discharges from MS4 area Land Development
TN08010209002_0700 Howard Creek	Phosphorus, E. Coli	Discharges from MS4 area
TN08010209002_1000 Loosahatchie River from Big Creek to Howard Creek	Mercury, PCBs, Dioxins, Chlordane, Siltation, Habitat Alteration, E. Coli	Atmospheric Deposition, Contaminated Sediment, Discharges from MS4 area Land Development, Channelization
TN08010209002_2000 Loosahatchie River from Howard Creek to Cypress Creek.	Phosphorus, Siltation, Habitat Alterations, E. Coli	Municipal Point Source Discharge, Discharges from MS4 area, Channelization, Land Development
TN08010209016_0100 West Beaver Creek from Beaver Creek to headwaters.	Phosphorus, Habitat Alterations, Siltation, Low DO	Channelization, Non-irrigated Crop Production
TN08010209016_0200 Middle Beaver Creek	Phosphorus, Habitat Alterations, Siltation, Low DO	Channelization, Non-irrigated Crop Production
TN08010209016_0300 East Beaver Creek from Beaver Creek to headwaters.	Phosphorus, Habitat Alterations, Nitrate/Nitrite, Siltation, Low DO	Non-irrigated Crop Production
TN08010209016_1000 Beaver Creek	Phosphorus, Habitat Alterations, Siltation, Low DO	Channelization, Non-irrigated Crop Production
TN08010209021_0100 Jakes Creek from Big Creek to headwaters.	Phosphorus, Siltation, E. Coli	Non-irrigated Crop Production, Unknown Source
TN08010209021_0110 Bear Creek from Jakes Creek to headwaters.	Phosphorus, Low DO, E. Coli	Non-irrigated Crop Production, Grazing in Riparian or Shoreline Zones
TN08010209021_0200 Royster Creek from Big Creek to	Phosphorus, Habitat Alterations, Siltation, Low DO, E. Coli	Channelization, Non-irrigated Crop Production, Grazing in Riparian or

SECTION 4 –SPECIAL CONDITIONS

headwaters.		Shoreline Zones
TN08010209021_0300 North Fork Creek from Big Creek to headwaters.	Phosphorus, Habitat Alterations, Siltation, Low DO, E. Coli	Channelization, Non-irrigated Crop Production, Discharges from MS4 area
TN08010209021_0600 Crooked Creek Canal	Phosphorus, Habitat Alterations, Siltation, Low DO, E. Coli	Channelization, Non-irrigated Crop Production, Discharges from MS4 area
TN08010209021_1000 Big Creek from Loosahatchie River to confluence of Crooked Creek.	Low DO, Nitrates/Nitrites, Phosphorus, Habitat Alteration, Siltation, E. Coli	Discharges from MS4 area, Municipal Point Source Discharge, Channelization
TN08010209021_2000 Big Creek from confluence of Crooked Creek to Big Branch.	Low DO, Phosphate, Habitat Alteration, Siltation, E. Coli	Discharges from MS4 area, Channelization
TN08010209021_3000 Big Creek from Big Branch to headwaters.	Phosphorus, Low DO, Habitat Alteration, Siltation, E. Coli	Channelization, Non-irrigated Crop Production, Discharges from MS4 area
TN08010210001_0100 Harrington Creek	Arsenic, Phosphate, Low DO, E. Coli	Discharges from MS4 area
TN08010210002_2000 Wolf River from Highway 177 to Grays Creek.	Lead, Loss of biological integrity due to Siltation, E. Coli	RCRA Hazardous Waste Site Channelization Discharges from MS4 area
TN08010210003_0100 Johnson Creek from Wolf River to headwaters.	E. Coli	Grazing in Riparian or Shoreline Zones
TN08010210003_1000 Wolf River from Grays Creek to Shaws Creek.	Lead	RCRA Hazardous Waste Site
TN08010210022_0100 Unnamed trib to Grays Creek	Siltation, Habitat Alteration, Phosphate, Low DO, E. Coli	Discharges from MS4 area
TN08010210022_0300 Marys Creek from Grays Creek to SR 205	Siltation, Phosphate, Low DO, E. Coli	Discharges from MS4 area Upstream Impoundment
TN08010210022_0350 Marys Creek from SR 205 to Herb Parsons Lake Dam	Low flow alterations, E. Coli	Grazing in Riparian or Shoreline Zones, Upstream Impoundments (PI-566 NRCS Structures)
TN08010210022_1000 Grays Creek	Arsenic, Copper, Lead, Phosphate, Habitat Alterations, Loss of biological integrity due to siltation	Discharges from MS4 area Nonirrigated Crop Production Channelization

SECTION 4 – SPECIAL CONDITIONS

TN08010210023_0200 Unnamed trib to Fletcher Creek (near La Grange Road) from Fletcher Creek to headwaters.	Low DO, Phosphate, E. Coli	Pasture Grazing, Discharges from MS4 area, Channelization
TN08010210023_1000 Fletcher Creek	Lead, Low DO, Phosphate, Habitat Alterations, Arsenic, E. Coli	Grazing in Riparian or Shoreline Zones, Channelization, Discharges from MS4 area
TN0801021100720_0200 Unnamed trib to Nonconnah Creek	Low DO, Phosphate, Loss of biological integrity due to siltation, E. Coli	Discharges from MS4 area, Land Development
TN0801021100720_0300 Unnamed trib to Nonconnah Creek	Siltation, Phosphorus	Specialty Crop Production
TN0801021100720_0400 Unnamed trib to Nonconnah Creek	Siltation, Phosphorus, E. Coli	Sources Outside State Jurisdiction or Borders
TN0801021100720_0410 Unnamed trib to Unnamed trib to Nonconnah Creek	Low DO, Siltation, Phosphorus, E. Coli	Grazing in Riparian or Shoreline Zones, Sources Outside State Jurisdiction or Borders
TN0801021100720_0500 Unnamed trib to Nonconnah Creek	Low DO, Siltation, Phosphorus, E. Coli	Sources Outside State Jurisdiction or Borders
TN0801021100720_2000 Nonconnah Creek from gaging station at Winchester Road to confluence of unnamed trib (near Bailey Road).	Low DO, Loss of biological integrity due to siltation, Habitat Alterations, E. Coli	Discharges from MS4 area, Channelization
TN0801021100720_3000 Nonconnah Creek from confluence of unnamed trib near Bailey Road to headwaters near Mississippi stateline.	Habitat Alterations, E Coli	Discharges from MS4 area, Channelization

TABLE 4.1 - Impaired Streams and Other Water Bodies

Shelby County must determine whether stormwater discharges from any part of the MS4 contribute pollutants of concern to an impaired water body. From the prior table, *Table 4.2* lists only the impaired stream segments in which the Shelby County MS4 is listed as a source of impairment. The requirements of the Shelby County MS4 permit require Shelby County to perform additional testing and duties to monitor and reduce pollution from entering these streams.

SC MS4 listed Impaired Stream Segments

Segment ID	Segment Name
TN08010209001_0100	Todd Branch
TN08010209001_1000	Loosahatchie River
TN08010209002_0100	Unnamed Trib to Loosahatchie River

SECTION 4 –SPECIAL CONDITIONS

TN08010209002_0200	Rocky Branch
TN08010209002_0400	Oliver Creek
TN08010209002_0500	Buckhead Creek
TN08010209002_0700	Howard Creek
TN08010209002_1000	Loosahatchie River
TN08010209002_2000	Loosahatchie River
TN08010209021_0300	North Fork Creek
TN08010209021_0600	Crooked Creek Canal
TN08010209021_1000	Big Creek
TN08010209021_2000	Big Creek
TN08010209021_3000	Big Creek
TN08010210001_0100	Harrington Creek
TN08010210002_2000	Wolf River
TN08010210022_0100	Unnamed trib to Grays Creek
TN08010210022_0300	Marys Creek
TN08010210022_1000	Grays Creek
TN08010210023_0200	Unnamed trib to Fletcher Creek
TN08010210023_1000	Fletcher Creek
TN0801021100720_0200	Unnamed trib to Nonconnah Creek
TN0801021100720_2000	Nonconnah Creek
TN0801021100720_3000	Nonconnah Creek

TABLE 4.2 - 303(d) Listed Waters where Shelby County MS4 as a Source of Impairment

Discharges into Water Bodies with Approved TMDLs

Section 303(d) of the Clean Water Act establishes the Total Maximum Daily Load (TMDL) program. For those impaired waters, the MS4 must determine whether or not a total maximum daily load (TMDL) has been established and approved by the Environmental Protection Agency (EPA).

A TMDL is a study that:

- Quantifies the amount of a pollutant in a stream,
- Identifies the sources of the pollutant, and
- Recommends regulatory or other actions that may need to be taken in order for the stream to cease being polluted.

Basically, the TMDL is the amount of pollution, or loading, that a stream can intake and still meet its intended uses. It might be necessary to lower the amount of pollutants being discharged under NPDES permits or to require the installation of other control measures, if necessary, to ensure that water quality standards will be met. The TMDL can also be described by the following equation:

$$\text{TMDL} = \text{sum of nonpoint sources} + \text{sum of point sources} + \text{margin of safety}$$

The TMDL equation sets a TMDL "budget", which is an allocation for the amounts of pollutants that can be discharged from each category. Pollutants from the Shelby County MS4

are a nonpoint source. The TMDL does not specify how the dischargers must attain their particular load allocation. In other words, the TMDL will not set best management practices for a discharger or otherwise tell the discharger how to meet their goal, it merely sets their goal.

The MS4 must implement storm water pollutant reductions consistent with assumptions and requirements of any applicable wasteload allocation(s) in TMDLs established or approved by EPA. If an MS4 discharges into a water body with an approved or established TMDL, then the Stormwater Management Program must include BMPs specifically targeted to achieve the wasteload allocations prescribed in the TMDL. *Table 4.3* summarizes the data obtained from the 2012 303(d) List as well as that obtained from the TDEC website for EPA-Approved TMDLs. *Figure 4.4* graphically shows the stream segment for Shelby County.

TABLE UPDATED 12/31/2013

TMDLs affecting the Shelby County Stormwater Program

• Nonconnah Creek – Chlordane, Dioxins & PCBs	June 10, 2009
• Nonconnah Creek – E. Coli	June 17, 2011
• Loosahatchie River – Chlordane, Dioxins & PCBs	Aug. 15, 2008
• Loosahatchie River – E. Coli	July 27, 2011
• Wolf River – E. Coli	Aug. 13, 2007
• Wolf River – Metals	May 30, 2013
• Wolf River – PCBs	Dec. 13, 2007
• Wolf River – Dioxins	July 27, 2011
• Mississippi River – Chlordane, Dioxins & PCBs	June, 25, 2008

TABLE 4.3 - 303(d) Listed Waters within Shelby County MS4 with TMDLs

Each TMDL lists the stream segments it covers, as well as, assigning a Wasteload Allocation (WLA) to the each potential source of pollutants, such as, the Shelby County MS4. Tables 4.5.1 through 4.5.9 list the stream segments covered by a TMDL and the WLA for those pollutants. For pollutants that have a wasteload allocation of 0 sources of these pollutants should no longer be available to citizens due to their banned ingredients and the only way to get releases of the pollutants into the collection system would be by disturbing soils or properties that have quantities of these chemicals mixed into the soil. For these cases the stormwater programs goal it to control sediment runoff and minimize erosion and scour from flood waters. For the other pollutants the stormwater program will carry out the various control measures specified in the stormwater management program detailed in section 5 of this plan.

Protection of State or Federally Listed Species

The Shelby County Stormwater Program must annually evaluate whether or not storm water discharges, allowable non-storm water discharges and discharge-related activities are likely to jeopardize the continued existence of any state or federally listed species or result in the adverse modification or destruction of habitat that is designated as critical under the ESA (critical habitat). Listed species are referenced on the TDEC Division of Natural Areas website and the Fish and Wildlife Service websites, <http://state.tn.us/environment/na/data.shtml> and <http://endangered.fws.gov/wildlife.html>. The lists are provided at *Appendix 4* and are current as of the publication date of this SWMP. *Appendix 4* shall be updated, if required, during the annual review.

Evaluation Procedure Using the lists available at the above referenced websites, the Permit provides three criteria from which Shelby County can choose to evaluate whether or not discharges are negatively impacting upon the listed species. Documentation of the evaluations

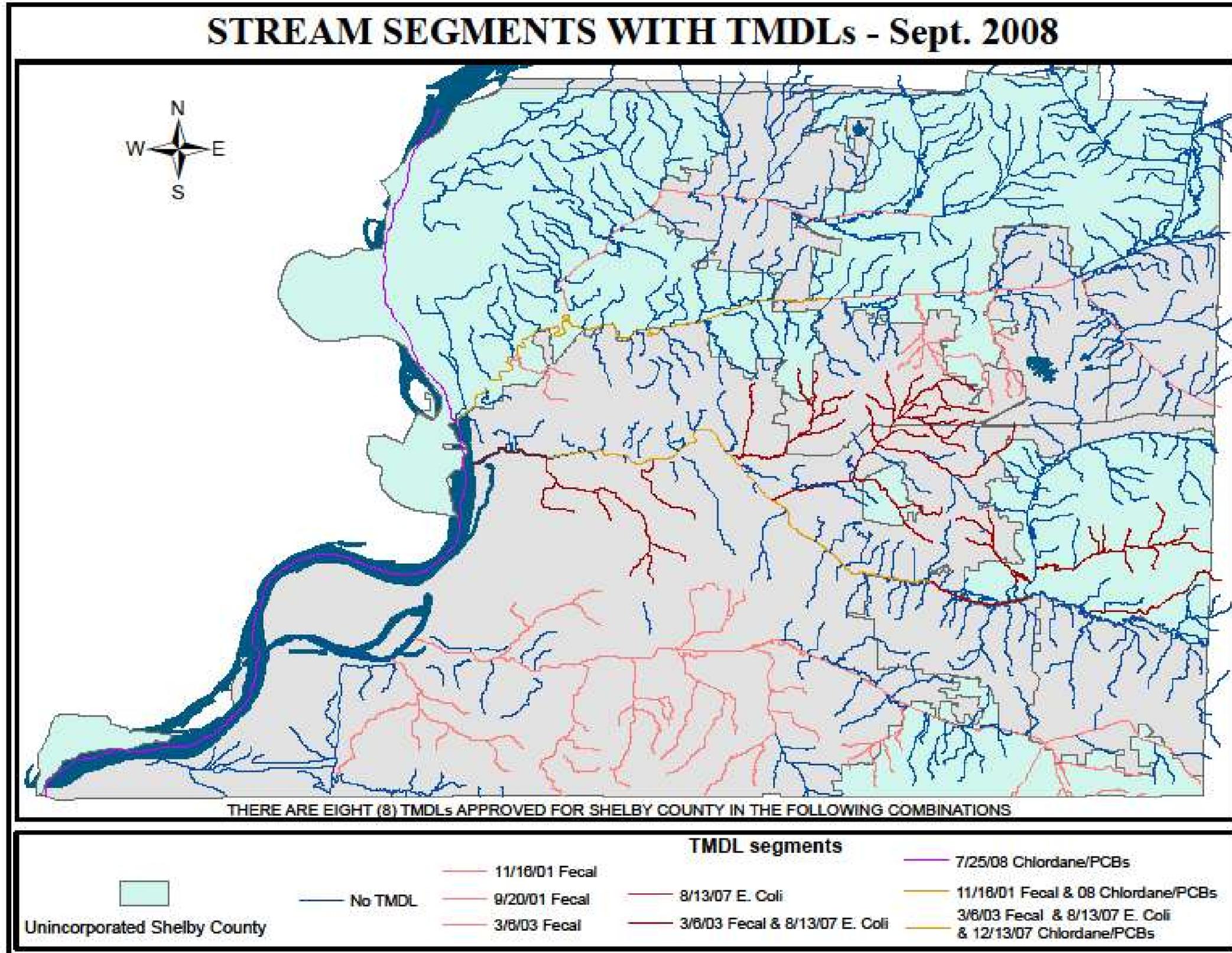


Figure 4.4 – Stream Segments with TMDLs

Figure 4.5.1 – WLA for Nonconnah Creek, Chlordane, Dioxins & PCBs

Figure 4.5.2 – WLA for Nonconnah Creek, *E. Coli*

Figure 4.5.2 (Continued) – WLA for Nonconnah Creek, *E. Coli*

Figure 4.5.3 – WLA for Loosahatchie River, Chlordane, Dioxins &PCBs

Figure 4.5.4 – WLA for Loosahatchie River, E.Coli

Figure 4.5.4 (Continued) – WLA for Loosahatchie River, E.Coli

Figure 4.5.5 – WLA for Wolf River, E.Coli

Figure 4.5.5 (Continued) – WLA for Wolf River, E.Coli

Figure 4.5.6 – WLA for Wolf River, Metals

Figure 4.5.6 (Continued) – WLA for Wolf River, Metals

Figure 4.5.6 (Continued) – WLA for Wolf River, Metals

Figure 4.5.6 (Continued) – WLA for Wolf River, Metals

Figure 4.5.7 – WLA for Wolf River, PCBs

Figure 4.5.8 – WLA for Wolf River, Dioxins

Figure 4.5.9 - WLA for Mississippi River, Chlordane, Dioxins and PCBs

SECTION 4 –SPECIAL CONDITIONS

and decisions reached through the evaluation are included in this plan at Appendix 4 and are submitted as part of the annual report.

- a. Criterion A: *“No state or federally listed species or critical habitats are in proximity to your MS4 or the point where authorized discharges reach the receiving water”*. There are several federal listed species within the jurisdictional boundaries of the Shelby County Stormwater Program, therefore, this criterion does not apply.
- b. Criterion B: *“The MS4 has evaluated the effects of its storm water discharges, allowable non-storm water discharges and discharge-related activities on state and federally listed species and critical habitat and do not have reason to believe the discharge and/or discharge-related activities will jeopardize the continued existence of any state or federally listed species or result in the adverse modification or destruction of critical habitat.”* Shelby County uses this criterion for listed species evaluation. Consultations with the TDEC Division of Natural Areas, the US Fish and Wildlife Agency and the Tennessee Wildlife Resources Agency are part of this evaluation.
- c. Criterion C: *“Storm water discharges, allowable non-storm water discharges and/or discharge related activities from the MS4 were already addressed in another operator’s certification of eligibility included with the MS4’s activities. By certifying eligibility, the MS4 agrees to comply with any measures or controls upon which the operator’s certification was based.*

Co-permittees and Coordinated Programs

Co-permittees The Permit allows multiple MS4s to share permit responsibilities under a single NOI. As of the publication date of the SWMP, Shelby County does not participate as a co-permittee under a single NOI.

Coordinated Programs Implementation of one or more of the minimum measures described in section 4.2 of the Permit may be shared with another entity, or the entity may fully take over the measure. As of the publication date of the SWMP, Shelby County does not participate in a coordinated program.

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

Program Background

To reduce the discharge of pollutants from the Shelby County MS4, to protect water quality and to satisfy water quality requirements of the Clean Water Act, Shelby County has developed, implemented, and enforces a Storm Water Management Program. The Storm Water Management Program follows Shelby County Ordinance #292 which established a new chapter 30 in the Shelby County Code of Ordinances entitled “Storm Water Management and Control.” This ordinance gives the Shelby County Stormwater Program authority under TCA §68-221-1106 to enforce specific management practices; control techniques, system design and engineering methods.

The objectives of this ordinance are:

1. To protect public health, safety and general welfare.
2. To eliminate any non-allowable discharges to Shelby County’s MS4 that adversely impact water quality.
3. To provide for the sound use and development of all flood-prone areas in such a manner as to maximize beneficial use without increasing flood hazard potential or diminishing the quality of the natural storm water resources.
4. To provide for sound fiscal management of the community and maintain a stable tax base by providing appropriate fees and other dedicated funding sources for the administration of the watershed management program.
5. To increase the awareness of the public, property owners and potential homebuyers regarding storm water impacts (i.e. flooding, erosion).
6. To minimize prolonged business interruptions.
7. To minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, storm and sanitary sewer lines; and streets and bridges.
8. To promote a functional public and private storm water management system that will not result in excessive maintenance costs.
9. To encourage the use of natural and aesthetically pleasing design that maximizes preservation of natural areas.
10. To promote the use of comprehensive watershed management plans.
11. To encourage preservation of floodplains, floodways and open spaces.
12. To encourage community stewardship of Shelby County’s water resources.
13. It is further the purpose of this Chapter to enable Shelby County to comply with the NPDES Permit and applicable regulations (at 40 CFR 122.32-35) for storm water discharges.

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

This section of the SWMP outlines Shelby County’s Storm Water Management Program and the policies and procedures used to implement the minimum control measures and requirements of section 4 of the Permit. The SWMP is intended to be the written document outlining the requirements under the Shelby County MS4 permit and the Shelby County Storm Water Program is the mechanism used to carry out the plan.

The SWMP includes the following information for each of the six minimum control measures described in section 4.2 of the permit:

- a) The best management practices (BMPs) implemented for each of the storm water minimum control measures;
- b) The measurable goals for each of the BMPs including, as appropriate, the months and years in which the MS4 will undertake required actions, including interim milestones and the frequency of the action; and;
- c) The person or persons responsible for implementing or coordinating the BMPs for the SWMP;
- d) Pollutant control efforts for all municipal-operated facilities that maintain or store motorized equipment, oils, or other hazardous materials;
- e) All inspection and monitoring programs shall be described in detail in the SWMP.

The Permit requires all elements of the minimum control measures to be in place upon the effective date of the permit with the exception of those items listed in the table below:

Permit Requirement	Description	Implementation Date
4.2.1	Develop a Public Involvement and Education (PIE) plan.	Within 12 months of coverage under this permit (June 2012)
4.2.2	Develop and implement a method of advertising public involvement opportunities	Within 30 days of coverage under this permit (July 2011)
4.2.3	Develop and implement an appropriate Enforcement Response Plan (ERP).	Within 18 months of coverage under this permit (December 2012)
4.2.4	All updates to construction site runoff control program.	Within 24 months of coverage under this permit (June 2013)
4.2.4.a	Modifications to ordinance or other regulatory mechanism for construction site runoff control program consistent with requirements of current NPDES general permit for construction storm water runoff.	Within 18 months of coverage under this permit or following the reissuance of the Construction General Permit.
4.2.4.d	Develop and maintain an inventory of all active public and private construction sites that result in a total land disturbance as defined in section 4.2.4.	Within 12 months of coverage under this permit (June 2012) and must be updated as new projects are permitted and projects are completed.
4.2.5.3	Review local codes and ordinances using the EPA Water Quality Scorecard.	Within one year of obtaining permit coverage (June 2012).
4.2.5.3	Update codes and ordinances, if necessary.	Within 4 years of coverage under this permit (June 2015)
4.2.5.6	Inventory and Tracking of Best Management Practices	Within 180 days of coverage under this permit (December

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

		2011).
4.2.5	Revisions to ordinances or other regulatory mechanisms for permanent storm water management to accommodate green infrastructure BMPs.	Within 48 months of coverage under this permit (June 2015).

Table 5.1 - Minimum Control Measures Implementation Time-line

MINIMUM CONTROL MEASURES

Public Education and Outreach

The Permit requires Shelby County to implement a public education and outreach program that focuses on the impacts of storm water discharges to water bodies and the steps that the public (along with commercial, industrial, or institutional entities) can take to reduce pollutants in storm water runoff. Additionally, the program must target specific pollutants and sources that may cause or contribute to impairment.

Shelby County has developed several best management practices (BMPs) to meet this minimum control measure. The following summarizes those BMPs. Detailed information concerning the implementation of these programs, including a listing of educational presentations, is located in Appendix 5.

1.

BMP	Present education on stormwater
Measurable Goal	Make presentations on water quality and storm water issues at public events. Target - 1 Tennessee Smart Yards presentation per year, 1 participation in Annual Earthday Event at Shelby Farms, 4 other presentations per year.
Primary Contact	Storm Water Coordinator
Pollutants of Concern	Sediments, nutrients, pathogens, trash and debris, pesticides, petroleum products.
Monitoring Requirements	Document number of presentations presented.

2.

BMP	Hot Line
Measurable Goal	Maintain a telephone number dedicated to water quality and storm water related complaints and issues. County currently receives tracks and handles complaints. Target is to investigate 100% of complaints with 72 hours.
Primary Contact	Storm Water Coordinator
Pollutants of Concern	Sediments, nutrients, pathogens, pesticides, petroleum products, illegal dumping.
Monitoring Requirements	Document number of complaints handled.

3.

BMP	Web Site
Measurable Goal	Up to-date information on county storm water program and activities posted on the internet. Information on the storm water in Shelby County; regulatory requirements; educational materials; information on public participation.
Primary Contact	Storm Water Coordinator
Pollutants of Concern	Sediments, nutrients, pathogens, pesticides, petroleum products, illegal dumping.
Monitoring Requirements	Document number of site visits.

4.

BMP	Drain Markers on Storm Drain Inlets
Measurable Goal	Shelby County adheres drainage markers indicating that a

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

	particular storm drain leads directly to a creek or pond.
Primary Contact	Storm Water Coordinator
Pollutants of Concern	Nutrients, , pesticides, petroleum products, illegal dumping.
Monitoring Requirements	Document number of markers applied.

5.

BMP	Public Service Announcements
Measurable Goal	Radio Ads, printed media. Scope will depend on cost and participation of neighborhood MS4s pooling resources for region-wide PSAs.
Primary Contact	Storm Water Coordinator
Pollutants of Concern	Sediments, nutrients, pathogens, pesticides, petroleum products, illegal dumping.
Monitoring Requirements	Document number of airtime announcements played.

6.

BMP	Informational Pamphlets
Measurable Goal	Make available to the public 6 different educational pamphlets, including Landscaping, Gardening & Pest Control; Food Service Industry; Automotive Maintenance & Car Care; Heavy Equipment & Earth Moving Activities; Detention Pond Maintenance and Home Repair & Remodeling
Primary Contact	Storm Water Coordinator
Pollutants of Concern	Sediments, nutrients, pathogens, pesticides, petroleum products, illegal dumping.
Monitoring Requirements	Document number of pamphlets distributed.

In addition to the established BMPs identified above, Shelby County must develop a Public Information and Education Plan (PIE) that details specific goals and specific public information events/activities that will occur over the remainder of the permit cycle. As noted in the requirements section above, the PIE is required by the end of the first year of permit coverage. The following summarizes this BMP. The PIE is located in Appendix 6.

7.

BMP	Public Information and Education Plan (P.I.E.)
Measurable Goal	By the end of the first year of permit coverage, develop a PIE that details specific goals and specific public information events/activities that will occur over the remainder of the permit cycle.
Primary Contact	Storm Water Coordinator
Pollutants of Concern	Sediments, nutrients, pathogens, trash and debris, pesticides, petroleum products, illicit discharges.
Monitoring Requirements	As specified in the P.I.E.

Public Involvement/Participation

The Permit requires Shelby County to implement a public involvement/participation program. Such program shall comply with all applicable state and local public notice requirements. The program shall encourage and promote citizen reporting of illegal spillage, dumping, or otherwise illicit disposal of materials into the MS4 system. Additional requirements include publicize program participation opportunities by methods designed to reach the intended audience, facilitate opportunities for citizen involvement through activities, continue to develop and implement a method of advertizing the public involvement, and track and maintain records of public involvement and participation activities.

Although this minimum measure is listed separate from the Public Education and Outreach minimum control measure, both programs overlap each other and contain some of the same BMPs. The following summarizes those BMPs.

Method of Advertising Public Opportunities

Shelby County Government is required to follow specific meeting notification requirements per the Tennessee Public Records Act, which is found in Tennessee Code Annotated 10-7-101 and the sections that follow it. This Act requires administrative agencies to do their work in public, and as a result, the process is sometimes called "government in the sunshine" or the "sunshine law". This law requires open meetings and mandates that certain procedures be followed before a public meeting is held.

All public educational opportunities, informational meetings, requests for public comments, publication of the SWMP's annual report and any other program elements that need publication will be sent through the County's Public Information Officer and notification shall be made through the County's protocols. Notification of meetings and requests for comments will typically be posted on the County's website and distributed through various electronic media, such as, faxes and emails. The PIO maintains email lists in multiple categories, so that specific levels of volunteer or neighborhood groups can be targeted, as well as, mass notification of all media outlets. A listing of the media organizations typically sent notice is given in *Table 5.1* below. A record of individual email addresses is kept by the stormwater program coordinator and may be available upon request.

ABC 24 Eyewitness News	Laprensa Latina	Tri-State Defender
Action Five News Desk	Memphian Newspaper	WDIA Radio
Associated Press, Johnson City	Memphis Business Journal	West Tennessee Examiner
Associated Press, Knoxville	Memphis Chamber	WGKX Radio
Associated Press, Memphis	Memphis Chinese Times	WHBQ Radio
Associated Press, Nashville	Memphis Daily News	WHBR Radio
Bartlett Express	Memphis Flyer	WKNO TV & Radio
BOTT Radio	Memphis Library Information	WLOK Radio
Christian Examiner Newspaper	Mid-South Tribune	WMC TV
Collierville Herald	Millington Star	WREC Radio
Commercial Appeal	Rock 103	WREG Radio
Covington Leader Newspaper	Tennessee Business Leader	WREG TV
El Horizonte Latino Newspaper	The Epoch Times	WTON Radio
Germantown News	The Weather Channel	WYPL Radio

TABLE 5.2 – Sample Notification List of Media Outlets

Pollutants of Concern

The permit requires the County to target specific sources, or "*hot spots*" that may cause or contribute to impairment of waters of the state. *Hot spots* are areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those activities typically found in stormwater. Examples might include operations producing concrete or asphalt, auto repair shops, auto supply shops, large commercial parking areas and restaurants.

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

Commercial and industrial areas within the area have a greater potential to contribute more toxic types and higher levels of pollutants to the storm water convenience system. Besides the types of products used by commercial and industrial facilities and the waste or by-products produced as a result of their activities, most commercial and industrial properties have large paved parking lots. These asphalt or concrete surfaces are impervious, which means that almost 100% of the rainfall that hits them is will runoff. The primary potential storm water pollutants associated with parking lots are oil, gasoline, antifreeze, transmission fluid, battery acid, and other fluids leaking from parked vehicles. During winter storms events these lots may also accumulate large concentrations of salt and cinder material spread on roadways by Shelby County and other municipalities to provide traction and melt ice. These types of facilities also tend to be sources of improperly disposed trash and debris. Commercial areas also tend to have landscaped frontages to attract customers. Pollutants associated with commercially landscaped areas include, applied fertilizers, herbicides, and pesticides; grass clippings, leaves, and other natural organic materials. For these reasons, this plan identifies all commercial and industrial properties as “hot spots” and the Shelby County Storm Water Program will focus its management practices in these areas.

1.	BMP	Public Meetings.
	Measurable Goal	Host in conjunction two public meetings per year. Provide educational material and attend meeting to accept input and communicate the goals of the Shelby County Storm Water Program
	Primary Contact	Storm Water Coordinator
	Monitoring Requirements	Document attendance and meeting topics covered.
2.	BMP	Chickasaw Basin Authority.
	Measurable Goal	Participate as appointed board member. Membership is established by State Charter and crosses multi jurisdictional boundaries. Its purpose is to provide oversight and coordination of water resources as well as coordination with Federal and State Agencies concerning plans, programs and construction projects. Also used as a sounding board for citizen needs and complaints.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirements	Document attendance and meeting topics covered.
3.	BMP	Citizens Group involved in stream clean-up.
	Measurable Goal	Participate with one or more groups, such as the Wolf River Conservancy or Sierra Club to involve citizens in stream clean-up events.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirements	Document numbers of events and trash removed.
4.	BMP	Household Hazardous Waste Facility.
	Measurable Goal	Shelby County runs a Countywide Household Hazardous Waste Facility that accepts common pollutants, such as, .
	Primary Contact	Public Works Department
	Monitoring Requirements	To be determined as part of program development.
5.	BMP	Additional citizen group involvement.
	Measurable Goal	Adopt-a-stream programs, possibly including riparian zone protection; citizen monitoring of streams. MS4's role is to initiate or respond to requests and assist in organizing and supporting these groups and programs.
	Primary Contact	Storm Water Coordinator

Monitoring Requirements	To be determined as part of program development.
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Illicit Discharge Detection and Elimination

Shelby County has developed, implements and enforces an illicit discharge detection and elimination program. Shelby County has developed several BMPs to meet this minimum control measure. Detailed information concerning the implementation of these programs is located in Appendix 5.

The following are common sources of illicit discharges to an MS4:

- | | |
|-------------------------------|------------------------------------------------|
| Sanitary wastewater | Effluent from septic tanks |
| Car wash wastewaters | Improper oil disposal |
| Radiator flushing disposal | Laundry wastewaters/gray water |
| Spills from roadway accidents | Improper disposal of auto and household toxics |
| Carpet cleaning wastewaters | |

The following language is from the Shelby County Storm Water Ordinance and gives the context in which the stormwater program operates.

ARTICLE II

ILLICIT DISCHARGES

SEC. 30-107 UNAUTHORIZED DISCHARGE A PUBLIC NUISANCE

Discharge of storm water in any manner in violation of this Chapter; or any violation of any condition of a permit issued pursuant to this Chapter; or any violation of any condition of a storm water discharge Permit issued by the State of Tennessee Department of Environment and Conservation is hereby declared a public nuisance and shall be corrected or abated.

SEC. 30-108 IMPROPER DISPOSAL AND ILLICIT DISCHARGES

(A) It shall be unlawful for any person to improperly dispose any contaminant into the Shelby County MS4. Contaminants include, but are not limited to the following:

- 1) Trash or debris;
- 2) Construction materials;
- 3) Petroleum products including but not limited to oil, gasoline, grease, fuel oil, or hydraulic fluids;
- 4) Antifreeze and other automotive products;
- 5) Metals in either particulate or dissolved form;
- 6) Flammable or explosive materials;
- 7) Radioactive material;
- 8) Batteries, including but not limited to, lead acid automobile batteries, alkaline batteries, lithium batteries, or mercury batteries;
- 9) Acids, alkalis, or bases;
- 10) Paints, stains, resins, lacquers, or varnishes;
- 11) Degreasers and/or solvents;
- 12) Drain cleaners;
- 13) Pesticides, herbicides, or fertilizers;
- 14) Steam cleaning wastes;
- 15) Soaps, detergents, or ammonia;
- 16) Swimming pool backwash including chlorinated swimming pool discharge;

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

- 17) Chlorine, bromine, and other disinfectants;
- 18) Heated water;
- 19) Animal waste from commercial animal or feeder lot operations;
- 20) Any industrial and sanitary wastewater, including leaking sewers or connections;
- 21) Recreational vehicle waste;
- 22) Animal carcasses;
- 23) Food wastes;
- 24) Medical wastes;
- 25) Collected lawn clippings, leaves, branches, bark, and other fibrous materials;
- 26) Collected silt, sediment, or gravel;
- 27) Dyes, except as stated in subsection (B);
- 28) Chemicals, not normally found in uncontaminated water;
- 29) Any hazardous material or waste, not listed above;
- 30) Washing of fresh concrete for cleaning and/or finishing purposes or to expose aggregates;
- 31) Junk motor vehicles, as defined in subsection (C);
- 32) Liquid from solid waste disposal containers.

Penalties for minor discharges that have no significant adverse impact on safety, health, the welfare of the environment, or the functionality of the County's storm water collection system may be waived at the discretion of the Manager.

(B) DYE TESTING

Dye testing is allowed but requires verbal notification to the Manager a minimum of twenty-four (24) hours prior to the date of the test. The City of Memphis and Shelby County governmental agencies are exempt from this requirement.

(C) JUNK MOTOR VEHICLES, DEFINITION THEREOF

"Junk motor vehicle" means any vehicle which shall include by way of example but not be limited to the following vehicle types:

automobiles, construction equipment, motorcycles, and trucks, which meets all of the following requirements:

- 1) Is three years old or older;
- 2) Is extensively damaged, such damage including, but not limited to any of the following: A broken window or windshield or missing wheels, engine or transmission;
- 3) Is apparently inoperable;
- 4) Is without a valid current registration;
- 5) Has a fair market value equivalent only to the value of the scrap in it.

SEC. 30-109 EXCEPTIONS, ALLOWABLE DISCHARGES

The following types of discharges shall not be considered prohibited discharges for the purpose of this Chapter unless the Manager determined that the type or quantity of discharge, whether singly or in combination with others, is causing significant contamination of the Shelby County MS4.

- 1) Potable water;
- 2) Potable water line flushing;
- 3) Air conditioning condensate;
- 4) Discharges from emergency fire fighting activities and exercises (A Storm Water Pollution Prevention Plan should be prepared to address discharges or flows from fire fighting only where such discharges are identified as significant sources of pollutants to waters of the United States);

- 5) Uncontaminated water from crawl space, pumps or footing drains;
- 6) Lawn watering;
- 7) Residential car and boat washing;
- 8) De-chlorinated swimming pool water;
- 9) Materials placed as part of an approved habitat restoration or bank stabilization project;
- 10) Rising ground waters, uncontaminated ground water infiltration, uncontaminated pumped ground water, uncontaminated springs, diverted stream flows; riparian habitats and wetlands;
- 11) Flows from riparian habitats and wetlands;
- 12) Common practices for water well disinfections;
- 13) Discharges within the constraints of a National Pollutant Discharge Elimination System (NPDES) permit from the Tennessee Department of Environment and Conservation (TDEC);
- 14) Unless otherwise prohibited by this ordinance, any discharge that could be made directly to "Waters of the State" without a Federal or State permits being required;
- 15) Dye testing in compliance with SEC.30-108 (B);
- 16) Other types of discharges as determined by the Manager.

SEC. 30-110 ILLICIT CONNECTION, DEFINED

Any connection, existing or future, identified by the Manager, as that which could convey anything not composed entirely of storm water directly to the Shelby County MS4 is considered an illicit connection and is prohibited with the following exceptions:

- 1) Connections conveying allowable discharges as defined in SEC. 30-109.
- 2) Connections conveying discharges pursuant to an NPDES Permit (other than an NPDES Storm Water Permit).

Existing illicit connections must be stopped, at owner's expense.

SEC. 30-111 MONITORING AND INSPECTION

1) MONITORING

The Manager shall periodically monitor compliance of the storm water NPDES Permit holder.

2) DETECTION OF ILLICIT CONNECTIONS AND IMPROPER DISPOSAL

The Manager shall take appropriate steps to detect and eliminate illicit connections to the Shelby County MS4, including the adoption of programs to identify illicit discharges and their source or sources and provide for public education, public information and other appropriate activities to facilitate the proper management and disposal of used oil, toxic materials and household hazardous waste.

3) INSPECTIONS

- A) The Manager or his designee, bearing proper credentials and identification, may enter and inspect properties for inspections, investigations, monitoring, observation, measurement, enforcement, sampling and testing, to effectuate the provisions of this Chapter, the Storm Water Management Plan, and/or the NPDES Storm Water Permit. The Manager or his designee shall duly notify the owner of said property or the representative on site and the inspection shall be conducted at reasonable times.
- B) Upon refusal by any property owner to permit an inspector to enter or continue an inspection, the inspector shall terminate the inspection or confine the inspection to areas wherein no objection is

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

raised. The inspector shall immediately report the refusal and the circumstances to the Manager. The Manager may seek appropriate action.

- C) In the event the Manager or his designee reasonably believes that discharges into the Shelby County MS4 may cause an imminent and substantial threat to human health or the environment, the inspection may take place at any time and without notice to the owner of the property or a representative on site. The inspector shall present proper credentials upon request by the owner or representative.
- D) At any time during the conduct of an inspection or at such other times as the Manager or his designee may request information from an owner or representative, the owner or representative may identify areas of the facility or establishment, material or processes which contains or may contain a trade secret. If the Manager or his designee has no clear and convincing reason to question such identification, the inspection report shall note that trade secret information has been omitted. To the extent practicable, the Manager shall protect all information that is designated as a trade secret by the owner or their representative.

1.	BMP	Storm Water Management Pollution Control Program Ordinance.
	Measurable Goal	Update ordinance as changes occur to federal and state laws and regulations.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	Review as part of the Storm Water Management Program's annual review and update accordingly.
2.	BMP	Dry weather field monitoring (outfall inspections).
	Measurable Goal	Perform 20% of inspections per permit year.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	Review as part of the Storm Water Management Program's annual review and adjust schedule accordingly to ensure 100% outfall inspection in 5 year cycle.
3.	BMP	Enforcement Response Plan.
	Measurable Goal	Respond to illicit discharges within 7 days.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	To be determined as part of program development.
4.	BMP	Public Information and Education Plan.
	Measurable Goal	Update the PIE to detail specific goals and specific public information events/activities that will occur over the remainder of the permit cycle.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	As specified in the P.I.E.
5.	BMP	Citizens Request System.
	Measurable Goal	Respond to complaints/reports of illicit discharges within 48 hours.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	Track number of reports responded to and average response times. Review response procedures as part of the Storm Water Management Program's annual review.
6.	BMP	Storm sewer mapping utilizing the GIS.

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

Measurable Goal	Maintain mapping system current.
Primary Contact	Storm Water Coordinator
Monitoring Requirement	Update as new developments are built. Update as data from dry weather monitoring is received.

Construction Site Storm Water Runoff Control

Shelby County has developed, implements and enforces a construction site storm water runoff control program. Shelby County has developed several BMPs to meet this minimum control measure. The following summarizes those BMPs. Detailed information concerning the implementation of these programs is located in Appendix 5.

1.

BMP	Storm Water Management Pollution Control Program Ordinance.
Measurable Goal	Update ordinance as changes occur to federal and state laws and regulations.
Primary Contact	Storm Water Coordinator
Monitoring Requirement	Review as part of the Storm Water Management Program's annual review and update accordingly.

2.

BMP	Plan review for EPSC BMPs.
Measurable Goal	Review all construction plans submitted.
Primary Contact	Engineering Department, Land Development Engineer
Monitoring Requirement	Review process as part of the Storm Water Management Program's annual review and update accordingly.

3.

BMP	Enforcement Response Plan.
Measurable Goal	Respond to illicit discharges/complaints within 7 days.
Primary Contact	Storm Water Coordinator
Monitoring Requirement	To be determined as part of program development.

4.

BMP	Public Information and Education Plan.
Measurable Goal	By the end of the first year of permit coverage, develop a PIE that details specific goals and specific public information events/activities that will occur over the remainder of the permit cycle (April 2012).
Primary Contact	Storm Water Coordinator
Monitoring Requirement	As specified in the P.I.E.

5.

BMP	Citizens Request System.
Measurable Goal	Respond to complaints/reports of illicit discharges within 7 days.
Primary Contact	Storm Water Coordinator
Monitoring Requirement	Track number of reports responded to and average response times. Review response procedures as part of the Storm Water Management Program's annual review.

6.

BMP	Site inspections.
Measurable Goal	Perform a minimum of one inspection per month per active site discharging to impaired waters.
Primary Contact	Storm Water Coordinator
Monitoring Requirement	Track inspections conducted.

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

7.	BMP	Inspector training.
	Measurable Goal	All EPSC inspectors are certified by the Tennessee Department of Environment and Conservation in Fundamentals of Erosion Prevention and Sediment Control.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	Track certifications. Notify Department heads when training is due.

Permanent Storm Water Management in New Development and Redevelopment

Shelby County has developed, implements and enforces a program to address permanent (post construction) storm water runoff management from new development and redevelopment projects that disturb greater than or equal to once acre, including projects less than one acre that are part of a larger common plan of development or sale. Shelby County has developed several BMPs to meet this minimum control measure. The following summarizes those BMPs. Detailed information concerning the implementation of these programs is located in Appendix 5.

1.	BMP	Storm Water Management Pollution Control Program Ordinance.
	Measurable Goal	Update ordinance as changes occur to federal and state laws and regulations.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	Review as part of the Storm Water Management Program's annual review and update accordingly.
2.	BMP	Plan review for permanent storm water management.
	Measurable Goal	Review all construction plans submitted.
	Primary Contact	Engineering Department, Land Development Engineer
	Monitoring Requirement	Review process as part of the Storm Water Management Program's annual review and update accordingly.
3.	BMP	Citizens Request System.
	Measurable Goal	Respond to complaints/reports of illicit discharges within 7 days.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	Track number of reports responded to and average response times. Review response procedures as part of the Storm Water Management Program's annual review.
4.	BMP	Enforcement Response Plan.
	Measurable Goal	Respond to illicit discharges/complaints within 7 days.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	To be determined as part of program development.

Pollution Prevention/Good Housekeeping for Municipal Operations

Shelby County has developed and implements an operation and maintenance program that has the ultimate goal of preventing or reducing pollutant runoff from municipal operations. Shelby County has developed several BMPs to meet this minimum control measure. The

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

following summarizes those BMPs. Detailed information concerning the implementation of these programs is located in Appendix 5.

1.	BMP	Municipal Employee Training Program.
	Measurable Goal	Provide one-time general education training to all city employees. Provide recurring training once every five years to employees performing park and open space maintenance, fleet and building maintenance, new construction and land disturbance inspectors, and storm water system maintenance.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	Track and schedule training requirements.
2.	BMP	Basin Inspection Program.
	Measurable Goal	Inspect each municipally owned detention and retention basin at least once each year.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	Track and schedule basin inspections.
3.	BMP	Facilities Storm Water Operations Plan.
	Measurable Goal	Inspect each municipally owned facility once every five years for BMP adequacy.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	Track inspections. Adjust schedule as required to ensure each facility is inspected within five year cycle.
4.	BMP	Roadside litter pick-up Program.
	Measurable Goal	Remove trash from ditches and roadsides at least once per year and each municipal parking area at least 26 times each year.
	Primary Contact	Public Works Department
	Monitoring Requirement	Track progress. Adjust schedule as required to meet measurable goal.
4.	BMP	Standard Operating Procedures.
	Measurable Goal	Develop a standard operating procedure for municipal operations that may generate storm water pollution.
	Primary Contact	Storm Water Coordinator
	Monitoring Requirement	To be determined as part of program development.

Qualifying Tribe, State or Local Program (QLP)

A QLP is a MS4 Storm Water Management Program that has been formally approved by the division as having met QLP minimum program requirements related to storm water discharges associated with construction activity. Shelby County currently does not participate in this program.

Stormwater Management Program Review and Update

The Permit requires the MS4 to do an annual review of the Storm Water Management Program during the preparation of the annual report. This review will normally be accomplished during the months of July through September.

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

Changes and updates to the Storm Water Management Program can be made anytime during the life of the Permit in accordance with procedures in section 4.4 of the Permit.

Enforcement Response Plan

The Shelby County Stormwater Program will take actions as detailed in an *Enforcement Response Plan (ERP)* as necessary to notify and gain compliance with all of the requirements of the stormwater management program. The Enforcement Response Plan is included as a stand-alone document and is incorporated into this planning document as if it were included verbatim. The ERP is included as Appendix 5.

Enforcement Response Plan (ERP) is a matrix of enforcement actions to be taken for noncompliance incidents. Permittees are required to include in their ordinance, or other regulatory mechanism, penalty provisions to ensure compliance with construction requirements, to require the removal of illicit discharges, and to address noncompliance with post-construction requirements. In complying with these requirements, EPA recommends the use of enforcement responses that vary with the type of permit violation, and escalate if violations are repeated or not corrected. The MS4 must develop and implement an enforcement response plan (ERP), which clearly describes the action to be taken for common violations associated with the construction program, or other Stormwater Management Program elements. A well-written ERP provides guidance to inspectors on the different enforcement responses available, actions to address general permit non-filers, when and how to refer violators to the state, and how to track enforcement actions.

The following language is from the Shelby County Storm Water Ordinance and gives the context in which the stormwater program operates.

ARTICLE VI

ENFORCEMENT AND ABATEMENT

SEC. 30-145 ADMINISTRATIVE REMEDIES

The enforcement remedies enumerated herein shall be applicable to all articles of this Ordinance.

- 1) **NOTICE OF ALLEGED VIOLATION** Prior to the issuance of a Notice of Violation (N.O.V.), the Manager may order any person who causes or contributes, or may be a cause or contributor, to a violation of a of Storm Water Permit or order issued hereunder to show cause why a proposed enforcement action not be taken. A Notice of Alleged Violation (N.A.V.) shall be served on the person, specifying the time and place for the meeting, the proposed enforcement action and the reasons for such action, and a request that the person show cause why this proposed enforcement should not be taken. The N.A.V. and notice of the meeting shall be served personally or by registered or certified mail, with return receipt, and postmarked at least ten (10) business days prior to the hearing. Such notice may be served on any person, principal executive, general partner, corporate officer, or other person with apparent authority to receive such notice.
- 2) **NOTIFICATION OF VIOLATION** Whenever the Manager finds any permittee or person discharging storm water, or other pollutants into the Shelby County MS4 or otherwise, has violated or is violating this Chapter, conditions of a Storm Water Permit, or order issued hereunder, the Manager or his agent may serve upon said user written N.O.V. This notice shall be by personal service, or registered or certified mail with return receipt. Within ten (10) days of the receipt date of this notice, the recipient of this N.O.V. shall provide the Manager with a written explanation of the violation. The response shall also include a plan for satisfactory correction and prevention thereof, to include specified required actions and milestones for their completion. Submission of this plan in no way relieves the discharger

of liability for any violations occurring before or after receipt of the notice of violation. The Manager will render a response within twenty (20) days. If Shelby County deems it necessary a complaint may be filed with the Commissioner of the Tennessee Department of Environment and Conservation pursuant to Tennessee Code Annotated (T.C.A) number 69-3-118.

- 3) CONSENT AGREEMENT The Manager is hereby empowered to enter into consent agreements, assurances of voluntary compliance, or other similar documents establishing an agreement with the person or persons responsible for the non-compliance. Such agreements will include specific action to be taken by the permittee or person discharging storm water to correct the non-compliance within a time period specified by the agreements. Consent agreements shall have the same force and effect as compliance orders issued pursuant to paragraph (4) below.
- 4) COMPLIANCE ORDER When the Manager finds that any person has violated or continues to violate this Chapter or any order issued hereunder, he may issue an order to the violator directing that, following a specified time period, adequate structures and/or devices be installed or procedures implemented and properly operated or followed. Orders may also contain such other requirements as might be reasonable necessary and appropriate to address the non-compliance, including the construction of appropriate structures, installation of devices, self-monitoring and related management practices.
- 5) CEASE AND DESIST ORDERS When the Manager finds that any person has violated or continues to violate this Chapter or any Permit or order issued hereunder and such action or inaction has or may have the potential for immediate and significant adverse impact on the MS4 or the storm water discharges to it, the Manager may issue an order to cease and desist all such violations immediately and direct those persons in non-compliance to:
 - A) Comply forthwith; or
 - B) Take such appropriate remedial or preventative action as may be needed to properly address a continuing or threatened violation, including halting operations and terminating the discharge.
 - C) Anyone receiving a Cease and Desist Order that includes instruction to halt operations shall receive an expedited review and appeal of such order within two (2) business days.

SEC. 30-146 CIVIL PENALTY

Any person who performs any of the following acts or omissions shall be subject to a civil penalty as set out in Part II, Chapter 1, Section 1-4, Code of Shelby County per day for each day, or part thereof, during which the act or omission continues or occurs.

1. Fails to obtain any required Permit;
2. Violates the terms and conditions of such required Permit in #1 above;
3. Violates a final determination or order of the Manager; or
4. Violates any provision of this Chapter.

The Manager, with consent of the Mayor, may also initiate civil proceedings in any court of competent jurisdiction seeking monetary damages for any damages caused to the Shelby County MS4 by any person, and to seek injunctive or other equitable relief to enforce compliance, with any lawful orders of the Manager.

SEC. 30-147 UNLAWFUL ACTS, MISDEMEANOR

It shall be unlawful for any person to knowingly:

1. Violate a provision of this Chapter;
2. Violate the provisions of any Permit issued pursuant to this Chapter;
3. Fail or refuse to comply with any lawful notice to abate issued by the Manager, which has not been timely appealed to the Director of Public Works within the time specified by such notice; or
4. Violate any lawful order of the Manager within the time allowed by such order.

SECTION 5 – STORMWATER MANAGEMENT PROGRAM

Such person shall be guilty of a misdemeanor; and each day of such violation or failure or refusal to comply shall be deemed a separate offense and punishable accordingly. Any person found to be in violation of the provisions of this Chapter shall be punished by a fine as set out in Part II, Chapter 1, Section 1-4, Code of Shelby County. Upon learning of such act or omission, the Manager may issue a County Ordinance Citation charging the person, firm, or entity with violating one (1) or more provisions of this ordinance (section) or permit issued thereunder, criminal violation of this ordinance (section) may also be the basis for injunctive relief, with such actions being brought and enforced through the Shelby County General Sessions Environmental Court.

SEC. 30-148 PROCESSING A VIOLATION

- 1) The Manager may issue an assessment against any person or permittee responsible for the violation;
- 2) Any person against whom an assessment or order has been issued may secure a review of such assessment or order by filing with the Director a written petition setting forth the specific legal and technical grounds and reasons for his objections and asking for a hearing in the matter involved before the Director and if a petition for review of the assessment or order is not filed within thirty (30) days after the date the assessment or order is served, the violator shall be deemed to have consented to the assessment and it shall become final;
- 3) Whenever any assessment has become final because of a person's failure to appeal the Manager's assessment, the Manager may apply to the appropriate court for a judgment and seek execution of such judgment and the court, in such proceedings, shall treat a failure to appeal such assessment as a confession of judgment in the amount of the assessment;
- 4) The Director may consider the following factors when reviewing a petition:
 - A) Whether the civil penalty imposed will be an appropriate economic deterrent to the illegal activity by the violator or others in the regulated community;
 - B) Damages to the County, including compensation for the damage or destruction of the Shelby County MS4, and also including any penalties, costs (direct or indirect) and attorneys' fees incurred by the County as a result of the illegal activity, as well as the expenses involved in enforcing this Chapter and the costs involved in rectifying any damages;
 - C) Cause of the discharge or violation;
 - D) The severity of the discharge and its effect on the Shelby County MS4;
 - E) Effectiveness of action taken by the violator to cease the violation;
 - F) The technical and economic reasonableness of reducing or eliminating the discharge;
 - G) The economic benefit gained by the violator.
- 5) Any civil penalty assessed to a violator pursuant to this section may be in addition to any civil penalty assessed by the Commissioner of the Tennessee Department of Environment and Conservation for violations of T.C.A. 69-3-115; however, the sum of penalties imposed by this section and by T.C.A. 69-3-115 shall not exceed ten thousand dollars (\$10,000) per day during which the act or omission continues or occurs.
- 6) Any appeal of this final determination shall be made to a court of competent jurisdiction. Such appeal must be filed within 15 days of the decision by the Director.

SEC. 30-149 APPEAL JUDICIAL PROCEEDINGS AND RELIEF

The Manager may initiate proceedings in any court of competent jurisdiction against any person who has or is about to:

- 1) Violate the provisions of this Chapter.
- 2) Violate the provisions of any Permit issued pursuant to this Chapter.
- 3) Fail or refuse to comply with any lawful order issued by the Manager that has not been timely appealed within the time allowed by this Chapter.
- 4) Violates any lawful order of the Manager within the time allowed by such order.

Any person who shall commit any act declared unlawful under this Chapter shall be guilty of a misdemeanor, and each day of such violation or failure shall be deemed a separate offense and punishable accordingly.

SEC. 30-150 DAMAGES, DISPOSITION OF FUNDS

All damages collected under the provisions of this ordinance and civil penalties collected under the provisions of Section 30-149, following the adjustment for the expenses incurred in making such collections shall be allocated and appropriated to the Storm Water Management program.

SEC. 30-151 RECORDS RETENTION

All dischargers subject to this Chapter shall maintain and preserve for no fewer than five (5) years, all records, books, documents, memoranda, reports, correspondence and any and all summaries thereof, relating to monitoring, sampling, and chemical analyses made by or in behalf of the discharger in connection with its discharge. All records which pertain to matters which are the subject of any enforcement or litigation activities brought by the County pursuant hereto shall be retained and preserved by the Discharger until all enforcement activities have concluded and all periods of limitation with respect to any and all appeals have expired.

SECTION 6 – MONITORING, RECORDING AND REPORTING

Analytical Monitoring

The Permit requires the MS4 to *perform analytical monitoring as a part of its Storm Water Management Program, at a minimum, in streams with EPA approved TMDLs and impaired streams*. Detailed information concerning analytical monitoring is included in Appendix 5. There are three types of analytical monitoring.

Biological Sampling Biological stream sampling is performed in streams that have been identified as impaired for siltation or habitat alteration where discharges from the MS4 have been identified as the source of the impairment. Stream sampling is performed utilizing the Semi-Quantitative Single Habitat (SQSH) Method as identified in the TDEC Quality System Standard Operating Procedure for Macroinvertebrate Stream Survey, revised August 2017 (Appendix 8). At a meeting conducted by the local Environmental Field Office (EFO) on February 25, 2011, officials from the Water Pollution Control Division (Ms. Joellyn Brazile and Mr. Lew Hoffman) advised that the dissolved oxygen, pH, temperature and conductivity readings stated in the procedure will not be required. At least one sample from each impaired stream segment is required in a five-year period. The following stream segments within the Shelby County require biological sampling as of the publication date of the SWMP.

Stream Segment	Stream Name
TN08010209021-2000	Big Creek
TN08010209002-2000	Loosahatchie River
TN08010209002-1000	Loosahatchie River
TN08010210022-0300	Marys Creek
TN08010210022-1000	Grays Creek
TN08010210022-0100	Unnamed tributary to Grays Creek
TN0801021100720-2000	Nonconnah Creek

Bacteriological Sampling Bacteriological stream sampling is performed in streams that have been identified as having unavailable parameters for pathogens where discharges from the MS4 have been identified as the source of the unavailable parameter. Stream sampling is performed utilizing methods identified in the TDEC Quality System Standard Operating Procedure for Chemical and Biological Sampling of Surface Water (Appendix 9). At least one sampling set is required for each pathogen-impaired stream segment within a five-year period. Sampling is to be coordinated with the local EFO so it coincides with their sampling periods. The following stream segments require bacteriological sampling as of the publication date of the SWMP.

Stream Segment	Stream Name
TN08010209021-0610	Unnamed tributary to Crooked Creek Canal
TN08010209021-0600	Crooked Creek Canal
TN08010209021-3000	Big Creek
TN08010209021-2000	Big Creek
TN08010209021-0100	Jakes Creek
TN08010209021-1000	Big Creek
TN08010209002-2000	Loosahatchie River
TN08010209002-1000	Loosahatchie River
TN08010209002-0100	Unnamed tributary to Loosahatchie River
TN08010209001-0100	Todd Creek

TN08010209001-1000	Loosahatchie River
TN08010210022-0300	Marys Creek
TN08010210022-1000	Grays Creek
TN08010210022-0100	Unnamed tributary to Grays Creek
TN08010210023-0200	Unnamed tributary to Fletcher Creek
TN0801021100720-3000	Nonconnah Creek
TN0801021100720-0500	Unnamed tributary to Nonconnah Creek
TN0801021100720-2000	Nonconnah Creek

TMDL Sampling Analytical monitoring for stream segments subject to TMDLs for parameters other than siltation, habitat alteration or pathogens, where discharges from the MS4 have been identified as a source of the impairment, shall be performed as prescribed in the TMDL. As of the publication date of the SWMP, there are no TMDLs that require analytical monitoring by Shelby County. Future TMDLs will be reviewed to assess their impact on this portion of the SWMP.

Reporting Results of analytical monitoring shall be forwarded to the local EFO as the data is collected and assimilated.

Non-analytical Monitoring

Visual Stream Surveys and Impairment Inventories must be performed on stream segments impaired for siltation, habitat alteration and pathogens in order to identify and prioritize MS4 stream impairment sources. At a minimum, the survey must be performed immediately upstream and downstream of each outfall that discharges into an impaired stream segment. Existing survey protocols such as the ones available through the EPA, Natural Resources Conservation Service and the State of Maryland Department of Natural Resources shall be utilized with the MS4 having the flexibility to select or modify a protocol to complement its existing program. All impaired stream segments in the MS4 jurisdiction must be surveyed in a five-year period. Detailed information concerning analytical monitoring is included in Appendix 5. The following *Figure 5.2* on the next page shows the stream segments that non-analytical monitoring will be performed.

Record Keeping

All records of monitoring information, copies of reports required by the Permit, the NPDES permit, and records of all data used to complete the NOI shall be maintained for a period of at least three years from the date of the sample, measurement, report or application, or for the term of this permit, whichever is longer.

Reporting

The Shelby County Stormwater Program submits an annual report to the TDEC's Memphis Environmental Field Office by September 30 of each calendar year that covers the activities taken during the previous fiscal year, which is July 1 through June 30. The annual report must be presented at a public hearing for suggestions and comments prior to submission to the local EFO. The annual report forms for each year since the program's beginning in 2005 have been included in the *Appendix*. The annual report forms and a request for public comments are placed on public notice using the procedure outlined in the section titled *Method of Advertising Public Opportunities* under Public Involvement/Participation.

SECTION 6 – MONITORING, RECORDING AND REPORTING

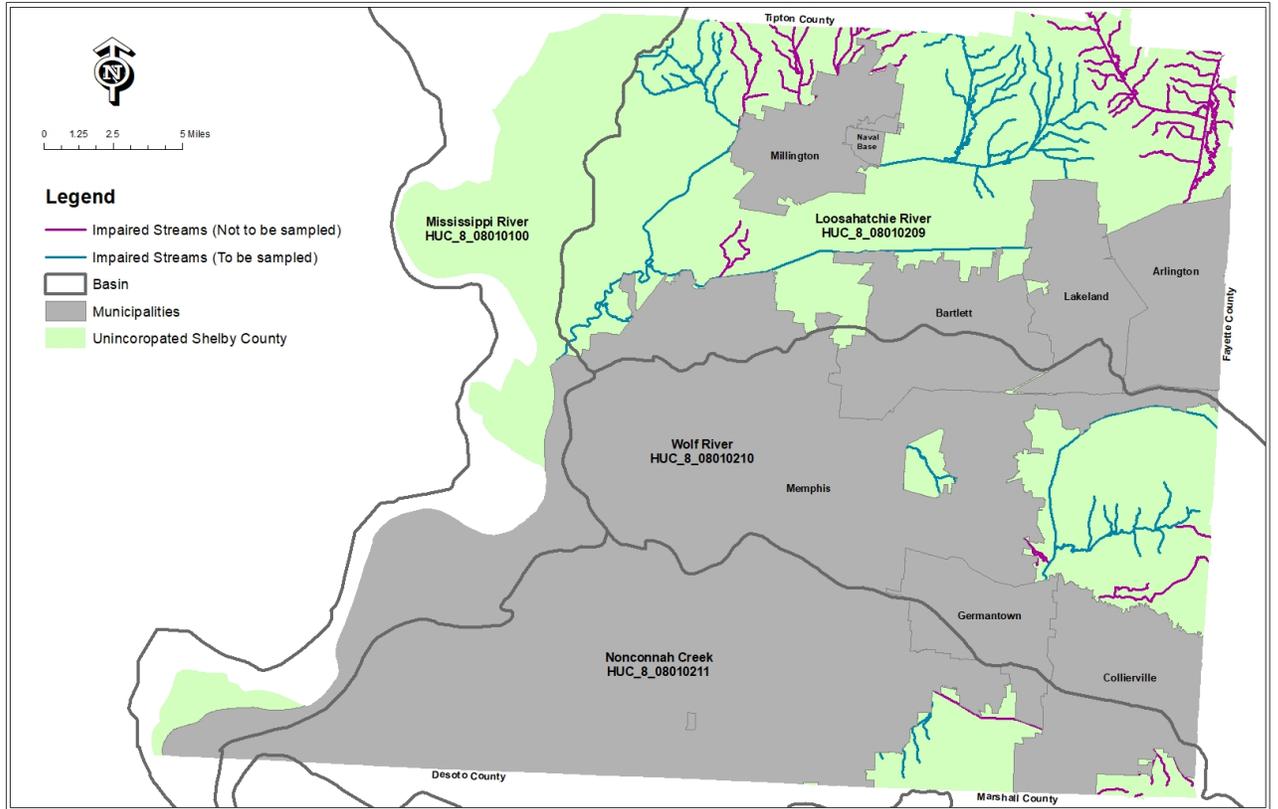


Figure 6.1 – Stream Segments to be Visually Assessed

Table 6.2. on the following pages summarize the sampling schedule that Shelby County plans to do over the next five-year cycle.

Shelby County

Stormwater Management Program

Stormwater Management Plan **Book of Appendixes**



Department of Roads, Bridges & Engineering
6449 Haley Road
Memphis TN 38134

August 11, 2011

Appendix 1

SHELBY COUNTY MS4 NPDES GENERAL PERMIT FOR DISCHARGES

Appendix 2

LISTED STREAMS WITHIN SHELBY COUNTY MS4

Listed Streams within Shelby County MS4

Stream Name	Stream Location	Entity Id
Brinkley Bayou	Brinkley Bayou from Mississippi River to headwaters (in Meeman - Shelby State Park). Ecoregion 73a & 74a Shelby County Tipton County	TN08010100001_0800
Ash Slough	Ash Slough from Mississippi River to headwaters (in Meeman - Shelby State Park). Ecoregion 73a & 74a Shelby County	TN08010100001_0900
Mississippi River	Mississippi River (Tennessee side) from confluence of Loosahatchie River to confluence of Hatchie River. Ecoregion 73a Shelby County Tipton County	TN08010100001_2000
Todd Branch	Todd Branch from mouth to headwaters. Ecoregion 74b Shelby County	TN08010209001_0100
Misc. Tribs to Loosahatchie River	Misc. tribs to Loosahatchie River from mouth to Big Creek. Ecoregion 73a, 74a, & 74b Shelby County	TN08010209001_0999
Loosahatchie River	Mainstem Loosahatchie River from mouth on Mississippi River to Big Creek Ecoregion 73a & 74b Shelby County	TN08010209001_1000
Unnamed Trib to Loosahatchie River		TN08010209002_0100
Rocky Branch		TN08010209002_0200
Oliver Creek		TN08010209002_0400
Buckhead Creek	Buckhead Creek from Loosahatchie River to headwaters. Ecoregion 74b Shelby County	TN08010209002_0500
Howard Creek		TN08010209002_0700
Misc. Tribs to Loosahatchie River	Misc. Tribs to Loosahatchie River (between Herman Creek and Big Creek). Ecoregion 74b Shelby County	TN08010209002_0999
Loosahatchie River	Mainstem Loosahatchie River from Big Creek to Howard Creek. Ecoregion 74b Shelby County	TN08010209002_1000
Loosahatchie River	Loosahatchie River from Howard Creek to Cypress Creek. Ecoregion 74b Shelby County	TN08010209002_2000
Misc. Tribs to Loosahatchie River	Misc. tribs to Loosahatchie River Ecoregion 74b Fayette County	TN08010209004_0999
West Beaver Creek Canal	West Beaver Creek from Beaver Creek to headwaters. Ecoregion 74b & 74a Shelby County Tipton County	TN08010209016_0100
Middle Beaver Creek		TN08010209016_0200

- = On 2010 303(d) list
- = ID number changed from 2008 to 2010
- = Segment no longer in GIS data
- = Segments no longer in unincorporated area

Listed Streams within Shelby County MS4

Stream Name	Stream Location	Entity Id
East Beaver Creek	East Beaver Creek from Beaver Creek to headwaters. Ecoregion 74b Tipton County Fayette County	TN08010209016_0300
Beaver Creek	Beaver Creek from Loosahatchie River to confluence with East Beaver Creek. Ecoregion 74b Shelby County Fayette County	TN08010209016_1000
Upper Middle Beaver Creek	Upper Middle Beaver Creek from East Beaver Creek to Kelley Creek. Ecoregion 74b Tipton County Shelby County	TN08010209016_2000
Jakes Creek	Jakes Creek from Big Creek to headwaters. Ecoregion 74b & 74a Shelby County	TN08010209021_0100
Bear Creek	Bear Creek from Jakes Creek to headwaters. Ecoregion 74b & 74a Shelby County Tipton County	TN08010209021_0110
Royster Creek	Royster Creek from Big Creek to headwaters. Ecoregion 74b Shelby County Tipton County	TN08010209021_0200
North Fork Creek	North Fork Creek from Big Creek to headwaters. Ecoregion 74b & 74a Shelby County Tipton County	TN08010209021_0300
Casper Creek	Casper Creek from Big Creek to Casper Lake dam. Ecoregion 74b Shelby County	TN08010209021_0400
Bull Branch		TN08010209021_0500
Crooked Creek Canal	Crooked Creek Canal from Big Creek to headwaters. Ecoregion 74b Shelby County	TN08010209021_0600
Unnamed Trib to Crooked Creek Canal	Unnamed tributary to Crooked Creek Canal from Crooked Creek Canal to headwaters. Ecoregion 74b Shelby County	TN08010209021_0610
Misc. tribs to Big Creek	Misc. tributaries to Big Creek. Ecoregion 74b & 74a Shelby County	TN08010209021_0999
Big Creek	Big Creek from Loosahatchie River to confluence of Crooked Creek. Ecoregion 74b Shelby County	TN08010209021_1000
Big Creek	Big Creek from confluence of Crooked Creek to Big Branch. Ecoregion 74b Shelby County Tipton County	TN08010209021_2000
Big Creek	Big Creek from Big Branch to Headwaters	TN08010209021_3000
Harrington Creek	Harrington Creek from Wolf River to headwaters. Ecoregion 74b Shelby County	TN08010210001_0100
Misc. tribs. To Wolf River	Misc. tribs to Wolf River between Fletcher Creek and Grays Creek. Ecoregion 74b Shelby County	TN08010210002_0999

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-  = Segment no longer in GIS data
-  = Segments no longer in unincorporated area

Listed Streams within Shelby County MS4

Stream Name	Stream Location	Entity Id
Wolf River	Wolf River from Highway 177 to Grays Creek. Ecoregion 74b Shelby County	TN08010210002_2000
Johnson Creek	Johnson Creek from Wolf River to headwaters. Ecoregion 74b Shelby County Fayette County	TN08010210003_0100
Misc. tribs to Wolf River	Misc Tribs to Wolf River between Grays Creek and Shaws Creek. Ecoregion 74b Shelby County Fayette County	TN08010210003_0999
Wolf River	Wolf River from Grays Creek to Shaws Creek. Ecoregion 74b Shelby County	TN08010210003_1000
Unnamed trib to Grays Creek	Unnamed trib to Grays Creek (near Cordova) from Grays Creek to headwaters. Ecoregion 74b Shelby County	TN08010210022_0100
Field Creek	Field Creek from Grays Creek to headwaters. Ecoregion 74b Shelby County	TN08010210022_0200
Marys Creek	Marys Creek from Grays Creek to SR 205. Ecoregion 74b Shelby County	TN08010210022_0300
Marys Creek	Marys Creek from SR 205 to Herb Parsons Lake dam. Ecoregion 74b Shelby County Fayette County	TN08010210022_0350
Misc. tribs to Grays Creek	Misc. tribs to Grays Creek. Ecoregion 74b Shelby County Fayette County	TN08010210022_0999
Grays Creek	Grays Creek from Wolf River to headwaters. Ecoregion 74b Shelby County Fayette County	TN08010210022_1000
Unnamed trib to Fletcher Creek	Unnamed trib to Fletcher Creek (near La Grange Road) from Fletcher Creek to headwaters. Ecoregion 74b Shelby County	TN08010210023_0200
Misc tribs to Fletcher Creek	Misc. tribs to Fletcher Creek. Ecoregion 74b Shelby County	TN08010210023_0999
Fletcher Creek		TN08010210023_1000
Unnamed Trib to Nonconnah Creek	Unnamed trib to Nonconnah Creek from Nonconnah Creek to Mississippi stateline. Ecoregion 74b Shelby County	TN0801021100720_0100
Unnamed Trib to Unnamed Trib. To Noconnah Creek	Unnamed trib to the unnamed trib of Nonconnah Creek from the mouth on unnamed trib to Mississippi stateline. Ecoregion 74b Shelby County	TN0801021100720_0110

- = On 2010 303(d) list
- = ID number changed from 2008 to 2010
- = Segment no longer in GIS data
- = Segments no longer in unincorporated area

Listed Streams within Shelby County MS4

Stream Name	Stream Location	Entity Id
Unnamed Trib to Nonconnah Creek	Unnamed trib to Nonconnah Creek from Nonconnah Creek to headwaters near Mississippi stateline. Ecoregion 74b Shelby County	TN0801021100720_0200
Unnamed Trib to Nonconnah Creek		TN0801021100720_0300
Unnamed Trib to Nonconnah Creek		TN0801021100720_0400
Unnamed Trib to Unnamed Trib. To Noconnah Creek	Unnamed Trib to Unnamed Trib. To Noconnah Creek	TN0801021100720_0410
Unnamed Trib to Nonconnah Creek		TN0801021100720_0500
Misc Tribs to Nonconnah Creek	Misc tribs to Nonconnah Creek from Johns Creek to headwaters. Ecoregion 74b Shelby County	TN0801021100720_0999
Nonconnah Creek	Nonconnah Creek from gaging station at Winchester Road to confluence of unnamed trib (near Bailey Road). Ecoregion 74b Shelby County	TN0801021100720_2000
Nonconnah Creek	Nonconnah Creek from confluence of unnamed trib near Bailey Road to headwaters near Mississippi stateline. Ecoregion 74b Shelby County Fayette County	TN0801021100720_3000

-  = On 2010 303(d) list
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-  = Segment no longer in GIS data
-  = Segments no longer in unincorporated area

Appendix 3

SHELBY COUNTY TOTAL MAXIMUM DAILY LOAD REPORTS

Appendix 4

STATE OR FEDERAL LISTED SPECIES IN SHELBY COUNTY

**Tennessee Natural Heritage Program
Rare Species Observations For
Shelby County**

Data current as of June, 2013		Known Species: 32			
<i>Invertebrate Animals: 4</i>		<i>St. Rank</i>	<i>Global Rank</i>	<i>St. Prot</i>	<i>Fed. Prot</i>
<i>Lampsilis siliquoidea</i>	Fatmucket	S2	G5	--	--
Slack water with mud substrat; Wolf R (Miss R trib); west TN; may occur at Reelfoot Lake; also reported Drakes Ck (Cumberland R), Sumner Co.					
<i>Obovaria jacksoniana</i>	Southern Hickorynut	S1	G2	--	--
Rivers with medium-sized gravel substrates and low-mod current; Wolf & Hatchie rivers; Mississippi River watershed; west Tennessee.					
<i>Webbhelix multilineata</i>	Striped Whitelip	S2	G5	--	--
Low wet habitats, marshes, floodplains, meadows; lake margins; under leaf litter or drift; Mississippi River floodplain.					
<i>Lycaena hyllus</i>	Bronze Copper	S3	G5		
Marshes, sedge meadows, moist to wet grassy meadows, ditches, fens, streamside or pondshore wetlands, or roads and right-of-ways through marsh land; West Tennessee					
<i>Other Types: 1</i>		<i>St. Rank</i>	<i>Global Rank</i>	<i>St. Prot.</i>	<i>Fed. Prot.</i>
<i>Heron rookery</i>	Heron Rookery	SNR	GNR	--	--
<i>Vascular Plants: 10</i>		<i>St. Rank</i>	<i>Global Rank</i>	<i>St. Prot.</i>	<i>Fed. Prot.</i>
<i>Magnolia virginiana</i>	Sweetbay Magnolia	S2	G5	T	--
Forested Acidic wetlands					
<i>Heteranthera multiflora</i>	Multiflowered Mud-plantain	SH	G4	S	--
Shallow Water, Mud Flats					
<i>Hottonia inflata</i>	Featherfoil	S2	G4	S	--
Wet Sloughs And Ditches					
<i>Iris fulva</i>	Copper Iris	S2	G5	T	--
Bottomlands					
<i>Panax quinquefolius</i>	American Ginseng	S3S4	G3G4	S-CE	--
Rich Woods					
<i>Prenanthes crepidinea</i>	Nodding Rattlesnake-root	S2	G4	E	--
Rich Bottomlands					
<i>Schisandra glabra</i>	Red Starvine	S2	G3	T	--
Rich Mesic Woods, Bluffs					
<i>Silene ovata</i>	Ovate Catchfly	S2	G3	E	--
Open Oak Woods					
<i>Symphotrichum praealtum</i>	Willow Aster	S1	G5	E	--
Moist Prairies And Marshes					
<i>Ulmus crassifolia</i>	Cedar Elm	S2	G5	S	--
Swamps					

<i>Vertebrate Animals: 17</i>		<i>St. Rank</i>	<i>Global Rank</i>	<i>St. Prot.</i>	<i>Fed. Prot.</i>
<i>Ammocrypta beani</i>	Naked Sand Darter	S2	G5	D	--
		Shifting sand bottoms & sandy runs; Hatchie River & larger tributaries.			
<i>Chondestes grammacus</i>	Lark Sparrow	S1B	G5	T	--
		Open habitats with scattered bushes and trees, prairie, cultivated areas, fields with bushy borders; ground nester.			
<i>Cycleptus elongatus</i>	Blue Sucker	S2	G3G4	T	--
		Swift waters over firm substrates in big rivers.			
<i>Dendroica cerulea</i>	Cerulean Warbler	S3B	G4	D	--
		Mature deciduous forest, particularly in floodplains or mesic conditions.			
<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3	G5	D	--
		Areas close to large bodies of water; roosts in sheltered sites in winter; communal roost sites common.			
<i>Hyla gratiosa</i>	Barking Treefrog*	S3	G5	D	--
		Low wet woods and swamps esp. with ephemeral ponds.			
<i>Ictinia mississippiensis</i>	Mississippi Kite	S2S3	G5	D	--
		Undisturbed stands of lowland and floodplain forests and along major rivers.			
<i>Limnothlypis swainsonii</i>	Swainson's Warbler	S3	G4	D	--
		Mature, rich, damp, deciduous floodplain and swamp forests.			
<i>Neotoma floridana illinoensis</i>	Eastern Woodrat	S3	G5T5	D	--
		Forested areas, caves & outcrops; west Tennessee generally.			
<i>Noturus gladiator</i>	Piebald Madtom	S3	G3	D	--
		Large creeks & rivers in moderate-swift currents with clean sand or gravel substrates; Mississippi River tributaries.			
<i>Pituophis melanoleucus melanoleucus</i>	Northern Pinesnake	S3	G4T4	T	--
		Well-drained sandy soils in pine/pine-oak woods; dry mountain ridges; E portions of west TN, E to lower elevations of the Appalachians.			
<i>Sorex longirostris</i>	Southeastern Shrew	S4	G5	D	--
		Various habitats including wet meadows, damp woods, and uplands; statewide.			
<i>Sterna antillarum athalassos</i>	Interior Least Tern	S2S3B	G4T2Q	E	LE
		Mississippi River sand bars & islands, dikes.			
<i>Thryomanes bewickii</i>	Bewick's Wren	S1	G5	E	--
		Brushy areas, thickets and scrub in open country, open and riparian woodland.			
<i>Tyto alba</i>	Barn Owl	S3	G5	D	--
		Open and partly open country, often around human habitation; farms.			
<i>Vireo bellii</i>	Bell's Vireo	S1B	G5	--	No Status
		Thickets adjacent to water, bottomlands; west Tennessee and one confirmed location in Western Highland Rim			
<i>Acris gryllus</i>	Southern Cricket Frog	S2S3	G5	Rare, not state listed	--
		.Grassy margins of swamps, marshes, lakes, ponds, streams, ditches and nearby temporary pools; far SW Tennessee.			

Description of Federal and State Ranks & Status Codes

GLOBAL RANK - The global or world-wide rank of a species which is a non-legal rank indicating the rarity and vulnerability of a species

G1	Extremely rare and critically imperiled in the world with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction
G2	Very rare and imperiled within the world, six to twenty occurrences, or few remaining individuals, or because of some factor(s) making it vulnerable to extinction
G3	Rare and uncommon in its range or found locally in a restricted range, generally from 21-100 occurrences
G4	Widespread, abundant, and apparently secure globally, but with cause for long-term concern
G5	Demonstrably widespread and secure globally
GH	Of historical occurrence throughout its range, e.g. formally part of the established biota, with the expectation that it may be rediscovered
GU	Can not be ranked using available information
GX	Believed to be extirpated throughout its range
HYB	Hybrid within its range in Tennessee
SSYN	Synonym for another species
_Q	Questionable taxonomy (GRANKs only)
_T#	Subspecific taxon rank (GRANKs only)

STATE RANK - The state rank of a species in Tennessee. Like the G_rank this is a non-legal rank indicating the rarity and vulnerability of a species at the state level.

S1	Extremely rare and critically imperiled in the state with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction
S2	Very rare and imperiled within the state, six to twenty occurrences, or few remaining individuals, or because of some factor(s) making it vulnerable to extinction
S3	Rare and uncommon in the state, from 21-100 occurrences
S4	Widespread, abundant, and apparently secure within the state, but with cause for long-term concern
S5	Demonstrably widespread and secure in the state
SH	Of historical occurrence in Tennessee, e.g. formally part of the established biota, with the expectation that it may be rediscovered
SU	Can not be ranked using available information
SX	Believed to be extirpated from the state
S#S#	Denotes a "range rank" because the rarity of the species is uncertain (e.g. S1S3)
S?, S_?	Unranked at this time or rank uncertain
SE	Exotic species established in the state
SE#	Exotic numeric (e.g. the Asian clam <i>Corbicula fluminea</i> would be SE5)
SP	Potentially occurring in Tennessee, but not yet documented by DNH
_N	Occurs in Tennessee in a non-breeding status (mostly applies to vertebrates)

Description of Federal and State Ranks & Status Codes

_B	Breeds in Tennessee
SA	Accidental or casual in the state (several birds)
SR	Reported from the state, but insufficient data to assign rank
SRF	Reported falsely from the state
HYB	Hybrid within its range in Tennessee
SSYN	Synonym for another species
_Q	Questionable taxonomy (GRANKs only)
_T#	Subspecific taxon rank (GRANKs only)

FEDERAL STATUS - The federal listing under the U.S. Endangered Species Act

LE, Listed Endangered	Taxon is threatened by extinction throughout all or a significant portion of its range
E/SA, Endangered by Similarity of Appearance	Taxon is treated as an endangered species because it may not be easily distinguished from a listed species
LT, Listed Threatened	Taxon is likely to become an endangered species in the foreseeable future
T/SA, Threatened by Similarity of Appearance	Taxon is treated as a threatened species because it may not be easily distinguished from a listed species
PE, Proposed Endangered	Taxon proposed for listing as endangered
PT, Proposed Threatened	Taxon proposed for listing as threatened
C, Candidate species***	Taxon for which the USFWS has sufficient information to support proposals to list the species as threatened or endangered, and for which the Service anticipates a listing proposal
(PS) Partial Status (based on taxonomy)	Taxon which is listed in part of its range, but for which Tennessee <u>subspecies</u> are not included in the Federal designation
(PS:status) Partial Status (based on political boundaries)	Taxon which is listed in part of its range, but for which Tennessee <u>populations</u> are not included in the Federal designation e.g. (PS:LE)
(XN) Non-essential experimental population in portion of range	Taxon which has been introduced or re-introduced in an area from which it has been extirpated, and for which certain provisions of the Act may not apply

Description of Federal and State Ranks & Status Codes

STATE STATUS -The legal listing in Tennessee

E, Endangered	Any species or subspecies whose prospects of survival or recruitment within the state are in jeopardy or are likely to become so within the foreseeable future
T, Threatened	Any species or subspecies that is likely to become an endangered species within the foreseeable future
D, Deemed in Need of Management	Any species or subspecies of nongame wildlife which the executive director of the TWRA believes should be investigated in order to develop information relating to populations, distribution, habitat needs, limiting factors, and other biological and ecological data to determine management measures necessary for their continued ability to sustain themselves successfully. This category is analogous to "Special Concern."
S, Special Concern	Any species or subspecies of plant that is uncommon in Tennessee, or has unique or highly specific habitat requirements or scientific value and therefore requires careful monitoring of its status.

Additional Modifiers for Plants

PE, Proposed Endangered	Any species or subspecies of plant nominated by the Scientific Advisory Committee to be added to the list of Tennessee's endangered species. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State endangered.
PT, Proposed Threatened	Any species or subspecies of a plant nominated by the Scientific Advisory Committee to be added to the list of Tennessee threatened species. After a public hearing, these plants will formally become State threatened.
E-PT, Endangered-Proposed Threatened	Species which are currently on the state list of endangered plants, but are proposed by the Scientific Advisory Committee to be down-listed to threatened. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State threatened.
E-PS, Endangered Proposed Special Concern	Species which are currently on the state list of endangered plants, but are proposed by the Scientific Advisory Committee to be down-listed to special concern. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State special concern.
T-PE, Threatened Proposed Endangered	Species which are currently on the state list of threatened plants, but are proposed by the Scientific Advisory Committee to be listed on the state endangered list. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State endangered.

Description of Federal and State Ranks & Status Codes

T-PS, Threatened Proposed Special Concern	Species which are currently on the state list of threatened plants, but are proposed by the Scientific Advisory Committee to be down-listed to special concern. After a public hearing, these plants will formally become State special concern.
P, Possibly Extirpated	Species or subspecies that have not been seen in Tennessee for the past 20 years. May no longer occur in Tennessee.
C, Commercially Exploited	Due to large numbers being taken from the wild and propagation or cultivation insufficient to meet market demand. These plants are of long-term conservation concern, but the Division of Natural Heritage does not recommend they be included in the normal environmental review process.

Appendix 5

SHELBY COUNTY STORM WATER PROGRAM

Shelby County

Stormwater Management Program

Stormwater Management Program



Department of Roads, Bridges & Engineering
6449 Haley Road
Memphis TN 38134

August 26, 2011

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Appendix 5, Shelby County Stormwater Management Program, is maintained in a separate binder labeled "Shelby County Stormwater Management Program". This binder is available for review at the Shelby County Engineering Field Office, 6463 Haley Road, Memphis, TN 38128 during normal business hours.

TABLE OF CONTENTS

SECTION 1 – INTRODUCTION

AUTHORITY.....	1
PURPOSE.....	1
REQUIREMENTS.....	1
RESPONSIBILITIES.....	1

SECTION 2 – PUBLIC EDUCATION AND OUTREACH

PUBLIC EDUCATION AND INFORMATION (PIE) PLAN.....	1
Specific Goals.....	1
Specific Events/Activities.....	2
Evaluation of Plan Effectiveness.....	3
Targeted Educational Campaigns.....	4
STORM WATER POLLUTION PREVENTION GENERAL EDUCATION.....	5
EDUCATIONAL PAMPHLETS.....	6
TENNESSEE STORM WATER STATEWIDE RADIO CAMPAIGN.....	7
STORMWATER MATTERS OFFICIAL WEBSITE.....	8
TRACKING AND MAINTAINING RECORDS OF ACTIVITIES.....	9

SECTION 3 – PUBLIC INVOLVEMENT AND PARTICIPATION

PUBLISHING PROGRAM PARTICIPATION OPPORTUNITIES.....	10
Stream Cleanup Events.....	11
Roadside Litter Pickup.....	11
Tennessee Smartyards Rainbarrel Construction.....	11
Stormwater Matters Website.....	12
OPPORTUNITIES FOR INVOLVEMENT THROUGH ACTIVITIES.....	12
TRACKING OF PUBLIC INVOLVEMENT AND PARTICIPATION ACTIVITIES...	13

SECTION 4 – ILLICIT DISCHARGE DETECTION AND ELIMINATION

STORM SEWER SYSTEM MAP.....	15
STORM WATER ORDINANCE.....	15
ILLICIT DISCHARGE DETECTION.....	16
PUBLIC AWARENESS.....	17
ILLICIT DISCHARGE REPORTING.....	17
Citizen's Request System.....	17
Telephone Reporting.....	17
Electronic Mail Reporting.....	18
HAZARDOUS SPILL RESPONSE.....	18

SECTION 5 – CONSTRUCTION SITE STORM WATER RUNOFF CONTROL

STORM WATER ORDINANCE.....	21
EROSION PREVENTION AND SEDIMENT CONTROL.....	21
DESIGN STORM AND SPECIAL CONDITIONS.....	21
INVENTORY ACTIVE PUBLIC AND PRIVATE CONSTRUCTION SITES.....	22
CONSTRUCTION SITE WASTE CONTROL.....	21
SITE PLAN REVIEW AND APPROVAL.....	21
PUBLIC INPUT.....	21
INSPECTION AND ENFORCEMENT.....	21
STAFF TRAINING.....	21
PRIORITY CONSTRUCTION ACTIVITIES.....	21

SECTION 6 – PERMANENT STORM WATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

STRATEGIES.....	21
WATER QUALITY BUFFERS.....	27
STORM WATER ORDINANCE AND SUBDIVISION REGULATION.....	28
PERFORMANCE STANDARDS.....	28
CODES AND ORDINANCES REVIEW AND UPDATE.....	29
SITE PLAN REVIEW AND APPROVAL.....	29
BMP MAINTENANCE.....	29
INVENTORY AND TRACKING.....	20
OWNER/OPERATOR INSPECTIONS.....	20

SECTION 7 – POLLUTION PREVENTION AND GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

EMPLOYEE TRAINING.....	21
BASIN INSPECTIONS.....	22
FACILITIES STORM WATER OPERATION PLAN.....	22
STREET AND MUNICIPAL PARKING AREA CLEANING PROGRAM.....	24
STANDARD OPERATING PROCEDURES.....	24

SECTION 8 – QUALIFYING TRIBE, STATE OR LOCAL PROGRAM (QLP) 27

SECTION 9 – ENFORCEMENT RESPONSE PLAN

STORM WATER ORDINANCE.....	29
ENFORCEMENT ACTIONS.....	29
NPDES PERMIT REFERRALS.....	30
ENFORCEMENT TRACKING.....	30
REQUIREMENTS FOR CHRONIC VIOLATORS.....	30

SECTION 10 – ANALYTICAL STREAM MONITORING

BIOLOGICAL SAMPLING.....	31
BACTERIOLOGICAL SAMPLING.....	32

TMDL SAMPLING.....	32
RECORD KEEPING.....	33
REPORTING.....	33

SECTION 11 – NON-ANALYTICAL STREAM MONITORING

VISUAL STREAM SURVEYS AND IMPAIRMENT INVENTORIES.....	35
RECORD KEEPING.....	35
REPORTING.....	35

SECTION 12 – REVIEWING AND UPDATING STORM WATER MANAGEMENT PROGRAM.....

37

ATTACHMENTS

1	Outfall Reconnaissance Inventory Report.....	39
2	Outfall Reconnaissance Inventory Procedures.....	43
3	Storm Water Inspection Report.....	51
4	Municipal Training Sign-in Sheet Sample.....	55
5	Basin Inspection Report.....	59
6	Fixed Facility Inventory Sample.....	63
7	Standard Operating Procedures.....	67

Appendix 6

SHELBY COUNTY STORMWATER PUBLIC EDUCATION and OUTREACH STRATEGY

Shelby County Storm Water Public Education and Outreach Program Strategy

BACKGROUND

Approximately 90% of unincorporated Shelby County consists of agriculture land, individual home lots, and residential subdivisions. In such a setting, the majority storm water runoff is generated from private surfaces, such as, crop land, yards, patios, driveways, and roofs. As a result, common individual behaviors have the greatest potential to generate storm water pollution, for example:

- Over-use of fertilizers and pesticides,
- improperly applying lawn-chemicals,
- washing cars on impervious driveways,
- not disposing of pet-waste,
- changing motor-oil and doing vehicle repairs.
- not properly maintaining septic tank systems
- improperly disposing leftover paint and household cleaners,
- blowing leaves and debris into the streets,
- draining chlorinated pool water directly into an inlet,
- performing landscaping or construction that exposes dirt or silt to rainfall.

It takes the use of proper practices by each individual landowner to control such pollution. Therefore, it is important to make the public sufficiently aware and concerned about the significance of their behavior for storm water pollution, through information and education.

An informed and knowledgeable community is crucial to the overall success of the entire Storm Water Management Program. As the public gains a greater understanding of the reasons why pollution prevention is important and necessary it helps ensure *Greater Support*. Public support is particularly important when seeking volunteers or instituting new funding initiatives. Additionally, as the public becomes aware of the personal responsibilities expected of them and others in the community, it ensures *Greater Compliance*, including taking the proper actions to protect the quality of local waterways or reporting those that don't.

The benefits of public education efforts cannot be understated. A 2005 report, [Environmental Literacy in America](http://www.neefusa.org/pubs/ELR2005.pdf) by the National Environmental Education & Training Foundation (NEETF) found that 78 percent of the American public does not understand that runoff from agricultural land, roads, and lawns, is now the most common source of water pollution; and nearly half of Americans (47 percent) believes industry still accounts for most water pollution¹.

Additionally, unincorporated contains several pockets of commercial and industrial businesses. The materials that may stored and used on the properties may be harmful to the environment due to either the type of material or the quantity used. Also, the properties usually have public parking lots which accumulate toxic vehicle fluids. The behaviors of business owner's and their employees also have the potential to generate storm water pollution, for example:

- 1) washing outdoor spills into a storm drain,
- 2) putting food or by-products in leaky dumpsters,
- 3) operating or maintenancing delivery vehicles,
- 4) inappropriately using cleaners and chemicals,

¹ <http://www.neefusa.org/pubs/ELR2005.pdf>

- 5) spilling fuel, oils, or grease during filling operations,
- 6) improperly storing bulk materials,
- 7) releasing air-borne particles of metal and organic wastes,
- 8) poorly maintaining parking lots and surrounding landscaping,
- 9) performing activities that expose dirt or silt to rainfall.

The number of properties containing commercial or industrial facilities is estimated at approximately 10%. However, due to the potential for a more environmentally impactful discharge this set of properties will be specifically addressed.

OBJECTIVE

Due to the wide variety of pollution sources and the diversity of residents within Shelby County, the Public Education and Outreach Strategy will involve using many different mechanisms and programs to engage the public's interest in preventing storm water pollution. This document is meant to be used as a guide to direct the types and focus of the mechanisms and programs to be used, and also, act as an operating plan to execute and evaluate the mechanisms and programs used. This document should be evaluated and updated as necessary to ensure that the strategy will best meet its intent.

This strategy also encourages partnerships with other governmental entities to fulfill its requirements. It is generally more cost-effective to use an existing program, or to develop a regional education program, than to have numerous operators developing their own local programs. The Shelby County MS4 will look to work in conjunction with the other urbanized area phase II programs and to compliment and enhance the City of Memphis' phase I program. Partnerships with non-governmental organizations, such as, environmental, civic, commercial, and industrial, will be sought to perform and support outreach activities.

GOAL

The major goal of Shelby County's Storm Water Public Education and Outreach Strategy is: *To reduce the amount of pollutants entering waters of the state to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act.*

To reduce the amount of pollutants entering waters of the state, Shelby County needs each individual resident and business owner to reduce the amount of harmful discharges from their property. To have the public reduce the potential for harmful discharges leaving their properties it will require them to practice storm water-friendly behaviors. Molding the general public's behaviors will involve several steps that each requires a specific focus of information and education.

Changing behaviors is a difficult task, but it can be broken down into three steps. The first step focuses on educating the community on the pollution potential of common activities. The second step tries to increase awareness of the direct links between their common activities, rainfall-runoff, storm drains, and their local water resources. And finally, the third step strives to give the public clear guidance on specific actions that they can take to reduce their storm water pollution-potential. A summary of the steps is given below.

STEP:	Make the public conscious of:
#1	The pollution potential of common activities
#2	The links between activities and water quality
#3	Specific actions that reduce pollution potential

Figure 1 – Strategy Steps

A key factor to consider is that as the education process continues, that public will continually have a varying level of background knowledge of both storm water management and their role in reducing storm water pollution. In general, the public will be on one of the steps of the program. The goal of this strategy will be to raise the citizen’s knowledge, on average, to the highest step possible. Each step requires a different focus of the educational effort.

First, to educate the community on the pollution potential of common activities the strategy must focus on simply generating basic awareness of storm water pollution. What is storm water and where does it come from? What are considered pollutants and where do they come from? These messages can be conveyed by “getting the word out there”. That is to expose every member of the public to the subject matter. This must be done on the broadest base and should contain simple reminders that rain falls from the sky and mixes with materials on the land, and that some materials are bad for the environment. The most important idea to pass on is that common things that people do can generate storm water pollution.

Second, to increase the awareness of the links between common activities, rain-fall runoff, the storm water conveyance system, and surface waters requires educating at a more sophisticated level using more substantive content. The focus should turn to “Where does the storm water go?” and “Why pollutants can be harmful”? It is important that the public make the connection between the common things they do and overall water quality for everyone. This message will need to be conveyed using more sophisticated materials and longer informative messages.

Last, to have the public take specific actions regularly that reduce their storm water pollution-potential requires building on existing recognition of the issues to prompt behavior changes. The focus during this step is to have the citizens put it all together and stop performing or perform potential pollution generating activities in a better way. Most storm water friendly activities will require the citizen to think about how they are doing things, and may take an additional step, even if a simple one, to perform. The goal is to have the citizen realize that their activity may generate storm water pollution and then to do something to eliminate or reduce their potential discharges. The focus during this step should concentrate on educating the citizens on how common activities should be performed; “What should I do?” or “How should I do this?” A matrix of the strategy’s steps and the focus of the educational effort needed to achieve them are shown below.

		FOCUS OF EDUCATIONAL EFFORT		
		Basic Awareness	More Substantive Education	Prompt Behavior Changes
STEP	Pollution Potential of Common Activities	X		
	Links Between Pollution and Water Quality	X	X	
	Specific Actions to Reduce Pollution	X	X	X

Figure 2 – Goal Matrix

APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

TARGET AUDIENCE

The Storm Water Management Program has a finite amount of funding to spread over six basic control measures. To reduce the amount of pollutants entering waters of the state and protect water quality to the maximum extent practicable it should be determined with which members of the public the greatest pollution-potential lies and target efforts and resources on those groups. The land uses allowed within Shelby County are determined mainly by zoning regulations. Potential pollution sources will generally be present depending on type of land use. For this strategy the properties are divided into five classifications:

- 1) Greenway, Floodway, and otherwise undevelopable land,
- 2) Agricultural and Farm land,
- 3) Large lot residential (4 acre or more lots)
- 4) Small lot residential (less than 4 acre lots)
- 5) Commercial and Industrial

Appendix A lists the pollutants most commonly found in storm water and their impacts. Appendix B is a matrix that matches sources of the common found pollutants and if their presence would be expected in the given land use classification. This information is important in determining where potential pollution sources will be located and forms the basis of the messages to be delivered.

Evaluating the demographic make-up of the citizens residing in unincorporated Shelby County is important in determining which mechanisms and programs should be used and how they should be used. To gather the data needed to develop the Shelby County Storm Water Educational and Outreach Strategy the most recent census data was collected from the *census.gov* website. Unincorporated Shelby County contained approximately 93,893 residents in July 2005. This represents 10.37% of the total population in Shelby County. This value was calculated by taking the population for all of Shelby County and subtracting the populations of each of the incorporated municipalities. From the combined tables it is also possible to calculate that the population has been rising on the average of 1,747 residents per year since 2000. Sections of the combined tables are shown below in Figure 3.

Table 1: Annual Estimates of the Population for Counties of Tennessee: April 1, 2000 to July 1, 2006									
Geographic Area	Population Estimates							April 1, 2000	
	July 1, 2006	July 1, 2005	July 1, 2004	July 1, 2003	July 1, 2002	July 1, 2001	July 1, 2000	Estimates Base	Census
Shelby Co.	911,438	905,705	903,362	902,205	900,244	898,197	898,214	897,472	897,472
Table 4: Annual Estimates of the Population for Incorporated Places in Tennessee, Listed Alphabetically: April 1, 2000 to July 1, 2005									
Bartlett	Tennessee	43,263	42,825	42,328	41,806	40,592	40,645	40,624	40,543
Millington	Tennessee	10,306	10,229	10,369	10,250	10,331	10,428	10,440	10,433
Lakeland	Tennessee	7,388	7,294	7,205	7,112	7,027	6,900	6,862	6,862
Arlington	Tennessee	3,534	3,378	3,221	3,035	2,889	2,700	2,649	2,569
Collierville	Tennessee	37,564	36,497	35,570	34,147	33,399	32,997	32,866	31,872
Germantown	Tennessee	37,480	37,477	37,512	37,518	37,522	37,663	37,667	37,348
Memphis	Tennessee	672,277	673,521	675,498	677,132	678,857	682,509	682,953	650,100
Unincorporated Shelby Co.		93,893	92,141	90,502	89,244	87,580	84,372	83,411	117,745

Figure 3 – Census Population Tables

Dividing the population into segments by age can help determine what level of sophistication the messages should be and how much effort should be expended trying to deliver each of those messages. The census data breaks down the age groups of the general population into 18 different segments. For the purpose of determining the best informational and educational strategy these groups were combined into six segments;

APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

young children, older kids, younger adults, older adults, and senior citizens. A pie chart illustrating number of citizens in each age group and the percentage each group makes up is on the next page.

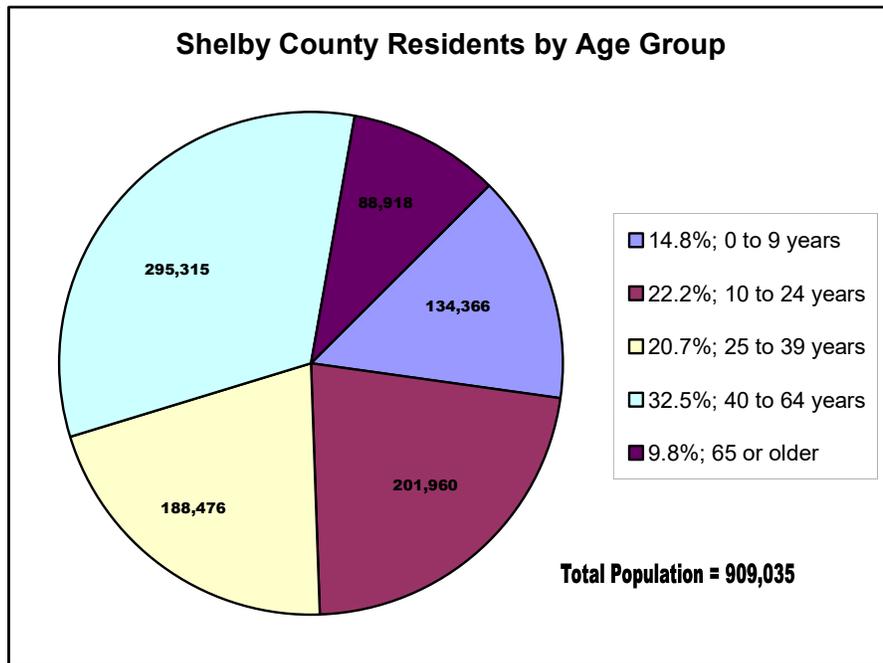


Figure 4 – Target Audience by Age

It is assumed that the residents between the ages of 0 to 9 years old will have little impact on overall water quality improvements and that messages used will basically be too advanced for retention. Information and education for this segment should focus on the simplest concepts of basic awareness.

Residents between the ages of 10 to 24 years old are impressionable and flexible to ideas and change. These ages tend to live with other adults and have no children of their own. This second largest segment would be a good target for more advanced and substantive education. Quality knowledge and information gained by this age group may prevent bad behaviors from becoming habitual and will better the chances that messages regarding proper storm water pollution actions will be heeded. The focus of information and education within this group should be to make the residents fully aware of the pollution-potential of common activities and to link the consequences of their actions to the quality of surrounding water bodies, as well as, continuing a barrage of awareness messages.

Residents between the ages of 25 to 39 typically are living busier life styles. These residents tend to have children of their own and/or are establishing a career. Although this group may be relatively adaptive to change and grasp the more advanced messages, they may not be willing to take the extra time or expense to practice storm water-friendly behaviors. Messages should spotlight linking their actions with the consequences to the environment. This age group may be swayed by the results of water quality of the future and their children's future. The focus of the information and education given to this group should be to continue the awareness campaign, complete the linking between pollution and water quality, and to inform them of specific actions that can reduce harmful discharges.

Residents between the ages of 40 to 65 years old tend to have established jobs and older children. This age group may be the least adaptive to change and the hardest to make an impression on. Messages should continue to try to prompt behavior changes and guide the residents on the correct actions to take. Information and education for this group needs to include all three steps on all three levels of effort.

APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

Residents ages 65 and older typically are retired and have no children living with them. This group may be resistant to change and be the least concerned with improving future water quality. However, this group tends to have more time and energy to expend on practicing storm water-friendly behaviors. The focus of the information and education given to this group should be on providing specific actions which reduce their pollution-potential, along with continuing awareness and pollution-water quality linking messages.

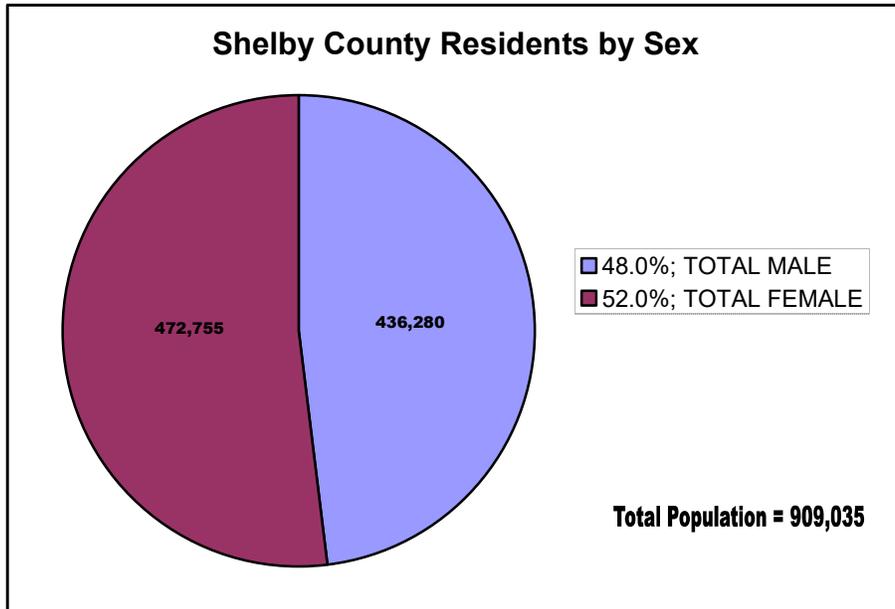


Figure 5 – Target Audience by Sex

Figure 5 shows the division of Shelby County residents by sex. Since the groups are so closely split, the Shelby County Storm Water Education and Outreach Strategy will not differentiate messages by sex. However, there may be a specific message which may apply more to males or females. These messages may be specifically targeted to one group or the other if it is determined that it will produce benefits in overall water quality.

APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

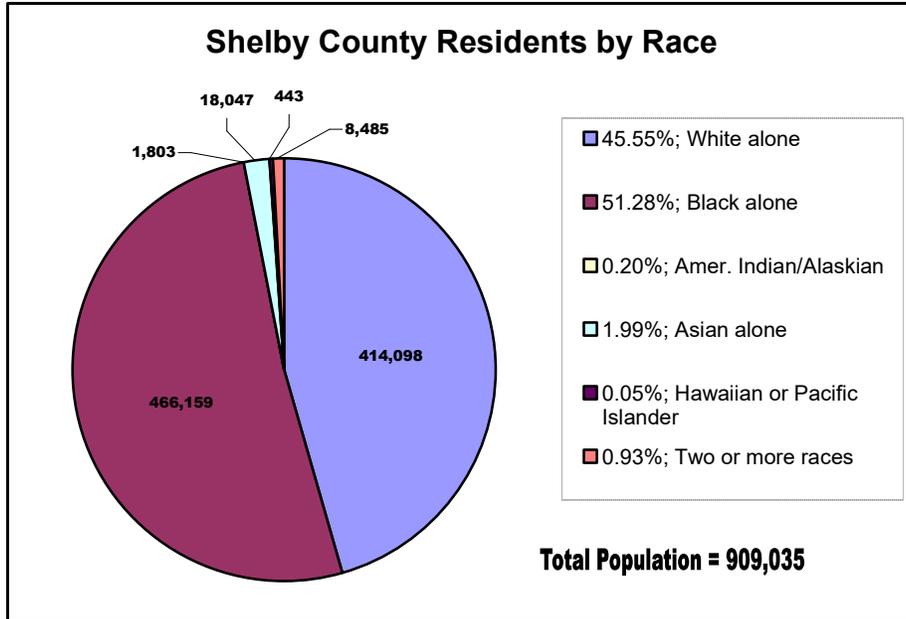
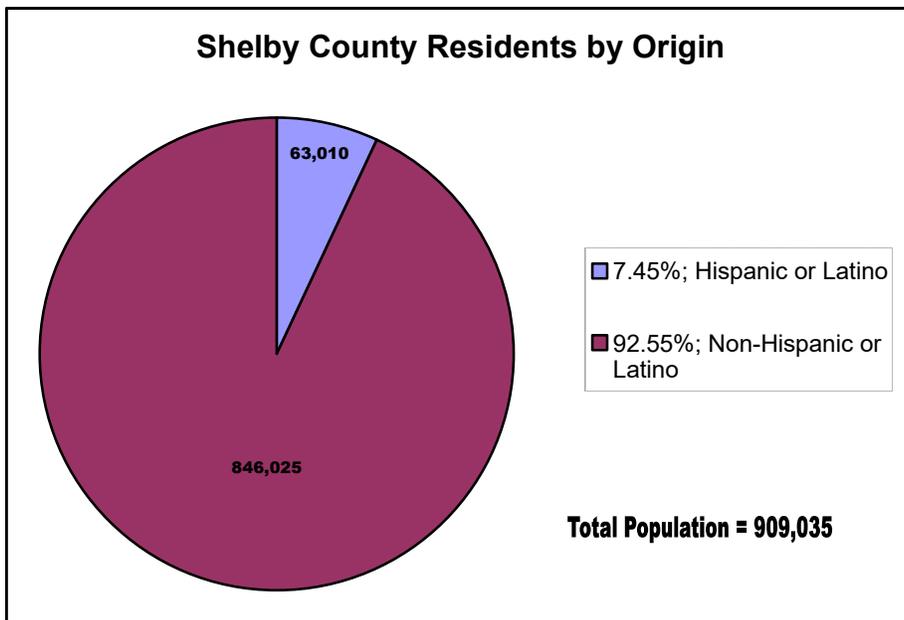


Figure 6 – Target Audience by Race

Shown in Figure 6 is a pie chart and information containing the break-down of Shelby County residents by race. Although the data shows that there is a majority of black residents in Shelby County, the break down for unincorporated Shelby County would probably show a greater majority of white residents. However, the difference in the percentages is again so evenly split between black and white that it does not generally make sense for the Education and Outreach Strategy to differentiate messages by race. All other races combined do not make up a significant amount of people to try to target. Again, if there is a specific message that is more applicable to a certain race and it possible to concentrate efforts to that group it can be done on an individual message level.



APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

Figure 7 – Target Audience by National Origin

Figure 7 depicts the percentage of Shelby County residents that are of Hispanic or Latino origin. These estimates are for legal residents. It is estimated by different publications that there as many as 110,000 Hispanic or Latino residents within Shelby County. The balance of which are generally illegal immigrants. However, the majorities of these residents reside within the City Limits of Memphis and should not be added to unincorporated totals. It is assumed that the percentages calculated by the census department will be a representative figure for unincorporated Shelby County and also the other municipalities outside of Memphis, but within Shelby County.

Multiplying the estimate of 63,010 residents by the percentages of 10.37% for residents living within unincorporated Shelby County and 7.45% for residents of Hispanic and Latino origin, places approximately 469 persons of Hispanic or Latino origin within unincorporated Shelby County. The amount of people within this group generally does not make up a large enough portion of the whole to gear specific messages toward. Although this is not a significant amount of residents, a portion of this group may not speak English, and therefore, all other informational and educational efforts may not provide any benefits in water quality. If the basic messages are not properly communicated no changes in behavior will occur. Therefore, it makes sense for the Storm Water Educational and Outreach Strategy to make some provisions to produce parallel messages in Spanish.

When examining the general information contained in Appendix B about pollution sources, it can be seen that two sources may likely occur in any of the identified locations. These sources are illegal discharges and siltation and erosion. Since no particular type of citizen profiled can be targeted as the likely source, the strategy will be to mark entrances into the storm water drainage system to educate all persons with access to the system.

In addition to the Public Education and Outreach requirements within the Storm Water Management Program, the other five minimum control measurements also contain aspects of education and outreach. It is also more efficient to plan and develop all education and outreach material in conjunction with this strategy. Therefore, elements from public participation, illicit discharge detection and elimination, construction site runoff, post-construction storm water management, and municipal pollution prevention will also be identified and targeted as a result of this strategy.

The permit requirement for Public Involvement and Participation involves getting the general public to take actions to two levels. First, is to comment on proposed resolutions, ordinances, and other legislation that forms the Storm Water Program as a whole that dictates the types of pollutant sources, regulatory mechanisms, and enforcement actions that will be used. The second is the physically take actions to clean-up polluted sites and to inform other citizen groups about storm water messages and environmentally-friendly behaviors. For general purposes, this group will be called volunteers. Volunteers come from all demographic backgrounds, but must have strong beliefs or concerns regarding storm water issues or they would not be involved. These citizens are valuable resource in determining the population's knowledge, attitudes, beliefs and perceptions of these issues and should be targeted in regards to developing social data.

The permit requirements for Illicit Discharge Detection and Elimination requires that the program inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper waste disposal. This control measure also addresses non-storm water discharges or flows. Shelby County has implemented a mechanism for gathering information from the public, via the internet and telephone hotline, on suspected illegal dumping. This group can be addressed as illicit dischargers.

There are many requirements placed on Shelby County by the permit regarding Construction Site Runoff. These requirements include containing sediment and preventing erosion, controlling wastes such as, discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste and also must include a mechanism to process information submitted by the public. These citizens can be generically called developers and builders. Staff must be trained in the fundamentals of erosion prevention and sediment

APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

control and in how to review erosion and sediment control plans. This group can be called construction site operators.

Post Construction Storm Water Management involves ensuring adequate long-term operation and maintenance of structural and non-structural best management practices. Persons involved in up keeping drainage features and landscaping include, individuals, contractors, home-owner associations, apartment and office managers, and County public works staff. This audience can be referred to as BMP maintainers.

The permit requirements for Pollution Prevention and Good Housekeeping for Municipal Operations include training employees to prevent and reduce storm water pollution from activities on park and open spaces, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance. Shelby County must educate employees on controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, fleet or maintenance shops with outdoor storage areas, salt/sand storage locations, waste transfer stations, and disposal of wastes removed from these areas and the storm sewers. This group of people will be collectively called municipal employees.

Considering the information portrayed about the demographics of the public combined with the potential impact on water quality caused by the pollution source, the Shelby County Storm Water Public Education and Outreach strategy will target audiences in the following ranking order:

APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

RANKING		AUDIENCE TYPE
1)	✓	Construction site operators,
2)		Commercial business owners and industrial site managers,
3)		Farmers,
4)	✓	People between 10 and 24 years old,
5)	✓	People between 25 and 39 years old,
6)		Municipal employees,
7)	✓	Small lot owners,
8)	✓	People between 40 and 65 years old,
9)	✓	People 65 years old and over,
10)		Volunteers,
11)	✓	Large lot owners,
12)	✓	Illicit dischargers,
13)		BMP maintainers,

✓ Include parallel messages in Spanish.

Figure 8 – Ranking of Target Audiences

The ranking of the members of the target audience is based on the limited justification given above. A comprehensive means to gather audience profile information has not been done. The Shelby County Storm Water program should consider, in the near future, refining this list by collecting additional social data. This data could be collected by various means, such as, performing citizen surveys, organizing focus groups, or other community assessments. These means should aim to quantify the level of knowledge of storm water issues, and the attitudes, beliefs, and perceptions of each of the target audiences. With this data, it can be determined which educational step in general each audience classification has, which in turn, shows the level of educational effort that should be incorporated into the individual messages that are developed.

MESSAGES

Currently Shelby County conveys a number of messages to target audiences. Messages are from general storm water information to specific actions to take to prevent potential pollution on a specific site or during a specific activity. Below is a table showing the messages and the target audience.

FORMAT AND DISTRIBUTION

EVALUATION

APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

Appendix A

Pollutants Commonly Found in Storm Water Runoff and Their Impacts

The Table below summarizes common storm water pollutants and also provides information on potential sources of these pollutants and types of impacts they may cause.

Sediment	<ul style="list-style-type: none">• Sediment is often viewed as the largest pollutant load associated with storm water runoff in an urban setting. The loadings have been shown to be exceptionally high in the case of construction activity.• Sediment is associated with numerous impacts in surface waters including increased turbidity, effects on aquatic and benthic habitat and reduction in capacity of impoundments.• A number of other pollutants often attach to, and are carried by, sediment particles.
Nutrients	<ul style="list-style-type: none">• The nutrients most often identified in storm water runoff are phosphorus and nitrogen.• In surface waters, these nutrient loads can lead to heavy algae growth, eutrophication (especially in impoundments) and low dissolved oxygen levels.• Nutrients enter the urban system in a variety of ways, including landscaping practices (commercial and home), leaks from sanitary sewers and septic systems, and animal wastes.
Organic Matter	<ul style="list-style-type: none">• Various forms of organic matter may be carried by storm water in urban areas. Decomposition of this material by organisms in surface waters results in depleted oxygen levels.• Low levels of dissolved oxygen severely impact water quality and life within surface waters.• Sources of organic matter include leaking septic systems, garbage, yard waste, etc.
Bacteria	<ul style="list-style-type: none">• High bacterial levels may be found in storm water runoff as a result of leaking sanitary systems, garbage, pet waste, etc.• The impacts of bacteria on surface waters may affect recreational uses and aquatic life as well as impose health risks.
Oil and Grease	<ul style="list-style-type: none">• Numerous activities in urban areas produce oil, grease, and lubricating agents that are readily transported by storm water.• The intensity of activities, including vehicle traffic, maintenance and fueling activities, leaks and spills, and manufacturing processes within an urban setting contribute heavily to the level of these pollutants present in adjacent surface waters.
Toxic Substances	<ul style="list-style-type: none">• Many toxic substances are potentially associated with urban storm water including metals, pesticides, herbicides and hydrocarbons.• Toxic compounds may affect biological systems, and accumulate in bottom sediments of surface waters.
Heavy Metals	<ul style="list-style-type: none">• Heavy metals such as copper, lead, zinc, arsenic, chromium and cadmium may be typically found in urban storm water runoff.• Metals in storm water may be toxic to some aquatic life and may accumulate in aquatic animals.• Urban sources of metals in storm water may include automobiles, paints, preservatives, motor oil and various urban activities.
Temperature	<ul style="list-style-type: none">• Storm water runoff increases in temperature as it flows over impervious surfaces. In addition, water stored in shallow, unshaded ponds and impoundments can increase in temperature.

APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

- Removal of natural vegetation (such as tree canopy) opens up water bodies to direct solar radiation.
- Elevated water temperatures can impact a water body's ability to support certain fish and aquatic organisms.

Source: http://h2o.enr.state.nc.us/su/what_is_stormwater.htm#pollutants

APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

Appendix B

Matrix Linking Presence of Potential Pollution Sources by Location

Potential Pollution Source	Land Classification				
	Undevelopable Land	Vacant & Agricultural	Large lot residential	Small lot residential	Commercial and Industrial
Animal Wastes	X	X	X	X	
Bulk Material Storage		X			X
Cross Connections Sewer Leaks				X	X
Faulty Septic Systems			X		
Floating Debris Garbage				X	X
Fuel Filling Operations		X			X
Gas Diesel Hydrocarbons		X	X	X	X
Grass Clippings Leaves Yard Waste			X	X	
Household Chemicals Paint		X	X	X	X
Illicit Discharges	X	X	X	X	X
Liquid Storage Tanks		X			X
Oil and Grease		X	X	X	X
Pesticides Herbicides		X	X	X	X
Siltation and Erosion	X	X	X	X	X
Vehicle Wash Activities			X	X	X
Total Sources Present	3	10	10	11	12

APPENDIX 6 – SHELBY COUNTY STORM WATER PUBLIC EDUCATION AND OUTREACH PROGRAM

Appendix B

Volunteer Group Partners within Shelby County

Group Name: Wolf River Conservancy

Contact: Keith Kirkland, Executive Director

Contact Address: PO Box 11031

Memphis, Tennessee 38111-0031

Contact Phone: 901-452-6500

Contact Email: wrc@wolfriver.org

URL: <http://www.wolfriver.org>

Activity: Watershed Alliance/Council

Description: WRC is dedicated to conserving and enhancing the Wolf River and its environs as a natural resource for public education and low impact recreational activities. Their long-term goal is to promote the establishment of a greenway in three counties along the 90 miles of the Wolf River by; educating Mid-Southerners about the significance of the river's biodiversity, addressing policy issues that impact the river, and identifying critical areas for acquisition by public agencies. **Number of Volunteers:** 600

Group Name: Tennessee Water Education Team (W.E.T.)

Contact: Laura Barr Coleman

Contact Address: East High School 3206 Poplar Ave.

Memphis, Tennessee 38111-

Contact Phone: 901 320-6160

Contact Email: laura_coleman@yahoo.com

Activity: Volunteer Monitoring

Description: Tennessee W.E.T. involves three schools (East High School in Memphis, Germantown High School in Shelby County, and Fayette-Ware High School in Fayette County) in monitoring the Wolf River. The sites represent the agricultural, suburban, and urban parts of the river.

Number of Volunteers: 20

Group Name: Environmental Science

Contact: Ruth Archer

Contact Address: 2009 Ridgeway Rd

Memphis, Tennessee 38119

Contact Phone: 901-761-8820

Contact Email: rutharcher1@yahoo.com

Activity: Education Project/Program

Description: This is an environmental science group that works with Litherman Nature Center. They are interested in monitoring water, soil, and air quality in the Memphis area.

Number of Volunteers: 26

Group Name: Wolf River/WET Program

Contact: Victoria Johnson; Leslie McNamara

Contact Address: 7653 Old Poplar Pike

Germantown, Tennessee 38138-

Contact Phone: 901 756-2350 ext.250

Contact Email: wetwolf@bellsouth.net ; johnsonvi.ten-nash.ten.k12.tn.us

Activity: Volunteer Monitoring

Description: Wolf River/WET Program at Germantown High School monitors the Wolf River and works with East High School (Shelby County) and Fayette-Ware High School (Fayette County) on test sites spread miles apart. They have a 5-year commitment and share data with the local Park Rangers, conservation groups, university faculty and to the public through various presentation. They were one of three schools chosen in Oct. 1999 to give a summary of the project for Governor Don Sundquist's "Tennessee Looks Good to Me" program.

Number of Volunteers: 5

Appendix C

Shelby County Educational Flyer



**ENLIGHTENING TIMES
WITH STUDENTS**

Educational programs geared to be informative and fun are being offered by the Shelby County Environmental Programs Department. Each program described below is approximately 45 minutes to 1 hour in length for groups of 25 or less in the Shelby County School System. If you are interested in booking a program for your class, please call our office at **379-4430** or email us at lisa.williams@shelbycountyttn.gov.

The Battery Barn or the Trash? Discover the items in your home that are classified as Household Hazardous Waste and what we should do to dispose of them properly. Create and decorate your very own Battery Barn by recycling an empty can from home to collect household batteries and dispose of them properly.

Storm Water Awareness! Rainy day adventures. Rivers, streams, wetlands, rainwater and watersheds. What do they have to do with you? Learn about our drinking water and the importance of protecting our water quality and how you can help keep our water clean.

Trash to Treasure! Experiment with creative ways to reuse trash. Learn ways to reuse trash to make art creations and useful everyday items. These projects will not only save you money, but will also help save our environment.

Reduce, Reuse, or Recycle? Define the differences between reducing, reusing, and recycling. Is it possible to reduce and reuse at the same time? How about learning some new "R" words to take care of our planet?

FUNDING FOR A PORTION OF THESE PROGRAMS IS PROVIDED BY THE LITTER GRANT PROGRAM COMPLIMENTS OF T.D.O.T.

Shelby County Storm Water Program Enforcement Response Plan

OBJECTIVE

The Shelby County Stormwater Program's Enforcement Response Plan (ERP) is written to provide guidance to its Stormwater Program Management Staff regarding compliance with and enforcement of Chapter 36 (Stormwater Ordinance) of the Shelby County Code, hereinafter "Code" and other applicable water quality regulations. The ERP should be used as a guide while recognizing that each situation is different and unique. The provisions of the ERP are not mandatory and actual enforcement procedures should consider any unusual aspects of a violation or condition, as well as special characteristics of an enforcement action, in determining the proper response.

While the purpose of the ERP is to provide guidance for the administration of the Stormwater Management Ordinance, it is not intended to limit the judgment and flexibility of the Shelby County Engineer (or his designee); hereinafter "Manager", in determining an appropriate response.

Minor infractions may be resolved by a verbal notice, telephone call, or warning letter advising owner/operator/person of the nature of violation. If such action fails to generate an adequate response, further enforcement actions as provided by the Code may be taken.

ENFORCEMENT RESPONSES

The order of precedence for enforcement responses is outlined in the attached Flow Chart (Exhibit A) using bold arrows, but should not be construed to prevent the Manager from taking a stronger action without first implementing less stringent steps, if in his opinion, a more forceful response is necessary.

VERBAL WARNING

A verbal warning is the lowest level of response to a threatened violation. It is intended for minor threats to the environment.

DOCUMENTED PHONE CALLS or INFORMAL DISCUSSIONS

In the case of the most minor violation of a permit or the Shelby County Code, a telephone call or in formal meeting may be sufficient to obtain the desired compliance. Phone calls must be documented by contemporaneous notes. A copy of the notes must be placed in the owner/operator/person's master file and another copy mailed to the subject. If an informal discussion is held, notes should be kept summarizing the discussion. Copies of the notes should be distributed to all entities involved. Anyone wishing to take exception to the notes should be required to respond in writing.

WRITTEN NOTICE OF VIOLATION

A written notice of violation should be issued prior to any enforcement action other than a verbal warning of non-compliance. A written notice of violation is an official notification to inform a non-compliant owner/operator/person of a violation of a Code Provision. Within ten (10) days of receipt of the notice, a written explanation of the violation and a remedial plan, to include specific required actions, shall be submitted by the owner/operator/person to the Manager. Inspection to insure performance of any corrective action may be conducted by the Manager at his discretion. Submission of the plan in no way relieves the owner of liability for any violation occurring before or after receipt of the notice of violation.

APPENDIX 7 – ENFORCEMENT RESPONSE PLAN

WRITTEN NOTICE TO SHOW CAUSE WITH PERSONAL CONFERENCE

The purpose of the written notice to show cause with personal conference is to provide a forum for the owner/operator/person to present a defense to the charges as outlined, or, to obtain additional information. The written notice to Show Cause shall include a hearing date within twenty one (21) days of receipt of the notice. The purpose of the conference is to agree upon a plan of action to ensure that no additional discharges occur and provide the owner/operator/person and representatives the opportunity to give reasons why civil penalties should not be pursued.

ADMINISTRATIVE REMEDIES

Administrative remedies are enforcement documents which direct owners/operators/persons to perform, or to cease, specific activities. There are three (3) primary types of administrative remedies: 1. Consent Agreements, 2. Compliance Orders and 3. Cease and Desist Orders.

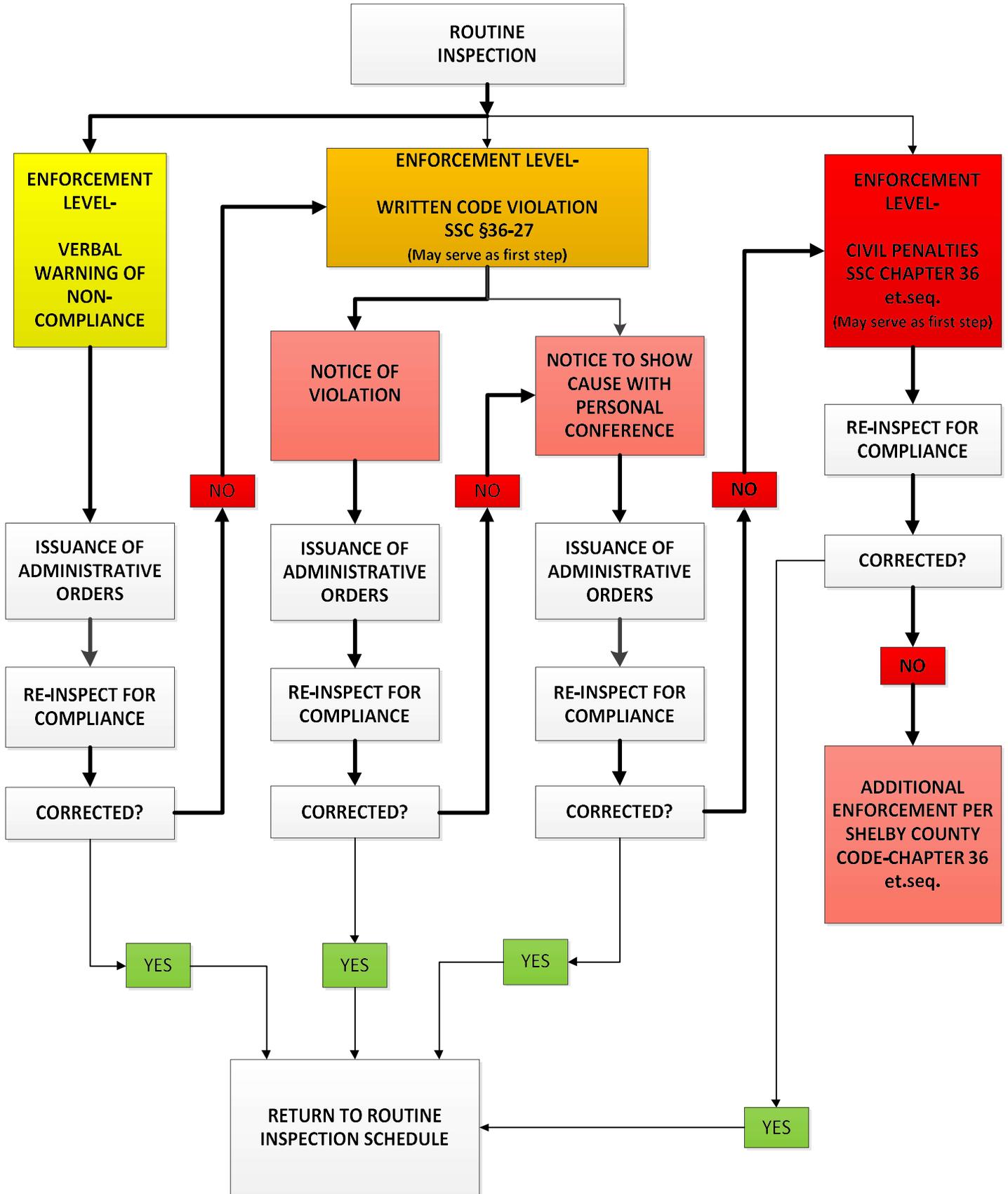
1. **Consent Agreement:** Are assurances of voluntary compliance or other similar document establishing an agreement with the owner/operator/person responsible for the non-compliance. Such agreements shall include specific action to be taken by the permittee or owner/operator/person discharging Stormwater to correct the non-compliance within a time period specified by the agreement.
2. **Compliance Order:** Upon a finding by the Manager that any owner/operator/person has violated or continues to violate the terms of the Code, he may issue an order to the violator directing that, following a specified time period, adequate structures and/or devices be installed or procedures implemented and properly operated or followed.
3. **Cease and Desist Orders:** Upon a finding by the Manager that any person has violated or continues to violate the provisions of Chapter 36 of the Shelby County Code or any permit or order issued thereunder, the Director may issue an order requiring the owner/operator/person to:
 - a. Comply forthwith; and
 - b. Take such appropriate remedial or preventive action as may be needed or deemed necessary to properly address a continuing or threatened violation, including halting operations and terminating the discharge.

CIVIL LITIGATION/PENALTIES

Pursuant to the provisions of the Code, the Manager may, through the County Attorney, petition the appropriate Court for civil penalty relief as specified therein.

Notes: (1) Enforcement action shall be escalated to the next enforcement level immediately following a failed follow-up inspection. (2) Inspectors shall follow the standard progression of enforcement as shown on Exhibit A, with the exception of Enforcement following a failed re-inspection for compliance following Step Two Code Violation which is to be authorized only by Manager.

APPENDIX 7 – SHELBY COUNTY STORM WATER PROGRAM ENFORCEMENT RESPONSE PLAN



Appendix 8

Quality System Standard Operating Procedure for Macroinvertebrate Stream Survey

**APPENDIX 8 – QUALITY SYSTEM STANDARD OPERATING PROCEDURE FOR
MACROINVERTIBRATE STREAM SURVEY**

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**APPENDIX 8 – QUALITY SYSTEM STANDARD OPERATING PROCEDURE FOR
MACROINVERTIBRATE STREAM SURVEY**

Appendix 8, Quality System Standard Operating Procedure for Macroinvertebrate Stream Survey, is maintained in a separate binder labeled “Quality System Standard Operating Procedure for Macroinvertebrate Stream Survey”. This binder is available for review at the Shelby County Engineering Field Office, 6463 Haley Road, Memphis, TN 38128 during normal business hours. This document is also available for viewing and downloading at the TDEC official web site:

<http://www.tn.gov/environment/wpc/publications/pdf/bugsop06.pdf>

Appendix 9

Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water

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Appendix 9, Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water, is maintained in a separate binder labeled "Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water". This binder is available for review at the Shelby County Engineering Field Office during normal business hours. This document is also available for viewing and downloading at the TDEC official web site:

<http://www.tn.gov/environment/wpc/publications/pdf/ChemSOP03QUAP.pdf>

Appendix 10

EPA Water Quality Scorecard