Prepared by the Ecorse Creek Watershed Advisory Group and the Alliance of Downriver Watersheds

City of Allen Park
City of Dearborn Heights
City of Ecorse
City of Inkster
City of Lincoln Park
City of Melvindale
City of Romulus
City of Southgate
City of Taylor
City of Westland
City of Wyandotte
Wayne County

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Executive Summary

The Ecorse Creek Watershed is a relatively urban watershed within Wayne County in southeast Michigan. Originally, combined sewers serviced the area, which contributed to water quality impairments of the creeks. The Michigan Department of Environmental Quality (MDEQ) required the separation of combined sewers in the 1980's and improvements to the Downriver Sewage System in the 1990's. Even after implementation of the required improvements, the water quality of the watershed continues to be threatened, and in some cases impaired, by urban storm water runoff.

Many of the drains within the watershed were originally designed to accept agricultural flows. However, as urbanization of the watershed occurred, with concurrent increase in impervious surfaces, storm water runoff increased. The capacity of many of the small drains was insufficient to handle the new, higher peak flows. This resulted in increased frequency and severity of flooding and erosion. Conversely, the increase in impervious surfaces also resulted in less rainwater being infiltrated into the ground, which contributes to lower groundwater levels and in lower creek base flows. The combination of these two effects, higher peak flows during storm events and lower base flows, is devastating to the aquatic life in the streams. Consequently in 2003, the Michigan Department of Environmental Quality developed a Total Maximum Daily Load (TMDL) for Biota, and in 2008 a TMDL for *E. coli* for the entire Ecorse Creek Watershed to address impairments of the watershed's creeks and drains. Previous studies and sampling, and the results of this Watershed Management Plan work, point to the impairment as being caused by unstable flows and excessive sedimentation, which are resulting in the loss of stable habitat for aquatic life. It is apparent that implementing methods to reduce the effects of urban storm water runoff are essential to further improving the water quality of the Ecorse Creek Watershed.

Background

The Ecorse Creek Watershed drains an area of approximately 43.4 square miles in a heavily urbanized region (especially along the eastern half of the watershed) and has a watershed population of roughly 152,301 people. The Ecorse Creek Watershed includes 11 communities as well as Wayne County and the Wayne County Airport Authority. These entities are listed below:

Allen Park
Dearborn Heights
Ecorse
Inkster
Lincoln Park
Melvindale
Romulus
Southgate
Taylor
Westland
Wyandotte
Wayne County
Wayne County Airport Authority

The Ecorse Creek Watershed can be subdivided into 3 main subwatersheds. These include the North Branch of Ecorse Creek, LeBlanc Drain, and the Sexton-Kilfoil Drain. The North Branch and the Sexton-Kilfoil Drain are open drainage courses while the LeBlanc Drain is an enclosed storm sewer. Each of these subwatersheds contains many small tributaries.

According to the Southeast Michigan Council of Governments (SEMCOG 2008), nearly 94.5% of the land is developed with only 5.5% remaining as open space (agriculture, water, parks, open space). The urbanization of the watershed is expected to continue with 97% of the land being developed and only 3% remaining as open space by the year 2030.

Flooding due to urbanization has long been a problem in the Ecorse Creek Watershed with the first documented event in June of 1968. While flooding continues to be a main focus for the watershed, a secondary focus has turned to water quality. This water quality focus not only includes the TMDLs for Biota and *e. coli* , but is focused on achieving much broader goals for the watershed - including achieving MDEQ identified designated uses and watershed specific desired uses.

Purpose of the Ecorse Creek Watershed Management Plan

On March 10, 2003 the entities within the Ecorse Creek Watershed applied for National Pollutant Discharge Elimination System (NPDES) permit coverage under Michigan's Phase II Storm Water regulations. These regulations require certain "small" municipal separate storm sewer system entities that are located in urbanized areas to obtain a storm water permit. An initial requirement of the permit was the development of a comprehensive Watershed Management Plan that addresses the following elements:

Elements of the Watershed Management Plan

- Watershed Condition
- Challenges and Goals
- Identify Management Alternatives
- Watershed Action Plan
- Methods and Milestones to Measure Progress
- Sustainability
- Public Involvement

The goal of the Watershed Management Plan is to create a tool that the entities within the watershed can use to guide implementation of action items that will help achieve long-term goals of the watershed, including addressing the TMDLs for macroinvertebrate and *e. coli*. The Ecorse Creek Watershed Inter-Municipality Committee (ECIC) developed a Watershed Management Plan in 2006 that was approved (CMI) by the State in 2007. This current document is an update to the 2006 Watershed Management Plan to include activities and data that have since been collected and/or developed such as the *e. coli* TMDL. The plan was also updated to achieve 319 approval from the State.

Formation of the Ecorse Creek Watershed Inter-Municipality Committee (ECIC)

The entities within the Ecorse Creek Watershed needed to legally establish a mechanism in order to fund the development of the Watershed Management Plan. The entities worked to develop a Memorandum of Agreement (MOA) to formalize the group and establish financial responsibilities and by-laws. Each entity adopted the MOA and the Ecorse Creek Watershed

Inter-Municipality Committee (ECIC) was formed on September 9, 2003 through the Inter-Municipality Committee Act (PA 200, 1957; MCL 123.631, et seq.). The ECIC evolved into the Alliance of Downriver Watersheds as is detailed below.

Formation of the Alliance of Downriver Watersheds
The Alliance of Downriver Watershed (ADW) members have been formally and informally working together for several years to manage the area's water resources on a watershed basis and to comply with federal regulations regarding the discharge of storm water. The ADW is a permanent watershed organization formed under Public Act 517 of the Public Laws of 2004. The ADW was formed in January 2007 and consists of 24 public agencies in the Ecorse Creek, Combined Downriver, and Lower Huron River Watersheds in southeast Michigan. The agencies and communities that comprise the ADW believe there are substantial benefits that can be derived by joining together and cooperatively managing the rivers, lakes, and streams within the watersheds and in providing mutual assistance in meeting state water discharge permit requirements of the members. The ADW is relatively urban in nature with more open and rural lands as you move south within the watershed boundaries. Based on 2010 Census data, more than 450,000 people reside within the ADW watershed boundaries. Article III of the ADW Bylaws details the assessment of cost to members methodology. The members of the ADW developed a cost allocation methodology based on each members total area (acres) in all 3 watersheds and total population in all 3 watersheds. Among other things, the annual membership dues provided by each member have been successful in serving as local match and leveraging several hundred thousand dollars in grant funds.

Ecorse Creek Watershed Condition
The current condition of the Ecorse Creek Watershed was determined through a review of existing reports, water quality sampling data and field investigations. The information reviewed came from the Michigan Department of Natural Resources, the Michigan Department of Environmental Quality, the U.S. Army Corps of Engineers, the U.S. Geological Survey, Wayne County Department of Environment and other sources. Field surveys utilizing the MDEQ's Stream Crossing Watershed Survey Procedure were also conducted at 61 locations throughout the Ecorse Creek Watershed to provide habitat, water quality data and culvert/bridge structure information.

The Ecorse Creek Watershed is identified on Michigan's list of water-quality limited or threatened waters as failing to meet Michigan water quality standards for pathogens and for the protection of warm water aquatic life. The TMDLs, which the MDEQ has developed, identify water quality indicators, and quantifiable pollutant load reductions to protect aquatic life and reduce pathogens.

Designated and Desired Uses and Pollutants
All surface waters in Michigan are designated for and protected for a variety of uses. The designated uses that are applicable to the Ecorse Creek Watershed are shown in the following table. In addition to the designated uses, certain desired uses were identified for the watershed. The desired uses are also shown in the table below.

Some of the uses are considered impaired, meaning the use is not being met. Potentially impacted indicates that the use is being met, however, there is a good likelihood that the use could become impaired in the future. For those uses recognized as impaired, the ADW identified known (k) and suspected (s) pollutants. Sources and causes for the pollutants were also identified.

Uses	Impaired	Potentially Impacted	Unknown	Known and Suspected Pollutants
Designated Use				
Total Body Contact Recreation (between May and Oct)	X			E.coli and other pathogens (k) Lack of stable flow (k)
Partial Body Contact	X			E. Coli and other pathogens (k)
Warmwater Fishery		X		
Other Indigenous Aquatic Life and Wildlife	X			Lack of stable flow (k) Sedimentation (k) Low dissolved oxygen (k) Nutrients (s) Lack of habitat (k)
Agriculture			X	
Industrial Water Supply			X	
Desired Use				
Flood Control (Local)	X			Lack of stable flow/excessive surface runoff (k) Lack of hydraulic capacity (k) Inadequate protective measures (k)
Aesthetics		X		
Open Space Preservation		X		
Greenway Preservation		X		
Wetland Preservation		X		
Recreational Areas		X*		*designated as potentially impacted because more recreational areas are desired
Native Vegetation/Unique Habitat/Natural Buffers		X		

Goals and Objectives

Once the ECIC identified the designated and desired uses, determined pollutants and their sources and causes, and considered plan maintenance and sustainability issues, goals and objectives for the watershed were developed. A goal is a long-term qualitative description of a desired future condition stated in general terms without criteria of achievement. An objective is an action that can be either short-term or long-term that will reduce pollution from a source to protect or restore a designated or desired use. The ECIC's 8 goals and the associated objectives are shown in the following table.

Goals	Objectives
Reduce Flooding	**Both Short- and Long-Term Objectives:** ▪ Preserve and restore wetlands and open space ▪ Reduce runoff volume/rate **Long-Term Objective:** ▪ Improve understanding of stream flow volumes and distribution ▪ Improve capacity of floodplains
Reduce Stream Flow Variability	**Both Short- and Long-Term Objective:** ▪ Reduce runoff volume/rate ▪ Preserve and enhance native vegetation/naturalization **Long-Term Objective:** ▪ Preserve and restore wetlands and open space
Watershed Management Sustainability	**Short-Term Objective:** ▪ Establish institutional relationships to ensure plan implementation **Long-Term Objective:** ▪ Develop long-term funding methodologies ▪ Develop adaptive and iterative management
Improve Water Quality	**Short-Term Objective:** ▪ Eliminate/reduce illicit discharges **Both Short- and Long-Term Objective:** ▪ Protect, expand, and restore the riparian corridor ▪ Improve erosion and sedimentation controls ▪ Preserve and restore wetlands and open space **Long-Term Objective:** ▪ Meet Biota TMDL mandated 50% reduction based on P-51 ScoresMeet e. coli TMDL for partial and total body contact ▪ Reduce directly connected storm water discharges to sanitary systems

Goals	Objectives
Protect, Enhance, and Restore Riparian and In-Stream Habitat	**Short-Term Objective:** ▪ Integrate storm water management in planning and land use approval process **Long-Term Objective:** ▪ Restore warmwater fishery ▪ Restore diverse aquatic community
Preserve, Increase, and Enhance Recreational Opportunities	**Short-Term Objective:** **Both Short- and Long-Term Objective:** ▪ Protect and improve riparian corridor aesthetics **Long-Term Objective:** ▪ Obtain land for wetlands and passive parks ▪ Meet partial body contact requirements ▪ Increase public access to stream corridors ▪ Encourage recreation and open space planning in site plan/land use approval process
Protect Public Health	**Both Short- and Long-Term Objective:** ▪ Reduce secondary health concerns related to flooding **Long-Term Objective:** ▪ Meet partial body contact requirements ▪ Meet total body contact requirements
Increase Public Education, Understanding, and Participation Regarding Watershed Issues	**Short-Term Objective:** ▪ Improve media coverage ▪ Create partnerships with institutions, schools, and the private sector ▪ Foster relationships with the County and neighboring communities ▪ Manage expectations of the public for an improved watershed **Both Short- and Long-Term Objective:** ▪ Improve education and awareness of watershed successes and failures

Action Plan

After gathering information and input from the various entities within the watershed, and reviewing current policies and programs that are in place, a variety of management alternatives were discussed to address the priority pollutants and causes and to work toward achieving the goals of the Watershed Management Plan. The ADW, including the Ecorse Creek Watershed communities have been working over the years to implement projects and activities that will have a positive impact on water quality, meet permit requirements, and document and measure progress. As is detailed in the annual ADW budget and financing plan, the ADW has organized its planned activities (over the next 5 years) into one of five categories:

- Illicit Connection/Discharge Elimination Plan (IDEP)
- Public Education
- Progress Evaluation Monitoring
- Planning and Reporting
- Other Storm Water Management Activities

As part of the 2010 WMP Update, each community within the watershed identified a number of projects that they would like to implement if funding is available (outside of permit requirements). This information was collected through a series of meetings with the individual communities. Storm Water Management Activities and best management practices were categorized into one of 16 categories:

- Green Roof
- Green Street
- Porous Pavement Installation
- Grow Zones/Native Plantings/Rain Gardens
- Bank Stabilization/Restoration of Bank or Riparian Features
- Culvert/Bridge Replacement
- Storm Water Detention/Retention
- Increase Floodplain
- Public Education/Stewardship
- Hydrodynamic Separators (Vortechnics/Stormceptor)
- Land Acquisition or Conservation Easements
- Water Efficiency
- Comprehensive Street Tree Planting Program
- Water Harvesting/Reuse
- Downspout Disconnection Program
- Other

Measuring Progress

The Watershed Management Plan includes ideas on how to measure the effectiveness of the various BMPs. Measuring progress will be done by both qualitative and quantitative techniques. Qualitative measures include: public surveys, ordinances passed, stream surveys, written evaluations following watershed activities, visual documentation, complaint records and citizen participation. Quantitative techniques include: aquatic life, suspended solids, pathogens/bacteria, dissolved oxygen, flow stability, and geomorphology.

The ADW tracks and reports on progress with the Annual Report submitted to the MDEQ each November as is required under the Storm Water General Permit. The Annual Report summarizes all activities completed by the ADW (both required and not required).

Sustainability

Sustainability is a required element of the Watershed Management Plan. It is important that implementation of the action items or BMPs occurs throughout the watershed, and that the effectiveness of the implemented activities is measured and evaluated. The evaluation results will help determine if future modification to the Plan are needed, so that revisions can be accomplished in a timely manner.

Working together as a team for the development of this Watershed Management Plan, the communities, Wayne County and the Wayne County Airport Authority have realized many benefits. Sharing technical and financial resources resulted in development of a more affordable and comprehensive plan addressing the goals of all involved. Similarly, when implementing the plan, it is anticipated that the entities will continue to realize the many positive benefits. The Alliance of Downriver Watersheds provides the means for continuing efforts to work together to benefit the watershed as a whole and comply with permit requirements.

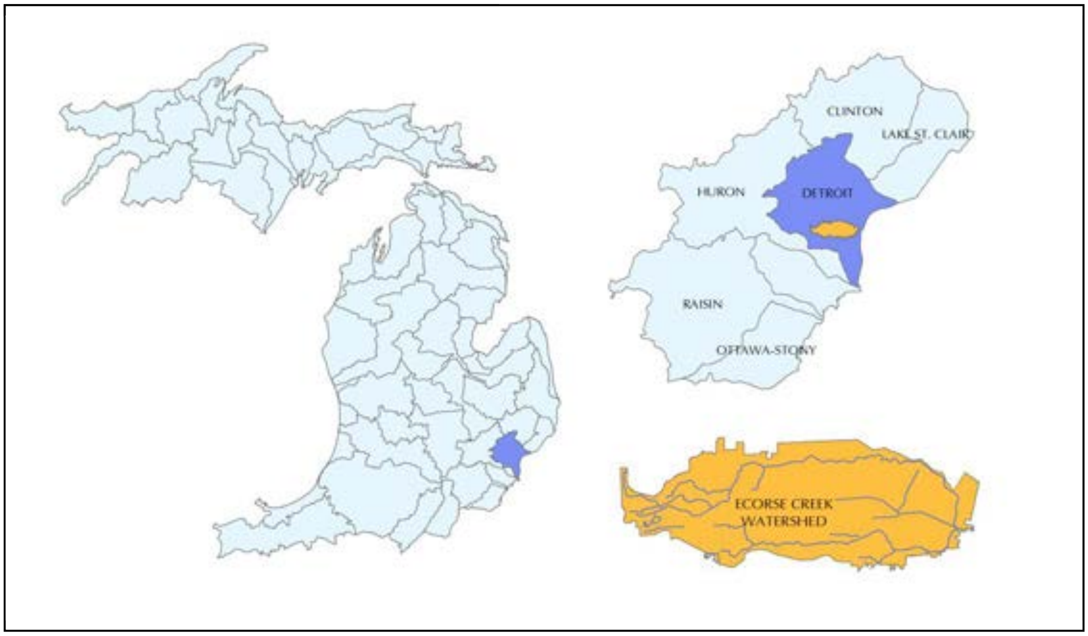
1 Introduction


North Branch Ecorse Creek
Kingston & Powers Roads

Chapter Contents

The Ecorse Creek Watershed (Hydrologic Unit Code 4090004) is located within Wayne County, in southeast Michigan (Figure 1-1). The North Branch of the Ecorse Creek and the Sexton-Kilfoil Drain (South Branch) join each other in Lincoln Park and Ecorse and flow east for a half mile before reaching the Detroit River. The watershed drains an area of approximately 43.4 square miles in a heavily urbanized region, including a portion of the Detroit Metropolitan Airport in the headwater region of the Sexton-Kilfoil Drain.

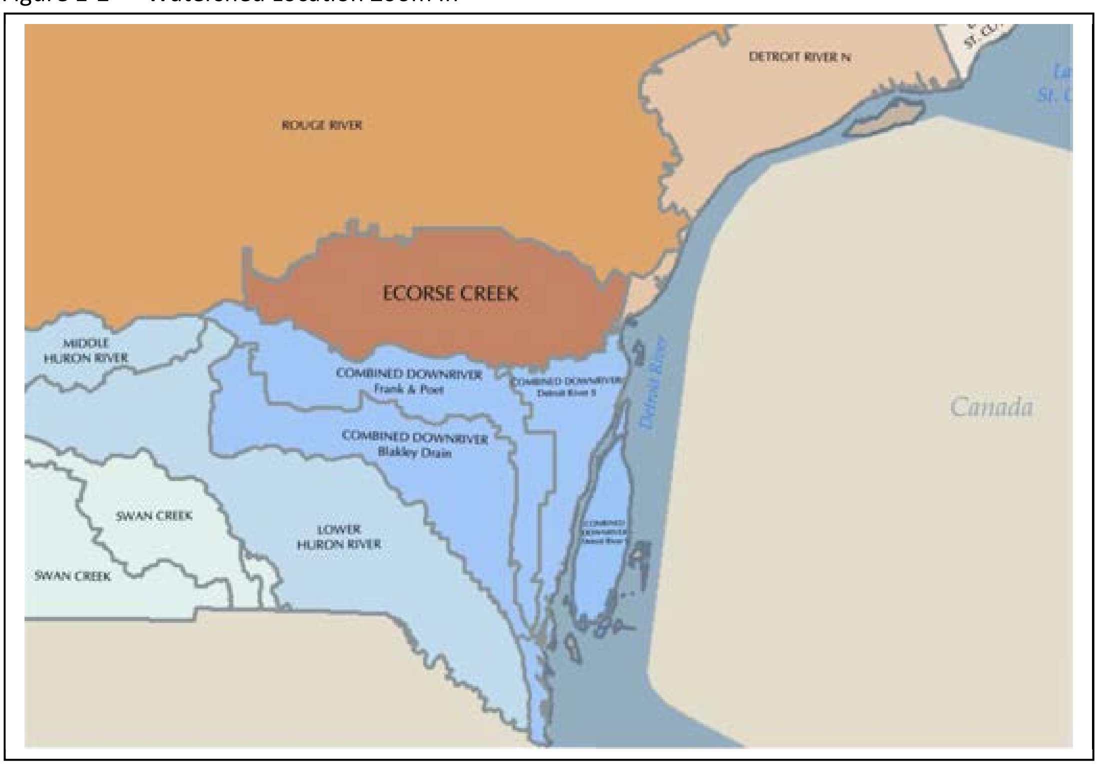
Figure 1-1 Watershed Location



1.1 Overview of the Ecorse Creek Watershed

The Ecorse Creek Watershed borders the Rouge River Watershed to the north, the Combined Downriver Watershed to the south, and the Detroit River to the east (Figure 1-2). Flood protection and pollution abatement studies for the Ecorse Creek have been conducted since the late 1960's by various agencies including the Michigan Department of Environmental Quality (MDEQ), the US Army Corps of Engineers, and the Wayne County Drain Commissioner.

Figure 1-2 Watershed Location Zoom In



The various surveys and site visits conducted by the MDEQ over the past 30 years all have similar findings. A 1969 water quality study on the lower Ecorse Creek found it to be severely degraded, theorized to be due in part to: a settling out and significant buildup of organic material; high sediment oxygen demand; excessive algal growth resulting in low dissolved oxygen concentrations; and, Combined sewer overflow impacts. The 1969 report also mentions the high rate of overland runoff due to the predominance of residential and commercial land use.[1]

MDEQ surveys in the watershed in 1990, 1996, 2001, and 2006[2] rated the habitat between poor and good, with the majority of sites over the years falling in the fair and poor categories. Macroinvertebrate communities consistently rated poor in the 1996, 2001, and 2006 surveys, with one fair score in the 1990 survey. Fish community ratings at two stations in 1996 and one station in 2001 rated poor. Among the reports, common explanations for the degradation in the watershed point to fluctuating flows from impervious surface runoff, heavy siltation, and a general lack of in-stream habitat. Significant embeddedness and the heavy deposition of sediment have homogenized large reaches of the watershed and resulted in a lack of stable substrates necessary for healthy biological communities.[3]

The Ecorse Creek Watershed includes 11 communities as well as the Wayne County Airport Authority (which is located within Romulus)[4]. Map 1-1 depicts the watershed. The watershed encompasses 27,791 acres or 43.4 square miles (Table 1-1). The cities of Allen Park, Lincoln Park, Taylor, and Romulus have the greatest amount of land area within the watershed (Figure 1-3).

Table 1-1

Land Area of Watershed by Community

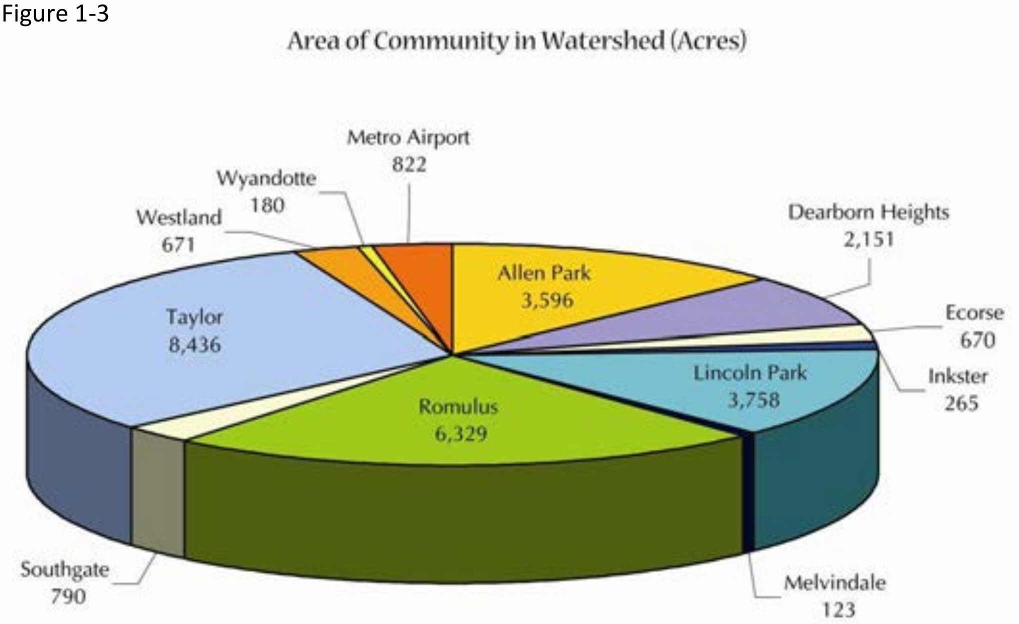
Community	Total Area of Community (Acres)	Area of Community in Watershed (Acres)	Percent of Community in Watershed	Percent of Total Watershed
Allen Park	4,509	3,596	79.8%	12.9%
Dearborn Heights	7,482	2,151	28.7%	7.7%
Ecorse	1,737	670	38.6%	2.4%
Inkster	3,997	265	6.6%	1.0%
Lincoln Park	3,761	3,758	99.9%	13.5%
Melvindale	1,746	123	7.0%	0.4%
Romulus	16,320	6,329	38.8%	22.8%
Southgate	4,420	790	17.9%	2.8%
Taylor	15,109	8,436	55.8%	30.4%
Westland	13,099	671	5.1%	2.4%
Wyandotte	3,322	180	5.4%	0.6%
Metro Airport	6,700	822	12.3%	3.0%
Total	82,202	27,791		100.0%

Source: Wayne County Dept. of Environment Dec. 6, 2004

Note: Romulus figures exclude Metro Airport acreage

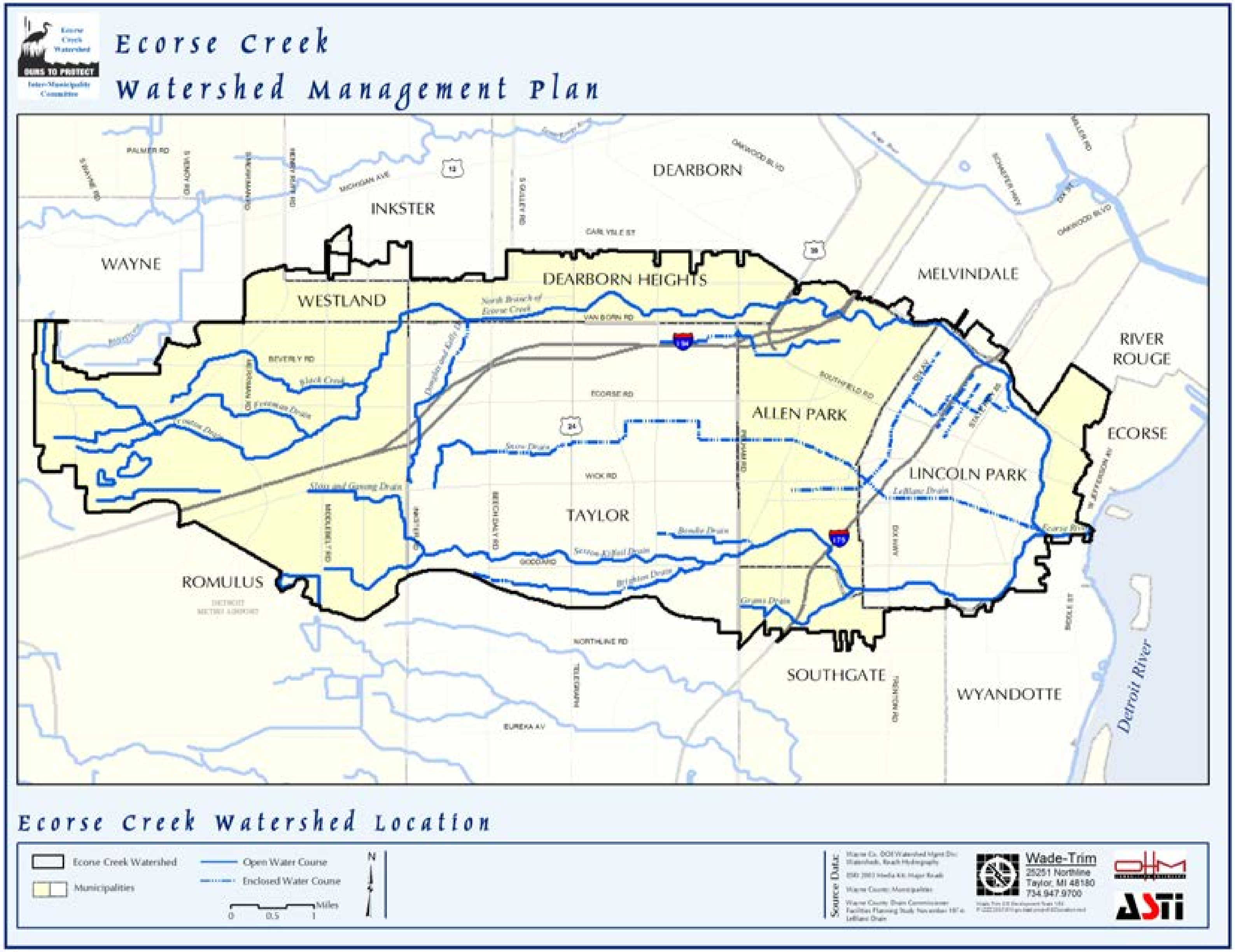
[1] *Total Maximum Daily Load for Biota for the Ecorse River Watershed*, MDEQ-Water Division. July 7, 2003.
[2] Biological Assessment of Detroit River Tributaries. MDEQ-Water Bureau, July 2008.
[3] Ibid.
[4] For purposes of this WMP, the terms “entities” and/or “communities” mean, the NPDES permittees (MS4’s) within the watershed, which include cities, the Wayne County Airport Authority, and Wayne County.

Figure 1-3



Source: Ecorse Creek Watershed IMC MOA

Map 1-1


Ecorse Creek
Watershed Management Plan
DEARBORN
INKSTER
WAYNE
WESTLAND
DEARBORN HEIGHTS
MELVINDALE
RIVER ROUGE
ALLEN PARK
ECORSE
LINCOLN PARK
TAYLOR
ROMULUS
SOUTHGATE
WYANDOTTE
Detroit River
MICHIGAN AVE
VAN BORN RD
ECORSE RD
WICK RD
GODDARD
NORTHLINE RD
EUREKA AV
BEVERLY RD
SOUTHFIELD RD
Ecorse Creek Watershed Location
Ecorse Creek Watershed
Municipalities
Open Water Course
Enclosed Water Course
Miles
0
0.5
1
N
Source Data:
Wade-Trim
25251 Northline
Taylor, MI 48180
734.947.9700

1.2 Purpose of the Watershed Management Plan

The National Pollutant Discharge Elimination System (NPDES) permit program was initiated by the Federal Water Pollution Control Act amendments of 1972. The purpose of the program is to control the discharge of pollutants into surface water. Most storm water discharges are considered point sources and require coverage by a NPDES permit. Phase I of the NPDES storm water program required operators of “medium” and “large” municipal separate storm sewer systems (MS4s), generally those serving a population of 100,000 or greater, to implement a storm water management program as a means to control polluted discharges. Phase II of the NPDES storm water program extended coverage to certain “small” MS4s that are located in urbanized areas, including those communities within the Ecorse Creek Watershed.

The Ecorse Creek communities are required to design a program that:

- Reduces the discharge of pollutants to the maximum extent practicable;
- Protects water quality; and
- Satisfies the appropriate water quality requirements of the Clean Water Act.

In Michigan, the Department of Environmental Quality (MDEQ) administers the NPDES program. A Watershed Management Plan is necessary in order to satisfy requirements of the State of Michigan Phase II Watershed Based Storm Water General Permit (MIG619000). In order for the Ecorse Creek Watershed Management Plan to be approved by the State of Michigan, it must contain the following:

- The geographic scope of the watershed.
- The designated uses and desired uses of the watershed.
- The water quality threats or impairments in the watershed.
- The causes of the impairments or threats, including pollutants.
- A clear statement of the water quality improvement or protection goals of the watershed management plan.
- The sources of the pollutants causing the impairments or threats and the sources that are critical to control in order to meet water quality standards or other water quality goals.
- The tasks that need to be completed to prevent or control the critical sources of pollution or address causes of impairment, including, as appropriate, all of the following:
    - The best management practices needed.
    - Revisions needed or proposed to local zoning ordinances and other land use management tools.
    - Informational and educational activities.
    - Activities needed to institutionalize watershed protection.
- The estimated cost of implementing the best management practices needed.
- A summary of the public participation process, including the opportunity for public comment, during watershed management plan development and the partners that were involved in the development of the watershed management plan.
- The estimated periods of time needed to complete each task and the proposed sequence of task completion.
- A description of the process that will be used to evaluate the effectiveness of implementing the plan and achieving its goals.

In 1999, the communities formed the Ecorse Creek Watershed Advisory Group. The group's mission was to provide:

> *An Ecorse Creek Watershed and riverine corridor system that is aesthetically pleasant, clean, healthy and safe so that watershed residents and visitors can enjoy an improved quality of life, with reduced risk of flooding and better coordination of storm water management throughout the region.*

In an effort to further this mission, and as required under the Phase II storm water rules, the municipalities each filed applications with the MDEQ to obtain coverage under Michigan's NPDES Phase II Storm Water Permit (MIG619000). As has been stated, an initial requirement of the permit is to study, develop, and prepare a Watershed Management Plan.

The communities worked to develop a Memorandum of Agreement (MOA) (Appendix A) to formalize the group and to establish financial responsibilities and by-laws. Each community adopted the MOA and the Ecorse Creek Watershed Inter-Municipality Committee (ECIC) was formed in September 2003. The function of the ECIC was to coordinate and facilitate the study, development, preparation and timely filing of the required Watershed Management Plan with the MDEQ. The ECIC developed a Watershed Management Plan (WMP) which was subsequently approved by the MDEQ in 2007. This document is an update to the original WMP and has been prepared by the Alliance of Downriver Watersheds (ADW) and the Ecorse Creek Watershed Advisory Group (a subset of the ADW). Figure 1-4 illustrates the various components and elements that went into the development of the original Watershed Management Plan.

Figure 1-4
Watershed Management Plan Elements

Also, in 2003, the MDEQ developed a Total Maximum Daily Load (TMDL) (Appendix B) for Biota[5] for the entire Ecorse Creek Watershed, which includes the Ecorse River, North Branch of the Ecorse Creek, Sexton-Kilfoil Drain, the LeBlanc Drain, and smaller tributaries. The impaired designated use is aquatic life, which is impacted by unstable flows and excessive sedimentation resulting in the loss of stable habitat. In 2008, the MDEQ developed a TMDL for *E. coli* for the Ecorse Creek Watershed. Monitoring data collected by the State confirmed exceedences of the water quality standard for *E. coli* at all sampling locations during the total body contact recreational season of May 1 through October 31. The impaired designated uses are total and partial body contact. Section 303(d) of the Federal Clean Water Act and the United States Environmental Protection Agency's Water Quality Planning and Management Regulations require States to develop Total Maximum Daily Loads (TMDLs) for waterbodies that are not meeting Water Quality Standards (WQS). Within the TMDL framework, the loading of specific pollutants is reduced and allocated based on pollutant sources and in-stream water quality. The TMDL provides States with a process whereby point and/or non-point pollutant sources must be reduced appropriately so that WQS can ultimately be attained.

In addition to the Watershed Management Plan fulfilling a requirement of the Phase II Storm Water Permit, the plan also helps the ADW focus on goals, actions and efforts required to meet both TMDL standards. Success in achieving water quality standards for aquatic life will be determined by a reproducible acceptable rating in two consecutive years following implementation of sediment control measures to minimize sediment loadings to the watershed, particularly during runoff events. The concentration of TSS (Total Suspended Solids) is strongly linked to flow patterns and the stability and flashiness of instream flows. Attempts to control TSS concentrations in the watershed will also have a commensurate focus on mitigating flashy stream flows and taking efforts toward reestablishing a more natural hydrologic response to precipitation in this highly impervious watershed. [6] Targets for the E. coli TMDL are 300 *E. coli* per 100 ml expressed as a daily maximum load and concentration from May 1 to October 31 and 130 *E. coli* per 100 ml as a 30-day geometric mean, expressed as a concentration.[7]

[5] *Total Maximum Daily Load for Biota for the Ecorse River Watershed*, MDEQ-Water Division. July 7, 2003.
[6] Ibid.
[7] Total Maximum Daily Load for E. Coli for the Ecorse River Watershed. MDEQ-Water Bureau. August 5, 2008.

2 Characteristics of the Watershed

Ecorse Creek at Biddle

Chapter Contents

There are three primary water courses within the watershed that drain into the Ecorse Creek and then the Detroit River. The North Branch of the Ecorse Creek flows easterly for more than 16 miles and conveys storm water runoff from the northern extremities of the basin. The enclosed LeBlanc Drain, approximately 9.6 miles long, provides for storm water runoff from the central portion of the basin. Finally, the 13-mile long Sexton-Kilfoil Drain is the main watercourse for the southerly areas of the watershed. The Ecorse River commences at the confluence of the North Branch and the Sexton-Kilfoil, and flows east for 0.5 mile into the Detroit River. All three major water courses within the watershed have extensive hydraulic and pollution problems. Map 2-1 depicts the approximate drainage areas within the watershed and Table 2-1 provides a listing of County Drains within the Ecorse Creek Watershed.

2.1 Overview of Subwatersheds

2.1.1 North Branch

The North Branch of the Ecorse Creek extends from the City of Romulus easterly through Dearborn Heights, Allen Park, Lincoln Park, Melvindale, and in the City of Ecorse it meets the confluence of the Ecorse River. The North Branch of the Ecorse Creek is an open water course that has a tributary area of approximately 12,000 acres.[1] The slope of the channel bottom of the North Branch of the Ecorse Creek is relatively flat, resulting in the deposition of sediments during low flow periods. This deposition reduces the capacity of the channel. The North Branch has a severely limited hydraulic capacity. Flooding of the adjacent areas along the North Branch has occurred many times over the years.

The headwaters of the North Branch include the Trouton and Freeman Drains and the Black Creek in Romulus, as well as the Douglas and Kelly Drain which originates in the City of Taylor. An approximately 40 acre area in the City of Inkster is shown to be excluded from the drainage area because it is serviced by a combined sewer system.

2.1.2 LeBlanc Drain

The LeBlanc Drain extends west from its outlet to the North Branch, approximately 500 feet west of the confluence of the North Branch and the Sexton-Kilfoil Drain, to the eastern section of the City of Taylor. The LeBlanc Drain is enclosed and has a tributary area of approximately 7,500 acres.[2] The Snow Drain in Taylor, portions of which are also enclosed, is tributary to the LeBlanc Drain.

The LeBlanc Drain was enclosed in 1927-28 and was originally designed for the agricultural flows from the western portion of the watershed. Continual urbanization of the western portion of the area that empties into the LeBlanc Drain has resulted in flooding of those areas tributary to it. The LeBlanc Drain also was originally constructed as a combined sewer and was a major contributor of combined sewage to the North Branch of the Ecorse Creek.[3] Sewer separation in the tributary area has occurred, and the LeBlanc Drain now is dedicated to the collection and transference of storm water for the central portion of the watershed.

2.1.3 Sexton-Kilfoil Drain

The South Branch of the Ecorse Creek, or the Sexton-Kilfoil Drain, is approximately 13 miles long. It extends from Middlebelt Road, near the Detroit Metropolitan Airport in Romulus, east through Taylor, Allen Park, and Lincoln Park, and ends where it meets the confluence of the Ecorse River. The Sexton-Kilfoil is an open water course with a tributary area of approximately 7,600 acres.[4] Significant drains tributary to the Sexton-Kilfoil include Grams Drain in Southgate, and the Brighton, Bondie, and the Sloss and Ganong Drains in Taylor.

[1] Facility Planning Study Pollution Abatement of Ecorse Creek, Wade-Trim. November 1974.
[2] Ibid.
[3] Ibid.
[4] Ibid.

Map 2-1

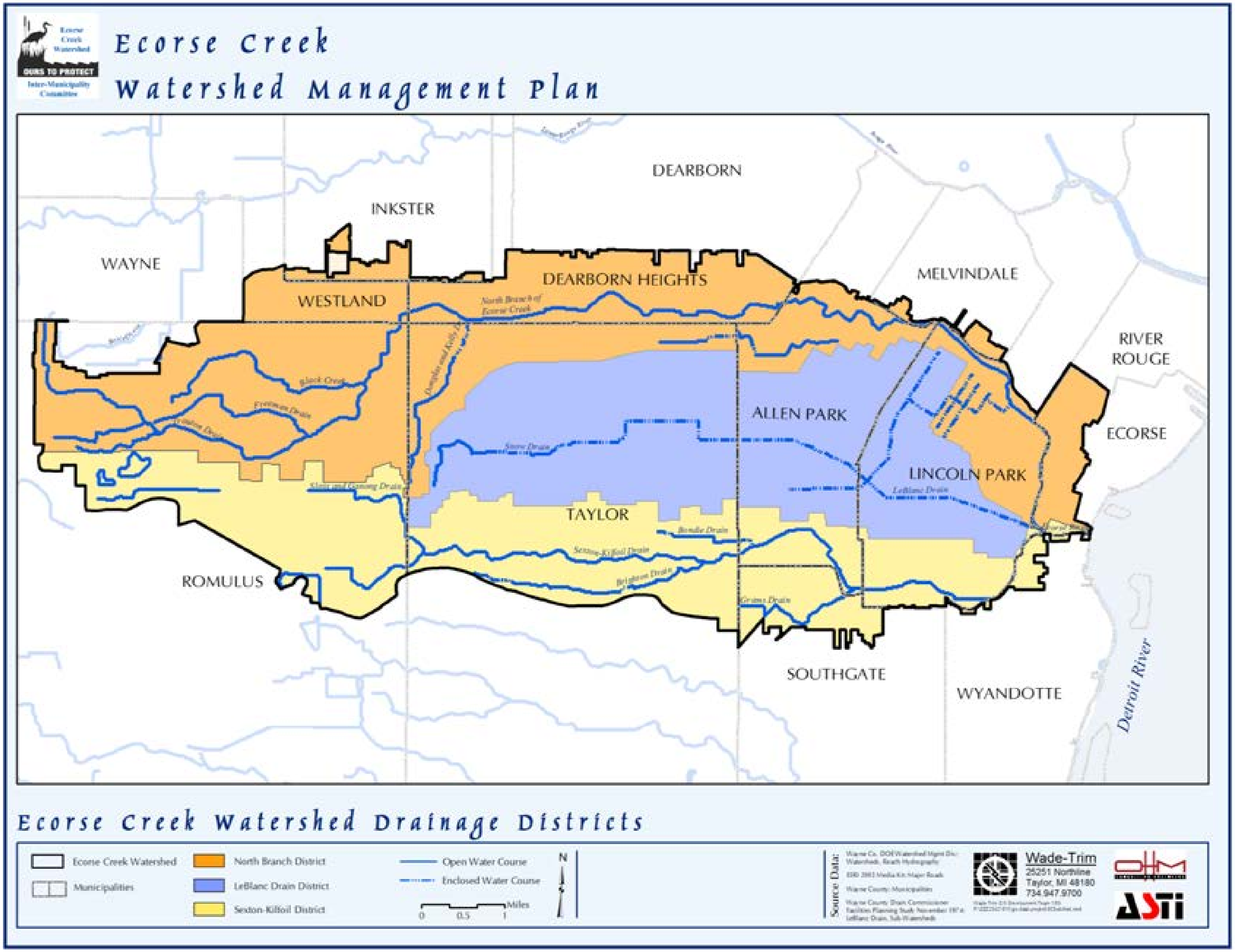

Ecorse Creek
Watershed Management Plan
DEARBORN
INKSTER
WAYNE
WESTLAND
DEARBORN HEIGHTS
MELVINDALE
RIVER ROUGE
ECORSE
ALLEN PARK
LINCOLN PARK
TAYLOR
ROMULUS
SOUTHGATE
WYANDOTTE
Detroit River
Ecorse Creek Watershed Drainage Districts
Ecorse Creek Watershed
Municipalities
North Branch District
LeBlanc Drain District
Sexton-Kilfoil District
Open Water Course
Enclosed Water Course
Miles
0
0.5
1
N
Source Data:
Wade-Trim
25251 Northline
Taylor, MI 48180
734.947.9700

Table 2-1

County Drains Within Ecorse Creek Watershed

Length (est. miles)	Drain Name	Drain Number	Chapter
0.22	Austin & Corey	A013	8
0.49	Barton	B008	8
3.15	Black Creek	B029	8
1.99	Bondie	B037	8
0.92	Bondie Extension #2	B038	8
3.25	Brighton	B047	8
2.99	Butler	B060	8
1.60	Carter	C010	8
2.38	Douglas & Kelly	D014	8
16.21	Ecorse Creek North Branch	E003	8
1.01	Ensign	E010	8
2.20	Freeman	F013	8
1.47	Gamong Br. McConologue	G001	8
2.16	Ganong & Sloss	G002	8
2.74	German	G005	8
0.86	Godfrey	G008	8
1.92	Grams	G014	20
1.95	Guidot Lateral Tile	G028	8
0.34	Gumtow Storm	G040	8
0.98	Harris	H013	8
3.09	Hand	H038	8
0.69	Holland	H040	8
1.30	Kennedy	K016	8
0.47	Leverance Br. Of Ecorse Ck	L015	8
2.79	Long	L019	8
0.49	Lukas Storm	L048	8
9.66	Le Blanc No1 San Arm	L062	8
1.14	McConologue	M005	8
1.32	McGee	M007	8
0.79	Milo	M055	8
1.72	Quandt	Q001	8
1.38	Rawson	R004	8
3.99	Reeck	R0011	8
4.17	Rosenworth	R027	8
1.55	Schloff	S004	8
13.19	Sexton-Kilfoil	S006	8
4.93	Snow	S023	8
2.92	Snow Tile	S024	8
1.23	Stevenson	S030	8
1.08	Strachen	S068	8
2.21	Trouton	T015	8
0.62	Watsonia Park	W007	8
1.92	Wick Rd. or Le Blanc	W040	8
1.80	Wilkie Lateral #1	W049	8
2.65	Wilkie Lateral #2	W050	8

Source: Wayne County DOE, Division of Public Works, April 16, 2002.

2.2 Population

The Ecorse Creek Watershed includes 11 communities as well as the Wayne County Airport Authority. The watershed encompasses 43.4 square miles, and in 2010 had 152,301 people living within its boundaries, or 3,507 people per square mile. The cities of Allen Park, Dearborn Heights, Lincoln Park, and Taylor have the greatest number of residents living within the watershed. Table 2-2 and Figure 2-1 summarize the population data for the watershed. As is depicted on Map 2-2, the greatest population densities are located in the eastern portion of the watershed.

Table 2-2

Population in Watershed by Community

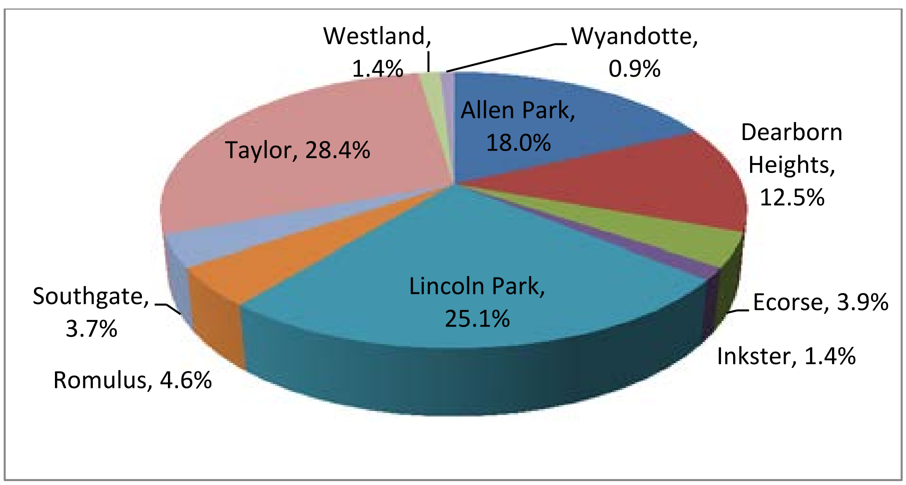
Community	2010 Population	2010 Population in Watershed	Percent of Watershed Population	Percent of Population in Watershed
Allen Park	28,210	27,428	18.0%	97%
Dearborn Heights	57,774	18,998	12.5%	33%
Ecorse	9,512	5,995	3.9%	63%
Inkster	25,369	2,201	1.4%	9%
Lincoln Park	38,144	38,142	25.1%	100%
Melvindale	10,715	73*	0.0%	0.7%
Romulus	23,989	7,026	4.6%	29%
Southgate	30,047	5,620	3.7%	19%
Taylor	3,131	43,258	28.4%	69%
Westland	84,094	2,193	1.4%	3%
Wyandotte	25,883	1,367	0.9%	5%
Total	86,153	152,301	100.0%	

Source: SEMCOG Community Profiles - 2010 Census

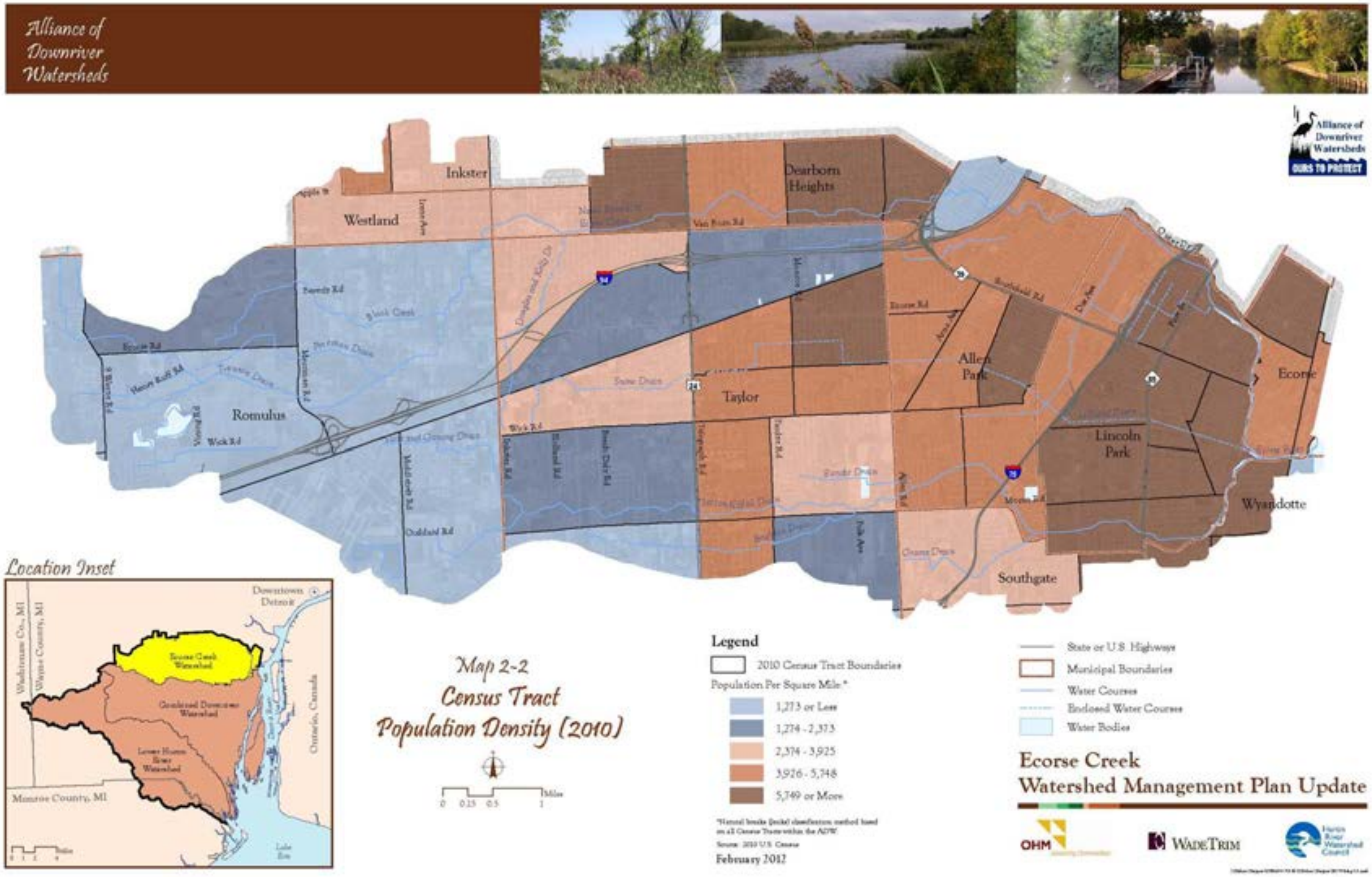
* An estimated 30 homes are within the watershed. 2.42 persons per household estimate used.

Figure 2-1

Percent of Watershed Population by Community



Map 2-2



Alliance of Downriver Watersheds
Map 2-2
Census Tract Population Density (2010)
Legend
2010 Census Tract Boundaries
Population Per Square Mile:*
1,273 or Less
1,274 - 2,373
2,374 - 3,925
3,926 - 5,748
5,749 or More
State or U.S. Highways
Municipal Boundaries
Water Courses
Enclosed Water Courses
Water Bodies
Ecorse Creek
Watershed Management Plan Update
February 2012
Location Inset
Westland
Inkster
Dearborn Heights
Romulus
Taylor
Allen Park
Lincoln Park
Ecorse
Wyandotte
Southgate

2.3 Geology

The geology of the study area results from glacial action during the Wisconsin period. The underlying bedrock of the basin is dolomite that ranges from 40 feet to 110 feet below the surface. Immediately over the bedrock is a clay layer varying in depth from 35 feet to 65 feet.[5]

2.4 Soils

Surface soils of the Ecorse Creek Watershed are generally very poorly drained and experience a permanent or seasonably high ground water table. Soils west of Telegraph Road are generally coarse to moderately fine in texture (sandy loams), while soils east of Telegraph Road are generally moderately fine to fine in texture (clay loams).

These soils exhibit low permeability and therefore inhibit the transmission of water through the soil. The clay soils also contribute to the Ecorse Creek and its tributaries being turbid throughout the year and extremely turbid during wet weather events. Due in part to the low percolation rates of clay soils, as well as the effects of urbanization, stream flows in the watershed are very flashy and erratic. The high and low rates of flow are dictated primarily by frequency of precipitation, with very little ground water contribution.[6]

The Soil Survey for Wayne County indicates that approximately half of the watershed is classified as Cut and Fill Land (original soils are impossible to identify) or no soil survey data is available (Map 2-3). The remaining land is characterized as one of numerous soil types found within the watershed, with some of the primary soils including:

KnA Kibbie fine sandy loam, 0 to 3 percent slopes
Pe Pewamo loam, 0 to 2 percent slopes
SfA Selfridge-Pewamo complex, 0 to 2 percent slopes
TeA Tedrow loamy fine sand, 0 to 2 percent slopes
TfA Tedrow loamy fine sand, loamy substratum, 0 to 2 percent slopes

2.5 Climate

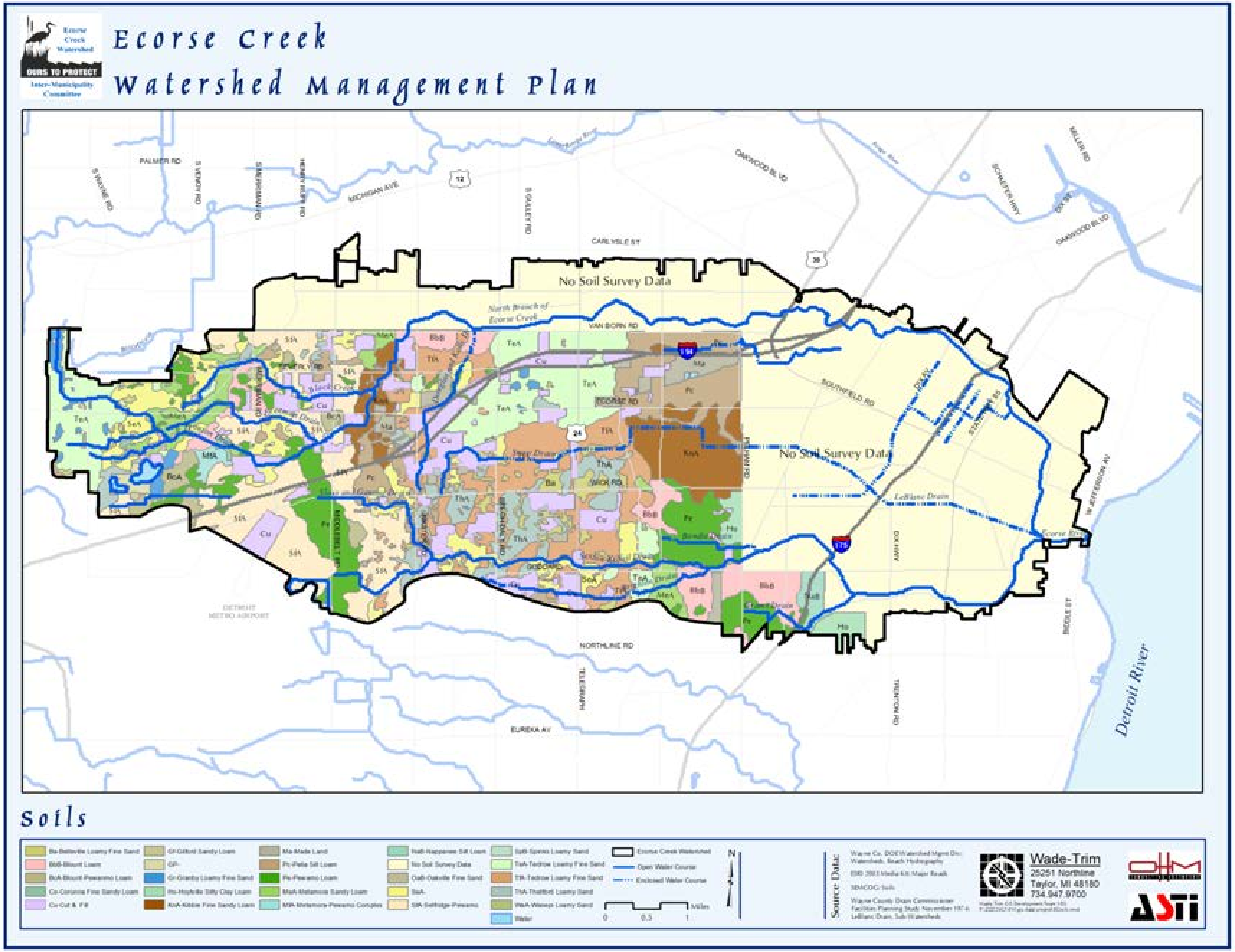
The watershed has a continental climate with mild winters and short, hot summers. The climate is controlled by the Watershed's location with respect to major storm tracks and the influence of the Great Lakes. Rainfall is approximately 32 inches per year, and total annual snowfall averages about 36 inches. The average date for the first freezing temperature is October 21. The average date for the last freezing temperature is April 23.[7] The average annual temperature is approximately 48F. The maximum monthly average temperature of 72F occurs in July, and the minimum monthly average temperature of 25F occurs in January.

2.6 Topography

The topography of the watershed (Map 2-4) is extremely flat with a gentle slope toward the Detroit River (Map 2-4). General elevations vary from 670 feet (USGS datum) at the northwest corner of the watershed to approximately 575 feet at the Detroit River.

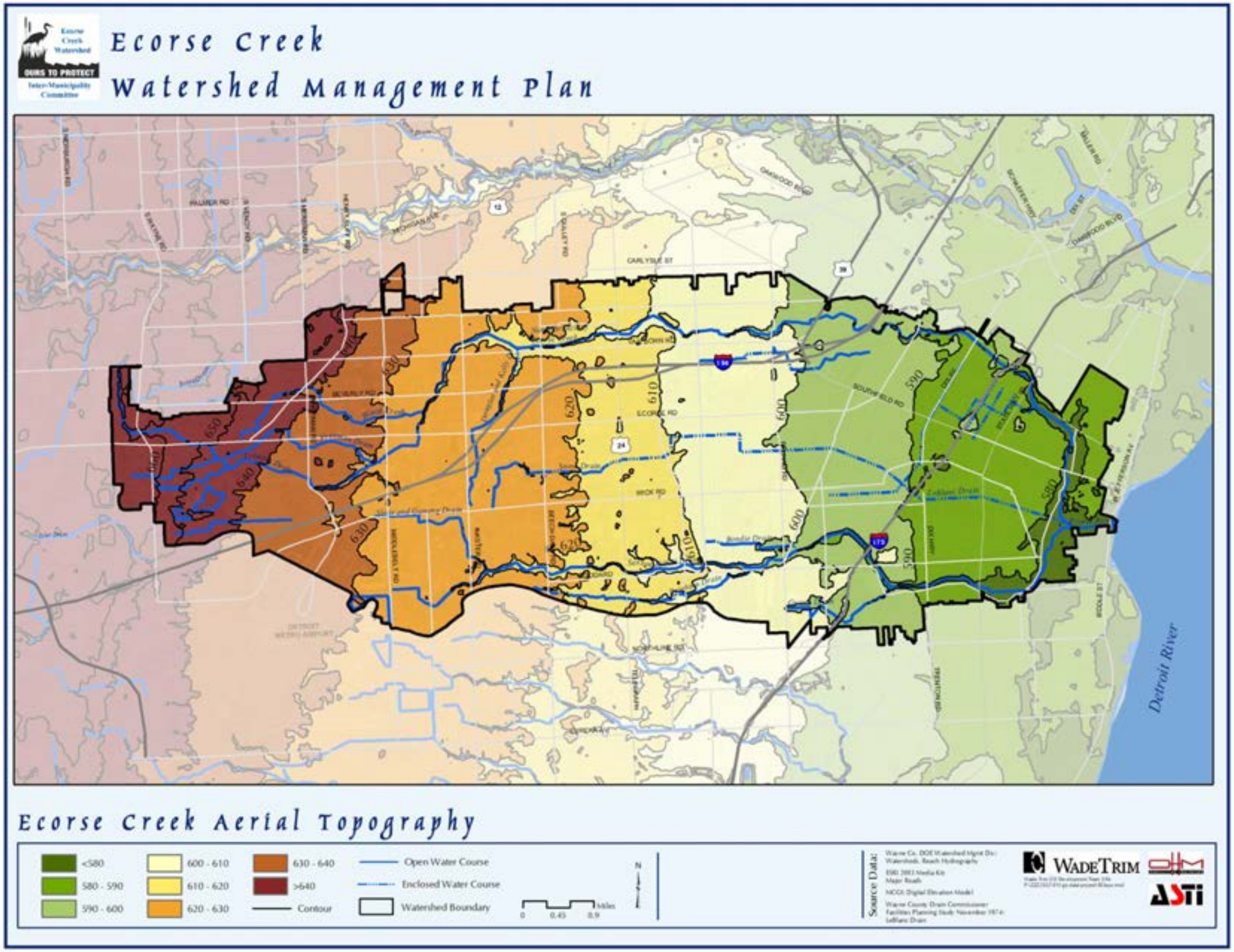
[5] *Ecorse Creek Drainage Basin, Wayne County, Michigan*. US Army Corps of Engineers. House Document 101- 193. May 17, 1990.
[6] Facility Planning Study Pollution Abatement of Ecorse Creek, Wade-Trim. November 1974.
[7] *Ecorse Creek Drainage Basin, Wayne County, Michigan*. US Army Corps of Engineers. House Document 101- 193. May 17, 1990.

Map 2-3



Ecorse Creek
Watershed Management Plan
OURS TO PROTECT
No Soil Survey Data
North Branch of Ecorse Creek
Detroit River
PALMER RD
MICHIGAN AVE
CARLYSLE ST
VAN BORN RD
ECORSE RD
SOUTHFIELD RD
NORTHLINE RD
EUREKA AV
TELEGRAPH
OAKWOOD BLVD
LeBlanc Drain
DETROIT METRO AIRPORT
Soils
Be-Belleville Loamy Fine Sand
BbB-Blount Loam
BoA-Blount-Pewamo Loam
Co-Corunna Fine Sandy Loam
Cu-Cut & Fill
Gf-Gilford Sandy Loam
GP-
Gr-Granby Loamy Fine Sand
Ho-Hoytville Silty Clay Loam
KnA-Kibbie Fine Sandy Loam
Ma-Made Land
Pc-Pella Silt Loam
Pe-Pewamo Loam
MaA-Metamora Sandy Loam
NaB-Nappanee Silt Loam
No Soil Survey Data
OaB-Oakville Fine Sand
SeA-
SfA-Selfridge-Pewamo
SpB-Spinks Loamy Sand
TeA-Tedrow Loamy Fine Sand
TfA-Thetford Loamy Sand
WaA-Wasepi Loamy Sand
Water
Ecorse Creek Watershed
Open Water Course
Enclosed Water Course
Miles
0
0.5
1
N
Source Data:
Wade-Trim
25251 Northline
Taylor, MI 48180
734.947.9700
OHM
ASTI

Map 2-4


Ecorse Creek
Watershed Management Plan
Ecorse Creek Aerial Topography
<580
580 - 590
590 - 600
600 - 610
610 - 620
620 - 630
630 - 640
>640
Contour
Open Water Course
Enclosed Water Course
Watershed Boundary
Miles
0 0.45 0.9
Source Data:
WADETRIM
ASTI
Detroit River

2.7 Pre-Settlement Vegetation

The pre-settlement vegetation (circa 1800) was dominated by mixed hardwood swamps, beech-sugar maple forest, and mixed oak savanna (Map 2-5). The headwaters and the south-western portion of the watershed was predominately mixed hardwood swamp. Smaller pockets of mixed hardwood swamp were found along the confluence of the North Branch and Sexton-Kilfoil as well as buffering the Sexton-Kilfoil Drain as it traversed from present day Taylor east toward the Detroit River. Hardwood swamps of red maple, ash, swamp white oak and elm grew in lowland depressions and poorly-drained areas. The area in and around present day Taylor was dominated by mixed oak savanna which likely indicates the area was fairly well-drained with sandy soils. Black ash swamp was found near present day I-94 where Taylor, Allen Park and Dearborn Heights meet.

2.8 Land Use

The types of urban and suburban development found in the Ecorse Creek Watershed have dramatic effects on surface waters in terms of altered runoff patterns, increased flashiness, increased suspended solids loadings, and shifts in temperature characteristics, as well as other impacts. The almost complete loss of vegetated riparian zone throughout the watershed, combined with substantial land coverage by surfaces impervious to precipitation (roads, parking lots, roof tops) and a curb, gutter, and storm drain system, produce rapid runoff rates. This efficient movement of water directly to the stream channel results in unstable and flashy flow conditions, stream bank erosion, and sedimentation of in-stream habitats.[8]

2.8.1 Existing Land Use

Land use data (2008) from the Southeast Michigan Council of Governments (SEMCOG) (Table 2-3) was utilized to gain a general understanding of existing land use patterns throughout the watershed (Map 2-6). The predominant land use is Single-Family Residential, with more than 45% of the watershed occupied by this use. Transportation, Communication and Utilities comprise the second largest land use with more than 2,200 acres, including I-75, I-94, and a portion of Detroit Metropolitan Airport. Land designated as Woodland and Wetland comprises the third largest category with over 2,200 acres or 8.1% of the watershed. The majority of the woodlands and wetlands are found in the western portion of the watershed in Romulus and western Taylor.

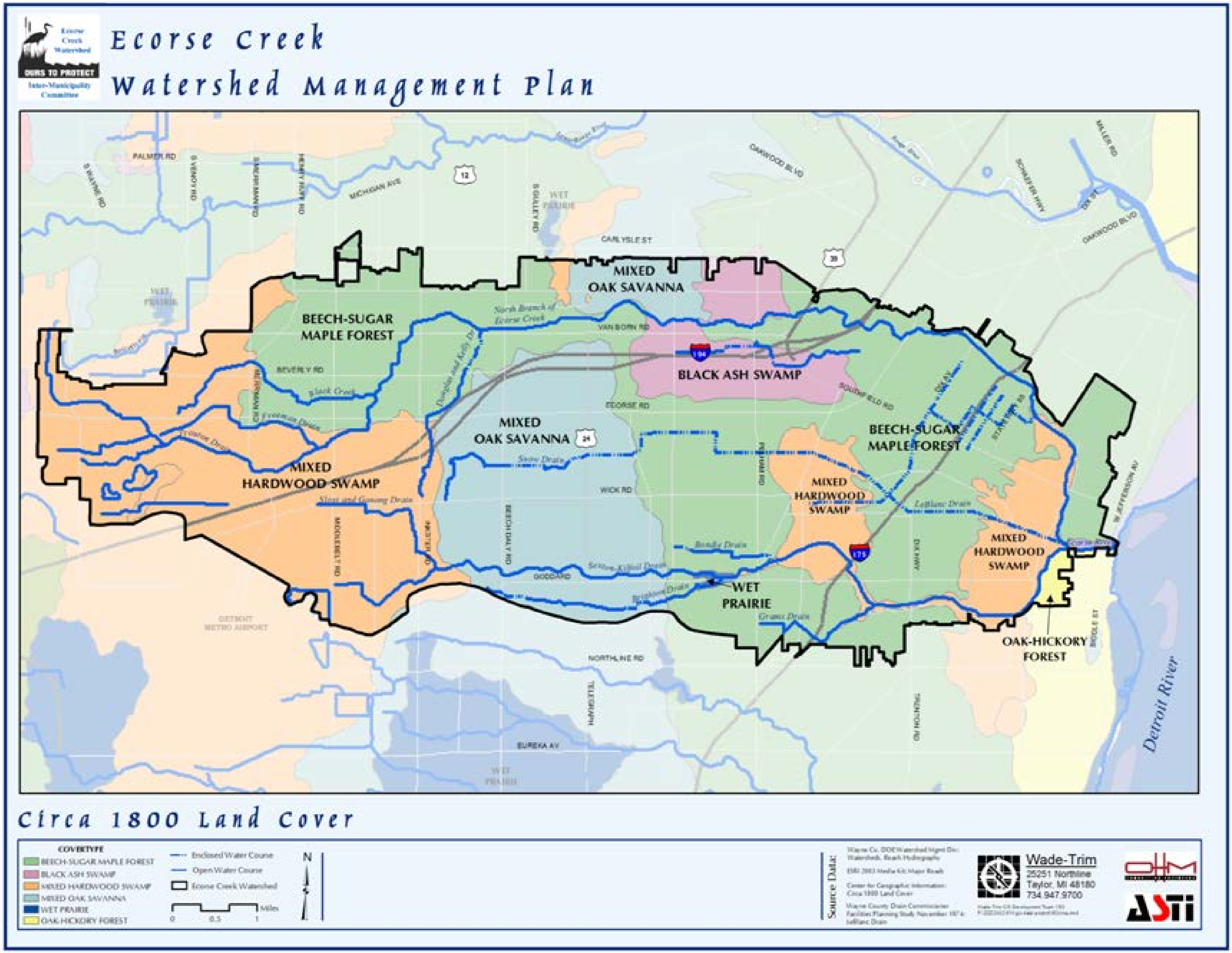
Table 2-3

Existing Land Use (2008)

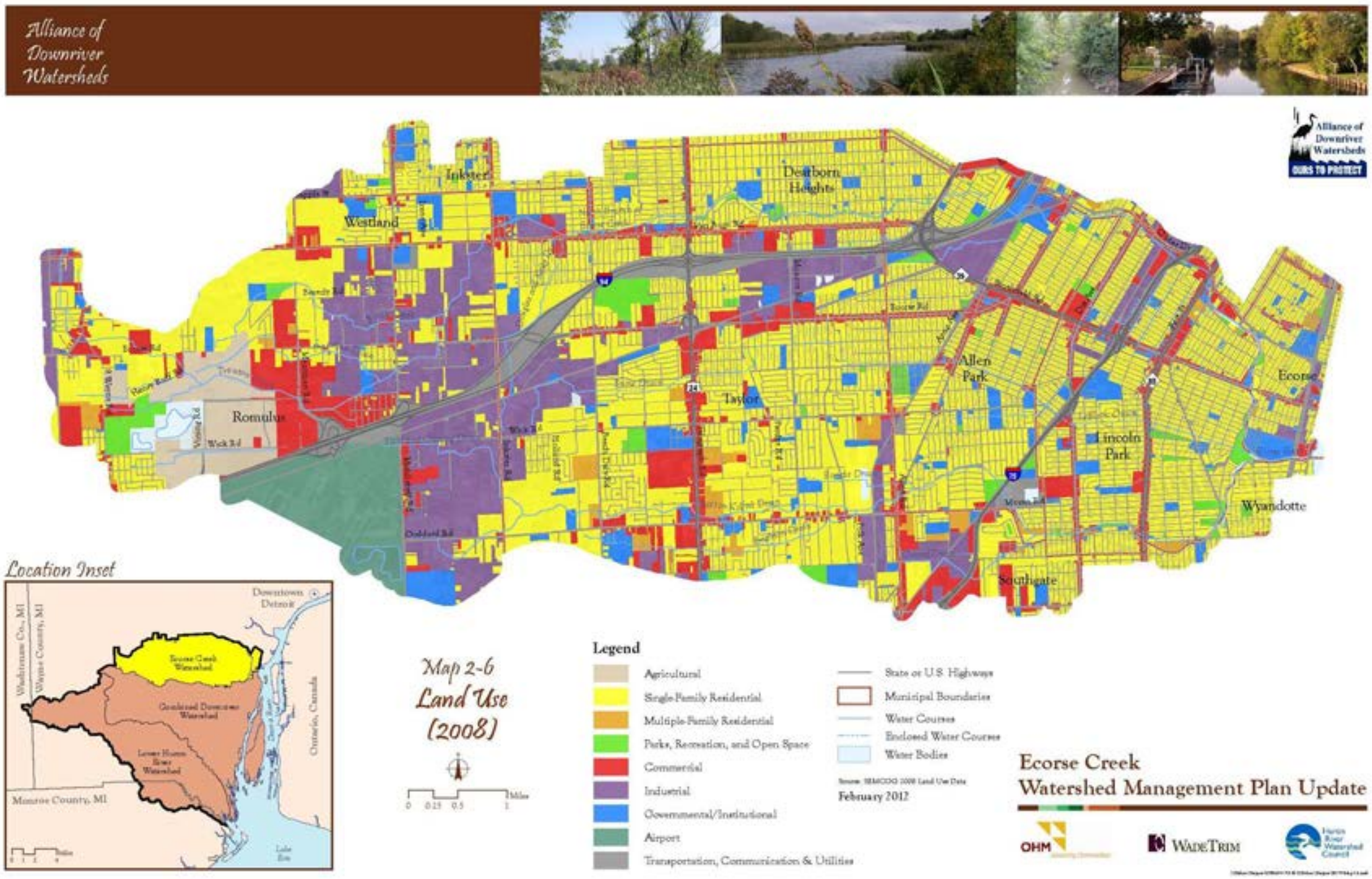
Land Use Category	Acreage	Percent
Agricultural	742.6	2.7%
Airport	778.4	2.8%
Commercial	2,388.3	8.6%
Governmental / Institutional	1,365.5	4.9%
Industrial	3,433.7	12.4%
Multiple-family residential	400.1	1.4%
Parks, Recreation, and Open Space	585.3	2.1%
Single-family residential	11,281.1	40.8%
TCU	6,506.5	23.5%
Water	185.8	0.7%
TOTALS	**27,667.3**	**100.0%**

8 Facility Planning Study Pollution Abatement of Ecorse Creek, Wade-Trim. November 1974.

Map 2-5


Ecorse Creek
Watershed Management Plan
BEECH-SUGAR MAPLE FOREST
MIXED OAK SAVANNA
BLACK ASH SWAMP
MIXED OAK SAVANNA
BEECH-SUGAR MAPLE FOREST
MIXED HARDWOOD SWAMP
MIXED HARDWOOD SWAMP
MIXED HARDWOOD SWAMP
WET PRAIRIE
OAK-HICKORY FOREST
PALMER RD
MICHIGAN AVE
CARLYSLE ST
VAN BORN RD
BEVERLY RD
ECORSE RD
WICK RD
GODDARD
NORTHLINE RD
EUREKA AV
OAKWOOD BLVD
North Branch of Ecorse Creek
Black Creek
Snow Drain
Sexton-Kilfoil Drain
LeBlanc Drain
Bondie Drain
Brighton Drain
Detroit River
Circa 1800 Land Cover
COVERTYPE
BEECH-SUGAR MAPLE FOREST
BLACK ASH SWAMP
MIXED HARDWOOD SWAMP
MIXED OAK SAVANNA
WET PRAIRIE
OAK-HICKORY FOREST
Enclosed Water Course
Open Water Course
Ecorse Creek Watershed
Miles
N
Source Data:
Wade-Trim
25251 Northline
Taylor, MI 48180
734.947.9700

Map 2-6


Alliance of Downriver Watersheds
Alliance of Downriver Watersheds
OURS TO PROTECT
Inkster
Westland
Dearborn Heights
Romulus
Taylor
Allen Park
Lincoln Park
Ecorse
Wyandotte
Southgate
Location Inset
Downtown Detroit
Washtenaw Co., MI
Wayne County, MI
Ecorse Creek Watershed
Combined Downriver Watershed
Lower Huron River Watershed
Ontario, Canada
Monroe County, MI
Lake Erie
Map 2-6
Land Use
(2008)
Legend
Agricultural
Single-Family Residential
Multiple-Family Residential
Parks, Recreation, and Open Space
Commercial
Industrial
Governmental/Institutional
Airport
Transportation, Communication & Utilities
State or U.S. Highways
Municipal Boundaries
Water Courses
Enclosed Water Courses
Water Bodies
February 2012
Ecorse Creek
Watershed Management Plan Update
OHM
WadeTrim

2.8.2 Future Land Use

Future land use information also was gathered from SEMCOG (Table 2-4). Map 2-7 shows general future land use within the watershed as projected based on municipal master plans and zoning ordinances. Again, the vast majority of land within the watershed is planned to remain low- (19.6%), medium- (22.2%), and high-density (13.8%) residential. Industrial uses are anticipated to expand, particularly along the major transportation corridors and in the vicinity of the airport. Commercial and office uses are planned to continue to be located along the primary roads and transportation corridors. A significant amount of land to the northwest of the airport is planned for commercial/mixed use.

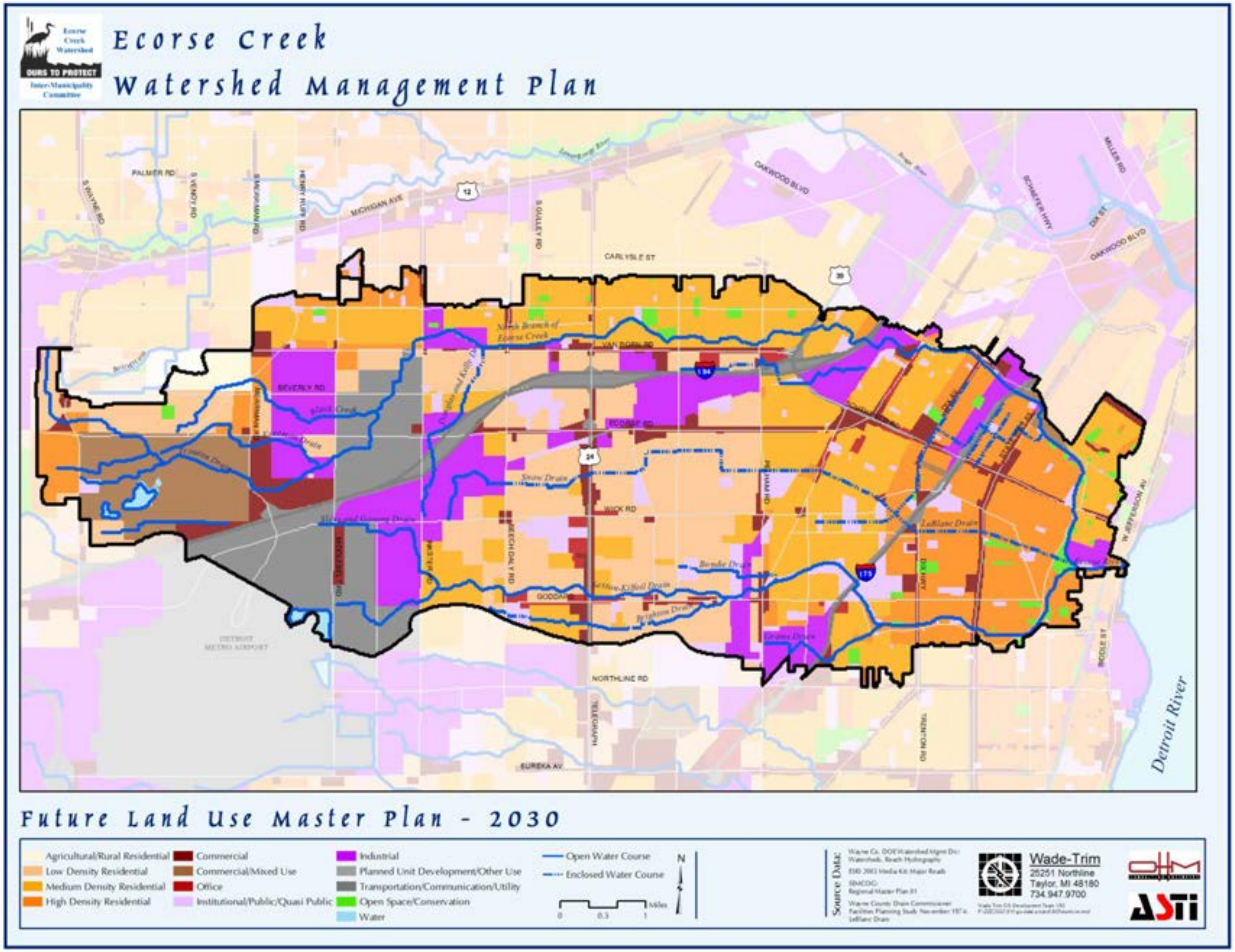
Table 2-4

Generalized Future Land Use (2030)

Land Use Category	Acres	Percent
Active Agriculture	233.8	0.8%
Commercial	1,904.2	6.9%
Commercial/Mixed Use	1,350.4	4.9%
High Density Residential	3,848.7	13.8%
Industrial	3,461.1	12.5%
Institutional/Public/Quasi Public	1,469.7	5.3%
Low Density Residential	5,454.9	19.6%
Medium Density Residential	6,181.8	22.2%
Office	299.1	1.1%
Open Space/Conservation	406.5	1.5%
Transportation/Communication/Utility	3,064.7	11.0%
Water	121.5	0.4%
Total	**27,796**	**100.0%**

Source: SEMCOG Generalized Future Land Use

Map 2-7



Ecorse Creek
Watershed Management Plan
PALMER RD
MICHIGAN AVE
CARLYSLE ST
OAKWOOD BLVD
VAN BORN RD
BEVERLY RD
ECORSE RD
WICK RD
GODDARD
NORTHLINE RD
EUREKA AV
TELEGRAPH
TRENTON RD
W JEFFERSON AV
Detroit River
North Branch of Ecorse Creek
Snow Drain
LeBlanc Drain
Bondie Drain
Future Land Use Master Plan - 2030
Agricultural/Rural Residential
Low Density Residential
Medium Density Residential
High Density Residential
Commercial
Commercial/Mixed Use
Office
Institutional/Public/Quasi Public
Industrial
Planned Unit Development/Other Use
Transportation/Communication/Utility
Open Space/Conservation
Water
Open Water Course
Enclosed Water Course
N
Miles
0
0.5
1
Source Data:
Wade-Trim
25251 Northline
Taylor, MI 48180
734.947.9700

2.9 Wetlands

A wetland is an area of land that is saturated or flooded with water for a sufficient time and/or frequency to foster the growth of water-loving plants and the development of hydric soils. Wetlands are known to be the most biological productive ecosystem in the temperate regions of the world. Wetlands have multiple functions including:[9]

- Water Quality
  - Nutrient Transformation
  - Sediment Retention
  - Shoreline Stabilization
- Hydrologic
  - Streamflow Maintenance
  - Surface Water Detention
  - Stream Shading
- Habitat
  - Habitat
  - Fish/Shellfish
  - Waterfowl/Bird
  - Amphibian

The MDEQ completed a Landscape Level Wetland Functional Assessment (LLWFA) for the Alliance of Downriver Watersheds area in 2010. The LLWFA is a GIS based tool that can be used to identify and prioritize existing wetlands for protection or enhancement based on the ecological or water quality functions they provide. . Table 2-5 summarizes the status and trends of wetlands in the ADW as a whole as well as in the Ecorse Creek Watershed. Map 2-8 illustrates existing wetland areas within the Ecorse Creek. The Ecorse Creek has lost 98% of it's pre-settlement wetlands with only 228 acres of wetlands existing in 2005.

Table 2-5
Wetland Resources and Trends

Alliance of Downriver Watersheds	**Pre-Settlement**	**2005 Condition**	**Total Loss**	**Percent Loss**
Acres of Wetland	48,733	5,230	43,503	90%
Average Size (acres)	49	8.5		
Ecorse Creek Watershed				
Acres of Wetland	10,183	228	9,955	98%
Average Size	64	5.7		

[9] MDEQ Landscape Level Wetland Functional Assessment

2.10 Flood Prone Areas

The 100-year floodplain (FEMA), the Floodway (FEMA) and Flood Prone Areas (SEMCOG) delineations were also gathered for the watershed (Map 2-9). The 100-year floodplain is that area that is expected to flood when a 100-year flood event occurs. It is a flood elevation that has a 1% chance of being equaled or exceeded each year. The 100-year floodplain is most extensive along the North Branch of the Ecorse Creek in Dearborn Heights and in Taylor, north of I-94. The Sexton-Kilfoil Drain within Taylor also has a designated 100-year floodplain, as does the North Branch in Allen Park and Lincoln Park.

Communities Participating in the National Flood Program

Allen Park
Dearborn Heights
Ecorse
Inkster
Lincoln Park
Southgate
Taylor
Westland
Wyandotte

Source: FEMA Website

Where FEMA has prepared detailed engineering studies, floodways are often times designated. The floodway is where the water is likely to be deepest and fastest. It is the area of the floodplain that should be kept free of obstructions to allow floodwaters to move downstream. A portion of the North Branch of the Ecorse Creek, beginning east of Inkster in Dearborn Heights and on into Allen Park has a designated floodway. A portion of the Sexton-Kilfoil Drain in the City of Taylor, north of Goddard and west of Pelham also has a designated floodway. It should be noted that electronic floodway data from FEMA (Q3, 1996) (Map 2-9), does not depict all those areas that are now officially designated as floodways.

Flood prone areas are designated along the entire length of the Ecorse Creek, and the North Branch from its confluence west into Romulus. Flood prone areas are also designated along the Sexton-Kilfoil in Wyandotte, Lincoln Park, and Allen Park. SEMCOG developed the Flood Prone Areas coverage utilizing the United States Geological Survey (USGS) maps of Flood Prone Areas, FEMA data, and topographic data.

2.11 Flooding History

The Ecorse Creek Drainage District has a history of flooding that has often resulted in flood damage and sewage back up in residential homes and businesses during heavy rainfalls. Many of the flooding problems within the basin are due to its limited hydraulic capacity. Flood events have been heavily documented, particularly since the late 1960s and early 1970s (Table 2-6).

Table 2-6
Ecorse Creek Flooding History

Date	Rain Amount
June 1968	2.5"
June 1972	3.0"
April 1979	1.7" plus snow melt
July 9 1979	1.06"
July 11, 1979	3.08"
February 1990	2.1" plus 6.5" snow melt
February 1998	2.69"
September 2000	4.03" over 2 days
May 2004	4.1" over 4 days

Source: Dearborn Heights Flood Mitigation Plan; EC Drainage Basin, Wayne Co, MI; US Army Corps House Document 101-193 May 1990; Wayne Co. rain gauge at Dearborn Heights Basin.

1979 Flooding

In the 1970s, several storms resulted in flooding of homes with extensive property damage. A rainfall of approximately 3.0 inches occurred on June 20, 1972 in Dearborn Heights, Inkster, and Westland, causing widespread overland and basement flooding. Melting snow in combination with 1.7 inches of rainfall on April 13, 1979 also resulted in flooding in eastern Dearborn Heights. Allen Park, Dearborn Heights, Lincoln Park, Romulus, and Taylor were declared Federal disaster areas as a result of a rainfall of 1.06 inches on July 9, 1979 followed by a rainfall of 3.08 inches on July 11, 1979. More than 10,000 homes were flooded in Allen Park, Dearborn Heights, and Taylor in this event, resulting in approximately 21 million dollars worth of damage.

On February 22, 1990, 2.1 inches of rainfall was recorded in Dearborn Heights and 2.28 inches at the Detroit Metropolitan Airport. The rain, combined with over 6.5 inches of melted snow, caused widespread street and basement flooding and swelled the Ecorse Creek by several feet. The swelling made travel through the south end of Dearborn Heights nearly impossible, caused school cancellations in District 7, and forced bridge closings on several streets because of concern over water damage. In Allen Park, over 100 basements were flooded.

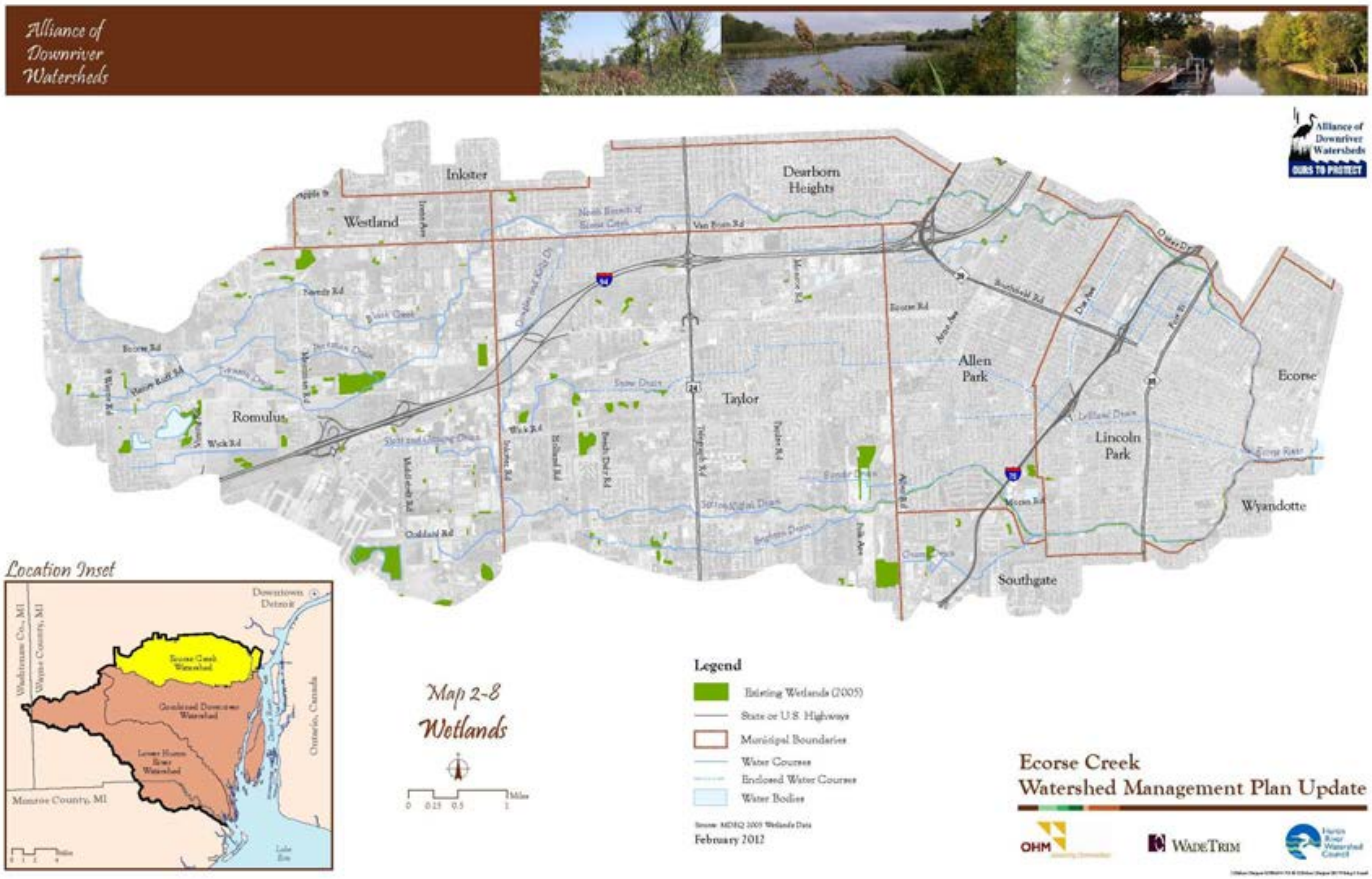
On February 17, 18, and 19 in 1998, heavy rainfall and ice melt contributed to flooding and widespread damage in many parts of Wayne County, including Dearborn Heights. Rainfall accumulated 2.81 inches at Detroit Metropolitan Airport and 2.69 inches in Dearborn Heights. Most of Wayne County was declared in a state of emergency, due to urban flooding. High water temporarily closed the Southfield Freeway just north of Interstate 94 near the Ecorse Creek. Hundreds of basements were flooded, especially in Dearborn Heights and Taylor.

On September 10 and 11, 2000, heavy rainfall (4.03” recorded at the Wayne County rain gauge at the Dearborn Heights basin over the two day period) contributed to sewer back up in more than 1,250 homes in Allen Park, 400 homes in Dearborn Heights, and 145 homes in Taylor. Overall, 13,211 private residences and businesses were affected by the flooding in southeastern Michigan, some seeking aid through Federal disaster funds. The sewage backup caused significant damage to many basements and extensive cleaning had to be done to kill any viruses, fungal contaminants, and other pathogens. Due to the extensive damage, Governor Engler declared a State of Disaster for Dearborn Heights and Wayne County on September 20, 2000. On October 17, 2000, Dearborn Heights and Wayne County received a presidential disaster declaration, making federal disaster funds available for families and businesses who were affected by the flooding.[10]

On May 21, 2004, an intense rainfall measuring over 4 inches resulted in widespread overland flooding and basement flooding throughout the North Branch of the Ecorse Creek Watershed. The Ecorse Creek water levels rose approximately 6.2 feet in 3 hours at the river gage at Beech Daly Road in Dearborn Heights. Over 1,500 basements were reported flooded in the Cities of Allen Park, Dearborn Heights, Ecorse and Lincoln Park. In Dearborn Heights alone, over 600 basements flooded. Extensive overland flooding occurred from Van Born Road to Dartmouth Avenue, limiting access to homes and businesses and hindering emergency response. Over 1000 emergency calls were received by the fire and police departments and Department of Public Works.

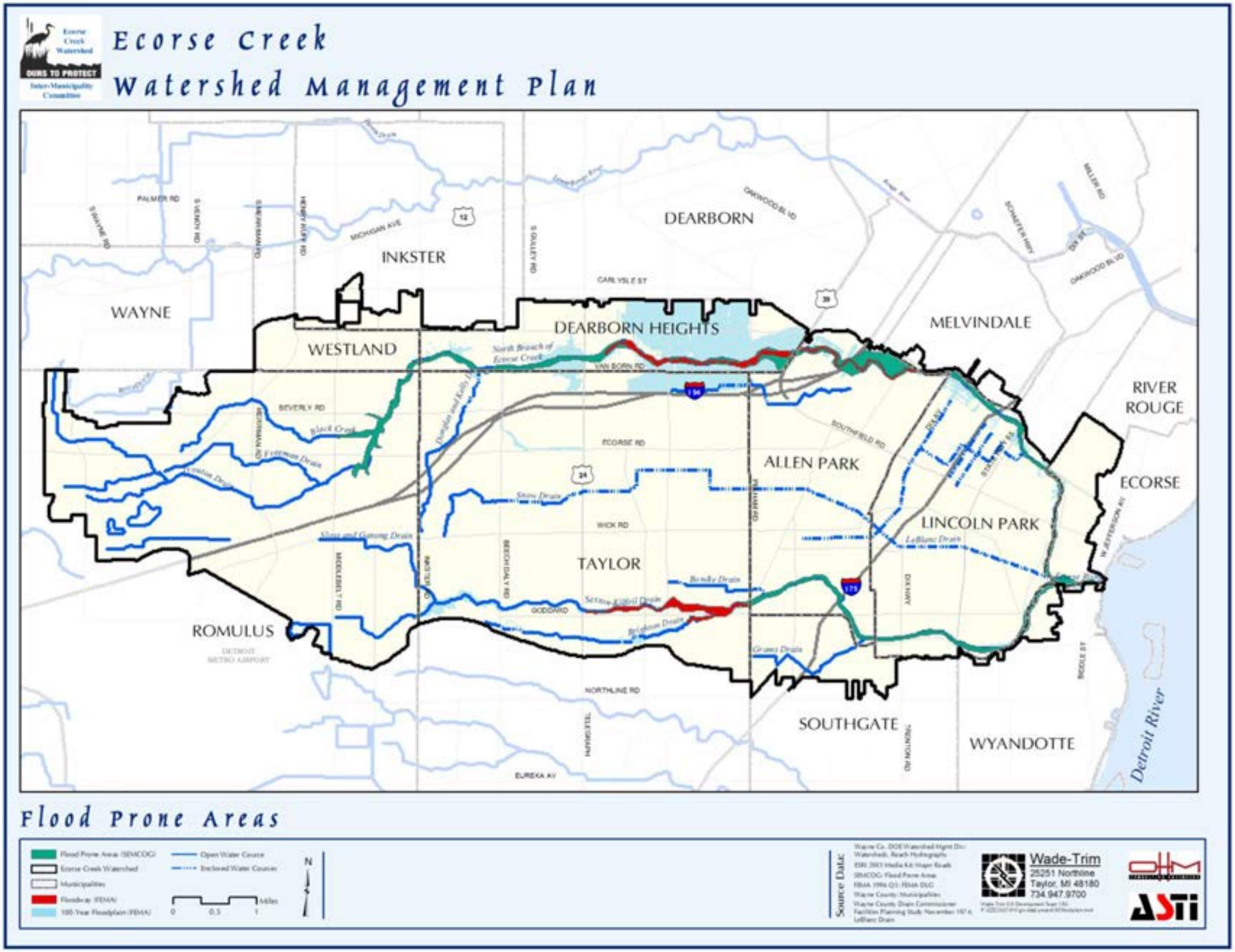
[10] City of Dearborn Heights: Flood Mitigation Plan. September 2004.

Map 2-8



Ecorse Creek
Watershed
Management Plan

Map 2-9


Ecorse Creek
Watershed Management Plan
Flood Prone Areas
DEARBORN
INKSTER
WAYNE
WESTLAND
DEARBORN HEIGHTS
MELVINDALE
RIVER ROUGE
ALLEN PARK
ECORSE
LINCOLN PARK
TAYLOR
ROMULUS
SOUTHGATE
WYANDOTTE
Detroit River
PALMER RD
MICHIGAN AVE
CARLYSLE ST
VAN BORN RD
BEVERLY RD
ECORSE RD
WICK RD
GODDARD
NORTHLINE RD
EUREKA AV
SOUTHFIELD RD
Black Creek
Sexton Kilfoil Drain
Brighton Drain
Goddard
Snow Drain
Sines and Gamone Drain
North Branch of Ecorse Creek
Bondie Drain
LeBlanc Drain
Wade-Trim
25251 Northline
Taylor, MI 48180
734.947.9700
Source Data

2.12 Permitted Discharges

An individual NPDES permit is site specific. The limitations and requirements in an individual permit are based on the permittee's discharge type, the amount of discharge, facility operations (if applicable), and receiving stream characteristics.

A general permit is designed to cover permittees with similar operations and/or types of discharge. General permits contain effluent limitations protective of most surface waters statewide. Locations where more stringent requirements are necessary require an individual permit. Facilities that are determined to be eligible to be covered under a general permit receive a Certificate of Coverage (COC).

Anyone discharging, or proposing to discharge, waste or wastewater into the surface waters of the State is required by law to obtain a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES program is intended to control direct discharge into the surface waters of the State by imposing effluent limits and other conditions necessary to meet State and federal requirements.[11]

Information on current NPDES permitted point source discharges, permits on public notice, and specific facility information can be found at: http://www.deq.state.mi.us/owis/Page/main/Home.aspx

An individual NPDES permit is site specific. The limitations and requirements in an individual permit are based on the permittee's discharge type, the amount of discharge, facility operations (if applicable), and receiving stream characteristics.

A general permit is designed to cover permittees with similar operations and/or type of discharge. General permits contain effluent limitations protective of most surface waters statewide. Locations where more stringent requirements are necessary require an individual permit. Facilities that are determined to be eligible to be covered under a general permit receive a Certificate of Coverage (COC).

[11] MDEQ Website: Who Needs an NPDES Permit.

3 Watershed Condition

Sexton-Kilfoil
South of Goddard Road

Chapter Contents

Readily available reports and data concerning water quality and quantity characteristics in the Ecorse Creek, and its tributary streams and drains, were compiled and reviewed to identify current conditions and relevant issues of concern within the Watershed. The information reviewed included reports and data from the Michigan Department of Natural Resources (MDNR), the Michigan Department of Environmental Quality (MDEQ), the U.S. Army Corps of Engineers (USACE), the U.S. Geological Survey (USGS), the Wayne County Department of Environment, (WCDOE) and other sources.

Particular emphasis was placed upon the Total Maximum Daily Load Allocation for biota[1] and *E. coli*[2] in the Ecorse River and other biological surveys conducted by the MDEQ.[3,4,56] In addition to reviewing available information for the Ecorse Creek Watershed, information from the Rouge River National Wet Weather Demonstration Project also was reviewed and compared to information from the Ecorse Creek. Field surveys, utilizing the MDEQ's Stream Crossing Watershed Survey Procedure[7] were also conducted (as part of the original WMP development in 2004/05) at a total of 61 locations throughout the Ecorse Creek Watershed to provide additional habitat and observational water quality data.

3.1 Overview of Subwatersheds

3.1.1 North Branch of Ecorse Creek

As described in Chapter 2, Characteristics of the Watershed, the North Branch of the Ecorse Creek drains an area of approximately 12,000 acres, primarily within the Huron-Erie Lake Plain (HELP) ecoregion.[8,9] Its drainage area includes portions of the cities of Romulus, Westland, Dearborn Heights, Taylor, Allen Park, Melvindale, Lincoln Park, and Ecorse. The drainage area has little gradient and limited hydraulic capacity, and many of these cities experience flooding problems. Most recently, flooding was extensive during the last week of May 2004, when southeast Michigan was hit by a series of heavy rainstorms. The metropolitan Detroit area received an average of 1.7 inches of rain on May 23rd and communities near the Ecorse Creek were among the hardest hit, receiving 4 to 6 inches of rain over a 3-day period.[10]

Prior to 1830, much of the North Branch of the Ecorse Creek subwatershed was beech-sugar maple forest, although extensive areas in the headwaters and elsewhere were mixed hardwood swamp or other types of wetland. Today, single family residential development is the dominant land use in the subwatershed. Today, wetlands, forest, and undeveloped open land make up 20% of the North Branch subwatershed by area[11]

3.1.2 LeBlanc Drain

The LeBlanc Drain subwatershed is approximately 7,500 acres in area and is largely an enclosed (piped) system. It was originally constructed as a combined sewer system, but storm sewers have since been separated from the sanitary sewer system, and the LeBlanc Drain now is dedicated to the collection and delivery of storm water flows only. The LeBlanc Drain enters the North Branch immediately upstream of the confluence of the North Branch and Sexton-Kilfoil Drain near Council Pointe Park in Lincoln Park.

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1 Goodwin, K. 2003. Total Maximum Daily Load for Biota for the Ecorse River Watershed, Wayne County, Michigan. Michigan Department of Environmental Quality, Water Division. July 7, 2003.

2 Total Maximum Daily Load for *E. Coli* for the Ecorse River Watershed, Wayne County, Michigan. Michigan Department of Environmental Quality, Water Division. August 5, 2008.

3 Goodwin, K. 2002. Biological Assessment of the Detroit River Tributaries, Including the Ecorse River, Frank and Poet Drain, and Brownstown Creek Watersheds, Wayne County, Michigan. July-September 2001. MDEQ Report #MI/DEQ/SWQ-02/020.

4 Oemke, M. 1997. A Survey of the Biological Communities in Sexton-Kilfoil Drain, Wayne County, Michigan, June 15, 1996. MDEQ Report #MI/DEQ/SWQ-97/066.

5 Jones, R. 1991. A Biological Survey of County Drains in the Vicinity of Detroit Metropolitan Airport, Wayne County, Michigan, July 12-13, 1990. MDEQ Report #MI/DNR/SWQ-91/059.

6 Biological Assessment of Detroit River Tributaries, Including the Ecorse River, Frank and Poet Drain, and Brownstown Creek Watersheds, Wayne County, Michigan. June – August 2006. MDEQ Report #MI/DEQ/WB-08?054.

7 Bauer, C., G. Goudy, S. Hanshue, G. Kohlhepp, M. McMahon, and R. Reznick. 2002. Stream Crossing Watershed Survey Procedure. Michigan Department of Environmental Quality, Surface Water Quality Division. June 26, 2002.

8 SEMCOG (Southeast Michigan Council of Governments). 2000. Digital Land Use Data.

9 Goodwin, K. 2003. Total Maximum Daily Load for Biota for the Ecorse River Watershed, Wayne County, Michigan. Michigan Department of Environmental Quality, Water Division. July 7, 2003.

10 http://www.crwc.org/programs/watershedmgmt/may2004flooding.html
http://www.detnews.com/2004/metro/0405/25/a01-161823.htm
http://www.detnews.com/2004/metro/0408/20/c01-247143.htm

11 SEMCOG (Southeast Michigan Council of Governments). 2000. Digital Land Use Data.

3.1.3 Sexton-Kilfoil Drain

The Sexton-Kilfoil Drain (South Branch) drains an area of approximately 7,600 acres.[12] Its drainage area includes portions of the cities of Romulus, Taylor, Southgate, Lincoln Park and Wyandotte. Prior to 1830, much of the Sexton-Kilfoil subwatershed was beech-sugar maple forest and mixed oak savanna, although areas in the headwaters and near the confluence with the North Branch were mixed hardwood swamp. Today, Detroit Metropolitan Airport is at the headwaters and single family residential development is the dominant land use in the subwatershed. Wetlands, forest, and open land now make up 15.7% of the Sexton-Kilfoil subwatershed.[13]

3.2 Water Quality Indicators

The Ecorse Creek Watershed, in its entirety, is identified on Michigan's list of water-quality limited or threatened waters (Michigan's Integrated Report, 2010[14] as failing to meet Michigan water quality standards for pathogens (bacteria) and for the protection of warm water aquatic life. The MDEQ has developed a Total Maximum Daily Load (TMDL) allocation, water quality targets and quantifiable pollutant load reductions, to protect aquatic biota (2003) within the Ecorse Creek Watershed (identified by the MDEQ as the Ecorse River) [15]. In 2008, the MDEQ also developed a TMDL allocation for *e. coli* for the Ecorse Creek Watershed.

The Ecorse Creek TMDL for biota establishes biological and habitat assessment scores rating the community composition and diversity of benthic macroinvertebrates and the habitat as the primary measures of water quality improvements in the watershed. Benthic macroinvertebrates are bottom dwelling aquatic insects, mollusks, and crustaceans large enough to be seen without magnification. The Biota TMDL also establishes wet weather (rain and snowmelt generated) total suspended solids (TSS) concentrations as a secondary measure of water quality improvement. The *e. coli* TMDL establishes target *e. coli* levels in order to reach partial body and full body contact water quality standards. As such, assessments of the biological communities, aquatic habitat, embeddedness, other key parameters with the potential to impact the biota and sedimentation (i.e. hydrology, impervious surfaces, nutrients [primarily phosphorus], bacteria concentrations, and dissolved oxygen), were selected as the principal parameters for this review. Table 3-1 summarizes each of the target water quality indicators, and, where available, provides the current data by subwatershed.

[12] Ibid.
[13] Ibid.
[14] Water Quality and Pollution Control in Michigan Sections 303(d), 305(b), and 314 Integrated Report, 2010.
[15] Goodwin, K. 2003. Total Maximum Daily Load for Biota for the Ecorse River Watershed, Wayne County, Michigan. Michigan Department of Environmental Quality, Water Division. July 7, 2003.

Table 3-1

Summary of Water Quality Indicators

	Target	North Branch	LeBlanc Drain	Sexton-Kilfoil
Biological Communities	"Acceptable" Macroinvertebrate and Habitat scores (MDEQ Procedure 51)	Poor	Enclosed	Poor
Sedimentation	80 mg/L during wet weather	100-502 mg/L (1980 data)	55-280 mg/L (1980 data)	360-512 mg/L (1980 data)
Hydrology	Ratio of mean monthly high to mean monthly low flows: 2.1 to 5.0	54.5	unknown	unknown
Imperviousness	Less than 25%	26.4%	27.8%	30.6%
Phosphorus	Less than 0.05 mg/L	0.07 -0.194 mg/L	unknown	0.07 -0.194 mg/L
Dissolved Oxygen	5 mg/L	As low as 1.05 mg/L	unknown	As low as 1.54 mg/L
Conductivity	Between 150 and 500 µS/cm	As high as 5,887 µS/cm	unknown	As high as 3,294 µS/cm
Pathogens (Bacteria)	130 *E. coli* / 100 ml water	330-781 *E. coli* / 100 ml water	unknown	330-781 *E. coli* / 100 ml water

The following sections describe each of these parameters in Table 3-1 in general terms and then specific descriptions of how each of these parameters is exhibited in the three subwatersheds of the Ecorse Creek.

3.2.1 Biological Communities

Different species or other taxonomic groups of benthic macroinvertebrates (aquatic insects, mollusks, and crustaceans) and fish, have varying habitat requirements and tolerances of ecological degradation. The diversity and composition of these biological communities, therefore, tend to integrate the cumulative effects of chemical, physical, and biological conditions within a lake or stream over time.[16,17,18,19] As such, the biological assessment of these communities has been gaining popularity and use for the evaluation of water resources in recent decades.[20]

[16] Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, 2nd Edition. United States Environmental protection Agency, Office of Water, Washington, DC. EPA 841-B-99-002.

[17] Davis, W.S. and T.P Simon (eds). 1995. Biological Assessment and Criteria: Tools for water resource planning and decision making. Lewis Publishers, Boca Raton, Florida.

[18] Karr, J.R., K.D. Fausch, P.L. Angermeier, P.R. Yant, and I.J. Schlosser. 1986. Assessing Biological Integrity in Running Waters: A Method and its Rationale. Illinois Natural History Survey Special Publication 5.

[19] Simon, T.P. (ed.) 1999. Assessing the Sustainability and Biological Integrity of Water Resources Using Fish Communities. CRC Press, Boca Raton, Florida.

[20] Ibid

MDEQ Procedure 51 Score (macro & fish)	Condition
-5 or Lower	Poor
Btwn -4 and +4	Acceptable
+5 or Higher	Excellent

In Michigan, the MDEQ conducts biological assessments of stream and river biota using Procedure 51 survey results and scoring.[21] Procedure 51 is a multi-metric assessment and scoring system that combines measures of overall community diversity, evenness, and the preponderance of groups known to be either particularly tolerant or intolerant of poor water or habitat quality. Sites are scored relative to scores developed for reference (least-impacted) stream sites within the same ecoregion, as described by Omernik and Gallant.[22] The Ecorse Creek Watershed lies in the transition zone between the Southern Michigan-Northern Indiana Till Plain (SMNITP) and the Huron-Erie Lake Plain (HELP) ecoregions.[23]

Individual Procedure 51 metrics are scored on a scale of +1, 0, or -1 as described below:

+1 Community is performing better than the average condition found at excellent sites within the appropriate ecoregion

0 Community is performing between the average condition and (minus) 2 standard deviations from the average condition found at the excellent sites

-1 Community is performing outside of (minus) 2 standard deviations from the average condition found at the excellent sites[24]

There are nine (9) macroinvertebrate metrics and ten (10) fish metrics, resulting in potential scores ranging from +9 to -9 and +10 to -10, respectively. Scores of -5 or lower are considered poor, scores between -4 and +4 are considered acceptable, and those sites scoring +5 or higher are considered excellent.

MDEQ Procedure 51 Score (habitat)	Condition
>154	Excellent
105 – 154	Good
58 – 104	Marginal
<58	Poor

TMDL Target Habitat Score =96

Procedure 51 also includes ten (10) metrics for the evaluation of habitat. Habitat scores, which assess the amount of stable in-stream structure such as woody debris, coarse substrate, overhanging banks and roots, the integrity of the riparian corridor, and the stability of a stream's hydrology, range from 0 to 200 and describe in-stream habitat as poor, marginal, good, or excellent.

North Branch of the Ecorse Creek

The entire Ecorse Creek Watershed fails to attain designated uses for the protection of aquatic life, specifically benthic invertebrates.[25] Biological surveys conducted by the MDNR and the MDEQ in 1969, 1991, 2001, and 2006 all identified severely degraded conditions, with benthic invertebrate and fish scores rating either fair or poor. In response, in 2003 the MDEQ finalized a Total Maximum Daily Load (TMDL) allocation, water quality targets and quantifiable pollutant load reductions, to protect aquatic

[21] MDEQ. 2002. Qualitative Biological and Habitat Survey Protocols for Wadable Streams and Rivers. P51. MDEQ, Surface Water Quality Division, Lansing, Michigan. Revised May, 28, 2002.
[22] Omernik, J.M. and A.L. Gallant. 1988. Ecoregions of the Upper Midwest States. USEPA, Environmental Research Laboratory, EPA/600/3-88/037.
[23] Goodwin, K. 2003. Total Maximum Daily Load for Biota for the Ecorse River Watershed, Wayne County, Michigan. Michigan Department of Environmental Quality, Water Division. July 7, 2003.
[24] MDEQ. May 1996 Revision. Update of P51. Metric Scoring and Interpretation. MDEQ Report #MI/DEQ/SWQ-96/068
[25] Creal, W. and J. Wuycheck. 2002. Clean Water Act Section 303(d) List – Michigan Submittal for Year 2002. MDEQ Report #MI/DEQ/SWQ-02/013.

biota, and in 2008 a TMDL for *E. coli* within the Ecorse Creek Watershed. Much of the North Branch has been channelized and is designated as a county drain, further limiting aquatic habitat.

In the most recent 2006 biological survey, sampling was conducted on the North Branch at VanBorn, Polk, Stanley and Southfield Roads as well as at Council Point Park. Of the sites evaluated, macroinvertebrate communities were rated best at the Southfield Road site ("Acceptable") with the remainder of locations rated "Poor". Most sites showed poor conditions in the substrate and in-stream cover metrics and channel morphology metrics. Results reflect a stream channel heavily impacted by a flashy hydrologic regime and siltation in the surveyed reaches, likely due to heavy suburban development and storm water runoff.

In the previous (2001) biological survey, habitat surveys and macroinvertebrate sampling were conducted on the North Branch at Beverly, Beech Daly, Pelham, and Southfield Roads and the Toledo Highway. Of the sites evaluated, habitat was rated best at the Toledo Highway site ("Good" – slightly impaired). Habitat quality in the North Branch at Beech Daly, Pelham and Southfield Roads rated "Fair" (moderately impaired), and "Poor" (severely impaired) at Beverly Road. Macroinvertebrate communities scored "Poor" at all sites on the North Branch. Macroinvertebrate communities, while exhibiting numerous individuals, were dominated by worms (Oligochaeta), midges (Chironimidae), and sowbugs (Isopoda), all of which are tolerant of low dissolved oxygen levels and poorer water quality. All sites exhibited few sensitive insect species. Fish were only sampled at one location on the North Branch, at Telegraph Road, during 2001. Only two (2) species of fish were observed and only ten individuals were collected in total. Both species observed, fathead minnows (*Pimephales promelas*) and green sunfish (*Lepomis cyanellus*) are tolerant of degraded conditions. The fish community was rated "Poor."

LeBlanc Drain
Because the LeBlanc Drain is an enclosed storm drainage system, aquatic communities within the Drain are assumed to be extremely limited or non-existent. As such, the LeBlanc Drain is not treated as an open water system and biological communities have not been sampled.

Sexton-Kilfoil Drain
Biological surveys conducted by the MDNR and the MDEQ in 1969, 1990, 1991, 1996, 2001, and 2006 all identified severely degraded conditions, with habitat scores rated as poor at all sampling stations. Benthic invertebrate and fish scores rated all sampled locations as either fair or poor.

In the most recent biological survey of the Sexton-Kilfoil drain (2006), the MDEQ sampled for habitat and macroinvertebrates at 6 sites. Macroinvertebrate communities were rated "acceptable" at Inkster Road north, Inkster Road south, and Pardee Road. The other 3 sites were rated as "poor" along the Sexton-Kilfoil.

In the previous biological survey of the Sexton-Kilfoil drain (2001), the MDEQ sampled the fish community at only one site, Telegraph Road. There they found only two fish species, and too few individuals to properly score the site. The two species found, fathead minnow and green sunfish are both tolerant of degraded conditions. Sampling for habitat and macroinvertebrates was conducted at 3 sites. Habitat scores were all "fair" and macroinvertebrate community was rated as "poor" at all Sexton-Kilfoil sites sampled in 2001.

3.2.2 Sedimentation Deposition
The principal physical function of a stream or river system is the upstream to downstream transport of water and sediment. However, sediment inputs to the system in excess of equilibrium conditions can result in increased in-stream erosion, deposition of fine sediments, changes in stream morphology, and impacts to fish and invertebrates. Deposition of finer-grained sediment, such as silts, clays, or sand, can fill the pore spaces between, or even bury gravels and other coarse substrates and fill pool habitat.

Stream habitat is therefore simplified or made homogenous, resulting in the loss of aquatic species that require a variety of habitats or coarse substrates for colonization.

High sediment loads also degrade water quality. In-stream erosion is accelerated, adding more sediment to the system. Streams can either erode the channel bottom (down-cutting or degradation) or the stream banks. Stream banks are generally made of softer material than the stream bottom, so a stream carrying excess water or excess sediment erodes laterally, resulting in a wide, shallow channel. Water is more readily heated in a shallow channel and the widening of the channel further exacerbates this effect as stream-side vegetation has less cooling influence. Turbid water is also warmed easier. Warm water is able to hold less dissolved oxygen. Soil particles also bind with and carry pollutants, like phosphorus, which can lead to nutrient enrichment and increased algae and other plant growth. Plants, as well the sediments themselves can further reduce dissolved oxygen levels.

Sediment is transported through a stream system either along the bottom (bed-load) or mixed in the water column. The latter component is more readily sampled and is measured as total suspended solids (TSS). In a review of the scientific literature, the European Inland Fisheries Advisory Commission (EIFAC)[26] documented impacts on fishes' reproductive success, growth, behavior, and health – even mortality – attributed to suspended sediment. Although cold water fishes appear to be more sensitive to suspended solids than warm water fishes, fish are known to avoid areas of high turbidity, resulting in stretches of river devoid of fish. Fish have also been shown to reduce feeding in highly turbid waters due to reduced visibility and the inability to find prey, which in turn reduces growth. High TSS concentrations have been shown to increase fishes' susceptibility to disease and toxicants, to abrade gill and other tissue, and in some cases cause acute mortality, particularly in young fish. The EIFAC report established tentative criteria for TSS concentrations:

- Continuous TSS concentrations less than 25 mg/l were found not harmful to fish,
- Concentrations between 25 and 80 mg/l were found to reduce fish yields,
- Good fisheries were unlikely at concentrations between 80 and 400 mg/l, and
- Concentrations greater than 400 mg/l resulted in poor fish populations.[27]

Macroinvertebrate communities also exhibit reduced densities at TSS concentrations greater than 80 mg/l.[28] Going forward, other measures of the sediment problems in the Ecorse Creek Watershed are more appropriate than TSS such as SSC (Suspended Sediment Concentration).

The Ecorse Creek TMDL establishes a numeric target for mean, annual, in-stream **TSS concentrations of less than or equal to 80 mg/l during wet weather** and snowmelt events, as a secondary means of documenting the re-attainment of designated uses.

North Branch of the Ecorse Creek

A 1980 study of the Ecorse Creek[29] included visual observations and analytical results of combined sewer overflows at Mill Street and on the combined main branch at Jefferson Avenue during two storm events. This investigation was designed to examine wet weather water quality resulting from combined

[26] EIFAC (European Inland Fisheries Commission). 1965. Water quality criteria for European freshwater fish. Report on finely divided solids and inland fisheries. International Journal of Air and Water Pollution 9:151-168. Cited in: Waters, T.F. 1995. Sediment in Streams: Sources, Biological Effects, and Control. American Fisheries Society Monograph 7.
[27] Ibid
[28] Ibid
[29] Woods, R. and G. Boersen, Ecorse River Storm Survey. Michigan Department of Natural Resources, Environmental Services Division, Inter-Office Communication to Paul Zugger. April 14, 1980.

sewer overflows (CSOs) to the river. In that study, MDNR staff found TSS concentrations ranging from less than 10 mg/l to 40 mg/l prior to the onset of the rain. These concentrations increased 10 to 20 times background levels to concentrations between 100 to 602 mg/l during and following the rain event. Sediment loading was amplified accordingly with a greater than 10-fold increase in flow in the North Branch.

CSOs have since been eliminated from the watershed with the separation of sanitary and storm sewer systems. As such, wet weather TSS concentrations may have been reduced. However, visual observations taken during field investigations in 2004 indicate that the North Branch of the Ecorse Creek is still highly turbid, even in times of dry weather.

LeBlanc Drain
Wet weather sampling conducted in 1980 (referred to previously)[30] found TSS concentrations ranging from 55 to mg/l to 280 mg/l prior to and during the monitored storm event at the mouth of the LeBlanc Drain at its confluence with the North Branch.

Sexton-Kilfoil Drain
Wet weather sampling conducted at Emmons Boulevard in 1980[31] found TSS concentrations ranging from less than 10 mg/l to 70 mg/l prior to the onset of the rain. By contrast, concentrations during and following a storm event ranged between 360 to 512 mg/l. Sediment loading increased dramatically with storm flows as stream flow in the Sexton-Kilfoil increased by 16.5 times that of pre-storm measured flows. Similar to findings in the North Branch, visual observations during 2004 field investigations indicate that the South Branch of the Ecorse Creek is still highly turbid, even in times of dry weather.

3.2.3 Hydrologic Modification/Stability

Flow stability, incorporating the relative magnitude, pattern, frequency, and duration of high and low stream flows, is a critical factor in determining the chemical, physical, and biological integrity of river systems. Streams that exhibit rapid fluctuations in flow are described as "flashy." Flashy flows destabilize banks, scour, dislodge and destroy habitat, strand and kill organisms, and inhibit recreational uses of rivers. Flow stability, especially during the period of May through July, is important for most warm water fish species to ensure adequate reproduction. High flows, from spring storms, can wash away nests, eggs, and newly hatched fry.[32]

Michigan has some of the world's most notably stable streams and rivers, particularly the Au Sable, Manistee, and Jordan Rivers. These rivers are largely groundwater driven, rarely flood, and because they receive substantial groundwater inputs as summer baseflow, they rarely exhibit low flows less than 80% of average flows. These rivers drain large areas of glacial outwash and post-glacial alluvium. By contrast, rivers draining areas of former lake bed (lake plains), as is the case in the Ecorse Creek Watershed, exhibit finer soils that contribute less groundwater and generally exhibit much flashier hydrology. The stability of a river system's hydrology, although determined in part by watershed geology, does not remain fixed, but instead changes with watershed land use.

In the past, one index of flow stability is a comparison of mean monthly high flows to mean monthly low flows. Higher ratios of these two numbers indicate flashy, unstable hydrology dominated by overland surface runoff. Lower ratios indicate stable flows dominated by groundwater. The Richard-Baker Flashiness Index is now the preferred method of determining flow stability as it allows comparison to other rivers statewide. The R-B Index uses data from U.S. Geological Survey (USGS) gaging stations to

[30] Woods, R. and G. Boersen, Ecorse River Storm Survey. Michigan Department of Natural Resources, Environmental Services Division, Inter-Office Communication to Paul Zugger. April 14, 1980.
[31] Ibid.
[32] Beam, Jennifer D. and Jeffrey J. Braunscheidel. 1998. Rouge River Assessment. Michigan Department of Natural Resources, Fisheries Division, Special Report 22. Ann Arbor, Michigan.

quantify the frequency and rapidity of short term changes in stream flow. The yearly-averaged R-B Index values for Michigan watersheds range from 0.006 to 1.009. Fluctuations over time are apparent in a stream's R-B Index values. Some fluctuations in the R-B Index values are expected from year to year simply because of natural weather variations. Longer term trends result from hydrologic alterations within the watershed.[33] The lower the R-B Index, the more stable the flows. The higher the R-B Index, the flashier the flows. As expected, the rivers and streams in the southeast part of the state exhibit the higher indices.

Surficial geology in the Ecorse Creek Watershed is defined by its location in the lake plain of Lake Erie's larger glacial predecessor. Soils in the watershed are predominantly fine-grained. This affects the availability and distribution of ground water inputs to the river system and, hence, the balance between groundwater and surface water contributions to stream flow, the topography of the land, and the erosivity of the stream bed and banks.

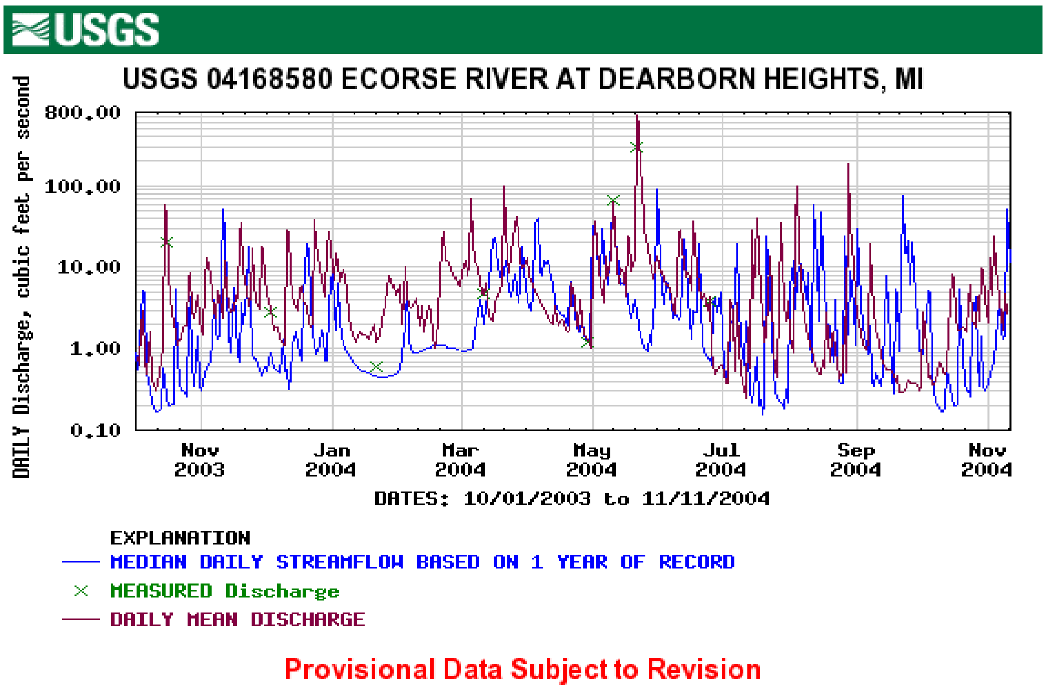
North Branch of the Ecorse Creek

The North Branch of the Ecorse Creek exhibits rapidly fluctuating (flashy) flows in response to rainfall and snowmelt events. These flashy stream flows are extremely degrading to natural systems. Rapid increases in flow are in turn followed by almost equally rapid returns to pre-storm discharge values. Figure 3-1 shows stream flows measured by the U.S. Geological Survey (USGS) at their gage on the Ecorse Creek at Dearborn Heights. It shows the creek's response to the rains in late May 2004 and also shows the dramatic differences between high and low flows on the North Branch. Peak recorded flows are over 4000 times measured baseflows. As described above, the ratio between mean monthly high flows and mean monthly low flows has been a method used to measure hydrologic stability (although moving forward the R-B Index is now preferred). This ratio for the North Branch of the Ecorse Creek, calculated from one year of USGS gage data, is 54.5, indicative of extremely unstable hydrology.

[33] MDEQ Application of Richard-Baker Flashiness Index to Gaged Michigan Rivers and Streams, August 2007.

Figure 3-1

Daily Discharge Records for the Ecorse Creek at Dearborn Heights, Michigan: October 1, 2003 through November 11, 2004.[34]



In general, the period of greatest flow instability on the North Branch of the Ecorse Creek is during the spring, the most critical time for fish reproduction. Peak flows spaced less than two (2) weeks apart do not provide adequate periods for fish nesting and hatching.[35] Two significant storm events occurred during the 2008-2009 period, one in September 2008 and another in June 2009. Compared to the full discharge record, the larger flow event in 2009 (daily peak of 162 cfs) had an annual probability of 0.55 or a return frequency of 1.8 years. Events of this size are known to be the driving events causing channel formation. If the channel is not large enough to contain such events, erosion will likely occur. Over the 2008-09 period, the North Branch of the Ecorse Creek produced a flashiness index of 1.01 (based on the ratio method). The long-term (2002-09) flashiness index for the site is 0.84, which is one of the highest index values in the state of Michigan and among the highest quartile in the Midwest. Further, the creek appears to be becoming more flashy. 12-month flashiness index values declined from initial launch until 2006 at which point index values have increased to their current levels. By this metric, North Branch of Ecorse Creek can be used as a reference of a highly impacted stream for comparing with other ADW streams.[36]

[34] http://waterdata.usgs.gov/nwis/dv/?site_no=04168580&agency_cd=USGS
[35] Ibid
[36] Evaluation Report – Grow Zones Across the ADW. March 2010. Wayne County and HRWC.

LeBlanc Drain

There are no permanent stream gages on the LeBlanc Drain. Flows measured during and following a 1.06-inch rain storm in April of 1980 were observed to decrease by approximately ½ over a six-hour period following the rain. The rate and volume of storm water conveyance through the LeBlanc Drainage system, and the associated sediment and pollutant loads, contribute to conditions in the most downstream sections of the North Branch and the Sexton-Kilfoil Drain near the Ecorse Creek's confluence with the Detroit River.

Sexton-Kilfoil Drain

There are no permanent stream gages on the Sexton-Kilfoil Drain. However, stream discharge monitoring along the Sexton-Kilfoil, as part of the Grow Zone Evaluation Report[37] indicated that this site produces the highest median flow of all stations monitored (4.98 cfs). This site maintains a perennial base flow – one of the only creek sites in the ADW with constant flow. The higher base flow and lower peak flows combine to result in a low flashiness index of 0.23 (based on ratio method). This index value places the site below the median in Michigan and among the least flashy/most natural in the Midwest.

3.2.4 Geomorphology of Stream Sites

As part of the Grow Zone Evaluation Report, 2 sites within the Ecorse Creek Watershed were evaluated for tractive force stability, one on the North Branch, and one on the South Branch. The tractive force for the Sexton-Kilfoil was 1.7, a slight amount above the stability threshold. This suggests that the stream channel may be somewhat unstable. The site has a bankfull depth of 1.65m. The measured peak flow at this site was 22 cfs, a low discharge for bankfull, given the drainage area.

The tractive force for the North Branch site was 0.1 – well under the stability threshold. This calculation suggests an unstable aggrading channel that is probably accumulating sediment. The measured peak flow at this site was 162 cfs. Flows around this discharge or lower may be adding sediment to the stream channel.

3.2.5 Impervious Surfaces

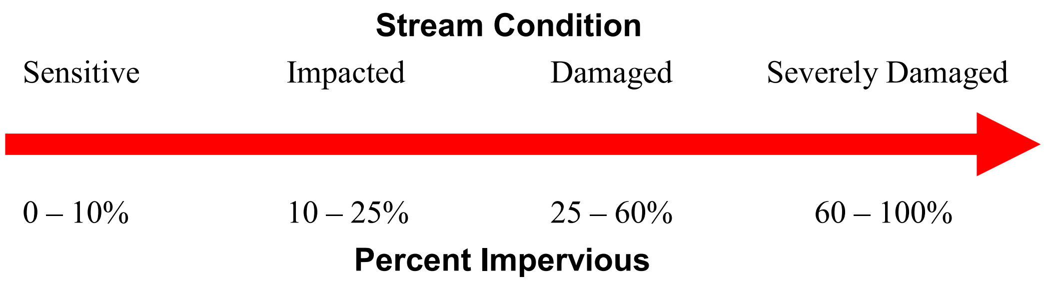
Imperviousness, which is a measure of the amount of non-porous surfaces (e.g. rooftops, roads, parking lots, driveways, etc.) in a watershed, is a driving factor in the degradation of stream and river systems in urban areas. The amount of imperviousness in a watershed has been shown to be directly related to the physical, chemical, and biological quality or integrity of aquatic ecosystems. Schueler,[38] reviewing studies from across the United States, determined that predevelopment stream quality is lost when watershed imperviousness exceeds 10%. He showed that watersheds with greater than 10% impervious surface coverage exhibited degraded conditions. Research conducted locally by the Huron River Watershed Council (HRWC) found that this degradation may be noted at even lower levels. Data from the HRWC's Adopt-A-Stream program found impacts evidenced in habitat scores, macroinvertebrate communities, and elevated conductivity measurements at subwatershed impervious surface levels equal to or greater than 8 percent of the total landscape.[39] Schueler classified streams with greater than 25% imperviousness as non-supporting of designated uses (Figure 3-2). At high levels of imperviousness, watershed degradation may be irreparable.

[37] Wayne County. 2010. Evaluation Report, Grow Zones Across the Alliance of Downriver Watersheds.

[38] Schueler, T. 1994. The Importance of Imperviousness. Watershed Protection Techniques 1(3):100-111. Center for Watershed Protection. Ellicott City, Maryland.

[39] Martin, J. and M.J. Wiley. 1999. The Current Conditions, Recent Changes, and Major Threats to the Huron River: A report on eight years of an ongoing study. Huron River Watershed Council, Ann Arbor, Michigan. http://www.hrwc.org/pdf/5yearreport.pdf

Figure 3-2
Scale of Watershed Imperviousness Related to Stream Condition



In an undeveloped landscape, most of the water falling as rain or snow is intercepted by the forest canopy, or other vegetation. This water is returned to the atmosphere through the processes of evaporation or transpiration without ever reaching the ground surface. Under natural conditions, water that does reach the ground is able to percolate through the soil surface. Some of this water is utilized by plants, some feeds local waterbodies as throughflow, and some continues to flow downward through the soil until it reaches the water table and recharges local groundwater supplies.

As the landscape is developed, the protective layer of trees, shrubs, and grasses are stripped away and replaced by hardened surfaces. Under these conditions, much more water reaches the ground surface when it rains than previously, and this water is then unable to infiltrate through the soil surface. Instead it runs off of roofs and roads, often carried more quickly through piped drainage systems, to local streams, rivers, and lakes.

The shape and dimensions of stream systems change over time to be in equilibrium with the amount of water and sediment the stream normally carries. Stream channels are generally formed to carry the largest flows experienced every one to two years.[40,41] As a stream's watershed is developed, more and more water and sediment are carried to the stream, increasing both the magnitude and frequency of those channel-forming storms. Large storm events, such as the “5-year storm,” (that storm event that normally would have a 1 in 5 chance of occurring in any given year), becomes the norm – occurring as many as five (5) times per year.[42] The result is that the streams become "flashy" and they experience higher highs, being driven by overland runoff and flood flows, and lower lows, since lower infiltration rates can reduce groundwater recharge and baseflow inputs to streams during summer low flow periods or drought. Additionally, these changes to stream channel morphology and hydrology lead to greater erosion, deposition, and pollution as described previously.

Maps 3-1 and 3-2 show graphically the distribution of existing (2008) and projected future (2030) average imperviousness in the Ecorse Creek Watershed. The watershed-wide existing average imperviousness is approximately 41.4%. If development continues in conformance with the 2030 land use projections, the 2030 average imperviousness is anticipated to approach 44.7%.

Estimates of existing and future levels of impervious surface coverage within the watershed were calculated using available land use data and land-use specific imperviousness averages measured within the neighboring Rouge River Watershed Data used for these calculations and mapping were based upon the 2008 Green Infrastructure Assessment (existing land cover) and SEMCOG’s 2030 build-out analysis based upon the merging of individual community Master Plans. Some seeming anomalies are

[40] Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.
[41] Leopold, L.B., M.G. Wolman, and J.P. Miller. 1992. Fluvial Processes in Geomorphology. Dover Publications, Inc. New York.
[42] Booth, D.B. 1990. Stream-channel Incision Following Drainage-basin Urbanization. Water Resources Bulletin 26(3): 407-417.

evident when reviewing the maps (i.e., areas where imperviousness seems to decrease for a specific area in the future). This stems from differences in the sources for the two data sets: aerial photography for the current land coverage and zoning and Master Plans for the future estimates. Despite these occasional oddities, the overall picture painted by the data is evident; watershed imperviousness coverage is already high and current development trends will result in significantly higher impervious coverage across the watershed.

3.2.6 Green Infrastructure Assessment for the Ecorse Creek Watershed

A Green Infrastructure Assessment was conducted using 2008 land cover data interpreted from aerial photography from United States Geologic Survey (USGS).[43] Land cover data was assessed to estimate stormwater storage capacity, air pollution removal and carbon sequestration of the existing green infrastructure in the each watershed of the ADW. A monetary value of the existing green infrastructure was also calculated for the current green infrastructure.

An existing conditions green infrastructure(GI) benefits assessment was performed on each of the three major watersheds using CityGreen© software and the 2008 aerial imagery. Storm water storage capacity changes, air pollution benefits, carbon storage and sequestering, and water quality pollutant loading reductions were calculated. The individual watershed benefits were than aggregated to provide an estimate of GI benefits for the full ADW. A desk-top assessment was also made to evaluate the stormwater management and maintenance impacts of each of the ten native plant Grow Zone projects. Maintenance cost savings were also calculated using a literature value.

The Ecorse Creek Watershed (Map 3-1) is approximately 56% green infrastructure (woody vegetation, open space) and 44% impervious surface (urban, urban bare). Air pollution benefits provided by the existing green infrastructure (based on woody vegetation only) include the annual removal of approximately 475,720 pounds of air pollutants. In financial terms, this level of air pollution removal represents a $1,128,505.00 annual cost savings benefit to the local communities and citizens within the Ecorse Creek watershed. The existing green infrastructure is also providing carbon storage benefits of approximately 263,963 tons at this time and is sequestering an additional 2,055 tons per year. Based on the 2-year, 24-hour storm event the Ecorse Creek existing green infrastructure is providing approximately 34,379,849 cubic feet of storm water storage. Replacement of this storm water storage would cost over $68, 759,699.

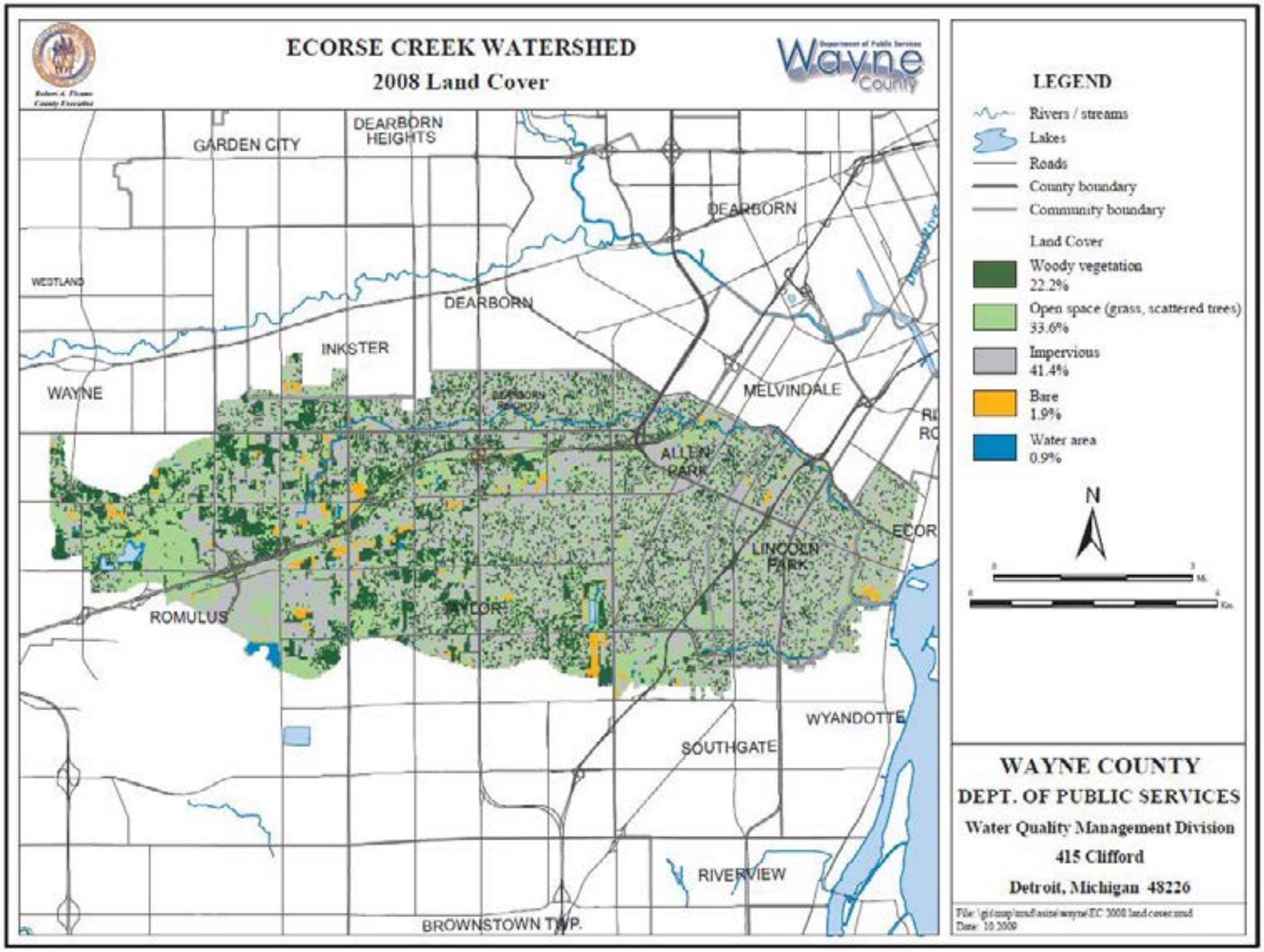
Table 3-2

Green Infrastructure - ECORSE CREEK LAND COVER 2008

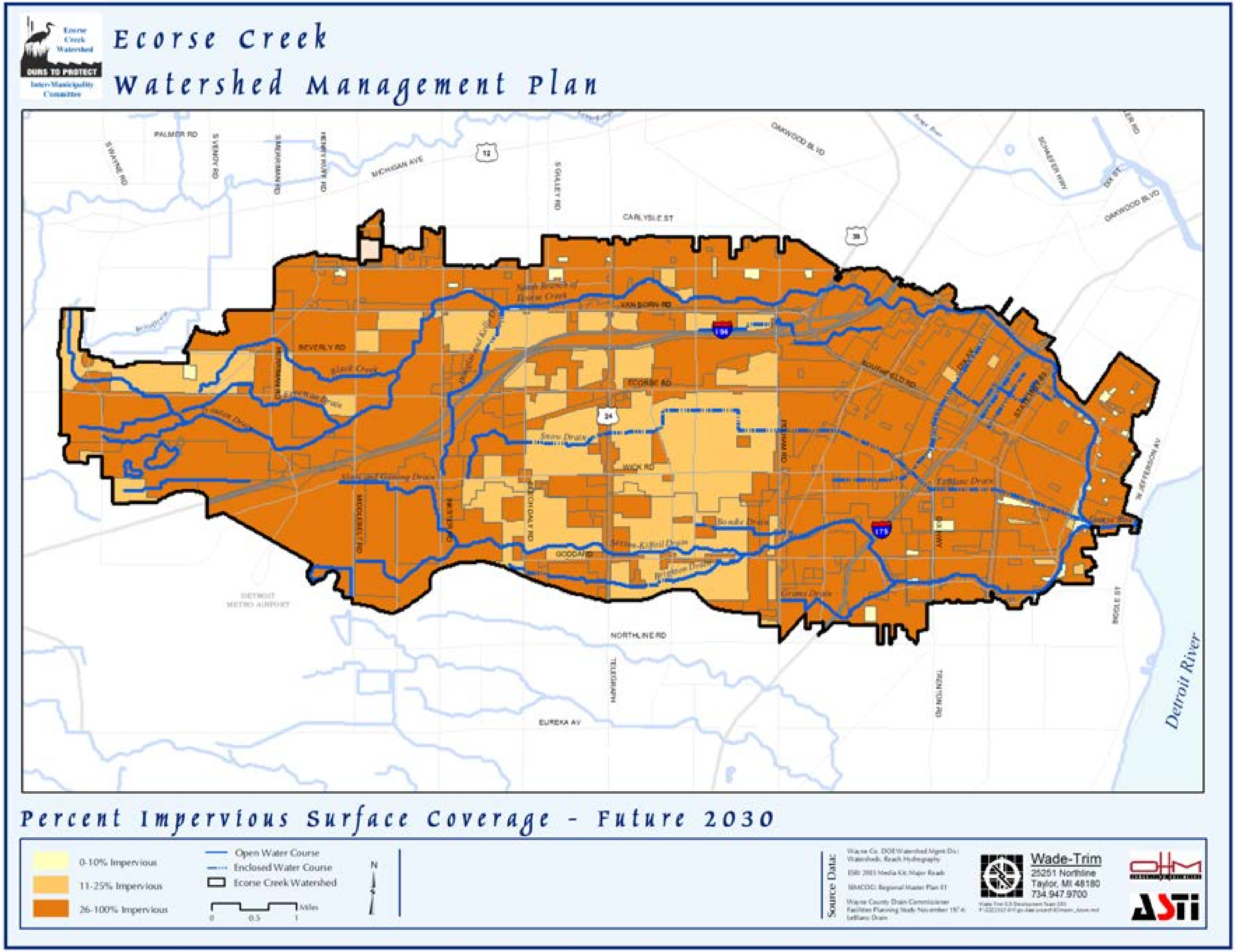
		Open		Trees		Urban		Bare		Water	
	Total ac.	**ac.**	**%**	**ac.**	**%**	**ac.**	**%**	**ac.**	**%**	**ac.**	**%**
LeBlanc Drain	7,795.90	2,280.00	29.2	1,509.20	19.4	3,885.10	49.8	101.50	1.3	20.10	0.3
North Branch	11,871.10	4,059.70	34.2	2,939.20	24.8	4,549.50	38.3	272.00	2.3	50.80	0.4
South Branch	8,173.80	3,088.90	37.8	1,576.50	19.3	3,168.10	38.8	167.40	2.0	172.90	2.1
Ecorse Creek Totals	27,840.80	9,428.60	33.9	6,024.90	21.6	11,602.70	41.7	540.90	1.9	243.80	0.9

[43] United States Geologic Survey (USGS) leaf –off ADS-40 imagery at 1 m resolution 4-band data including near infra-red, spring 2008. Imagery special accuracy of 5 m c.e.

Map 3-1


ECORSE CREEK WATERSHED
2008 Land Cover
Wayne County
GARDEN CITY
DEARBORN HEIGHTS
DEARBORN
WESTLAND
INKSTER
WAYNE
MELVINDALE
ALLEN PARK
LINCOLN PARK
ROMULUS
TAYLOR
WYANDOTTE
SOUTHGATE
RIVERVIEW
BROWNSTOWN TWP.
LEGEND
Rivers / streams
Lakes
Roads
County boundary
Community boundary
Land Cover
Woody vegetation 22.2%
Open space (grass, scattered trees) 33.6%
Impervious 41.4%
Bare 1.9%
Water area 0.9%
N
WAYNE COUNTY
DEPT. OF PUBLIC SERVICES
Water Quality Management Division
415 Clifford
Detroit, Michigan 48226

Map 3-2


Ecorse Creek
Watershed Management Plan
OURS TO PROTECT
PALMER RD
MICHIGAN AVE
CARLYSLE ST
VAN BORN RD
BEVERLY RD
ECORSE RD
WICK RD
GODDARD
NORTHLINE RD
EUREKA AV
TELEGRAPH
OAKWOOD BLVD
Black Creek
Sexton-Kilfoil Drain
Brighton Drain
Bondie Drain
LeBlanc Drain
DETROIT METRO AIRPORT
Detroit River
Percent Impervious Surface Coverage - Future 2030
0-10% Impervious
11-25% Impervious
26-100% Impervious
Open Water Course
Enclosed Water Course
Ecorse Creek Watershed
Miles
N
Source Data:
Wade-Trim
25251 Northline
Taylor, MI 48180
734.947.9700
OHM
ASTI

3.2.7 Phosphorus

Phosphorus and other nutrients are essential for plant growth. In Michigan waters, phosphorus is generally considered the limiting nutrient, meaning that the amount of available phosphorus generally determines the rate and amount of plant growth. As such, phosphorus is a key water quality concern. Phosphorus binds to soil particles, and is thereby delivered to streams and lakes with eroded soil. Phosphorus is also a chief component of lawn, garden, and agricultural fertilizers, detergents, fuels, and animal wastes. Phosphorus from these sources is carried in storm water runoff, and enters rivers and lakes from failing septic tanks and from wastewater treatment plants. Excessive phosphorus can, in turn, lead to excessive growth of algae and other aquatic plants, which can then deplete the available dissolved oxygen in the water. This can result in a change in the species composition of fish and aquatic invertebrates or even result in fish kills. High nutrient concentrations and the resulting growth of nuisance plant levels can also inhibit recreation and enjoyment of our waters. The MDEQ considers total phosphorus concentrations higher than 0.05 mg/L to have the potential to cause eutrophic conditions (e.g. nuisance algae and plants growth, widely fluctuating DO concentrations, etc.).

Among intensively monitored river sites on Michigan tributaries to the Great Lakes, the Au Sable River exhibits the lowest median total phosphorus concentrations and the Clinton River exhibited the highest (0.01 mg/l and 0.17 mg/l, respectively).[44] The MDEQ generally limits total phosphorus in wastewater treatment plant discharges to an average of 1.0 mg/l,[45] although some waste water treatment facilities are now being more strictly permitted. The United States Environmental Protection Agency (U.S. EPA) recommends that total phosphate not exceed 0.05 mg/L (as total phosphorus) in streams or rivers at the point where they enter a lake or reservoir, and should not exceed 0.1 mg/L in streams that do not discharge directly into lakes or reservoirs.[46]

North Branch of the Ecorse Creek

Water quality samples were collected and analyzed for total phosphorus (TP) and ortho-phosphate between July and September 2001.[47] Measured TP concentrations ranged from 0.07 to 0.194 mg/l – all in excess of the U.S. EPA recommended value of 0.05 mg/l. The mean for all stations on the North Branch equaled 0.120 mg/l. Samples collected at Beech Daly and Pelham Roads in 1991 both exhibited lower concentrations than the same sampling stations in 2001.[48] This may indicate that TP concentrations are increasing over time, although this potential trend cannot be determined conclusively with the limited data available. Orthophosphate, the form of phosphorus available for uptake by plants, averaged 0.053 mg/l in the North Branch/Ecorse Creek in 2001. For comparison, the summer mean for orthophosphate concentrations in all monitored Michigan streams and rivers in the Huron-Erie Lake Plain equals 0.0354 mg/l (range equals 0.0125 to 0.06 mg/l).[49]

LeBlanc Drain

Phosphorus data are not available for the LeBlanc Drain.

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[44] MDEQ (Michigan Department of Environmental Quality). 2004. Michigan Water Chemistry Monitoring: Great Lakes Tributaries, 2002 Report. MDEQ Report # MI/DEQ/WD-04/049. http://www.deq.state.mi.us/documents/deq-wb-swas-2002trendreport.pdf

[45] http://www.deq.state.mi.us/documents/deq-swq-npdes-Phosphorus.pdf

[46] Mueller, D.K and D.R. Hellsel. 1996. Nutrients in the Nation's Waters – Too Much of a Good Thing?. U.S. Geological Survey. Electronic Version of Circular 1136. http://water.usgs.gov/nawqa/circ-1136.html

[47] Goodwin, K. 2002. Biological Assessment of the Detroit River Tributaries, Including the Ecorse River, Frank and Poet Drain, and Brownstown Creek Watersheds, Wayne County, Michigan. July-September 2001. MDEQ Report #MI/DEQ/SWQ-02/020.

[48] Jones, R. 1991. A Biological Survey of County Drains in the Vicinity of Detroit Metropolitan Airport, Wayne County, Michigan, July 12-13, 1990. MDEQ Report #MI/DNR/SWQ-91/059.

[49] U.S. EPA. 2000. Ambient Water Quality Criteria Recommendations: Information supporting the development of state and tribal nutrient criteria, Rivers and streams in nutrient ecoregion VI. United States Environmental Protection Agency, Office of Water, 4304, EPA 822-B-00-017. December 2000.

Sexton-Kilfoil Drain

Water quality samples, collected and analyzed for total phosphorus (TP) and ortho-phosphate in 2001,[50] exhibited TP concentrations ranging between 0.079 to 0.126 mg/l – all in excess of the U.S. EPA recommended value of 0.05 mg/l. The mean for all stations on the Sexton-Kilfoil Drain equaled 0.097 mg/l. Samples collected at four sites in 1991 had a mean value of 0.066 mg/l.[51] Orthophosphate concentrations averaged 0.045 mg/l in 2001.[52]

3.2.8 Dissolved Oxygen Concentrations (DO)

Oxygen dissolved in water is necessary for life of both aquatic plants and animals. Oxygen enters water either through plant photosynthesis or across the air-water interface through turbulence and osmosis. The amount of oxygen that can be held by the water is temperature dependent. Solubility increases with decreasing temperature (colder water holds more oxygen). Oxygen is lost or reduced when water temperatures rises, when plants and animals respire, and when aerobic microorganisms decompose organic matter. Plants produce excess oxygen during the daylight hours through photosynthesis. During the night, they must continue to use oxygen while no photosynthesis is occurring. Thus, DO levels decrease at night, and are generally lowest just before dawn.

As stated above, introduction of excess nutrients (driving nuisance plant growth) and/or excess warming may result in oxygen depletion. Prolonged exposure to low dissolved oxygen levels (less than 5 to 6 mg/l oxygen) may not directly kill organisms, but can increase their susceptibility to environmental stresses. Exposure to less than 30% saturation (less than 2 mg/l oxygen) for periods of one to four days may kill most life in aquatic systems.[53]

Rule 64 of the Michigan Water Quality Standards (Part 4 of Act 451)[54] includes minimum concentrations of dissolved oxygen which must be met in Michigan surface waters. This rule states that surface waters protected for warmwater fish and aquatic life must meet a minimum dissolved oxygen standard of 5 mg/l.

Surface waters protected for warmwater fish and aquatic life must meet a minimum dissolved oxygen standard of 5 mg/l.

North Branch of the Ecorse Creek

Sampling on the North Branch, conducted in 1969, showed DO concentrations as low as 0.3 mg/l at Southfield Road, with DO concentrations below Michigan's water quality standard measured at stations throughout the length of the North Branch. More recent MDEQ studies (i.e. 1991 and 2001) did not record DO concentrations. However, single-event measurements taken during summer 2004 field investigations identified DO concentrations less than 5 mg/l in Black Creek at Merriman and Henry Ruff Roads (1.05 mg/l) and in the Freeman Drain at Merriman and Ecorse Roads (3.40 mg/l).[55] Sediment oxygen demand is one of the suspected causes for poor macroinvertebrate scores and limited fish diversity and is cited as a reason for the biota TMDL restrictions.

LeBlanc Drain

Dissolved oxygen data are not available for the LeBlanc Drain.

[50] Goodwin, K. 2002. Biological Assessment of the Detroit River Tributaries, Including the Ecorse River, Frank and Poet Drain, and Brownstown Creek Watersheds, Wayne County, Michigan. July-September 2001. MDEQ Report #MI/DEQ/SWQ-02/020.

[51] Jones, R. 1991. A Biological Survey of County Drains in the Vicinity of Detroit Metropolitan Airport, Wayne County, Michigan, July 12-13, 1990. MDEQ Report #MI/DNR/SWQ-91/059.

[52] Goodwin, K. 2002. Biological Assessment of the Detroit River Tributaries, Including the Ecorse River, Frank and Poet Drain, and Brownstown Creek Watersheds, Wayne County, Michigan. July-September

[53] http://www.deq.state.mi.us/documents/deq-swq-npdes-DissolvedOxygen.pdf

[54] http://www.state.mi.us/orr/emi/admincode.asp?AdminCode=Single&Admin_Num=32301041&Dpt=EQ&RngHigh=

[55] ASTI (ASTI Environmental) 2004. Watershed Survey Data (unpublished). ASTI Environmental, Brighton, Michigan.

Sexton-Kilfoil Drain
Sampling on the Sexton-Kilfoil Drain in 1969 showed DO concentrations as low as 0.1 mg/l at Southfield Road. Stations throughout the length of the Sexton-Kilfoil Drain exhibited DO concentrations below Michigan's water quality standard. Measurements taken during the summer 2004 field investigations identified DO concentrations less than 5 mg/l at Goddard Road west of Allen Road (1.54 mg/l) and at Council Pointe Park at the confluence with the North Branch (4.72 mg/l).[56]

3.2.9 Conductivity

Conductivity is a measure of the ability of water to pass an electrical current and, as such, is an indirect measurement of the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, and phosphate anions (ions that carry a negative charge) or sodium, magnesium, calcium, iron, and aluminum cations (ions that carry a positive charge). Conductivity is affected by temperature: the warmer the water, the higher the conductivity. Conductivity is frequently measured as micro-Siemens per centimeter (µS/cm). Because it is related to temperature, conductivity is generally standardized as conductivity at 25 degrees Celsius (25^{o} C).

Conductivity in streams and rivers is affected primarily by the geology of the watershed. Streams that run through areas with granite bedrock tend to have lower conductivity because granite is composed of more inert materials that do not ionize (dissolve into ionic components) when washed into the water. Streams that run through areas with clay soils tend to have higher conductivity because of the presence of ionizing materials. Ground water inflows can have the same effects depending on the bedrock they flow through.

Conductivity of rivers in the United States generally ranges from 50 to 1500 µmhos/cm. Studies of inland fresh waters indicate that *streams supporting good mixed fisheries have a range between 150 and 500 µS/cm*. Industrial waters can range as high as 10,000 µS/cm. Conductivity values outside of 150 to 500 µS/cm range may indicate the presence of anthropogenic inputs and water unsuitable for certain species of fish or macroinvertebrates. In the Huron River, in southeast Michigan, average conductivity values less than or equal to 800 µS/cm are considered natural.[57] Conductivity values greater than 800 µS/cm were correlated with imperviousness values greater than 8% and impaired macroinvertebrate communities.[58]

North Branch of the Ecorse Creek
Sampling on the North Branch, conducted during the summer of 2004,[59] revealed several locations with high conductivity. Measured values ranged from 514 to 5,887 µS/cm, with the highest reading recorded on the Trouton Drain at South Wayne Road between Beverly and Ecorse Roads. Conductivity values in excess of 1,500 µS/ were measured at six out of eleven stations within the North Branch subwatershed.

LeBlanc Drain
Conductivity values were not measured in the LeBlanc Drain.

Sexton-Kilfoil Drain
Sampling on the Sexton-Kilfoil, conducted during the summer of 2004,[60] also revealed several locations with high conductivity. Measured values ranged from 278 to 3,294 µS/cm. The highest values were

[56] Ibid.
[57] Dakin, T.D. and J.S. Martin. 2003. The Quality of a Hidden Treasure: The Davis Creek Report. Huron River Watershed Council. Ann Arbor, Michigan.
[58] Martin, J. and M.J. Wiley. 1999. The Current Conditions, Recent Changes, and Major Threats to the Huron River: A report on eight years of an ongoing study. Huron River Watershed Council, Ann Arbor, Michigan. http://www.hrwc.org/pdf/5yearreport.pdf
[59] ASTI Environmental unpublished sampling data
[60] Ibid

recorded at Telegraph and Goddard, and at Goddard west of Allen. Conductivity values exceeded 2,000 µS/ at three of seven stations sampled along the Sexton-Kilfoil.

3.2.10 Pathogens (Bacteria)

Bacteria from human sources can enter waters through either point or nonpoint sources of contamination. Point sources are those that are readily identifiable and typically discharge water through a system of pipes (e.g. an industrial or wastewater discharges). Point source discharges can also include "illicit" connections to storm drainage systems, wherein wastewater that would normally require treatment prior to discharge is instead routed through storm drains without treatment. Nonpoint sources are diffuse, with contamination entering waters through overland runoff or seepage through the soil. Failed septic systems in residential or rural areas can contribute bacteria to surface water and groundwater. Animal wastes from livestock, pets, wildlife and waterfowl are also sources of bacteria.

Standards
Total Body Contact Recreation
300 *e. coli* per 100 ml water

Partial Body Contact Recreation
1000 *e. coli* per 100 ml water

Most bacteria are harmless, however some have the potential to cause illness or disease in humans. These are referred to as *pathogens*. Examples of waterborne diseases caused by bacteria include cholera, dysentery, shigellosis and typhoid fever. Minor gastro-intestinal discomfort is probably the most common ailment associated with water-borne bacteria, however, pathogens that cause only minor discomfort to some may cause serious illness or even death in other individuals, particularly those with compromised immune systems or the young and elderly.[61,62]

Of particular interest or concern is a sub-group called coliform bacteria, typically found in the digestive systems of warm-blooded animals. Coliform bacteria include total coliforms, fecal coliforms, and the group *Escherichia coli* (*E. coli*). Each of these indicates the presence of fecal waste in surface waters.[63][3] The fecal-coliform bacteria group was the preferred indicator for potential water quality concerns, however, recent advances in the use and analysis of indicator bacteria have shown that *E. coli* are more reliable for predicting the presence of disease causing organisms.[64]

Rule 62 of the Michigan Water Quality Standards (Part 4 of Act 451)[65] limits the allowable concentration of microorganisms in surface waters of the state and surface water discharges. Waters of the state which are protected for total body contact recreation must meet limits of 130 *Escherichia coli* (*E. coli*) per 100 milliliters (ml) water as a 30-day average and 300 *E. coli* per 100 ml water at any time. The limit for waters of the state which are protected for partial body contact recreation is 1000 *E. coli* per 100 ml water during any one sampling event.

North Branch of the Ecorse Creek

The previously noted 1980 storm survey of combined sewer overflows[66] included visual observations and analytical results of combined sewer overflows during two storm events. Fecal coliform bacteria counts in the North Branch were found as high as 380,000 cts/100 ml. Extremely high bacteria counts were found at locations both upstream of the confluence with the LeBlanc Drain on the North Branch and further downstream below the confluence of the North Branch and the Sexton-Kifoil Drain. This

[61] Ibid
[62] Schueler, T.R. 1999. Microbes and Urban Watersheds II. Concentrations, Sources, and Pathways. Watershed Protection Techniques 3(1): 1-12.
[63] Ibid
[64] Gregory, M.B. and E.A. Frick. 2000. Fecal-coliform bacteria concentrations in streams of the Chattahoochee River National Recreation Area, Metropolitan Atlanta, Georgia, May-October 1994 and 1995. U.S. Geological Survey Water Resources Investigation Report 00-4139, August 2000.
[65] http://www.state.mi.us/orr/emi/admincode.asp?AdminCode=Single&Admin_Num=32301041&Dpt=EQ&RngHigh=
[66] Woods, R. and G. Boersen, Ecorse River Storm Survey. Michigan Department of Natural Resources, Environmental Services Division, Inter-Office Communication to Paul Zugger. April 14, 1980.

investigation was designed to examine wet weather water quality resulting from CSOs to the creek. Dry weather sampling conducted in 1977 also showed high fecal coliform bacteria concentrations in the North Branch (average = 2,507 cts/100 ml), although dry weather values were considerably less than wet weather values.

CSOs have since been eliminated from the watershed. Recent MDEQ studies, since the elimination of CSOs, have not included bacteriological sampling, but data collected by the Wayne County Health Department, June through August of 2000 and 2001[67,68] found daily geometric mean *E. coli* concentrations (from throughout the watershed) between 330 and 781 organisms/100 ml. Individual sample values from all sites, on all days sampled, exceeded the 130 per 100 ml water quality standard. The geometric mean of samples collected by the Wayne County Department of Environment (WCDOE) in 2004 from stations throughout the North Branch, equaled 548 *E. coli*/100mL. From these more recent data, it appears that bacteria levels have been reduced dramatically as a result of sewer separation, but that water quality standards are still routinely exceeded. Urban storm water inputs and suspected illicit connections between sanitary and storm sewer systems are potential sources for current elevated bacteria concentrations.

LeBlanc Drain
In the wet weather sampling conducted in April 1980 (pre-sewer separation), MDEQ personnel found fecal coliform bacteria concentrations ranging from less than 10,000 cts/100 ml (prior to the rain) to 280,000 cts/ 100 ml during the monitored storm event. No recent (post-sewer separation) data are available for the LeBlanc Drain.

Sexton-Kilfoil Drain
Fecal coliform bacteria counts, in 1980 in the Sexton-Kilfoil, were found to be as high as 690,000 cts/100 ml. Dry weather sampling conducted in 1977 also showed high fecal coliform bacteria concentrations in the Sexton-Kilfoil (average = 555 cts/100 ml). Dry weather values (1977) were considerably less than wet weather values (1980). The geometric mean of samples collected by the WCDOE in 2004 equaled 422 *E. coli*/100mL, from stations throughout the Sexton-Kilfoil. Urban storm water inputs and presumed illicit connections are suspected as sources for current elevated bacteria concentrations in the Sexton-Kilfoil Drain.

3.2.11 Additional Information

North Branch of the Ecorse Creek
Investigations of the Trouton Drain and the headwaters of the Ecorse Creek were conducted in 1978, and again in 1983, to determine if oils or other substances had been discharged via contaminated ground water in the vicinity of Chemical Recovery Systems, Inc. near Van Born Road. Residents in the area had complained of odors during both summer low flow periods, when the stream in this area dries completely, and during spring runoff events.[69,70] Ponding of turbid, reddish water and odors were observed during both site visits, however, improvement in the amount and diversity of aquatic life was observed between the two visits. Removal of contaminated sediments and improvements to channel conveyance were recommended.[71]

[67,63] WCHD (Wayne County Health Department). 2000/2001. Water Quality Results for Natural Bathing/Recreational Areas. E. coli sampling results for Ecorse Creek, June through August, 2000 & 2001 spreadsheets. Wayne County Health Department, Division of Environmental Health.

[69] Evans, E. 1978. Staff Report: Observations of Trouton Drain and the Headwaters of the Ecorse River, Wayne County, Michigan, June 14, 1978. Michigan Department of Natural Resources, Water Quality Division.

[70] Evans, E. 1978. Staff Report: Trouton Drain from Van Born Road to Wayne Road, Romulus, Michigan, June 21, 1983. Michigan Department of Natural Resources, Water Quality Division.

[71] IBID

Sexton-Kilfoil Drain
As a part of routine monitoring in 1991, the MDEQ sampled the final effluent (storm water) from the Detroit Metropolitan Airport to determine if the discharge negatively impacts the headwaters of the Sexton-Kilfoil Drain. Testing was conducted to determine the acute toxicity of the effluent. The storm water effluent was found to be acceptable and not acutely toxic to *Daphnia magna*.[72]

3.3 Field Inventory Summary

While previously written reports were reviewed to gain an understanding of the condition of the Ecorse Creek Watershed, a supplementary field inventory was conducted in order to gain a more hands-on assessment of the watershed. Field observations were made in August and September 2004 and represent the physical conditions and characteristics of the watershed during that period.

3.3.1 Methodology

A team of planners, engineers, biologists and ecologists surveyed the Ecorse Creek Watershed at various locations. Observations were made at road-stream crossing locations throughout the watershed as well as at various reaches of the streams and drains. There are approximately 168 stream-road crossings throughout the watershed.[73] Observations were made at 61 locations or approximately 36% of the total stream-road crossings in the watershed and were selected so that observation points were geographically dispersed across the entire watershed. Additional observation points were chosen based on where communities in the ECIC indicated specific priority areas of concern within the watershed. Map 3-3 shows the locations of the road-stream crossing inventories. Once all areas of concern were visited, supplemental locations were selected based on the goal of gaining an understanding of the entire watershed.

Survey information for road-stream crossings was collected using the Stream Crossing Watershed Survey Procedure, prepared by the MDEQ.[74] Where possible, the following data were collected at each crossing:

- Background Information
  - Event Conditions
  - Days since rain
  - Water color
  - Waterbody type
  - Stream width
  - Average stream depth
  - Stream flow type
- Substrate of river bottom
- River Morphology
  - Presence of riffles
  - Presence of pools
  - Channel-natural, recovered, or maintained
  - Designated drain status
  - Highest water mark
- Physical Appearance

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72 McMahon, M. 1991. Staff Report: Acute Toxicity Assessment of Detroit Metro Wayne Co. Airport Final Effluent, Romulus, Michigan, June 12-14, 1991, NPDES Permit No. MI0036846. Michigan Department of Natural Resources, Surface Water Quality Division, Report No. MI/DNR/SWQ-91/101. July 1991.

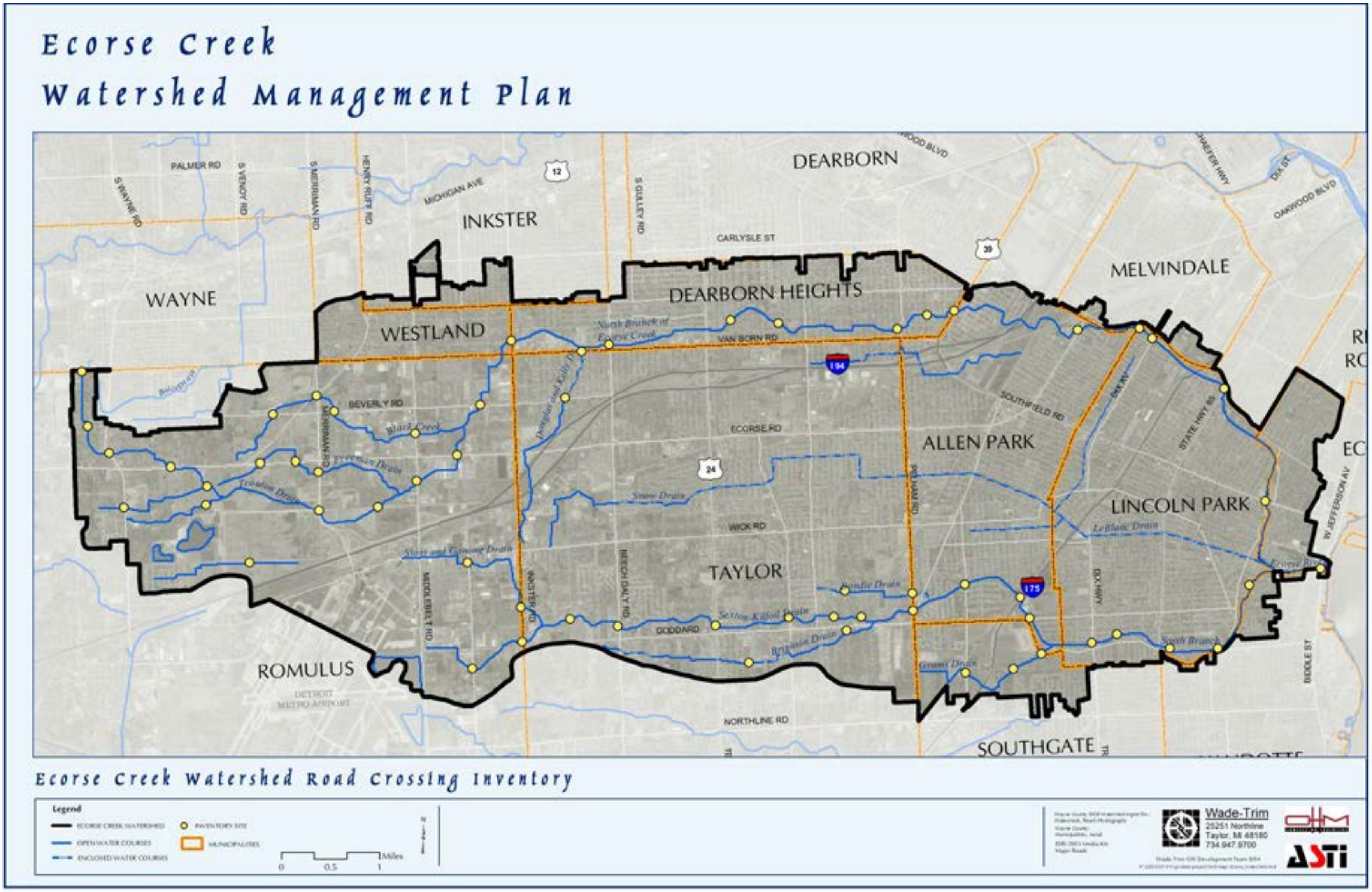
73 Determined by running a script in GIS to identify all points where the roads shape file intersected with the water courses shape file.

74 Bauer, C., G. Goudy, S. Hanshue, G. Kohlhepp, M. McMahon, and R. Reznick. 2002. Stream Crossing Watershed Survey Procedure. Michigan Department of Environmental Quality, Surface Water Quality Division. June 26, 2002.

    - Presence of aquatic plants
    - Presence of floating algae
    - Presence of filamentous algae
    - Presence of bacterial sheen/slimes
    - Presence of turbidity
    - Presence of oil sheen
    - Presence of foam
    - Presence of trash
  - In-stream Cover
    - Presence of undercut banks
    - Presence of overhanging vegetation
    - Presence of deep pools
    - Presence of boulders
    - Presence of aquatic plants
    - Presence of logs or woody debris
  - Stream Corridor
    - Riparian vegetative width
    - Severity of bank erosion
    - Type of streamside land cover
    - Amount of stream canopy
    - Types of adjacent land uses
  - Potential pollutant sources

Similar information was noted at the areas of concern and other supplemental field locations. In addition to the collected information, photographs were taken at each of the sites visited. The following section includes some photos taken during the inventories. Additional photographs, along with their descriptions, can be found in Appendix C.

Map 3-3



Ecorse Creek Watershed Management Plan

3.3.2 Summary of Findings

Field findings have been summarized and are presented in the following pages by Drainage Area, which include those drains and creeks that are tributary to the three primary water courses: North Branch of the Ecorse Creek, the LeBlanc Drain and the Sexton-Kilfoil Drain.

North Branch and Tributaries

North Branch of Ecorse Creek

The North Branch of the Ecorse Creek flows along the north side of the watershed for an estimated 16.21 miles. The North Branch was inspected at 17 different points along this length. General characteristics were observed and noted. In general, the width of riparian vegetation along the North Branch was very small (often less than 10 feet). The riparian vegetation that was present, however, did provide a canopy of moderate cover. The water of the North Branch of the Ecorse Creek generally was brownish in color, with high turbidity. Turbidity generally increased going downstream. The turbidity is likely due to sediment in runoff as well as stream bank erosion. A relatively high amount of undercut banks and stream bank erosion was observed on the North Branch, often resulting in exposed plant and tree roots and exposed banks. Observations were made in the late summer and low flows were predominantly observed. These conditions allow for suspended solids in the stream to settle out. While flows were low when the field inventory was conducted, there was strong evidence that the North Branch is "flashy" (high water marks of over 5 feet that were observed in several places).

Bank Erosion along the North Branch – Telegraph north of Van Born

Trouton Drain

The Trouton Drain is tributary to the North Branch of the Ecorse Creek and stretches an estimated 2.21 miles. The Trouton Drain was observed at 11 different locations to help determine general characteristics. The drain was observed to be less than 10 feet wide in most locations. The width of riparian vegetation along the Trouton Drain was generally small (often less than 20 feet). Like the North Branch, the riparian vegetation that was present provided a canopy and moderate cover. Overhanging vegetation and woody debris provide shelter and habitat for aquatic animals. In general, the water in the drain was clear but in some areas appeared to be cloudy. Little or no erosion was observed along the drain. Flow was predominantly stagnant at the time of the site visit, but high water mark observations indicated that the drain is flashy.

Overhanging vegetation in the Trouton Drain – Wayne Road North of Ecorse Road

Freeman Drain

The Freeman Drain is tributary to the North Branch of the Ecorse Creek and stretches an estimated 2.20 miles. The Freeman Drain was inspected at three different locations, where general observations were made. The drain was stagnant and the water depth was shallow at the times of observation. The high water marks observed did not indicate that flooding was an issue and little to no erosion was seen. A very small riparian vegetative buffer was present and because it was predominantly grass and shrubs, provided little shade. The water was clear with some trash and debris present. There also was a location in which bacterial sheens and algae blooms were present in the water and may be a result of little or no riparian buffer to help filter runoff from crops, residential yards, and impervious surfaces that flow directly into the body of water. This runoff can produce bacterial sheens and algae blooms, which are harmful to the wildlife living in or near the drain. Algae blooms can block sunlight necessary for aquatic plant growth and also deplete dissolved oxygen levels in the water. The area along the drain at Ecorse Road west of Merriman is typical of this type of situation. In this situation, the drain is located immediately adjacent to a residential area and croplands.

Debris, algae growth, and lack of riparian vegetative buffer in the Freeman Drain – Ecorse Road west of Merriman

Black Creek

The Black Creek is tributary to the North Branch of the Ecorse Creek and stretches an estimated 3.15 miles. The Black Creek was inspected at three different locations and general characteristics were observed. The creek is approximately 5 feet wide and the width of the riparian vegetation along Black Creek at the points of observation was very small (predominantly less than 10 feet). This may allow harmful runoff from crops, residential yards, and impervious surfaces to adversely affect the health of the creek and the waters downstream. The area along the drain at Beverly Street east of Merriman is typical of this type of situation, as the drain is located immediately next to the roadway. The bank vegetation provides a moderate cover for the creek at the observed locations. The water was brownish in color with some turbidity and flow was predominantly low to stagnant at the time of observation. The high water mark was relatively low in this tributary indicating relatively low flashiness, and little to no erosion was observed.

Black Creek along roadside – Beverly east of Merriman

Douglas and Kelly Drain

The Douglas and Kelly Drain is tributary to the North Branch of the Ecorse Creek and stretches an estimated 2.38 miles. The Douglas and Kelly Drain was inspected at two different locations. The average width of the drain was less than 5 feet at the observed locations and the water depth was less than a foot. The water was generally clear with some turbidity. There was also a bacterial sheen present. The high water mark was relatively low and little or no erosion was observed along the drain. At the observed locations, the riparian vegetative width was greater than 25 feet and provides moderate cover. In addition, woody debris and overhanging vegetation was present. This is important in providing shelter and habitat for wildlife.

Douglas and Kelly Drain – Beverly between Inkster and Beech Daly

LeBlanc Drain and Tributaries

The LeBlanc Drain stretches through the middle of the watershed an estimated 9.66 miles. The majority of the LeBlanc is enclosed as it was originally designed as a combined sewer in the late 1920's. Although the drain is now completely dedicated to the conveyance of storm water, the majority of the drain remains enclosed.

Snow Drain

Observations were made at the most upstream section of the drain (Snow Drain) where the drain is an open watercourse. The limited observations of the drain provided information on the general condition of this segment of the drain. The water in the observed section of drain appeared clear, although some turbidity and bacterial sheens were present. At the time of the observation, flow in the drain was stagnant. Wildlife was observed at the sight, as a blue heron and an abundance of frogs were spotted.

Algae growth in the Snow Drain –north of Wick between Inkster and Beech Daly

Sexton-Kilfoil and Tributaries

Sexton-Kilfoil Drain

The Sexton-Kilfoil Drain (also known as the South Branch of the Ecorse Creek) stretches along the south side of the watershed an estimated 13.19 miles. The Sexton-Kilfoil Drain was inspected at fifteen different locations and general characteristics of the drain were observed. The stream width varied from 5-30 feet but was generally about 15 feet wide. At the time of observation the stream was generally 1-2 feet deep with slow moving flow. In the upstream stretches of the drain the water was clear with little turbidity, while brownish water with high turbidity was observed in the downstream stretches of the drain. Slight to moderate erosion was observed in the drain. High water marks indicated that flows reach a few feet or more above the observed water depth, which indicates the drain is susceptible to flashy flow. The riparian vegetative width was generally less than 20 feet. Almost all the observed sites had moderate cover. Algae, bacterial slimes and sheens were observed at several of the visited locations. In addition, overhanging vegetation and woody debris as well as trash was present in most locations visited.

Erosion of the Sexton-Kilfoil Drain - Goddard Road east of Beech Daly Road

Grams Drain

The Grams Drain is tributary to the Sexton-Kilfoil Drain and stretches an estimated 1.92 miles. General observations were made at three different locations of the Grams Drain. The drain was generally less than 5 feet wide with a depth of less than a foot at the time of observation. The water was observed to be clear at all locations. However, foams, bacterial sheens, and algae were present in the water. Flow was predominantly low to stagnant at the times of observation. The high water marks ranged from less than a foot upstream to over 5 feet downstream. These high water conditions indicate that the Grams Drain is susceptible to flashy flows. The drain had a very small vegetative buffer width that was generally less than 10 feet and only provided moderate shade and cover, as bank cover was predominantly grass with some trees. Little or no erosion was observed along the drain.

Looking downstream on the Grams Drain - just east of Reek Road

Brighton Drain

The Brighton Drain is tributary to the Sexton-Kilfoil Drain and stretches an estimated 3.25 miles. General observations were made of the Brighton Drain at two separate locations. The water in the Brighton Drain at the observation points was clear with little or no turbidity. Flow was low to stagnant with a depth of generally less than one foot. Erosion appears to be moderate and it appears measures have been taken to attempt to curb erosion. The predominant streamside land cover along the drain is grass and shrubs, which provide minimal cover to the stream. In addition, the riparian vegetative width is generally less than 10 feet. Trash, overhanging vegetation and aquatic plants were observed in the drain.

Erosion control measures – Brighton Drain at Baraga Street, south of Goddard

Sloss and Ganong Drain

The Sloss and Ganong Drain is tributary to the Sexton-Kilfoil Drain and stretches an estimated 2.16 miles. The Sloss and Ganong Drain was visited at five different locations, where general observations of the condition of the drain were made. Because much of the drain is enclosed, the open drain was observed at three separate locations. West of the airport, the drain appeared to be intermittent as no flow was observed. Downstream of the airport, the water was clear or grayish in color and flow levels were low to moderate during the times of observation. A high amount of trash was observed in the drain as well as algae growth, slimes, and sheens. The streamside land cover along the drain was predominantly grass, with more trees further downstream toward the confluence with the Sexton-Kilfoil Drain. There was little to no stream bank canopy provided by this vegetation and in general, the riparian vegetative width was less than 10 feet. High water marks indicated that the drain is “flashy”, especially further downstream. However, little to no erosion was observed along the drain.

Lack of riparian vegetative buffer along the Sloss & Ganong Drain - Wick Road east of Middlebelt

3.3.3 Areas of Concern

Initial field observation points were chosen based on where communities in the ECIC indicated specific priority areas of concern within the watershed. These areas are described below:

North Branch and Tributaries

North Branch of Ecorse Creek

Observations were also made at locations that were reported as "areas of concern" by the Ecorse Creek Watershed communities. From field observations and review of previous studies, the North Branch of the Ecorse Creek is known to be highly susceptible to flash floods and subsequent stream bank erosion and heavy sedimentation when peak flows have subsided.

The predominance of impervious areas along the North Branch of the Ecorse Creek has increased the occurrence of flash flooding, thus increasing the amount of erosion along the banks. The areas along the North Branch at Van Born west of Beech Daly, Telegraph north of Van Born, north of Van Born between Monroe and Pelham, and south of Outer Drive east of Allen are examples of high erosion areas. Observations of fully exposed and undercut stream banks were made. Sediment can clog the gills of fish and block light transmission, both conditions which are harmful to aquatic life. Sediment also settles out with low velocity stream flow, eventually reducing the stream cross section and increasing the risk of flooding. In addition, sediment from runoff also carries with it pollutants such as nutrients, pesticides, solvents, automobile fluids etc.

Fallen trees due to erosion were noted at a couple of the visited locations. Although some woody debris and fallen/overhanging trees are beneficial for aquatic life and fish, they can also decrease the hydraulic efficiency of the stream, which can potentially contribute to flooding upstream. The areas along the North Branch at Austin Street south of Outer Drive and LeJeune and Cicotte (west of Pepper between Outer Drive and Southfield) are typical of this type of situation. In both instances, large trees have fallen and are now impeding flow through this stretch of the stream. It should be noted that logjams are only problematic when they result in flooding that poses a threat to public safety.

Logjam impeding flow and collecting garbage and debris in the North Branch – West of Pepper between Outer Drive and Southfield

Heavy deposition of sediment during low flow periods has reduced the cross-section and capacity of the North Branch in many locations. The area along the North Branch at Austin Street, south of Outer Drive is typical of this type of situation. In this instance, sediment deposits have obstructed almost half of the river's flow area.

Sediment deposition in the North Branch of Ecorse Creek – Austin, south of Outer Drive

Sexton-Kilfoil and Tributaries

Sexton-Kilfoil Drain

It appears from the field observations that the Sexton-Kilfoil Drain is susceptible to flash floods with accompanying stream bank erosion, and subsequent heavy sedimentation when peak flows have subsided (although the concern does not appear to be as critical as that of the North Branch of the Ecorse Creek). The area along the Sexton-Kilfoil Drain at Goddard, east of Telegraph, is typical of this type of situation. In this instance, the banks of the stream are fully exposed and undercut by heavy erosion.

Eroded stream bank of the Sexton- Kilfoil Drain – Goddard, east of Telegraph

Grams Drain

As previously noted, it appears that the Grams Drain is somewhat susceptible to flash floods, although the flows do not appear concentrated enough to produce serious erosion concerns. The general characteristic of concern for this drain is the lack of riparian vegetative buffers. In areas along the Grams Drain (as well as almost every other drain in the watershed), vegetative buffers along the drain have been diminished such that harmful runoff from crops, residential yards, and impervious surfaces can flow directly into the body of water. This runoff can produce bacterial sheens and algae blooms that are harmful to the wildlife living in or near the drain. The area along the Grams Drain at McCann Street and Brest Street is typical of this situation. In this particular situation, the buffer has been diminished and runoff from maintained lawns and the adjacent road can readily flow into the drain with no filtration. At this particular site, the stream bank has also been disrupted due to construction activity.

Lack of vegetative buffer along the Grams Drain – Corner of McCann and Brest (east of I-75 & south of Moran)

In an identified area of concern along the Grams Drain, the drain has been intentionally obstructed by placing wood across a culvert in order to establish a pond within a development. In most cases, this impoundment reduces the peak flows to the downstream drain. However, this pond also serves as a location for ducks and geese to take residence, which may increase nutrient loads into the watercourse. In addition, the sitting water is susceptible to heating, which may adversely affect aquatic life in the drain. The small “waterfall” caused by the dam also may prohibit the migration of aquatic species that may be necessary for their livelihood. The area along the Grams Drain east of Reeck Road is typical of this situation.

Man-made pond in Grams Drain – East of Reeck Road

4 Challenges and Goals

Sexton-Kilfoil Drain
Beech Daly Road, North of Goddard

Chapter Contents

Through the review of existing data and supplemental field inventory results, the watershed committee developed an understanding of the characteristics and condition of the watershed. With this understanding and knowledge, the ECIC reviewed and developed designated and desired uses for the watershed. After identifying the applicable designated and desired uses for the watershed, the known and suspected causes of impairment and/or threats to these uses were identified. The ECIC then developed goals and objectives for the watershed that are based on restoring and protecting the designated and desired uses and address the priority pollutants, sources, and causes.

4.1 Designated Uses in the Ecorse Creek Watershed

Per the Michigan Department of Environmental Quality, water quality is primarily measured by whether the water body meets the designated uses as defined by the State of Michigan. In Michigan, the goal is to have all waters of the state meet the designated uses that apply to that body of water.

Designated uses are recognized uses of water established by state and federal water quality programs.

All surface waters of the State of Michigan are designated for and shall be protected for all of the following uses. Those that are applicable to the Ecorse Creek Watershed are in bold:

1. **Agriculture**
2. **Industrial water supply**
3. Public water supply
4. **Navigation**
5. **Warmwater fishery**
6. **Other indigenous aquatic life and wildlife**
7. **Partial body contact recreation**
8. **Total body contact recreation between May 1 and October 31**
9. Coldwater fishery

The following definitions[1] apply:

1. Agriculture - a use of water for agricultural purposes, including livestock watering, irrigation, and crop spraying.
2. Industrial water supply - a water source intended for use in commercial or industrial applications or for noncontact food processing.
3. Public water supply - a surface raw water source that, after conventional treatment, provides a source of safe water for various uses, including human consumption, food processing, cooking, and as a liquid ingredient in foods and beverages.
4. Navigation – a water source suitable for navigation
5. Warmwater fishery - a water body that contains fish species which thrive in relatively warm water.
6. Other indigenous aquatic life and wildlife - the use of the surface waters of the state by fish, other aquatic life, and wildlife for any life history stage or activity and the protection of fish for human consumption.
7. Partial body contact recreation - any activities normally involving direct contact of some part of the body with water, but not normally involving immersion of the head or ingesting water, including fishing, wading, hunting, and dry boating.
8. Total body contact recreation between May 1 and October 31 - any activities normally involving direct contact with water to the point of complete submergence, particularly immersion of the head, with considerable risk of ingesting water, including swimming.
9. Coldwater fishery – water bodies that contain fish species which thrive in relatively cold water.

Public water supply is not applicable since communities in the Ecorse Creek Watershed do not use local surface water as a source for drinking water. Throughout most of the watershed, waterways are used for navigation and the State considers this use "Fully Supporting". Navigation is not considered impacted in the watershed, however, sedimentation can limit waterway capacity. Coldwater fishery is not applicable in the Ecorse Creek Watershed and the Ecorse Creek is not designated as a Michigan trout stream (MDNR Fisheries Division).

[1] Administrative Rules Part 4 Water Quality Standards, MDEQ http://www.deq.state.mi.us/documents/ deq-swq-part31-part4.doc

Table 4-1 prioritizes (locally) the designated uses and notes the status of each according to the State as well as the local status. Indigenous aquatic life and wildlife and partial and total body contact recreation uses are not supporting within the watershed as is detailed in the 2003 and 2008 TMDLs for the Ecorse Creek The warmwater fishery use is potentially impacted due to flashy hydrology, lack of habitat, high suspended solids and sediment deposition. Flashy hydrology and sediment loads also potentially impact use of the water for agriculture and industrial water.

Table 4-1

Designated Uses in Order of Priority

Designated Use	State Status	Local Status	Notes
Other Indigenous Aquatic Life and Wildlife	Not Supporting		2003 TMDL for Biota
Partial Body Contact Recreation	Not Supporting		2008 TMDL for *E. Coli*
Warmwater Fishery	Not Assessed	Potentially Impacted	Potentially impacted by flashy hydrology and sediment loads. Recommend a Fishery Assessment be completed.
Total Body Contact Recreation (between May and Oct)	Not Supporting		2008 TMDL for *E. Coli*
Agriculture	Fully Supporting		
Industrial Water Supply	Fully Supporting		
Public Water Supply at Point of Intake	Not Applicable		No surface water public water supplies in the watershed
Navigation	Fully Supporting	Potentially Impacted	Potentially impacted by flashy hydrology and sediment loads
Coldwater Fishery	Not Assessed		

4.2 Desired Uses in the Ecorse Creek Watershed

Desired uses are how communities may want to use the watershed or how they may want it to look and function. The Ecorse Creek Watershed Inter-Municipality Committee (ECIC) members identified desired uses of the watershed based on factors important to the watershed community. Desired uses include restoring and/or protecting all of the applicable designated uses as described above, as well as those presented below. Desired uses may include current or potential natural resource concerns, such as loss of farmland and open space, or preserving unique habitat for wildlife. Many desired uses may not have a direct impact on water quality, but are still included in the watershed planning process.

A **desired use** is how you might want to use your watershed or how you might want it to look.

During development of the original Management Plan (2004), ECIC members were asked to complete a survey identifying their community's desired uses for the watershed. These survey results were then compiled into a preliminary list and categorized as either Fully Met, Partially Met, or Not Met. Uses were determined to be Met, Partially Met or Not Met based on studies previously published by the Michigan Departments of Natural Resources and Environmental Quality or other agencies[2,3,4,5,6,7,8] and upon measurements and observations made by ASTI, OHM, and/or Wade Trim during their 2004 field investigations. Where no information was available, the desired use status was categorized as unknown. Once compiled, the desired uses were brought before the ECIC members for discussion, finalization, and prioritization. Table 4-2 summarizes the desired uses identified and lists them in order of priority.

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[2] Wade-Trim. 1974. Facility Planning Study for Pollution Abatement of Ecorse Creek.

[3] Goodwin, K. 2002. Biological Assessment of the Detroit River Tributaries, Including the Ecorse River, Frank and Poet Drain, and Brownstown Creek Watersheds, Wayne County, Michigan. July-September 2001. Michigan Department of Environmental Quality, Water Division. MDEQ Report #MI/DEQ/SWQ-02/020.

[4] Goodwin, K. 2003. Total Maximum Daily Load for Biota for the Ecorse River Watershed, Wayne County, Michigan. Michigan Department of Environmental Quality, Water Division. July 7, 2003.

[5] Jones, R. 1991. A Biological Survey of County Drains in the Vicinity of Detroit Metropolitan Airport, Wayne County, Michigan, July 12-13, 1990. Michigan Department of Natural Resources, MDEQ Report #MI/DNR/SWQ-91/059.

[6] Oemke, M. 1997. A Survey of the Biological Communities in the Sexton-Kilfoil Drain, Wayne County, Michigan, June 15, 1996. Michigan Department of Environmental Quality, MDEQ Report #MI/DEQ/SWQ-97/066.

[7] Woods, R. and G. Boersen. 1980. Ecorse River Storm Survey: Inter-Office Communication to Paul Zugger, April 14, 1980. Michigan Department of Natural Resources, Environmental Services Division.

[8] WCDOE (Wayne County Department of Environment). 2000/2001. Water Quality Results for Natural Bathing/Recreational Areas. *E. coli* sampling results for Ecorse Creek, June through August 2000 & 2001 spreadsheets. Wayne County Department of Environment, Division of Environmental Health.

Table 4-2
Locally Desired Uses in Order of Priority

Desired Use	Fully Met	Partially Met	Not Met
Flood Control			X
Aesthetics		X	
Open Space Preservation		X	
Greenway Preservation		X	
Wetland Preservation		X	
Recreational Areas		X*	
Native Vegetation/Unique Habitat/Natural Buffers		X	

**Note: Designated as only partially met because more areas are desired*

1. **Flood Control**
   Flooding is a primary concern for the communities and entities in the watershed. Over the years, flooding and sewage backup has occurred in homes and businesses during heavy rainfalls, causing significant property damage. There is limited hydraulic capacity within many of the drains, and flooding occurs when large rain events (and sometimes snow melts) occur. Chapter 2 documents the past flooding events. The Ecorse Creek Watershed Committee and their constituents are concerned and interested in preventing flooding.

2. **Aesthetics**
   The ECIC desires that the streams, drains, and riparian corridors provide aesthetic beauty, and encourage people to utilize the riparian areas for recreation as well as maintain property values. A high aesthetic quality increases the general quality of life in the region.

3. **Open Space Preservation**
   Currently, there is approximately 23% open space in the watershed. However, based on SEMCOG Future Land Use projections, by 2030 it is predicted there will be less than 2% open space. Open space is important for a variety of reasons, including habitat, increased potential for storm water infiltration, pollution prevention, aesthetics, and recreational opportunities. Impervious development and associated urban runoff is one of the greatest threats to the watershed. Preserving existing open space will be a critical factor in the health of the watershed.

4. **Greenway Preservation**
   Greenways can be described as connections between people and places to protect and enhance natural resources while providing opportunities for non-motorized recreation and an increased quality of life. Greenways protect open space that is vital to the health of the watershed, provide habitat corridors for wildlife, and have also been documented to enhance property values.

   The Downriver Linked Greenways Initiative is already underway to connect the Downriver communities through a network of trails and greenways. Implementing and expanding this initiative in the Ecorse Creek Watershed is desired by the ECIC.

5. **Wetland Preservation**
Wetlands provide habitat for wildlife, absorption of pollutants, and flood control. As communities develop, wetland areas generally are removed or reduced. Mitigated wetlands often fail. The increase of urban runoff often overburdens remaining wetlands and greatly degrades the quality of the wetland. Preserving existing, natural wetlands will help to maintain the existing benefits wetlands provide, such as enhancing water quality by filtering pollutants and to assist in flood control. The MDEQ has developed a Landscape Level Wetland Functional Assessment for the Alliance of Downriver Watersheds. This GIS-based tool should be referenced in order to prioritize protection and preservation of remaining wetland areas based on selected functions and needs (water quality, water quantity, or biological enhancement).

6. **Recreational Areas**
Currently, there are limited recreation areas in the watershed, particularly along the primary water courses. The ECIC desires passive parks and trails along the riparian corridors for recreational opportunities, as well as to maintain and enhance property values. There also is the potential opportunity for recreation on some of the streams and creeks as well, with activities such as kayaking, fishing, wildlife viewing, and photography. Bringing people closer to the streams and water bodies can also raise the level of awareness and concern for watershed issues.

7. **Native Vegetation/Unique Habitat/Natural Buffers**
Native vegetation and naturalization of urban areas will help to prevent pollution from reaching the water courses. Native vegetation generally has deeper root systems than non-native species, which allows for greater filtration of pollutants and enhances the amount of storm water that is infiltrated. Native vegetation is beneficial both at the stream corridor and throughout the watershed. Native plants also can improve the aesthetic quality of the area and reduce maintenance.

   Providing unique habitats can improve stream health and invite wildlife not normally seen in an urban environment. Natural buffers allow for storm water infiltration as well as enhanced pollution removal by vegetation from storm water runoff. Natural buffers also slow down storm water runoff velocities, which is important in preventing stream bank erosion.

4.3 Pollutants and Threats to Watershed Health, and their Sources and Causes

After identifying the applicable designated and desired uses for the watershed, the known and suspected causes of impairment and/or threats to these uses were identified. These causes include issues that (may) contribute to the problem.

4.3.1 Pollutants

Pollutants are defined as any substance of such character in such quantities that when it reaches a body of water, soil, or air, it contributes to the degradation or impairment of their usefulness or renders them offensive. Pollutants not only include the traditional types of pollutants – such as sediment and nutrients – but also include such things as changes in temperature and hydrologic flow[9]. Pollutants and issues were identified for each impaired or threatened use. At a regular ECIC meeting, the committee discussed and prioritized the pollutants for each use. Table 4-3 summarizes the designated and desired uses (both state and local) that are impaired or potentially impacted in the Ecorse Creek Watershed, and the associated pollutants/issues that are known (K).

Table 4-3

Ecorse Creek Watershed Uses and Pollutants/Issues

Impaired Uses	**Known and Suspected Pollutants/Issues** (in order of priority for each use)
Flood Control	Lack of stable flow/excessive surface runoff (K) Sedimentation (K) Inadequate protective measures (K)
Total Body Contact Recreation (State)	E. coli and other pathogens (K) Lack of stable flow (K)
Other indigenous aquatic life/wildlife (State)	Lack of stable flow (K) Sedimentation (K) Low dissolved oxygen (K) Nutrients (S) Lack of habitat (K)
Partial Body Contact Recreation (State)	E. coli and other pathogens (K) Lack of stable flow (K)
Potentially Impacted Uses	**Known and Suspected Pollutants/Issues**
Open space preservation Wetland preservation Greenway preservation Native Vegetation/Unique Habitat/Natural Buffers	Inadequate protective measures (K)
Warm Water Fishery	Lack of stable flow (K) Sedimentation (K) Low dissolved oxygen (K) Nutrients (S) Lack of habitat (K)

Note: (K) refers to known pollutants (S) refers to suspected pollutants

[9] Developing a Watershed Management Plan for Water Quality, MDEQ

The Ecorse Creek Watershed is over 75% developed and includes residential, industrial and commercial land uses. This urban landscape provides many challenges to improving the health of the creek and watershed. As previously noted, urban storm water runoff carries pollutants that degrade the water quality. The following is a description of known and suspected pollutants and causes of the problems within the Ecorse Creek Watershed.

Known and Suspected Pollutants

Lack of stable flow/excessive surface runoff

Natural base flow (dry weather base flow) in streams is primarily fed by groundwater. After a storm event, rainwater should infiltrate to the groundwater table, which in turn provides constant flow to the streams. Once urbanization occurs, "urban runoff" results as rainwater infiltration is impeded by impervious surfaces. Urban runoff is able to quickly travel to drains and streams, resulting in higher (flashy) peak flows after storm events. In addition, the lack of infiltration results in lower groundwater recharge, and lower resulting stream base flows during dry weather as less groundwater is available to provide a constant source of flow. Higher peak flows can cause stream bank erosion and flooding while lower dry weather flows make it difficult for some aquatic species to survive.

Excessive surface runoff

As described above, the large increase in impervious surface and loss of open space or "green" space within the watershed has greatly reduced the amount of precipitation that is able to infiltrate to the groundwater table. Instead, this water becomes surface runoff and quickly travels to the stream. This results in both higher peak flows and a greater volume of runoff. Excessive surface runoff can cause stream bank erosion, flooding, and an increase in pollutants to the stream.

Sediment

Excessive peak flows can result in stream bank erosion, which in turn result in suspended solids and sediment deposition. Sediment in streams may also be a result of sediment being carried to the stream via urban runoff. As storm water travels across impervious surfaces, it is able to carry pollutants, including sediment. In addition, disturbed soils due to activities such as construction can contribute to the problem.

Suspended solids can result in turbidity, which is harmful to aquatic life. Waters can become warmer as suspended solids absorb heat from sunlight. Less dissolved oxygen can be retained by the warmer waters, which causes oxygen levels to fall. Photosynthesis decreases because less light penetrates the water. Since photosynthesis produces oxygen as a byproduct, this sediment induced drop in photosynthesis also can contribute to lower oxygen levels. Sediment also can clog the gills of fish and settle and deposit in areas necessary for aquatic insects and fish spawning.

Sediment deposition also changes the natural shape of the channel and can reduce the capacity of the stream. This, in turn, can contribute to flooding problems.

Lack of habitat

A lack of habitat results in a poor diversity of aquatic species. Poor habitat can be caused by sediment as it is deposited on substrate necessary for aquatic insects. The absence or downsizing of riparian buffer zones is the biggest cause of lack of habitat. Riparian buffer zones provide shade necessary for preventing heating of stream water. Riparian vegetation also results in woody debris that creates protection for aquatic life. A lack of stable hydrology also plays a major role in the degradation of habitat. In addition, urban runoff results in a loss of the pool and riffle structure normally found in natural streams. Pools are areas of relatively deep, slow moving water and are important in providing deeper areas for aquatic species. Riffles are relatively shallow areas of fast moving water and are important for aerating the water.

Low dissolved oxygen
Sufficient dissolved oxygen levels are necessary for the survival of aquatic species. As the levels of dissolved oxygen decrease, the diversity of aquatic life also decreases, as sensitive species are no longer able to survive. Oxygen in the water is used as microorganisms break down organic and/or chemical pollutants (biological oxygen demand) and/or through chemical oxidation (chemical oxygen demand), resulting in less oxygen available for aquatic life. These biological pollutants typically include natural sources (leaf debris, grass, animal wastes) and algae blooms. As noted above, excess suspended solids can absorb heat from sunlight and reduce photosynthesis, which also causes oxygen levels to decrease. Urban runoff, which may be heated as it travels across impervious surfaces, also can contribute thermal pollution (warming) of the streams, which decreases dissolved oxygen levels.

Nutrients
Nutrients are considered a suspected pollutant because it is highly likely that nutrients are discharged to receiving waters based on studies conducted in similar watersheds. However, the severity of nutrients as a pollutant in the Ecorse Creek Watershed is unknown as there is insufficient data to prove or disprove that nutrients are problematic in the Ecorse Creek Watershed. Nutrients can come from several sources within the watershed. Excess fertilizer runoff, animal wastes, failing septic systems, and even permitted discharges can contribute to excessive nutrients in the streams. Fertilizer used by residents, businesses, and agriculture can be carried to the streams by storm water, both in terms of soluble nutrients and attached to sediment (as suspended solids) in the runoff. Animal wastes also contribute to nutrient loading. Excessive geese populations along impoundments that are mowed to the banks can contribute significant loadings. Septic systems that are not maintained or inspected regularly and properly can result in the migration of human wastes that contain nutrients. Permitted discharges, such as those discharges from domestic and/or industrial wastewater treatment plants, also can be a source for nutrients. High nutrient levels result in excessive growth of aquatic plants (often nuisance plants) and algae. Nuisance plants are able to out compete plants that may be more valuable for habitat and water quality. Excessive plant and algae growth also results in lower dissolved oxygen levels when they die and are degraded. The lowered oxygen levels can adversely affect aquatic life.

E. coli, other pathogens
E. coli contamination can harm wildlife as well as impair the use of the creeks for total and partial body contact uses. Sources of E. coli can include urban storm water, illicit connections, failing septic systems, and animal wastes. Urban storm water can collect pathogens from sources such as animal waste as it travels across impervious surfaces. Failing septic systems can leach contaminated water that may find its way to streams, contributing E. coli and other pathogens. Illicit connections in which sanitary sewers carrying human waste are improperly discharged to the storm water system can also be a source for E. coli and pathogen contamination.

Inadequate Protective Measures
Development and land use projections (SEMCOG 2030) indicate that the majority of open space in the Ecorse Creek Watershed will be lost to development. Protection by local regulations can help reduce the amount of open space, natural features, wetlands, greenways, agricultural land, and natural stream buffers that is lost to development.

4.4 Sources and Causes of Pollutants

Sources are where the pollutants originate.

Causes are the conditions that are creating the source of the pollutant.

In order to determine how best to reduce the identified pollutants, the sources contributing those pollutants must be identified. Sources are simply where the pollutants originate. After sources are identified, the next step is to identify possible causes for the pollutants. The cause is the condition that is creating the source of the pollutant. For example, if sediment (pollutant) is resulting from stream bank erosion (source), the cause of the streambank erosion may be unrestricted livestock access[10].

Sources were determined using a variety of methods including a literature review, field observations, and input from the ECIC. Sources were prioritized for each pollutant and causes were prioritized for each source. The committee discussed and prioritized sources and causes at a regular ECIC meeting based on the committee's experience and knowledge of the watershed.

Table 4-4 summarizes the sources and causes of the pollution and problems in the watershed. The table provides more specific information to help explain the factors that face the communities and entities in the watershed. Sources and causes have been categorized as either known or suspected, depending on available supporting data.

[10] Ibid

Table 4-4

Ecorse Creek Watershed Pollutants/Issues, Sources and Causes

Known and Suspected Pollutants/Issues	**Known and Suspected Sources** (in order of priority for each pollutant)	**Known and Suspected Causes** (in order of priority for each source)	**Affected Uses**
Lack of stable flow/excessive surface runoff (K)	Urban storm water (K)	Impervious surfaces (K) Development pre-dating storm water management requirements (K) Inadequate storm water management (K) Loss of floodplain (K) Loss of wetlands (K) Limited capacity of drains (K)	Flood Control Warm Water Fishery Other Indigenous Aquatic Life/Wildlife
	Reduced base flow/groundwater recharge (K)	Impervious surfaces (K) Development pre-dating storm water management requirements (K) Loss of wetlands (K) Inadequate storm water management (K) Loss of floodplain (K)	
Lack of habitat (K)	Sedimentation (K) Erosion (K)	Unstable hydrology/excessive runoff (K) Removal of streambank vegetation (K) Inadequate soil erosion/sedimentation controls (K)	Warm Water Fishery Other Indigenous Aquatic Life/Wildlife
	Reduced base flow/groundwater recharge (K)	Impervious surfaces (K) Development pre-dating storm water management requirements (K) Loss of wetlands (K) Inadequate storm water management (K) Loss of floodplain (K)	
	Limited woody debris (K)	Removal of forested riparian buffer (K) Inadequate protective ordinances (S)	

Note: (K) refers to known pollutants/sources/causes and (S) refers to suspected pollutants/sources/causes

Table 4-4 (cont'd)

Ecorse Creek Watershed Pollutants/Issues, Sources and Causes

Known and Suspected Pollutants/Issues	Known and Suspected Sources (in order of priority for each pollutant)	Known and Suspected Causes (in order of priority for each source)	Affected Uses
Nutrients (S)	Illicit connections (K)	Aging development sanitary sewer infrastructure (K) Insufficient sanitary sewer infrastructure maintenance (S)	Other Indigenous Aquatic Life/Wildlife
	Fertilizer use (S)	Improper usage of fertilizers (S)	
	Permitted discharges (current NPDES Permits) (K)	-	
	Animal waste (S)	Improper management of animal waste (S) Excessive geese, improper management (S)	
	Failing septic systems (S)	Insufficient septic system maintenance (S) Poor soils (K) Inadequate ordinances (S)	
Low dissolved oxygen (K)	Natural sources (leaves, grass, animal wastes) (S)	Inadequate storm water management (K) Inadequate soil erosion/sedimentation controls (K)	Warm Water Fishery Other Indigenous Aquatic Life/Wildlife
	Sediment oxygen demand (S)	Unstable hydrology/excessive runoff (K) Removal of streambank vegetation (K) Inadequate soil erosion/sedimentation controls (K)	
	Elevated water temperature (K)	Limited riparian cover (K) Impervious surfaces (K) Detention basins (S)	

Note: (K) refers to known pollutants/sources/causes and (S) refers to suspected pollutants/sources/causes

Table 4-4 (cont'd)
Ecorse Creek Watershed Pollutants/Issues, Sources and Causes

Known and Suspected Pollutants/Issues	Known and Suspected Sources (in order of priority for each pollutant)	Known and Suspected Causes (in order of priority for each source)	Affected Uses
E. coli, other pathogens (K)	Animal wastes (S)	Improper management of animal waste (S) Excessive geese, improper management (S)	Total Body Contact Recreation Partial Body Contact Recreation
	Illicit connections (K)	Aging development sanitary sewer infrastructure (K) Insufficient sanitary sewer infrastructure maintenance (S)	
	Urban storm water (S)	Impervious surfaces (K) Development pre-dating storm water management requirements (K) Inadequate storm water management (K) Loss of floodplain (K) Loss of wetlands (K) Limited capacity of drains (K)	
	Failing septic systems (S)	Insufficient septic system maintenance (S) Poor soils (K) Cost to correct (S) Insufficient enforcement (S)	
Sediment (K)	Streambank erosion (K)	Removal of streambank vegetation (K) Inadequate soil erosion/sedimentation controls (K)	Flood Control Warm Water Fishery
	Urban runoff (K)	Impervious surfaces (K) Development pre-dating storm water management requirements (K) Inadequate storm water management (K) Loss of floodplain (K) Loss of wetlands (K) Limited capacity of drains (K)	
Inadequate protective measures (K)	Development and land use projections (S)	Inadequate natural features protections in local regulations (S) Inadequate historical public understanding and knowledge (K) Insufficient funding for land acquisition and protection (S)	Open space Preservation Wetland Preservation Greenway Preservation Native Vegetation/Unique Habitat/Natural Buffers

Note: (K) refers to known pollutants/sources/causes and (S) refers to suspected pollutants/sources/causes

4.5 Goals and Objectives

As is detailed in Figure 4-1, the designated and desired uses, plan sustainability, pollutants, threats, sources, and causes in the watershed were the basis for the goals developed. Once the committee came to a consensus on these inputs, they developed long-term goals to address them. Goals are a qualitative description of a desired future condition, purpose or end stated in general terms without criteria of achievement. Prioritization of the goals was done by the ECIC at several committee meetings. The committee discussed each goal and prioritized them based on their experiences in the watershed.

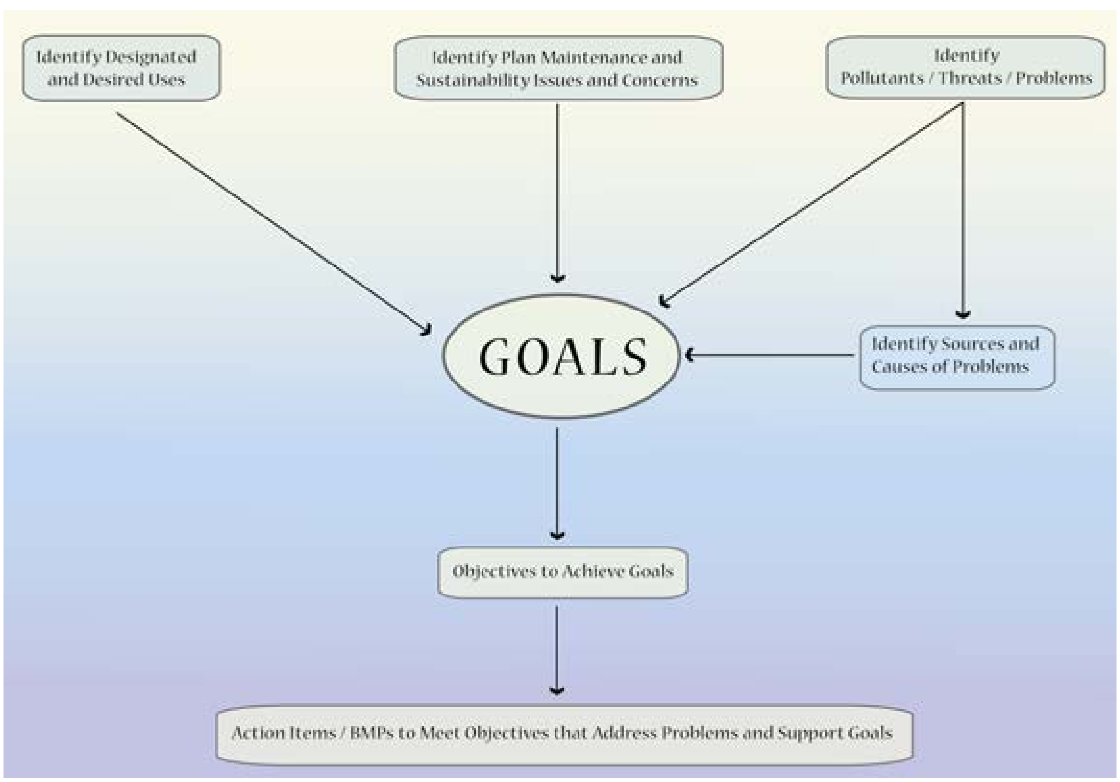
Goals are a qualitative description of a desired future condition, purpose or end stated in general terms without criteria of achievement.

Objectives are actions to reduce pollution from a source to protect or restore a designated or desired use.

In contrast, objectives outline how the goal will be reached. In terms of the Watershed Management Planning process, an objective is how you will reduce pollution from a source to protect or restore a designated or desired use. Finally, action items/BMPs are identified that may be implemented to work toward meeting the objectives that address the problems and support the goals. (Action Items/BMPs are discussed in Chapters 5 and 6)

Figure 4-1

Goal Development Diagram



It should be noted that the overarching goals of the ADW are to attain compliance with the TMDL allocations and restore and/or protect the designated and desired uses of the watershed. Therefore, the uses addressed by each goal are included. The collective goals, objectives, and associated uses are presented on the following pages. The goals are listed in order of priority, however, it is generally understood and recommended that multiple actions will be occurring simultaneously throughout the implementation of the plan. For example, it is essential that efforts to increase public understanding and participation regarding watershed issues occur on an on-going basis during the life of this plan. Many of the identified goals and long-term (greater than 5 years), and short-term (less than 5 years) objectives must be addressed in concert with one another to accomplish the end result of improved water quality in the Ecorse Creek Watershed.

The long-term goal is identified, under which short- and long-term (or both) objectives have been identified. The objectives address many of the designated and desired uses of the watershed.

1 **Goal : Reduce Flooding**

Both Short- and Long-Term Objectives:
- Preserve and restore wetlands and open space
- Reduce runoff volume/rate

Long-Term Objective:
- Improve understanding of stream flow volumes and distribution
- Reduce sedimentation

Use(s) Addressed:
- Flood Control
- Open Space Preservation
- Wetland Preservation

2 **Goal : Reduce Stream Flow Variability**

Both Short- and Long-Term Objective:
- Reduce runoff volume/rate
- Preserve and enhance native vegetation/naturalization

Long-Term Objective:
- Preserve and restore wetlands and open space

Use(s) Addressed:
- Flood Control
- Warmwater Fishery
- Other Indigenous Aquatic Life and Wildlife
- Open Space Preservation
- Wetland Preservation
- Natural Vegetation/Unique Habitat/ Natural Buffers
- Partial Body Contact Recreation
- Total Body Contact Recreation

3 **Goal : Watershed Management Sustainability**

Short-Term Objective:
- Establish institutional relationships to ensure plan implementation

Long-Term Objective:
- Develop long-term funding methodologies
- Develop adaptive and iterative management

Use(s) Addressed:
- All

4 **Goal : Improve Water Quality**

Short-Term Objective:
- Eliminate/reduce illicit discharges

Both Short- and Long-Term Objective:
- Protect, expand, and restore the riparian corridor
- Improve erosion and sedimentation controls
- Preserve and restore wetlands and open space

Long-Term Objective:
- Meet Biota TMDL mandated “adequate” macroinvertebrate community and habitat based on P-51 Scores Meet e. coli TMDL for partial and total body contact
- Reduce directly connected storm water discharges to sanitary systems

Use(s) Addressed:
- Warmwater Fishery
- Other Indigenous Aquatic Life and Wildlife
- Partial Body Contact Recreation
- Total Body Contact Recreation
- Open Space Preservation
- Wetland Preservation
- Natural Vegetation/Unique Habitat/ Natural Buffers

5 **Goal : Protect, Enhance, and Restore Riparian and In-Stream Habitat**

Short-Term Objective:
- Integrate storm water management in planning and land use approval process

Long-Term Objective:
- Enhance warmwater fishery
- Restore diverse aquatic community

Use(s) Addressed:
- Warmwater Fishery
- Other Indigenous Aquatic Life and Wildlife
- Natural Vegetation/Unique Habitat/ Natural Buffers

6 **Goal : Preserve, Increase, and Enhance Recreational Opportunities**

Both Short- and Long-Term Objective:

- Protect and improve riparian corridor aesthetics

Long-Term Objective:

- Obtain land for wetlands and passive parks
- Meet partial body contact requirements
- Increase public access to stream corridors
- Encourage recreation and open space planning in site plan/land use approval process

Use(s) Addressed:

- Recreational Areas
- Open Space Preservation
- Greenway Preservation
- Wetland Preservation
- Natural Vegetation/Unique Habitat/ Natural Buffers
- Partial Body Contact Recreation

7 **Goal : Protect Public Health**

Both Short- and Long-Term Objective:

- Reduce secondary health concerns related to flooding

Long-Term Objective:

- Meet partial body contact requirements
- Meet total body contact requirements

Use(s) Addressed:

- Partial Body Contact Recreation
- Total Body Contact Recreation

8 **Goal : Increase Public Education, Understanding, and Participation Regarding Watershed Issues**

Short-Term Objective:

- Improve media coverage
- Create partnerships with institutions, schools, and the private sector
- Foster relationships with the County and neighboring communities
- Manage expectations of the public for an improved watershed

Both Short- and Long-Term Objective:

- Improve education and awareness of watershed successes and failures

Use(s) Addressed:

- All

5 Management Alternatives

North Branch of Ecorse Creek
Allen Road, South of I-94

Chapter Contents

Information was gathered from the various entities in the watershed to understand current practices and policies and to develop focused recommendations. This chapter details the variety of Best Management Practices (BMPs) and potential improvement projects that were discussed during the development of this Watershed Management Plan. BMPs will need to be applied as systems of practices because one practice rarely solves all water quality problems at a site, and the same practice will not work for all the sources and causes of a pollutant. Critical areas within the watershed are also identified and described in this chapter to provide additional focus for implementing BMPs and preservation and conservation efforts.

5.1 Information Gathering

5.1.1 Meetings & Workshops

The Ecorse Creek Watershed Inter-municipality Committee met throughout the course of developing the original Watershed Management Plan (2007). In total, 16 meetings were held, several of which were held jointly with the Combined Downriver Watershed Inter-municipality Committee (CDWIC). A schedule of these meetings can be found in Appendix D. All meetings were open to the public and the schedule was provided on the project webpage. Committee meetings were used to conduct regular business of the committee, solicit information necessary for the completion of the WMP from committee members, provide updates and discuss the progress of the WMP, and provide information regarding on-going watershed activities.

In addition to regularly scheduled ECIC meetings, two workshops also were held. These workshops were held jointly with both the CDWIC and Lower Huron River Watershed Inter-municipality Committee. The purpose of these workshops was to both provide general background information to the committees and to solicit input necessary for the development of the WMP. The first workshop, held on November 9, 2004, focused on finalizing the desired uses and goals for the watershed. The first portion of this workshop provided a characterization of each of the three watersheds and pointed out differences and similarities between the three. With this information in hand, representatives from the watershed came to a consensus on the designated and desired uses as well as goals for the watershed. The second workshop, held on February 9, 2005, focused on Management Alternatives. The desired outcomes of this workshop were to gain an understanding of the relationship between goals, objectives, and management alternatives; and to identify objectives and management alternatives to address problems and support the goals of the watershed. The first portion of this workshop focused on explaining the relationship between goals, objectives, and management alternatives and also provided an overview of different types of management alternatives. The watershed groups then divided and brainstormed short-term objectives to support the long-term goals for the watershed. In addition, the ECIC representatives reviewed a list of possible management alternatives and discussed and revised the list so it could be used for future selection.

5.1.2 Public Meetings

As is described in greater detail in Chapter 9 (Public Involvement), the development of the original (2007) plan included several formal and informal public involvement sessions. These were in addition to the meetings and workshops held with the Inter-Municipality Committee and in addition to individual community and entity meetings held throughout the planning process. The results of the public information meetings were utilized as another tool in understanding the issues and priorities in the watershed and in developing the action plan(s). Public involvement opportunities included:

Public Information Meeting #1 **January 20, 2005**

The purpose of the meeting was to provide an overview of the watershed management plan process, present an overview of the watershed including general findings to date, and to discuss the next steps in the project and how to stay involved. General input and comments were gathered from those in attendance. Example goals for the watershed were also presented and participants were asked to indicate their priorities.

Public Information Meeting #2 **June 1, 2005**

The purpose of the meeting was to present an overview of WMP process, the designated and desired uses, major goals of the watershed, the draft recommended action plan for the watershed, and methods to measure progress. The meeting was also held to gather additional input and ensure continued awareness and involvement in the development of the plan.

Public Information Meeting #3 September 22, 2005

The purpose of the meeting was to present the final draft of the Watershed Management Plan and to gather any final comments and input prior to the plan being approved by the MDEQ. The meeting was held in conjunction with the Friends of the Detroit River Annual Meeting and approximately 52 people were in attendance.

In addition to the three formal public information meetings that were held during the development of the2007 watershed management plan, *informal* input was gathered and participation encouraged. As was detailed in the MDEQ approved Public Participation Plan (PPP), the communities and entities that make up the watershed committee utilized several methods to ensure awareness and participation in the development of the management plan. For example, a project website (www.ecorsecreek.com) was developed and maintained. This website included information on the project, announced meeting schedules, and allowed the public to email comments to various project participants, and/or request to be added to an email list for project announcements; An email distribution list of committee representatives and interested public, that grew over time, was developed and used to provide continuous communication; and, phone calls and individual meetings with various stakeholders took place. These and other informal means of communication and input proved to be imperative in the development of the watershed management plan.

5.1.3 Individual Community/Entity Interviews

Additional meetings were held (March and April 2005) with each individual community or entity that chose to participate. Communities and entities that participated include: the City of Allen Park, City of Dearborn Heights, City of Ecorse, City of Lincoln Park, City of Melvindale, City of Romulus, City of Southgate, City of Taylor, Wayne County, Wayne County Airport Authority, City of Westland, and the City of Wyandotte. Attendees at these meetings varied but included mayors, supervisors, directors, planners, engineers, and/or field staff. The purpose of these meetings was to review each community's/entity's individual Management Alternatives Selection Sheet, review the Codes and Ordinances Worksheet (COW), identify problem areas within the community or entity's jurisdiction, and identify possible areas for future improvements. Problem areas included locations of flooding, streambank erosion, sedimentation, algae growth, debris buildup, etc. and are discussed further in Section 5.5.1.

Management Alternatives Selection Sheet

Before the individual meetings, each community/entity was asked to complete a Management Alternatives Selection Sheet. This sheet was developed as a tool for communities to consider implementing different types of management alternatives. The selection sheet was not meant to be an exhaustive list of management alternatives and communities/entities were given the opportunity to add any management alternatives to the sheet. The management alternatives were organized by categories of structural, vegetative, and managerial best management practices (BMPs). Communities and entities were asked to identify management alternatives that are currently being done, those to be implemented in less than 5 years, and those to be implemented in 5 to 25 years. Not all management alternatives were applicable or feasible for every community or entity in the watershed. In these cases, communities indicated that they were not interested in a particular management alternative. The Management Alternatives Selection Sheet was discussed at the individual community interviews. A summary of the identified management alternatives can be found in Section 5.3.

Codes and Ordinances Worksheet (COW)

Besides structural controls for storm water quantity and quality control, management alternatives include non-structural municipal or organizational policies and programs. In order to identify what policies and programs could be initiated to improve water quality, an assessment of current policies and programs was needed. This was accomplished by using the Codes and Ordinance Worksheet (COW) developed by the Center for Watershed Protection (CWP) in Maryland.[1] The worksheet was slightly altered for this Watershed Management Planning effort, and a copy can be found in Appendix E. The COW is a simple worksheet used to compare local development policies, ordinances, and codes with model development principles (from a water quality standpoint). It has been utilized in a variety of watersheds across the United States. Within Michigan, it has been used for planning purposes in the neighboring Huron River Watershed. The COW was distributed to all entities in the ECIC and results were discussed at individual meetings with committee members.

5.1.4 2012 Watershed Management Plan Update

As part of the 2012 Watershed Management Plan update, information was gathered from each community regarding their housekeeping activities and what types of BMP practices they were interested in implementing over the next 5 years (depending on available funding). Individual meetings were scheduled with each community throughout the summer and early Fall of 2010 to detail the types of BMP projects desired, their location, and desired year of implementation. A worksheet was developed to solicit this information from each community via meetings and emails. This information was then added to the Watershed Treatment Model (WTM) to develop the existing pollutant loads as well as the reductions due to BMP project implementation. This information was also utilized to generate the Action Plan. The following summarizes the topics of discussion at meetings related to the development of the 2012 WMP Updates.

Full ADW Meeting **April 15, 2010**

The agenda included discussing the proposed schedule for the WMP updates and how new land cover data was going to be used to help determine opportunity for BMPs. Meetings with individual communities/stakeholders were also announced. Also discussed new TMDLs released since the last WMP.

Full ADW Meeting **July 15, 2010**

A PowerPoint presentation of critical area maps were reviewed and discussed with the group, as well as potential improvement projects. Signup sheets for individual community meetings were distributed. An email was sent with instructions on developing wishlist projects and a brainstorming checklist. Communities were to complete the worksheet/checklist prior to the individual meetings.

Individual Meetings with Stakeholders **July – October 2010**

Full ADW Meeting **October 14, 2010**

A summary of the individual meetings was provided. The Watershed Treatment Model was also presented and the results were discussed. Watershed Advisory Group meetings were scheduled for November.

Individual WAG Meetings **November 30, 2010**

Existing conditions for TSS, Nitrogen, Phosphorus, Fecal and Runoff were reviewed. We also reviewed future conditions based on community commitments and model input. The WAGs were also given the opportunity to identify any additional critical areas and projects.

Full ADW Meeting **January 18, 2011**

Wayne County and the US Army Corp of Engineers gave a presentation on the North Branch Ecorse Creek Flood Risk Management Study. The recommendations from this study were added to the WTM as future projects. Draft WMPs were posted to the ADW website in March 2011 .

[1] Schueler, Thomas. Better Site Design: A Handbook for Changing Development Rules in Your Community. Center for Watershed Protection, Ellicott City, MD

Full ADW Meeting. **March 3, 2011**

The ADW members were asked to review and comment on the draft WMPs prior to submittal to MDEQ. Drafts were submitted to MDEQ in March 2011.

Team Meeting with MDEQ **December 20, 2011**

The purpose of the meeting was to meet with MDEQ discus their comments on the draft WMPs and how edits would be made to the documents.

Full ADW Meeting **January 12, 2012**

The results of the meeting with MDEQ were shared with the ADW members. Announced that revised WMPs would be submitted to MDEQ in February 2012.

5.2 Analysis of Existing Policies & Programs

As was described, during the development of the 2007 WMP, policies and programs were assessed through the completion of a Codes and Ordinances Worksheet by each community/entity. The COW focused on policies to minimize impervious land area, preserve open land, and treat runoff. More specifically, the following policies and programs were reviewed in the COW: street width, right-of-way width, vegetated open channels, parking ratios, parking codes, parking lots, structured parking, parking lot and other runoff, open space design, sidewalks, driveways, open space management, rooftop runoff, buffer systems, buffer maintenance, clearing and grading, tree conservation, land conservation incentives, storm water outfalls, land runoff, and farmland preservation. Additional miscellaneous questions also were measured.

Listed below are select results from the completed COWs and the recommendations for these various codes and ordinances from the Center for Watershed Protection. A summary of the completed COWs can be found in Appendix E.

5.2.1 Minimizing Impervious Land Area

The COW included specific questions regarding impervious land area caused by streets, parking lots, sidewalks, driveways, and rooftops that contribute to significant storm water runoff. To reduce the amount of runoff, minimizing the amount of impervious surface area is a focal point of this Watershed Management Plan. Recommendations were made for the following:

- Street width
- Parking ratios
- Parking codes
- Parking lots
- Sidewalks
- Driveways
- Rooftop runoff

As shown in Table 5-1, community development policies within the Ecorse Creek Watershed overlap slightly with street width, parking ratios and parking lot stall dimension recommendations from the Center for Watershed Protection, but generally allow for, or require, more paved surface than recommended. It is recommended that Ecorse Creek communities review their policies for these parking and residential street development standards and revise these standards, as appropriate, to reduce the amount of impervious surface required in new and re-development settings.

Table 5-1

Comparison of Ecorse Creek Communities' Policies and Recommended Standards Governing Paved Surfaces

Code or Ordinance	Typical Code or Ordinance	Recommended Code or Ordinance[2]
Allowable street width (ft)	22-60	18-22
Parking ratios Office (per 1000 ft^2) Shopping Center (per 1000 ft^2) Homes (each)	 3.3-6 4-7 1-2	 3 4.5 2
Parking lots Stall width (ft) Stall length (ft)	 8.5-10 18-20	 9 18
Driveways width (ft)	8-12	9

In particular, communities are urged to review and revise policies governing parking ratios for commercial and multi-family residential uses. Studies conducted by the Center for Watershed Protection and the City of Olympia, Washington found that not only were parking ratios generally higher than required, based upon average use, but that developers generally exceeded required parking minimums; leading to significant unused space and exceedingly high impervious surface use. They recommend policies that not only reduce the minimum amount of parking required but that also establish ceilings for parking lot ratios.[3,4]

As stated previously, impervious surface coverage in the Ecorse Creek Watershed is high and expected to increase as additional lands are developed. The amount of paved surface within the watershed is a driving factor behind both water quality concerns and the flooding problems experienced in the watershed. Policies governing the amount of paved surface should be carefully scrutinized and revised as needed. A local study, conducted by the Washtenaw County Drain Commissioner's Office for three townships neighboring the City of Ann Arbor, found that reducing parking and street width requirements, along with cluster or open-space development designs, could reduce impervious surface coverage in future development by fourteen percent (14%).[5] The Olympia, Washington study predicted that aggressive policy changes could yield a 20% reduction in the amount of expected imperviousness at build-out.[6]

In addition to the items identified in the table above, another way to reduce storm water runoff is to allow for shared parking between businesses. Currently over 1/2 of communities/entities within the watershed allow for reduced parking ratios if shared parking arrangements are in place. This is an excellent way for communities to continue to minimize impervious surfaces within the watershed and it is recommended these practices be adopted watershed-wide.

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2 Center for Watershed Protection, Better Site Design, Codes & Ordinances Worksheet http://www.cwp.org/COW_worksheet.htm

3 Wells, Cedar. 1995. Impervious Surface reduction Study: Final Report. City of Olympia, Washington, Public Works Department, Water Resources Program.

4 Schueler, Thomas R. 1998. Better Site Design: A Handbook for Changing Development Rules in Your Community. Center for Watershed protection. Ellicott City, Maryland.

5 Sheehan, H. and J. Bobrin. 1999. Imperviousness Reduction and Mitigation in Tributaries of the Huron River: A Stormwater Management Study of Ann Arbor, Scio and Superior Townships. A project of the Washtenaw County drain Commissioner, funded by the Michigan Department of Environmental Quality, Great Lakes protection Fund. 88 pp.

6 Wells, Cedar. 1995. Impervious Surface reduction Study: Final Report. City of Olympia, Washington, Public Works Department, Water Resources Program.

Currently very few communities, if any, allow pervious materials to be used for spillover parking lots or require 30% of parking areas sized for compact cars. Communities may be reluctant to change these policies until case studies have been constructed and documented in the area. Allowing for these policy changes will minimize impervious land area throughout the watershed and it is recommended that communities/entities investigate this possibility.

Sidewalks play an important role in allowing pedestrians to access shopping and recreation areas, especially in urban communities. Sidewalks can also play an important role in the general health and recreation of a community. A recommended way to reduce the impact of sidewalks is to slope sidewalks to drain to front yards instead of directly to streets and/or to create pedestrian walkways through common areas rather than along roads. This allows for the sidewalk runoff to be infiltrated to the ground, thereby reducing directly connected impervious surfaces.

Rooftops in an urban area are also a significant source of storm water runoff. Directing rooftop runoff to yard areas or allowing temporary ponding of rooftop runoff on yards is a recommended method for reducing directly connected impervious surfaces. Most communities in the watershed allow for rooftop runoff to be discharged to yard areas but less allow for ponding on yards. It is recommended all communities allow rooftop runoff to be discharged to yard areas and for the communities to evaluate whether temporary ponding of storm water on yards is feasible for their individual locations.

5.2.2 Preserving Open Land

Paralleling closely with practices minimizing impervious land area, preserving open land practices and ordinances help protect valuable open space that allows storm water runoff to be filtered and infiltrated before reaching open water courses. The following types of policies were reviewed and have recommendations for improvement:

- Open space design and management
- Tree conservation
- Land conservation incentives

The Center for Watershed Protection recommends allowing for cluster-development designs that promote open space preservation in a community. The CWP notes that providing flexibility in standards, such as lot sizes, setbacks, road widths, and/or other incentives, may help encourage developers to promote such designs. The results of the COW indicate that nearly every community/entity within the Ecorse Creek Watershed allows for cluster-type development in their respective community to preserve open space and are willing to work with developers on a case-by-case basis to provide needed flexibility in the design. The results of the COW in this category are very promising and 100% adoption of this philosophy is recommended.

The Center for Watershed Protection recommends that communities have enforceable requirements to establish associations that can effectively manage open space and that open space areas are consolidated into larger areas with greenway corridors between them. The purpose of having larger open space areas and connecting greenway corridors is to promote wildlife habitat and access, as well as reducing directly connected impervious surface areas. The results of the COW indicate that approximately 1/2 of the communities/entities in the Ecorse Creek Watershed have associations that manage open space, while most do not require open spaces areas to be consolidated or require greenway corridors. It is recommended that the communities within the Ecorse Creek Watershed revisit land use plans to determine where open space consolidation is desired and feasible and where greenway corridors can be established.

Preserving natural resources such as trees, wetlands, native vegetation and other open space areas are important to the watershed. The COW indicates that most communities do not have policies in place to protect trees and native vegetation during development. Most communities in the watershed do not provide flexibility in working with developers to conserve non-regulated open space, and do not typically provide land conservation incentives to do so. The Center for Watershed Protection recommends that communities work with developers on a case-by-case basis to provide needed flexibility and incentives, such as transfer-of-development rights, in order to promote land conservation. It is recommended that communities/entities review their policies regarding land conservation incentives and determine whether it is applicable to their community to allow for these flexibilities and incentives.

5.2.3 Treating Runoff

Runoff can be treated by numerous methods. Runoff can be directed through vegetated channels or bioretention islands so that it is filtered before entering an open watercourse. Vegetated buffers also provide similar protection. Wet detention basins can allow sediment to settle before being discharged. In addition to treatment, pollutants in runoff can be prevented through clearing and grading and land runoff policies. Specifically, recommendations are made for the following policies:

- Vegetated open channels
- Parking lot & other runoff
- Buffer systems
- Buffer maintenance
- Clearing and grading
- Storm water outfalls
- Land runoff

Buffer systems along open drainage courses and around wetlands are important features for filtering pollutants, including sediment. Most communities/entities have adopted the Wayne County Storm Water ordinance, which requires a 25-foot buffer around open drains and wetlands. Communities in the watershed should consider adopting the recommendations of the Center for Watershed Protection of maintaining a 75-foot buffer around streams and wetlands to further promote filtering and a reduction in streambank erosion.

Another way of treating storm water runoff is by creating vegetative swales and bioretention islands. Both methods use vegetation to enhance infiltration of storm water runoff and to filter pollutants. Vegetative swales also assist in reducing runoff velocities. The results of the COW indicate that most communities do not have established design criteria for grassed swales, but that more than half allow the use of bioretention islands. Having example projects for communities to see, and having a better understanding of the operation and management of bioretention islands, may help promote bioretention islands throughout the watershed. Most communities within the watershed require a minimum percentage of parking lots to be landscaped and bioretention islands could fulfill these requirements.

It is recognized that curb and gutter systems effectively and rapidly convey storm water off site, which contributes to high stream flows and streambank erosion. Many established communities, such as those in the Ecorse Creek Watershed, require curb and gutter in their respective residential areas. It is recommended that the communities evaluate this policy to determine if there are areas within their community where it is feasible to have grassed swales instead of curb and gutter systems.

5.3 Description of Best Management Practices (BMPs)

A number of Best Management Practices (BMPs) or management alternatives are being considered by the ADW. These are actions that are being done or may be done in the future by some or all of the entities in the Watershed. The following are brief descriptions of these BMPs, categorized as Structural, Vegetative, or Managerial. Managerial BMPs are further described as Ordinances and Policies, Managerial Practices, Studies and Inventories, Public Education, Illicit Discharge Elimination, or Coordination and Funding. How these BMPs will be implemented is described in Chapter 6, the Watershed Action Plan.

A Best Management Practice (BMP) is a land management practice that is implemented to control sources or causes of pollution. There are three primary types of BMPs that treat, prevent, or reduce water pollution.

- Structural BMPs: “bricks and mortar” practices that require construction activities to install, such as storm water basins, grade stabilization structures, and rock rip-rap
- Vegetative/Green Infrastructure BMPs: that use plants, including grasses, trees, and shrubs, to stabilize eroding areas
- Managerial BMPs: that involve changing the operating procedures at a site

BMPs are typically applied as systems of practices because one practice rarely solves all water quality problems at a site, and the same practice will not work for all the sources and causes of a pollutant. All three types of BMPs may be needed to address a source of pollutants.

5.3.1 STRUCTURAL

Construct Detention/Retention ponds – Addresses Goals 1, 2, 4

Detention/retention ponds should be designed and constructed to meet or exceed the Wayne County Storm Water Ordinance. Retention ponds do not have an outlet, meaning that runoff only leaves the basin through evaporation or infiltration. Detention ponds capture and retain storm water runoff and release the runoff at a regulated rate, thus reducing peak flows to downstream waterways. Detention ponds may be designed as wet or dry basins depending on whether or not a permanent pool of water is present. A wet pond utilizes a permanent pool of water that contributes to nutrient removal and the settling of solids. The outlet of a dry pond is designed to gradually release storm water, which allows for some settling of sediment and other pollutants, but may not be as effective in removing pollutants as a wet pond. An advantage to dry ponds is that storm water is generally heated to a lesser degree since a permanent pool is not present.

Install porous pavement at appropriate sites – Addresses Goals 1, 2, 4
Porous pavement helps reduce the amount of impervious land area within the watershed, which is critical to infiltrating storm water runoff, therefore improving water quality and reducing stream flow variability. Porous pavement, including gravel, can especially be utilized in overflow parking areas that are not used regularly. Porous pavement is an infiltration technique that combines stormwater infiltration, storage, and structural pavement consisting of a permeable surface underlain by a storage reservoir. Porous pavement is well suited for parking lots, walking paths, sidewalks, playgrounds, plazas, tennis courts, and other similar issues.

Streambank Stabilization – Addresses Goals 4, 6, 7
Eroding streambanks are present throughout the watershed due to high velocity peak stream flows and runoff. Eroding streambanks are of concern due to the sediment loads and loss of aquatic habitat that can result. It is difficult for vegetation to survive in areas of erosion. Public safety at severely eroded streambanks also may be an issue. Bank stabilization is the process by which stream banks are stabilized by various techniques to prevent damage done by erosion. Stream banks can be protected and stabilized using techniques such as building a flood plain bench to provide additional storage during higher flow events, adding native vegetation and bioengineering techniques throughout the critical area, cutting back the banks, and restoring the stream bank with a wide variety of structural and vegetative measures.

Install catch basin inserts at strategic locations – Addresses Goals 4, 5, 7
Catch basins are often the entry points into a storm drain system, and therefore are an ideal place to filter storm water before it enters the system. Catch basin inserts can collect sediment, trash, and debris. Filters in the inserts can also remove oil, nutrients, and certain metals.

Increase Floodplain – Addresses Goals 4, 5
In order to help meet TMDL requirements for biota, off-line areas could be created specifically for the purpose of providing conditions suitable for biota. These off-line areas would be located adjacent to streams and floodplains. A floodplain is flat or nearly flat land adjacent to a stream or river that stretches from the banks of its channel to the base of the enclosing valley walls and experiences flooding during periods of high discharge. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which are areas covered by the flood, but which do not experience a strong current. A vegetated riparian buffer can be designed in these areas. The buffer protects the adjacent stream by filtering pollutants through both the vegetation and underlying soil. In addition, the vegetation slows runoff velocities reaching the stream, thus reducing stream bank erosion. Vegetation also helps stabilize stream banks.

Replace undersized bridges and culverts – Addresses Goals 1
During the field inventory and during individual community interviews, several bridges and culverts were identified as not being able to convey flow either because of being undersized, having heavy sedimentation or debris build-up, or being misaligned. Undersized bridges and culverts should be properly sized to convey the appropriate flow. Heavy sedimentation and debris that is obstructing flow through bridges and culverts should be removed and misaligned bridges and culverts should be realigned or replaced.

Install Green Roofs at Strategic Locations – Addresses Goals 1, 2, and 4
Green roofs reduce the amount of runoff from impervious rooftops. Green roofs are conventional rooftops that include a thin covering of vegetation allowing the roof to function more like a vegetated surface. The overall thickness of the vegetated roof may range from 2 to 6 inches, typically containing multiple layers consisting of waterproofing, synthetic insulation, non-soil engineered growth media, fabrics, synthetic components, and foliage. Green roofs would reduce impervious area, peak flows and stream flow variability.

Hydrodynamic Separation – Addresses Goals 4, 5, and 7
Hydrodynamic separators (HDS) are storm water management devices used to control water pollution. They are designed as flow-through structures with a settling or separation unit to remove sediment and other pollutants. HDS are considered structural Best Management Practiced (BMPs), and are used to treat and pre-treat storm water runoff.

Water Harvesting – Addresses Goals 1, 2, 3, 4, and 7
Water Harvesting can be broken down into rainwater harvesting and storm water harvesting. Rainwater harvesting is the accumulating and storing, of rainwater. It has been used to provide drinking water, water for livestock, water for irrigation or to refill aquifers in a process called groundwater recharge. Water collected from the ground, sometimes from areas which are especially prepared for this purpose, is called stormwater harvesting. Rainwater harvesting is typically accomplished by use of cisterns and/or rain barrels and reduces the amount of roof runoff and peak flows.

Green Street – Addresses Goals 1, 2, 3, 4, and 7
A green street is a street that is designed to integrate a system of “green infrastructure” to manage storm water runoff within its right of way and reduce the amount of directly connected impervious runoff. Green streets reduce the amount of water that is piped directly to streams and rivers, add to the aesthetics of the community, and make the best use of the street tree canopy for storm water interception as well as temperature mitigation and air quality improvement. SEMCOG has estimated that urban runoff from roads is the largest uncontrolled contributor of nonpoint source pollution in Southeast Michigan with over 100 billion gallons of storm water runoff, 30 million pounds of sediment, and 200,000 pounds of nutrients generated from roads.

Water Efficiency – Addresses Goals 3
Water efficiency is the long-term ethic of saving water resources through the employment of water-saving technologies and activities. Using water efficiently will help ensure supplies for future generations.

5.3.2 VEGETATIVE

Construct Bio-retention Cells and/or Rain Gardens, where feasible – Addresses Goals 1, 2, 4, (7)
Bio-retention cells and/or Rain gardens are shallow surface depressions excavated and backfilled with compost and sharp sand and planted with specially selected native vegetation to capture and treat stormwater runoff from rooftops, streets, and parking lots. Rain gardens provide on-site treatment of storm water runoff by providing vegetated areas that may be graded so that storm water runoff flows to the area. This allows the runoff to be infiltrated and filtered through the vegetation. Native vegetation is commonly used in these areas because it requires less maintenance and generally has deeper roots, which is more effective in facilitating infiltration and filtering pollutants. Rain gardens can be designed with an overflow structure and underdrain system so that during large storms, storm water runoff is able to reach the storm drain system to prevent flooding. Rain gardens can be applied in highly urbanized areas and are generally used on small sites and can be substituted for parking lot islands.

Construct Grow Zones   Addresses Goals 1, 2, 4, 7
A Grow Zone is an area that had traditionally been turf grass or other impervious cover that is converted to native grasses and/or wildflowers, trees, and shrubs to minimize storm water runoff and provide on-site treatment of storm water runoff.

Implement Tree Planting Programs, Addresses Goals 1, 2, 4, and 5
Tree planting is the process of transplanting tree seedlings, generally for forestry, land reclamation, or landscaping purposes. Strategically placed, healthy trees can effectively reduce the amount of runoff and pollutant loading in receiving waters. Trees protect water quality by substantially reducing runoff during small rainfall events, which are responsible for the first flush runoff. According to the International Society of Arboriculture, a typical tree will intercept approximately 3,000 gallons of storm water per year.

Preserve/restore/expand/improve wetlands, Based on MDEQ Landscape Level Wetland Assessment – Addresses Goals 1, 2, 4, (5), (6)
Results of the MDEQ Landscape Level Wetland Functional Assessment (2011) identified areas of existing wetlands within the ADW as well as areas with high or medium level potential for wetland restoration. The results should be utilized when seeking properties for preservation and/or wetland restoration. (See Section 5-5) The Assessment indicated a 90% loss of wetlands in the ADW as a whole (as compared to pre-settlement condition) and a 98% wetland loss in the Ecorse Creek Watershed. Wetlands serve critical functions such as flood control, sedimentation areas, erosion control, water cleaners, habitat, recreation, and economy. A restored wetland is the rehabilitation of a drained or degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to the natural conditions to the greatest extent possible. Wetland size and configuration, hydrologic sources, and vegetation selection must be considered during the design phase. Constructed wetlands provide a suspended solid removal of approximately 70 percent, while nutrient removal ranges widely due to a lack of standard design criteria, but is in the range of 40-80 percent.

Install woody debris or habitat structures at strategic locations[7] – Addresses Goals 5, 6
Habitat restoration techniques include in-stream structures that may be used to correct and/or improve fish and wildlife habitat deficiencies over a broad range of conditions. Examples of these techniques include: channel blocks, boulder clusters, covered logs, tree cover, bank cribs, log and bank shelters, channel constrictors, cross logs and revetment and wedge and “K” dams. The majority of these structures require trained installation with hand labor and tools. After construction, a maintenance program must be implemented to ensure long-term success of the habitat structures. In areas that experience high storm water peak flows, in-stream habitat restoration should be installed after desired flow target is reached so as to ensure the success of the habitat improvement project.

5.3.3 MANAGERIAL – ORDINANCES & POLICIES

Work with County to enforce W.C. storm water ordinance – Addresses Goals (all)
Many of the communities in the Ecorse Creek Watershed have adopted the Wayne County Storm Water Ordinance. As local development and redevelopment plans are received, the ordinance is applied with specific design criteria required for flood control and water resources protection. The County storm water ordinance provides guidance and encourages the implementation of appropriate Best Management Practices to control the volume, rate, and minimize the potential pollutant load of storm water runoff from new development as well as redevelopment projects.

[7] Ibid

Incorporate low impact design planning[8] – Addresses Goals 1, 2, 4, 5, 6, (7), (8)
Land use planning and management involves a comprehensive planning process to promote Low Impact Development (LID) and control or prevent runoff from developed land uses. LID is a low cost alternative to traditional structural storm water BMPs. It combines resource conservation and a hydrologically functional site design with pollution prevention measures to reduce development impacts to better replicate natural watershed hydrology and water quality. Through a variety of site design techniques, LID reduces the creation of runoff, volume, and frequency. Essentially, LID strives to mimic pre-development runoff conditions. This micro-management source control concept is quite different from conventional end-of-pipe treatment or conservation techniques. Less developed communities in the subwatershed should be especially interested in adopting LID principles. The LID planning process involves the following steps: 1) determine water quality and quantity goals with respect of human health, aquatic life and recreation; 2) identify planning area and gather pertinent hydrological, chemical and biological data; 3) determine and prioritize the water quality needs as they relate to land use and the proposed development; 4) develop recommendations for low impact development to address the problems and needs that have been previously determined; 5) present recommendations to a political body for acceptance and 6) implement adopted recommendations.

Incorporate riparian corridor in community zoning and land-use plans –
Addresses Goals 4, 5, 6, (7)
As described above, the riparian corridor refers to the area adjacent to streams. A vegetated riparian buffer refers to establishing or maintaining vegetation in the riparian area. The buffer protects the adjacent stream by filtering pollutants through both the vegetation and underlying soil. In addition, the vegetation slows runoff velocities reaching the stream, thus reducing stream bank erosion. Vegetation also helps stabilize stream banks. By incorporating the riparian corridor into zoning and land-use plans, the areas adjacent to drains are identified and can more easily be protected and preserved. Opportunities for restoration of the riparian corridor are also more easily identified.

Review and revise grading and land clearing policies – Addresses Goals 1, 2, 4, 5, (6), (8)
If not already in place, grading and land clearing policies will minimize clearing and grading of woodlands and native vegetation to the minimum amount needed to build lots, allow access, and provide fire protection.

Review and revise SESC policies and program practices[9] – Addresses Goals 1, 4, 5, (8)
Soil erosion control is the process of stabilizing soils and slopes in an effort to prevent or reduce erosion due to storm water runoff. Source areas are construction sites where soil has been disturbed and exposed, streambanks that are eroding due to lack of vegetation and an excess of peak flows during storm events, and road crossing over streams where the integrity of the structure is compromised or where the road itself contributes gravel or dirt. Soils can be stabilized by various physical or vegetative methods, while slopes are stabilized by reshaping the ground to grades, which will improve surface drainage and reduce the amount of soil eroding from a site. In areas where development activity is underway, it is important to emphasize the Soil Erosion and Sediment Control ordinance inspection and enforcement, which often entails hiring an adequate number of field staff.

Adopt native landscaping ordinances – Addresses Goals 1, 2, 4, 5, 6, (8)
A native vegetation preservation and planting ordinance gives first consideration for the use of native vegetation, includes incentives to encourage native vegetation preservation and planting, and includes provisions for protection, maintenance and replacement of native vegetation. Native vegetation assists in the infiltration and filtering of storm water runoff.

[8] Ibid
[9] Ibid

Review and revise parking requirements for new development/redevelopment – Addresses Goals 1, 2, 4

Parking lots can contribute a large percentage of impervious area on a site. Parking lots are often oversized to handle peak usage, leaving much of the parking lot empty during normal usage. To reduce the amount of impervious surface, communities can consider revising the number of spots required (with overflow). Shared parking can also be utilized in certain situations. If two adjacent sites utilize parking at different times, a single shared lot may meet the needs of both sites. Requiring compact car spaces can also reduce the size and amount of impervious surface.

Enact wetland and/or natural features protection ordinances – Addresses Goals 1, 2, 4, 5, 6, (7), (8)

A natural features ordinance would call for the protection of such natural features as woodlands, grasslands, slopes, wetlands, and groundwater. The ordinance reduces the impact to natural features by limiting the proximity of disturbance. Protection of wetlands from sedimentation, destruction, and misuse is also provided.

Open space preservation in zoning and master planning – Addresses Goals 1, 2, 4, 5, 6, (7), (8)

Land use projections based on SEMCOG data show that the majority of open space will be depleted by the year 2030. In order to maintain the current hydrology and counteract further degradation from urbanization, as much open space as possible should be preserved. Open space can be preserved through community zoning and master planning, in which areas of open space are recognized and planned for in the future. Standards for development that require a certain percentage of open space can also help in preserving current open space.

Implement private roads ordinances (narrower streets)[10] – Addresses Goals 1, 2, 4

A private roads ordinance complements efforts to reduce directly connected impervious surfaces by permitting roads to be built that are narrower than county road standards. Narrower roads produce a smaller area of impervious surface. The ordinance can promote rural character by allowing narrow roads in certain developments in order to preserve open space.

5.3.4 MANAGERIAL – PRACTICES

Work w/ County to revise drain maintenance procedures to reduce the destruction of habitat and stream vegetation – Addresses Goals 4, 5, 6

Current practices may result in the destruction of stream bank vegetation from rough clearing the drain for sediment removal or channel widening. Drain maintenance should limit the destruction of stream bank vegetation that is essential in filtering pollutants and maintaining the integrity of the stream bank. Sediment disruption should also be limited, as this will only cause additional sediment deposition downstream of the maintenance site. Downstream conditions should also be investigated before drain maintenance is put in place to ensure it can handle any additional flows. In general, drain maintenance usually results in an increased flow rate downstream as surface water is generally able to better flow through the area in which maintenance has occurred.

Review & revise drain maintenance and restoration procedures, as appropriate – Addresses Goal 1

Areas where sediment deposition and streambank erosion have occurred should be considered for cleanout to increase the hydraulic capacity of the drain. As mentioned above, this should be done in a way that minimizes destruction of stream bank vegetation. Downstream conditions should also be investigated before maintenance occurs to ensure that any increased flows do not have an adverse effect downstream.

[10] Ibid

Implement pet waste collection program to supply the public with convenient disposal places for pet waste – Addresses Goals 4, 6, 7, 8
A pet waste collection program would supply the public with convenient disposal places for pet wastes in locations such as public parks and other areas that may have high pet traffic. Pet waste contributes nutrient loads and can pose a threat to partial and full body water contact. In addition, a pet waste collection program also increases public awareness since disposal locations are visible to all those passing.

Routinely sweep public streets & public parking lots – Addresses Goals 4, 5, (7)
Street sweeping on a regular basis minimizes pollutant loads to receiving waters by removing sediment, debris, and other pollutants from road and parking lot surfaces. High-efficiency street sweepers are capable of removing smaller particles than older sweepers and can result in more significant pollutant removal.

Eliminate roof drains directly connected to impervious surfaces, where possible – Addresses Goals 1, 2, 4, 5
Storm water runoff that is connected directly to impervious surfaces, such as driveways and catch basins contributes to higher peak flows and pollutant loads. If runoff is instead directed to pervious surfaces such as landscaped areas or grass swales, runoff velocities are decreased, runoff volume is decreased due to infiltration, and storm water is filtered by vegetation. Runoff can be diverted from impervious surfaces by directing runoff from roofs, driveways, parking lots, etc, to vegetated areas. This can apply to residential, commercial, and industrial developments. In older communities, downspout disconnection also can reduce directly connected impervious surfaces.

Water quality monitoring – Addresses Goals 4, (8)
Water quality monitoring will help measure the success of activities being implemented. This will help communities in the watershed know the extent of whether their activities are making an impact on the health of the watershed or whether their activities should be reassessed.

Investigate opportunities for recreational areas[11] – Addresses Goal 6
In order to encourage public awareness and concern for rivers, streams and wetlands, it is important to increase opportunities for people to access these water resources. If provided with aesthetic and accessible, well-advertised recreational areas - be it a canoe livery, a fishing pier, or a trail system – the public will be able to experience the human benefits that the water offers and in turn, may want to work to protect the resource. First, the designated and desired uses must be restored so that it is safe for the public to use the resource in the manner it is intended; i.e., reduce sediment in order to promote a canoe livery. Then, the recreational amenity can be planned, built and promoted.

Flow monitoring – Addresses Goals 4, 7, (8)
Flow monitoring involves an analysis of data on rainfall, streamflow, instream water quality, storm water quality, biological communities and habitat, instream bottom sediment, air deposition, and aesthetic conditions. In addition, flow monitoring includes measurement of the performance of various storm water best management practices (BMPs) including structural controls, wetlands, and nonstructural controls.

Evaluate areas suitable for dredging to increase hydraulic capacity of drains – Addresses Goals 1, (4), (5)
Sediment buildup from runoff and erosion has decreased the hydraulic capacity of certain waterways in the Ecorse Creek Watershed. Areas where flooding is a problem could be evaluated to determine if sediment buildup is the cause and those areas could be prioritized and dredged (with minimal disturbance to the waterway).

[11] Ibid

Inventory areas lacking storm water detention for retrofit opportunities – Addresses Goals 1, 2, (4)

Storm water detention is now required for new developments, however, older developments were not subject to this requirement. Performing an inventory would involve creating a list of these older developments and determining whether on-site conditions are suitable for retrofit opportunities, such as detention basins, bioretention islands, etc.

Initiate hydrologic and hydraulics studies to determine sources contributing to flooding[12] – Addresses Goals 1, 2, (4)

Initiating hydrologic and hydraulics studies to determine sources contributing to flooding can be used to help prioritize areas for implementing BMPs that will help reduce the volume and rate of runoff. A comprehensive study of the hydrology of the watershed would provide an understanding of the interaction of precipitation, infiltration, surface runoff, stream flow rates, water storage, and water use and diversions. A hydraulics study would yield information about stream velocity, flow depth, flood elevations, channel erosion, storm drains, culverts, bridges and dams. Information resulting from these studies would provide greater detail on the sources and causes of problems related to hydrology-induced erosion.

Compile Annual Summary of ADW Activities – Addresses Goals 3

A comprehensive ADW summary would provide an annual report of Watershed activities and findings for the year. The report outlines ongoing activities, results from any monitoring, present case studies, and report successes and findings. The report would serve as a summary that could be provided to both the DEQ and the general public for educational purposes. The ADW has prepared Annual Reports each year since its inception. This activity should continue.

Program to increase awareness and use of rain barrels – Addresses Goal 8

Residential rain barrels are used to collect rooftop runoff. Collecting this water helps reduce peak runoff flows and promotes water conservation. Also, residential rain barrels are a useful tool in creating public awareness and educating the public about watershed issues.

Establish BMP case studies – Addresses Goals (all)

Implementing BMPs requires a change from the normal accepted practices that are now in place. Because of this, there is some reluctance in implementing BMPs that are not yet common. Several project profile sheets have been developed for grant funded projects (Grow Zones and Green Roofs) in the ADW. Establishing successful BMP case studies within the watershed has been an effective means of increasing BMP awareness and acceptance. This practice should continue where appropriate.

Regular storm water-related information on cable TV – Addresses Goals 3, 8

Cable Television is one source that can be utilized by communities to reach the general public. Upcoming meetings and events, as well as educational materials can be posted on Cable TV. Possible educational topics include: education of the public about their responsibility and stewardship in their watershed; education of the public on the location of residential separate storm water drainage system catch basins, the waters of the state where the system discharges, and potential impacts from pollutants from the separate storm water drainage system; encouragement of public reporting of the presence of illicit discharges or improper disposal of materials into the separate storm water drainage system; education of the public on the need to minimize the amount of residential or noncommercial wastes washed into nearby catch basins (this should include the preferred cleaning materials and procedures for car, pavement, or power washing; the acceptable application and disposal of pesticides and fertilizers; and the effects caused by grass clippings, leaf litter, and animal wastes that get flushed into the waterway); education of the public on the availability, location and requirements of facilities for disposal or drop-off of household hazardous wastes, travel trailer sanitary wastes, chemicals, yard

[12] Ibid

wastes, and motor vehicle fluids; and education of the public concerning management of riparian lands to protect water quality. [13]

Send out watershed-related press releases – Addresses Goals 3, 8
Press releases that result in publicity of watershed activities and successes will result in an increase in overall awareness, understanding, and participation regarding watershed issues.

Maintain watershed webpage – Addresses Goals 3, 8
A watershed webpage provides a central and easily accessible means for citizens to learn about the watershed and its challenges and goals, and a means to provide information on activities in which citizens can participate. The ADW maintains a website, www.allianceofdownriverwatersheds.com which serves as a repository and informational site for elected officials, staff, and interested stakeholders.

Provide watershed education – Addresses Goals 8, (all)
The ECIC believes that watershed education is essential to improving water quality from a non-point source standpoint. Watershed education includes a school curriculum dealing with watershed issues, organizing participation activities throughout the watershed (such as a stream cleanup day), making available flyers, education via cable TV and newsletters.

Trash management education to the public – Addresses Goals 1, 4, 6, 8
Trash management education to the public could be used to inform the public on the proper disposal of wastes. Specifically, information on hazardous waste disposal would be supplied. Information would include methods for the proper disposal of various common substances, as well as information on the location of disposal sites. The message may be distributed via flyers, newsletter articles, cable TV, etc.

Outreach program to educate homeowners about the proper operation/maintenance of their septic systems – Addresses Goals 4, 7, 8
Failing septic systems can contribute nutrient and pathogen loads to the storm sewer system and waterways. Failing septic systems can be attributed to unsuitable soil conditions, improper design and installation, or poor maintenance. Education materials can help teach homeowners with septic systems how to identify when their septic system is failing and proper maintenance to prevent a failing system.

Pet waste management education to the public – Addresses Goals 4, 7, 8
Pet waste management information to the public would include messages that notify pet owners that pet waste has a negative impact on water quality and can contribute to both nutrient and pathogen loads. Proper and timely disposal of pet waste can help combat pollution caused by pet waste. The message may be distributed via flyers, newsletter articles, cable TV, etc.

Lawn and garden maintenance information to the public – Addresses Goals 4, 5, 8
Lawn and garden maintenance information to the public would include such messages as the proper height to mow grass and the use of environmental-friendly fertilizers. The message may be distributed via flyers, newsletter articles, cable TV, etc.

Distribute/display SE Michigan Partners for Clean Water Materials –
Addresses Goals (3), 4, 5, 7, 8
With the Phase II requirements affecting many communities that are SEMCOG members, SEMCOG established the Southeast Michigan Partners for Clean Water to coordinate storm water public education activities to help save local dollars and to send consistent messages. These messages are intended to be action-oriented with the primary goals of protecting water resources and meeting permit requirements, and would be delivered through brochures, newsletters, workshops, river crossing signage, print ads, and local media. Materials focus on the "Seven Simple Steps to Clean Water," which

[13] Michigan Department of Environmental Quality, Public Education Plan Guidance Document.

are: Help keep pollution out of storm drains; Fertilize sparingly and caringly, Carefully store and dispose of household cleaners, chemicals, and oils; Clean up after your pet; Practice good car care; Choose earth friendly landscaping; and Save water.

Watershed-related articles in Newsletter/ Magazine – Addresses Goals (3), 4, 5, 8
Articles in community/entity newsletters or magazines focus on public education. The messages of these newsletter or magazine articles can vary and include: ultimate discharge point, lawn and garden maintenance, pet waste disposal, septic system maintenance, trash management, etc.

Post watershed-related news and/or educational materials on Entity Website - Addresses Goals (3), 4, 5, 8
News and educational materials can be displayed on entity's websites for easy access by the general public. Upcoming activities, activity summaries, as well as educational materials that include messages on ultimate discharge point, lawn and garden maintenance, pet waste disposal, septic system maintenance, trash management, etc. can be posted.

Watershed-related Informational Displays – Addresses Goals (3), 4, 5, 8
Informational displays in public buildings or at public events is one way to educate the public on storm water issues. The messages of these displays can vary and include: ultimate discharge point, lawn and garden maintenance, pet waste disposal, septic system maintenance, trash management, etc.

River Crossing and Entering Watershed Signage – Addresses Goals (4), 8
"River crossing" signs and "Entering the Watershed" signage serves as a method of public education as to the proximity of rivers and boundaries of the watershed. Knowing these locations helps citizens gain a sense of ownership and protectiveness for the waterways within the watershed.

Storm Drain Curb Marker Program[14] – Addresses Goals (4), (7), 8
Many of the entities in the Watershed have been working with the Detroit Riverkeeper group and their "Storm Drain Labeling and Educational Program." The Riverkeeper program has been working closely with the Combined Downriver and Ecorse Creek Watershed groups to put together a program that involves storm drain labeling and a region wide storm water educational program. Over 12,000 labels have been made and distributed to the participating communities in these watersheds. Installation of the curb-side storm drain labels started in 2004 and continued through 2005, helping to bring attention to storm drain born water quality issues.

Promote Reporting System for Illicit Discharges – Addresses Goals (4), (7), 8
A reporting system for illicit connections can be effective in identifying illicit connections. The reporting system should be advertised through public education and be a convenient way for residents and others to report illicit connections. To make citizens aware of the reporting system, advertisements can be made via cable TV, newsletter or magazine articles, entity websites, etc.

[14] Detroit Riverkeeper Program http://www.detroitriver.org/Riverkeeper_2005.htm

Household Hazardous Waste Collection Site/Day[15] – Addresses Goals (4), 7, 8
Some jobs around the home may require the use of products containing hazardous components. Such products may include certain paints, cleaners, stains and varnishes, car batteries, motor oil, and pesticides. The used or leftover contents of such consumer products are known as "household hazardous waste." Household hazardous wastes are sometimes disposed of improperly by individuals pouring wastes down the drain, on the ground, into storm sewers, or putting them out with the trash. The dangers of such disposal methods may not be immediately obvious, but certain types of household hazardous waste have the potential to cause physical injury to sanitation workers; contaminate septic tanks or wastewater treatment systems if poured down drains or toilets; and present hazards to children and pets if left around the house. Household hazardous waste collection sites or designated collection days allow citizens to properly dispose of household hazardous wastes.

Yard Waste Collection and/or Recycling – Addresses Goals 4, (5), 8
When yard waste decomposes, it depletes dissolved oxygen levels and has an adverse effect on aquatic species. Excessive plant material also encourages algae growth. Yard waste collection and/or recycling enables citizens to dispose of their yard waste in the proper manner so that it does not reach downstream waterways.

Watershed-related educational brochures and published articles to the public – Addresses Goals 4, 8
Brochures and published articles focus on public education. The messages of these brochures can vary and include: ultimate discharge point, lawn and garden maintenance, pet waste disposal, septic system maintenance, trash management, etc. Brochures can be distributed via mail, or made available at public buildings or events.

Illicit Discharge Elimination Program – Addresses Goals 3, 4, 5, and 7.
The Illicit Discharge Elimination Program (IDEP) directly results in the annual removal of significant quantities of raw sewage and other pollution which pose a threat to both human and aquatic life. The ADW, in cooperation with Wayne County staff, actively identifies and eliminates potential and existing improper discharges and sanitary sewer connections to storm water systems and open waterways. Illicit discharges and connections are identified by dye testing facility sanitary drainage systems, overseeing "housekeeping" issues, and looking for signs of illicit discharges or material handling/storage practices that may allow material to migrate to a storm drain or watercourse. Facilities found to have improper sanitary sewer connections or illicit discharges to the storm sewer system, or to an open waterway, are notified. Follow-up work with facility owner/managers and local community staff to ensure corrective actions are taken and compliance with federal, state, and local regulations is achieved.

Meet w/ County and/or MDOT to coordinate drain maintenance – Addresses Goal 1
Currently there is confusion as to who is responsible for drain maintenance in the numerous drains throughout the Watershed. The committee would like to establish responsibility for each drain, whether it is the County, MDOT, or the individual community. Once responsibility is clarified, the ADW members are committed to working cooperatively with the responsible entity to identify issues related to drain maintenance.

Create partnerships with institutions, schools, and private sector to promote a collaborative effort in watershed management – Addresses Goals 3, 8, (all)
The ECIC recognizes that its efforts in watershed management can be far more effective with the participation of institutions, schools, and the private sector. The committee feels that public education through the schools to change everyday practices, is a key component to watershed management. The private sector also plays an important role in watershed management. In addition to possible help with

[15] Environmental Protection Agency http://www.epa.gov/epaoswer/non-hw/househld/hhw.htm

project implementation, the private sector also must change its practices for maximum improvement to occur throughout the watershed.

Seek alternative funding sources – Addresses Goals (all)
Funding for storm water projects is available through the State of Michigan, Federal funds and other private sources. Currently, the *Bolt* decision makes it difficult for local governments and the state to use fees to finance storm water services. Because *Bolt* rests on an interpretation of the Michigan Constitution, the principles announced in the case cannot be reversed by the legislature. Nonetheless, there is a need to identify and evaluate the merits of alternatives that, if implemented, would reinforce the legitimacy of using fees and clarify the circumstances under which fees are an appropriate option. Fiscal responsibility and discipline would be enhanced, some more certainty would be gained, and the risks that local governments or the state faces when charging fees for governmental services would be reduced. A brief general description of options to help initiate that policy development and evaluation process follows.

1. Amend the Michigan Constitution. Proposed amendments to the state constitution can originate either from the legislature or citizen petition. However, an attempt to amend the constitution is costly and time consuming. And, proposing constitutional amendments to resolve issues of concern should be limited to rare circumstances. In fact, the legislature has major responsibility for fiscal policy and could be very helpful in resolving the concerns raised in this report.
2. Work with Michigan Legislature in securing legislation that specifically authorizes the use of fees to fund essential government services and accomplishes the following:
   a. Reduces the uncertainty of fees as an option for funding essential services;
   b. Requires fees to be calculated in accordance with accepted accounting and rate-making principles;
   c. Recognizes that fees can be used to raise revenues sufficient to cover the true (complete) cost of providing the service; and
   d. Clarifies that the imposition of fees by local governments for essential services in the exercise of police powers or in complying with federal and state laws and rules constitutes a regulatory purpose.[16]

Create a funding source for land acquisition and protection – Addresses Goals all
The protection or creation of open space can assist in counteracting further degradation from urbanization, allow for infiltration, increased floodplain, storm water treatment and storage, etc. while also serving as a recreational amenity to the community, watershed, and region. A variety of options should be investigated on an individual community and watershed-wide basis. These could include elements such as open space preservation millages, grants, tax initiatives, donations, conservation easements, land preservation through the development process, etc.

Create law to allow illicit discharge enforcement as a source of revenue –
Addresses Goals 3, 7, (8)
Creating such a law would involve establishing authority and a system in order to charge inspection fees and collect fines for punishment for illegally discharging a substance into the storm sewer conveyance system (including open drainage courses). Fee's and penalties would be used to fund storm water requirements including PEP and IDEP.

Work with Stream Team and others for citizen monitoring – Addresses Goals 4, 7, 8
The Stream Team is comprised of volunteers from area schools and Downriver Citizens for a Safe Environment. The Stream Team is active in clean-up days and water-quality monitoring, and in specific restoration projects. Currently, there is not an established water-quality monitoring program in the Ecorse Creek Watershed. The Stream Team could provide needed monitoring of the waterways in the

[16] SEMCOG, State and Local Government Financing of Essential Services with User Fees, February 2005.

area that could be used as the backbone for measuring the progress and effectiveness of watershed activities.

5.4 Identification of Critical Areas

Critical (priority) areas were identified to focus attention on, and prioritize actions within. These are areas of the watershed that exhibit known or suspected problems that offer opportunities to prevent further degradation through the protection of remaining and significant natural features, and/or that hold potential for restoration. These critical areas were identified using information provided by the ECIC, the Michigan Department of Natural Resources, the Wayne County Department of Environment, and other community or organizational representatives, and through geographical information analysis and modeling. Sites within the following four (4) categories were identified as critical areas within the Ecorse Creek Watershed:

- Problem areas as identified by communities within the watershed;
- Natural areas for preservation and conservation;
- Areas estimated to contribute the greatest amount of pollution to area watercourses; and
- Areas susceptible to flooding and hydrologic instability

5.4.1 Critical Priority Areas Identified by the Committee

As previously described, individual meetings were held with a majority of the communities and entities within the watershed as part of the development of the original WMPs (March and April 2005) to further identify and discuss problem areas within their jurisdictions. These meetings were key to soliciting information directly from those who have the greatest understanding of the issues and potential for projects within the watershed. Discussions with community/entity representatives not only identified the location and nature of problems but also focused on possible restoration or retrofit opportunities in those areas. The critical areas were reviewed by the Watershed during the 2012 WMP Update process and confirmed that they continued to be critical areas. They are listed below in order of priority.

Identified problems and critical areas in the watershed are illustrated on the following map (Map 5-1, Critical Areas Identified by Watershed Committee), and typically fell into one of four categories:

- Flooding
- Erosion
- Debris Build Up
- Algae Growth

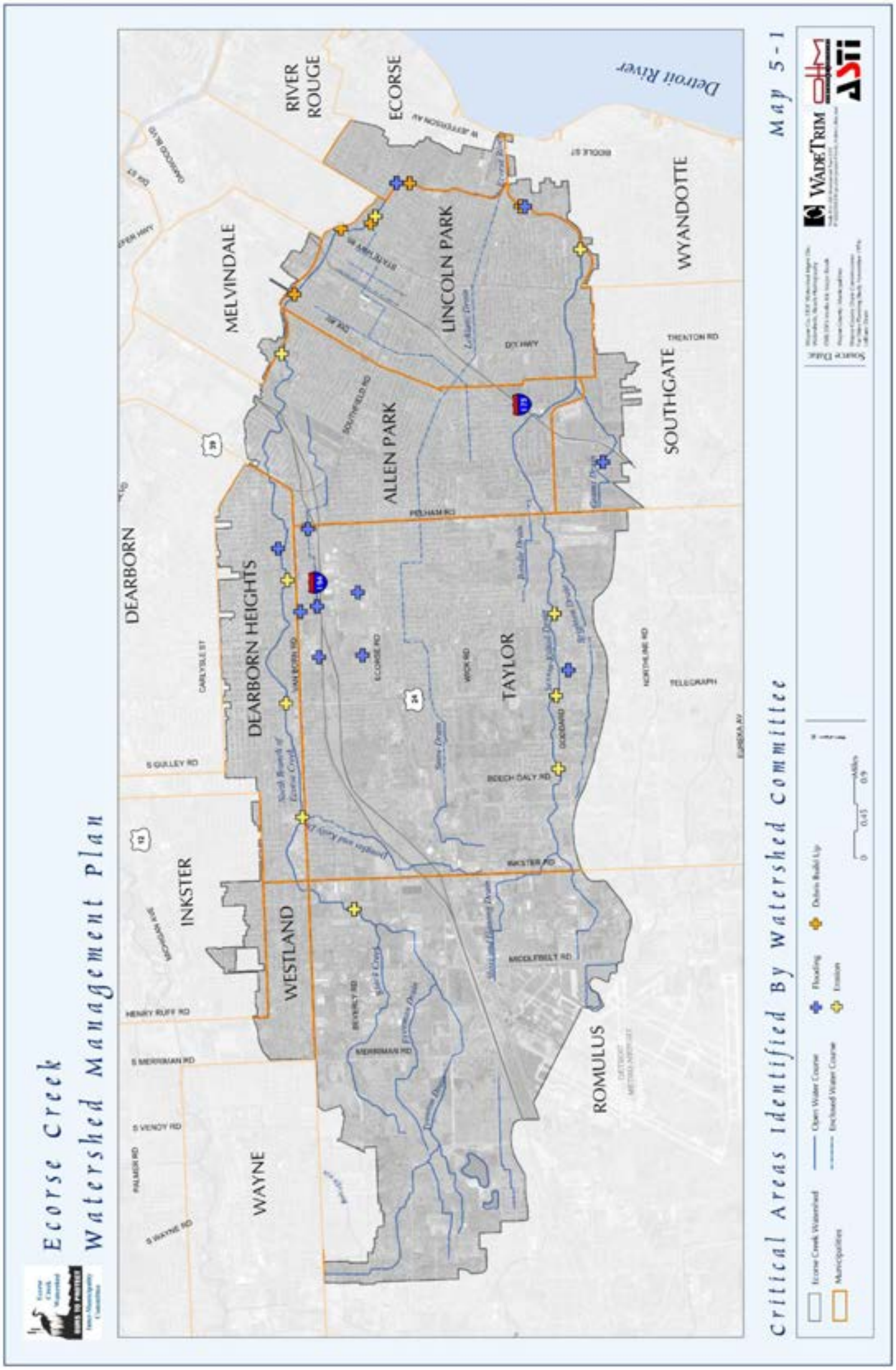
This information was further used to develop elements of the Watershed Action Plan (Chapter 6) and to quantify possible potential pollutant load reductions (Section 5.6) that could result from implementation of these projects/actions.

5.4.2 Critical Areas for Preservation and Conservation

As described previously in Chapters 2 and 3, unstable hydrology and excess sedimentation are the principal factors impacting the biotic communities within the Ecorse Creek Watershed, causing non-attainment of water quality standards and designated uses. The key factor driving the exaggerated peak flows, hydrologic instability, and sedimentation in the watershed is urbanization and the resultant increase in impervious surfaces. Forested riparian buffers, wetlands, woodlands, and other areas of open space, while outside of the stream channel itself, are critical components of a healthy stream system. Their protection helps minimize impervious surfaces and maintains the natural processes of interception, infiltration, and evapotranspiration of rain and snow melt, thereby helping to maintain a more natural hydrologic balance.

Although these open space elements are deemed critical to preventing further degradation, SEMCOG land use projections indicate that the vast majority (89%) of existing open space will be depleted by the year 2030.[17] In order to counteract further degradation of the stream system from urbanization, it is recommended that as much open space as possible be preserved.

[17] SEMCOG (Southeast Michigan Council of Governments). Digital future (2030) land use projections derived from municipal master plans


Ecorse Creek
Watershed Management Plan
Critical Areas Identified By Watershed Committee
Map 5-1
RIVER ROUGE
ECORSE
Detroit River
MELVINDALE
LINCOLN PARK
WYANDOTTE
SOUTHGATE
ALLEN PARK
DEARBORN
DEARBORN HEIGHTS
TAYLOR
INKSTER
WESTLAND
ROMULUS
WAYNE
Flooding
Erosion
Debris Build Up

Areas of natural land cover were identified using current (2000) SEMCOG land use and aerial photography data.[18] Three categories of natural features information were mapped:

1. Areas of intact riparian buffer (i.e., wetland, forest, shrub/scrub adjacent to streams within the Ecorse Creek Watershed);
2. Contiguous blocks of wetland, forest, shrub/scrub land equal to or greater than five (5) acres in size; and
3. Additional areas, identified by the Michigan Natural Features Inventory (MNFI) as areas with recorded observations of federal or state-listed threatened, endangered, or otherwise significant species, natural plant communities, or natural features.

Maps 5-2 and 5-3 show those critical areas targeted for preservation and conservation. Map 5-2 shows areas within the Ecorse Creek Watershed where a natural riparian buffer is yet intact. Areas of wetland, forest, or shrub-land within 300-feet in either direction from the center of the stream are shown. The relative width of the band shown indicates the width (up to 300-feet) of the existing buffer. Conversely, the absence of a mapped band along sections of the stream indicate areas where a riparian buffer is lacking. The amount of intact buffer within different land use/land cover categories is summarized in Table 5-2. Areas designated as agricultural lands may include pasture, orchard, row crops or other agricultural practices and should be inspected in the field to determine whether a true buffer or filter strip may exist along the stream at those locations.

Table 5-2
Critical Areas Within 300-Foot Riparian Corridor

Critical Land Use	Acres
Active Agriculture	335
Cultural, Outdoor Recreation, and Cemetery	186
Grassland and Shrub	520
Woodland and Wetland	479
Extractive and Barren	57
Water	124

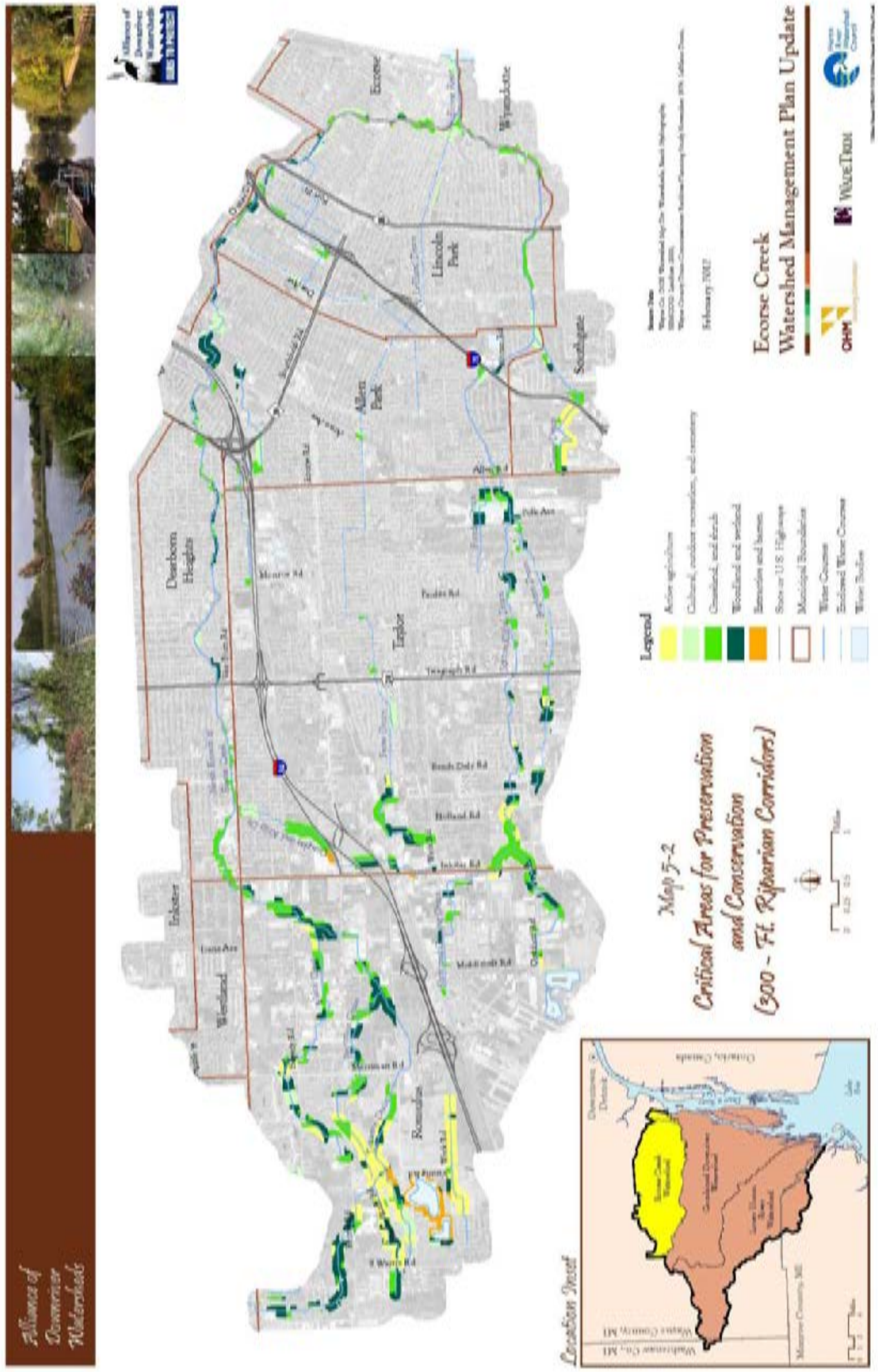
An intact forested riparian corridor provides a variety of critical functions, including:

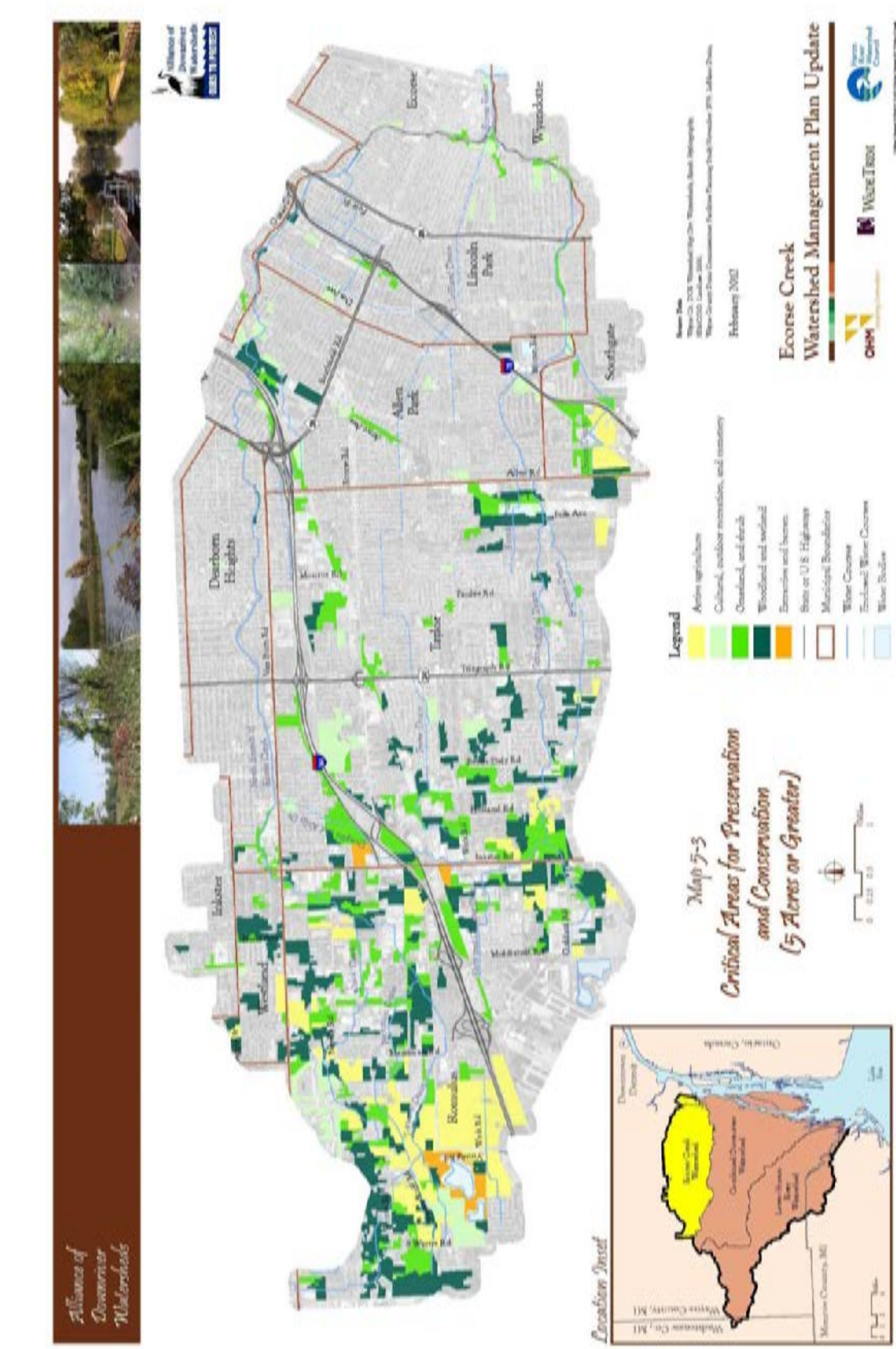
- Protecting fish and wildlife by providing food, cover, shade, and linear connections between habitats;
- Maintaining cool water temperatures, and thereby protecting dissolved oxygen concentrations, by shading the stream;
- Preventing overland runoff from contributing pollutants from upland areas through the filtration, trapping, and conversion of sediments, nutrients, and other chemicals;
- Floodwater storage and energy dissipation;
- Maintaining streambank stability and channel capacity, and
- Maintaining balanced hydrology and hydraulics within the stream channel.

Areas where the buffer is still intact should be protected through the use of overlay zones, protective ordinances, conservation easements and/or incentive programs. Areas with minimal or no riparian

[18] SEMCOG (Southeast Michigan Council of Governments). 2000. Digital land use data.

buffer should be reviewed and targeted for possible restoration. The width of buffer to be maintained or restored varies according to the desired function of the buffer as well as site


Map 5-2
Critical Areas for Preservation and Conservation
(300 - Ft. Riparian Corridors)
Ecorse Creek
Watershed Management Plan Update
Legend
Location Inset
Alliance of Downriver Watersheds
Dearborn Heights
Allen Park
Lincoln Park
Taylor
Romulus
Westland
Inkster
Southgate
Wyandotte
Ecorse



Map 5-3
Critical Areas for Preservation and Conservation (5 Acres or Greater)
Ecorse Creek
Watershed Management Plan Update
Legend
Location Inset

specific considerations such as the size (width/order) of the stream, the slope of the land adjacent to the stream, soils, vegetation and vegetative structure, and the intensity of adjacent land uses (Table 5-3).

In general, water quality goals such as protecting the stream from overland runoff and providing shade to the stream require less buffer width than other benefits such as flood storage or wildlife habitat. Even if these buffer functions are secondary to water quality benefits, efforts should be made to protect wider buffers where they currently exist, particularly in the headwaters region.

Table 5-3

Minimum Recommended Buffer Widths[19]

Desired Function/Benefit	Recommended Range (Min.)
Bank Stabilization and Aquatic Food Web	25 to 35 feet
Water Temperature Moderation	25 to 50 feet
Nitrogen/Phosphorus (Nutrient) Removal	40 to 125 feet
Sediment Removal	55 to 150 feet
Flood Mitigation	65 to 210 feet
Wildlife Habitat	60 to 260 feet

Contiguous, remaining blocks of wetlands, forest, shrub or grasslands, agricultural land, areas of extractive use or barren lands, and parks, greater than five-acres in size, within the Ecorse Creek Watershed are shown in Map 5-3 and summarized by land use category in Table 5-4 (includes acreages in Table 5-2). These lands represent areas of low impervious cover and areas maintaining the natural hydrologic processes of interception, infiltration, and evapotranspiration of rain and snow melt and flood water storage. The amount of these areas within different land use/land cover categories is summarized in Table 5-4.

Table 5-4

Critical Areas 5 Acres or Larger (Entire Watershed)

Critical Land Use	Acres
Active Agriculture	1,242
Cultural, Outdoor Recreation, and Cemetery	705
Grassland and Shrub	1,576
Woodland and Wetland	1,975
Extractive and Barren	139
Water	132

[19] USDA Forest Service. 1998. Chesapeake Bay Riparian Handbook: A guide for establishing and maintaining riparian forest buffers. USDA Forest Service, Northeastern Area – State and Private Forestry, NA-TP-02-97.

Review of Map 5-3 (and 5-2) readily shows differences between the headwaters region of the watershed at the left (west) of the Figure(s) and downstream regions to the right (east).

In general, there is a direct correlation between the preservation (or loss) of open space in a watershed and the physical, chemical, and biological integrity of the system. Remaining open space within the river system must be conserved if there is to be hope of reducing flood damage and re-attaining water quality standards and designated and desired uses.

Map 5-4 illustrates generalized locations of threatened, endangered, and special concern species or unique and rare plant communities or natural features, based upon observations recorded in a database maintained by the MDNR Michigan Natural Features Inventory (MNFI). The areas shown indicate the locations (1/4-1/4 Section) of occurrences of these unique elements since 1970. The color coding for these areas indicates the biodiversity score assigned by the MNFI. The biodiversity scoring is designed to help prioritize areas for conservation according to their contribution to biodiversity. Factors considered in calculating the biodiversity value of each occurrence include the species' global status, state status, the quality rank assigned to each occurrence, the presence of potential habitat within the known spatial extent of the occurrences, and the last date observed at that location (a measure of the probability that it is still present).[20]

5.4.3 Critical Areas Based on MDEQ Landscape Level Wetland Functional Assessment

The Michigan Department of Environmental Quality completed a Landscape Level Wetland Functional Assessment (LLWFA) for the Alliance of Downriver Watersheds area. The LLWFA is a GIS based tool that can be used to identify and prioritize existing wetlands for protection or enhancement based on the ecological or water quality functions they provide. Similarly, the tool can be used to prioritize historic wetland areas for restoration based on the functions they would then provide.

The LLWFA uses pre-European settlement data, a 2005 update of the original National Wetlands Inventory data, soils data and 2005 high resolution aerial photography to identify existing wetlands and areas with potential for wetland restoration (areas identified as pre-settlement wetland and/or hydric soils). The database associated with the mapping provides hydro-geomorphic information for each wetland area such as: landscape position, landform, water flow direction, and pond classification. This information is then interpreted to derive the specific wetland functions (i.e. flood water storage, fish habitat, nutrient transformation, groundwater influence, etc.) of each wetland area. The status and trends of wetlands in the area are summarized in Table 5-5 and the current status of wetland areas is shown in Map 5-4.

Table 5-5

Wetland Resources and Trends

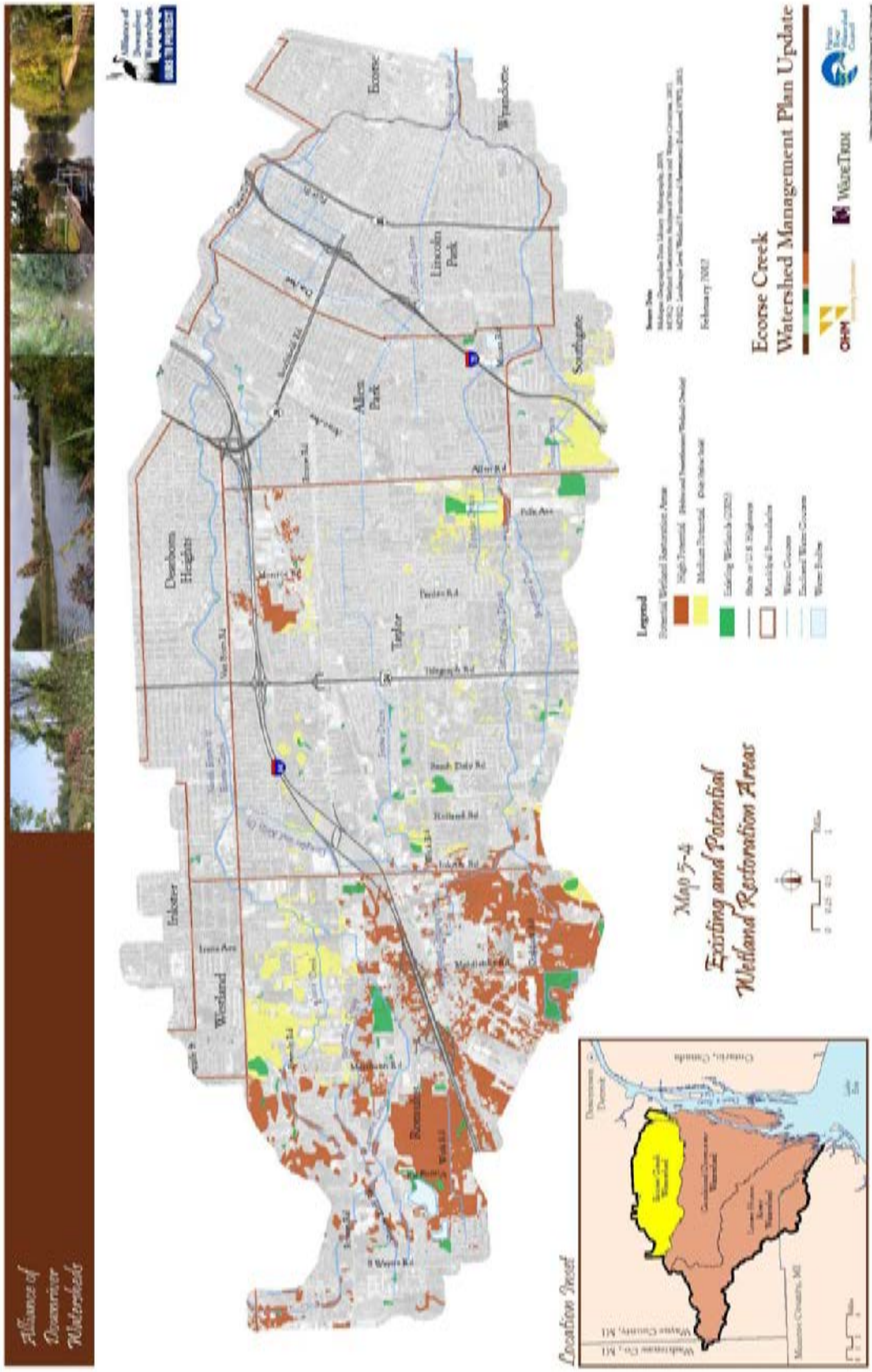
Alliance of Downriver Watersheds	**Pre-Settlement**	**2005 Condition**	**Total Loss**	**Percent Loss**
Acres of Wetland	48,733	5,230	43,503	90%
Average Size (acres)	49	8.5		
Ecorse Creek Watershed				
Acres of Wetland	10,183	228	9,955	98%
Average Size	64	5.7		

[20] Schools, E., Enander, H., and J. Paskus. Using Geographic Information Systems to Prepare Sensitive Species Information for Land Use Master Planning. Michigan Natural Features Inventory/Michigan State University Extension. Lansing, Michigan. 27 pp..

Due to the high ecological importance of wetland areas as well as the exceptionally high rate of wetland loss in the watershed, all opportunities for restoration and protection of wetlands should be pursued as they arise regardless of their location in the watershed. When an opportunity for restoration or protection does arise, the Ecorse Creek Watershed will pursue the wetlands using the following process:

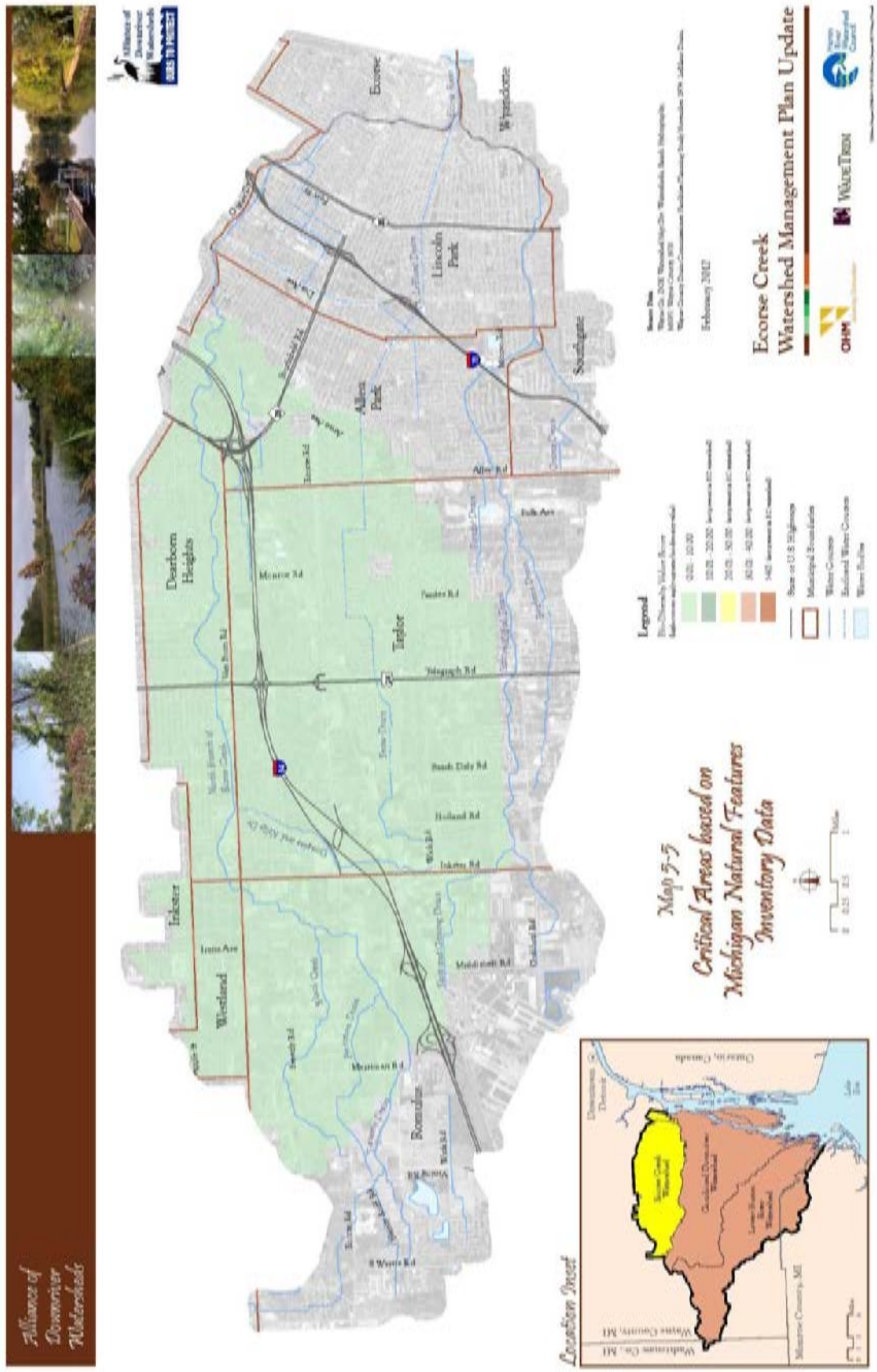
Critical areas and sites will be identified using the LLWFA and other criteria for each appropriate goal. For example, for the Flow Stability and Flood Control Goals:

- Upstream of a flood prone or “flashy” area
- High performing for “floodwater storage”
- Wetland area 20 acres or more in size


Map 7-4
Existing and Potential Wetland Restoration Areas
Ecorse Creek
Watershed Management Plan Update
Legend
Location Inset
Alliance of Downriver Watersheds
Dearborn Heights
Inkster
Westland
Taylor
Allen Park
Lincoln Park
Southgate
Ecorse
Wyandotte
Romulus
February 2007

5.4.4 Critical Areas Based Upon Estimated Pollutant Loads

During the development of the 2006 plan, average annual pollutant loads to streams within the watershed were estimated using the U.S. EPA's PLOAD model. As part of the 2012 update, the Watershed Treatment Model (WTM), developed by the Center for Watershed Protection, was employed in order to benefit from a different approach that incorporated a tracking tool for pollutants to estimate loading and effectiveness of implementation efforts.


Map 5-5
Critical Areas based on Michigan Natural Features Inventory Data
Ecorse Creek
Watershed Management Plan Update
Location Inset
Legend
Alliance of Downriver Watersheds
Dearborn Heights
Taylor
Allen Park
Lincoln Park
Southgate
Wyandotte
Ecorse
Inkster
Westland
Romulus
Telegraph Rd
Monroe Rd
Pardee Rd
Allen Rd
Eureka Rd
Goddard Rd
Middlebelt Rd
Merriman Rd
Inkster Rd
Holland Rd
Beech Daly Rd
Van Born Rd
Wayne County, MI
Washtenaw Co., MI
Monroe County, MI
Ontario, Canada

Pollutant load export from the watershed was estimated for both existing and future land use conditions in order to identify priority areas within the Ecorse Creek Watershed to predict how changes in proposed land use may change pollutant loads, and to determine how various BMPs may, in turn, reduce pollutant loads to the creeks. Average annual pollutant loads to streams within the Ecorse Creek Watershed were estimated using the Watershed Treatment Model (WTM) along with the assumptions outlined in Appendix E.

The WTM is a spreadsheet-based, decision-making and pollutant-accounting tool that calculates annual runoff volumes and pollutant loads (including total suspended solids, total nitrogen, bacteria -- fecal coliform, and total phosphorus) in small watersheds. The WTM is a simple modeling tool that is not physically based and calculates on an annual basis. WTM can serve as a tracking tool for pollutants to estimate loading and effectiveness of implementation efforts. The WTM can be populated with data from an initial monitoring effort, such as pollutant loads and practice efficiencies, then use the WTM to track practice implementation over time. Since the WTM is a spreadsheet, local government staff can maintain it and update it over time without hiring an outside consultant.

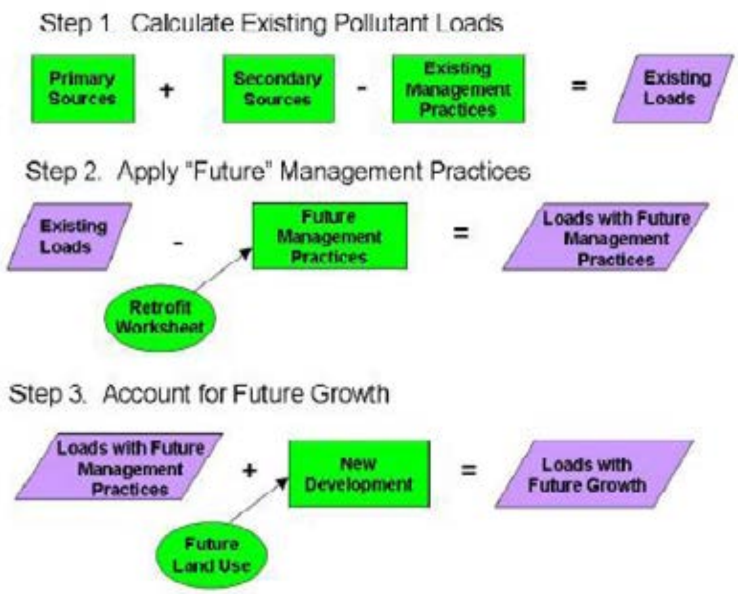
The WTM is structured to answer three questions (figure showing model structure):

1. What is the current pollutant load and runoff volume in the watershed?
2. What is the load or volume with future (i.e., proposed) management practices?
3. What is the load or volume after growth occurs in the watershed?

Each component of the figure represents one Excel worksheet that calculates the total load or load reduction.

Figure 5-1. Model Structure of the WTM

Purple boxes refer to loads, including pollutant loads and runoff volumes. Ovals are "support" worksheets that provide input to another calculation sheet.



The major inputs to the WTM include primary pollutant sources, secondary pollutant sources, and management practices (current and future). Primary sources include any pollutant source that can be determined by land use alone, while secondary sources require additional data (Table 5-5). Many of the secondary sources are individual point sources (such as the NPDES dischargers), but others are more diffuse, and include sources such as illicit discharges or septic systems.

Table 5-5 WTM Pollutant Sources

Primary Sources	
Residential Land (various densities) Commercial Land Industrial Land Roadway	Open Water Active Construction Rural Land (includes cropland and pasture) Other Land Uses (user-defined)
Secondary Sources	
Septic Systems SSOs CSOs Illicit Connections Channel Erosion	Livestock Marinas Road Sanding (didn't apply for ADW) NPDES Discharges

The WTM accounts for the benefits of management practices in both the "current" and "future" conditions. The WTM is unique in both the range of practices it characterizes and the techniques it uses to estimate their effectiveness. The wide range of practices encompasses nonstructural as well as structural practices, including programmatic measures such as lawn care education (Table 5-6).

Since literature value load reductions can rarely be achieved with any management practice, the WTM accounts for those deficiencies using a series of discount factors to reflect practice implementation. For structural practices, these factors reflect a lack of space or poor maintenance and can hamper practice effectiveness over time. For programmatic practices, they reflect incomplete adoption of the practice by watershed residents. In both of these cases, specific design features (in the case of the structural practices), or outreach techniques (in the case of an education program) can make the practice more or less effective.

Table 5-6 Management Practices in the WTM

Structural Practices	
Stormwater Treatment Practices (e.g., ponds and infiltration)	Stormwater Retrofits Channel Protection
Nonstructural and Programmatic Practices	
Lawn Care practices Street sweeping Riparian buffers Catch basin cleanouts	Marina Pumpouts Illicit connection removal CSO repair Septic system inspection/repair
Erosion and Sediment Control Lawn Care Education Pet Waste Education	Septic System Education Land Conversion Redevelopment with Improvements

The WTM accounts for the effects of future growth on pollutant loads, using future land use data (derived from a zoning map) and applying programs that will be in place to control runoff from new development. The resulting load from new development is then added to the "load with future management practices" to calculate the load including growth.

The updates to the WTM 2010 beta edition include the incorporation of runoff reduction, a description of the influence of turf and septic systems in more detail, and the addition of a "retrofit worksheet" that allows model users to describe individual storm water retrofit practices. Account for runoff reduction is a critical modification to the WTM because it brings to light the advantages of many low-impact development practices, which would otherwise receive very little credit. Assumptions for calculating runoff reduction were taken from Hirschman et al.[21]

The methods employed in modeling and in pollutant load reduction calculations are described in greater detail in Appendix F.

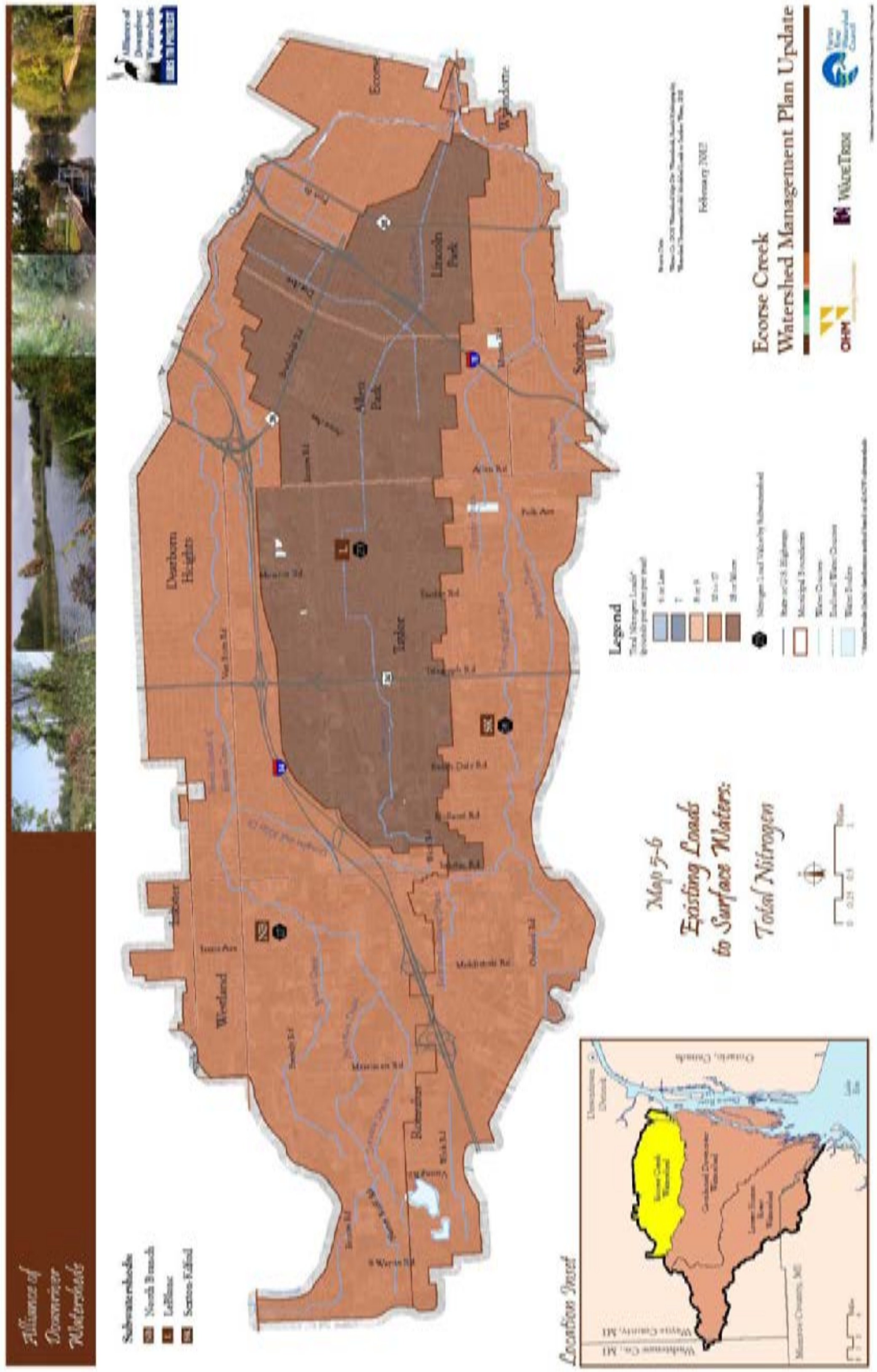
Modeled annual load estimates for total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS), fecal coliform, and runoff volume for the Ecorse Creek Watershed are presented in Table 5-7. Studies have shown that models that include all areas within a watershed tend to overestimate surface runoff and resultant pollutant loads. The higher values can be attributed to enhanced resolution of the storm water load and non-storm water load in the WTM that includes factoring in contributions from channel erosion.

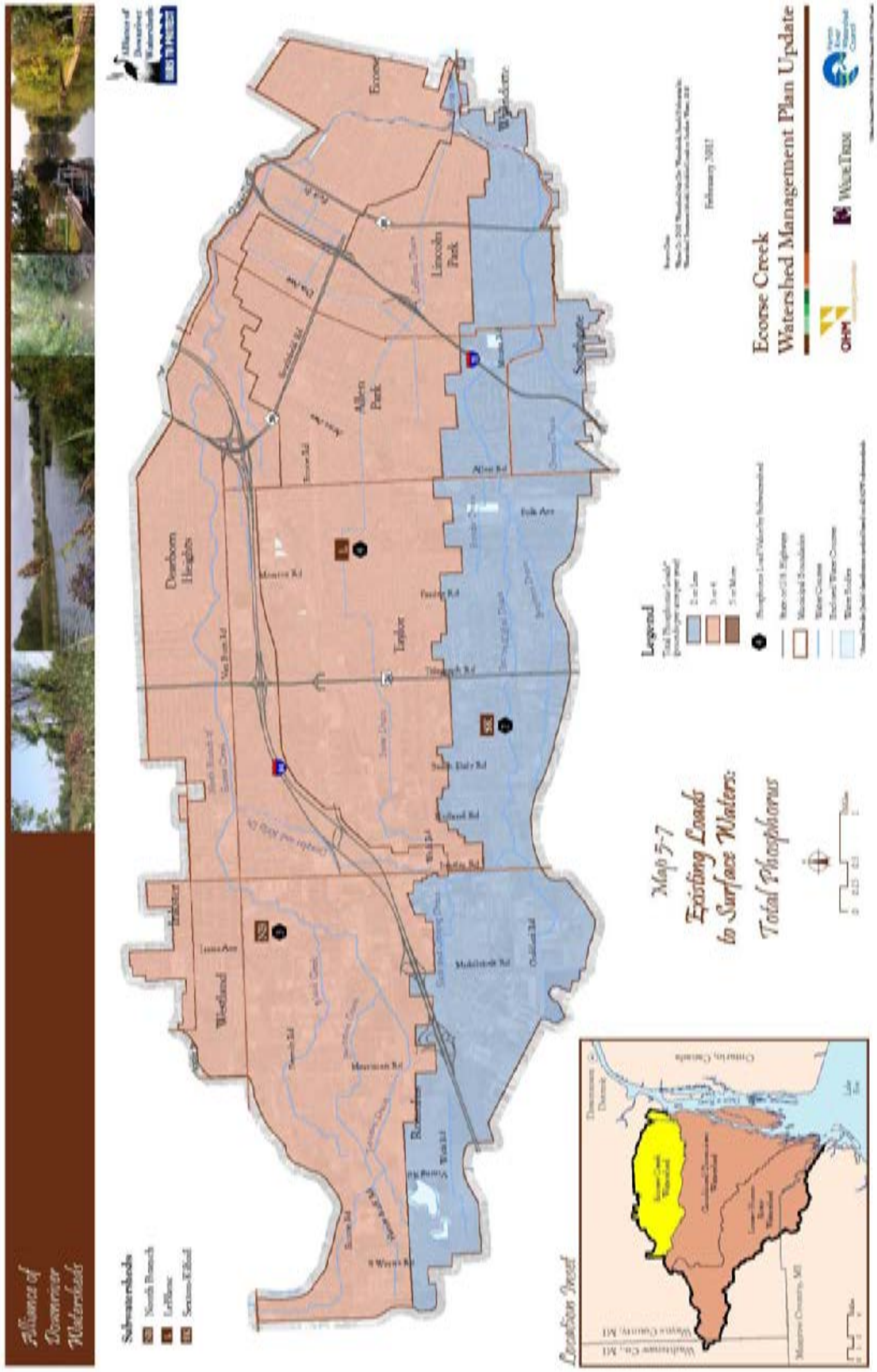
[21] Hirschman, D., K. Collins, and T. Schueler. 2008. Technical memorandum: the runoff reduction method. Prepared for the U.S. EPA Region V and the Office of Wetlands, Oceans and Watersheds. Ellicott City, MD: Center for Water Protection.

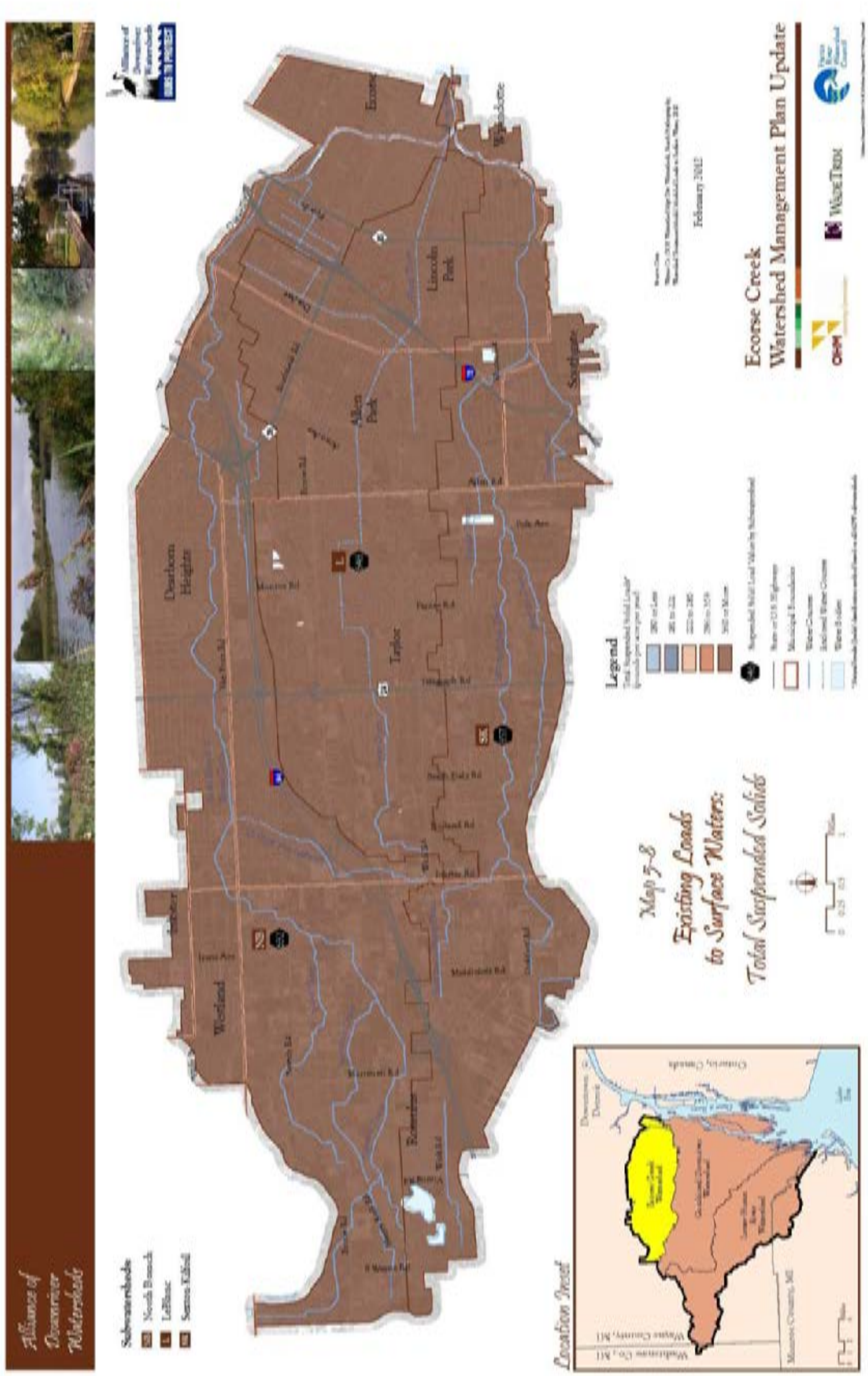
Table 5-7
Estimated Annual Pollutant Load Estimates for the Ecorse Creek Watershed
Total Impervious Area (TIA) (lb/yr/acre)

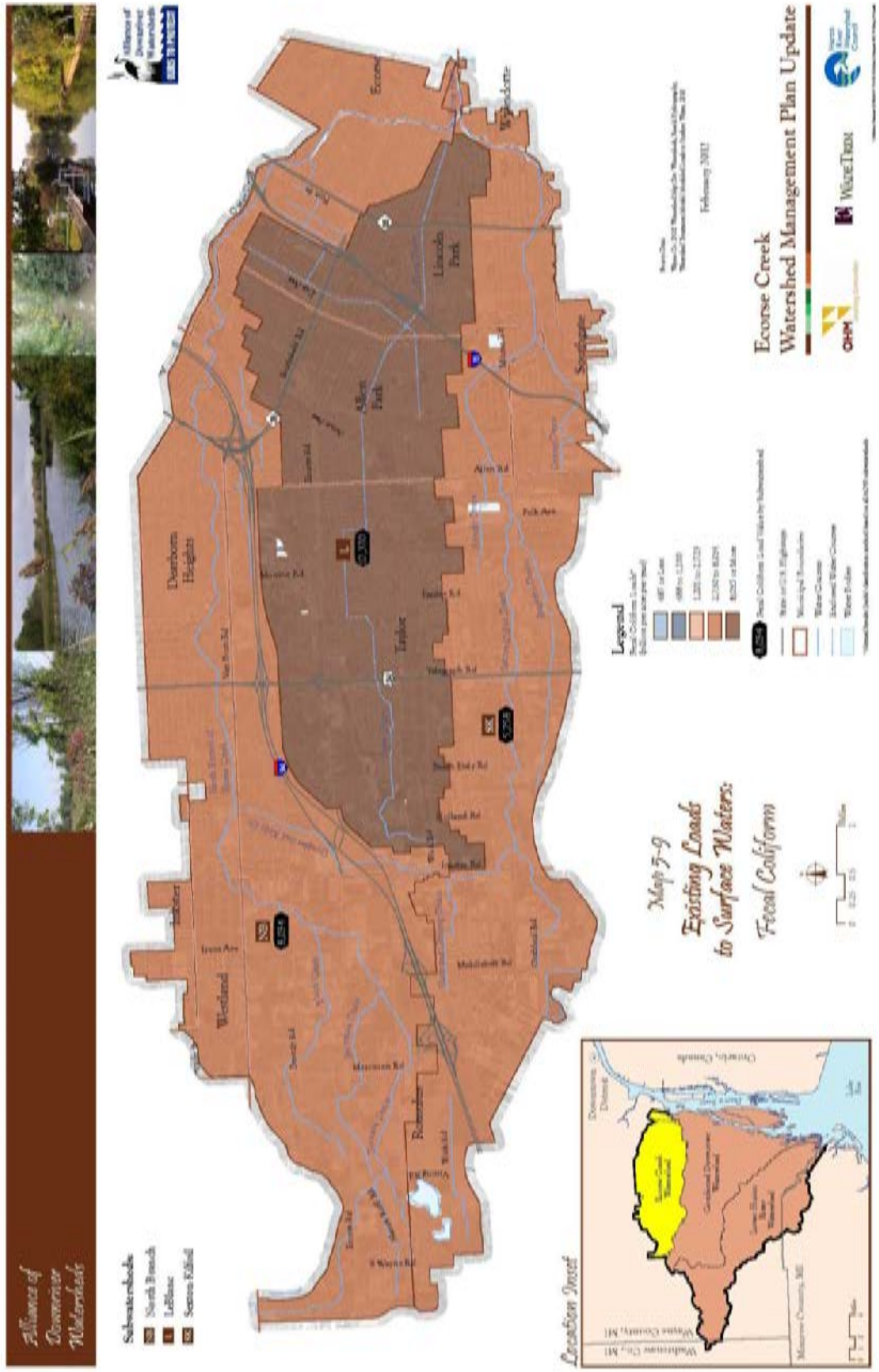
Existing Loads to Surface Waters					
Total Load to Surface Waters	**TN** lb/year/acre	**TP** lb/year/acre	**TSS** lb/year/acre	**Fecal Coliform** billion/year/acre	**Runoff Volume (acre-feet/year)**
Ecorse Creek					
North Branch	17	3	632	8,034	12,052
LeBlanc	23	4	646	12,370	9,221
Sexton-Kilfoil	13	2	657	5,258	8,592

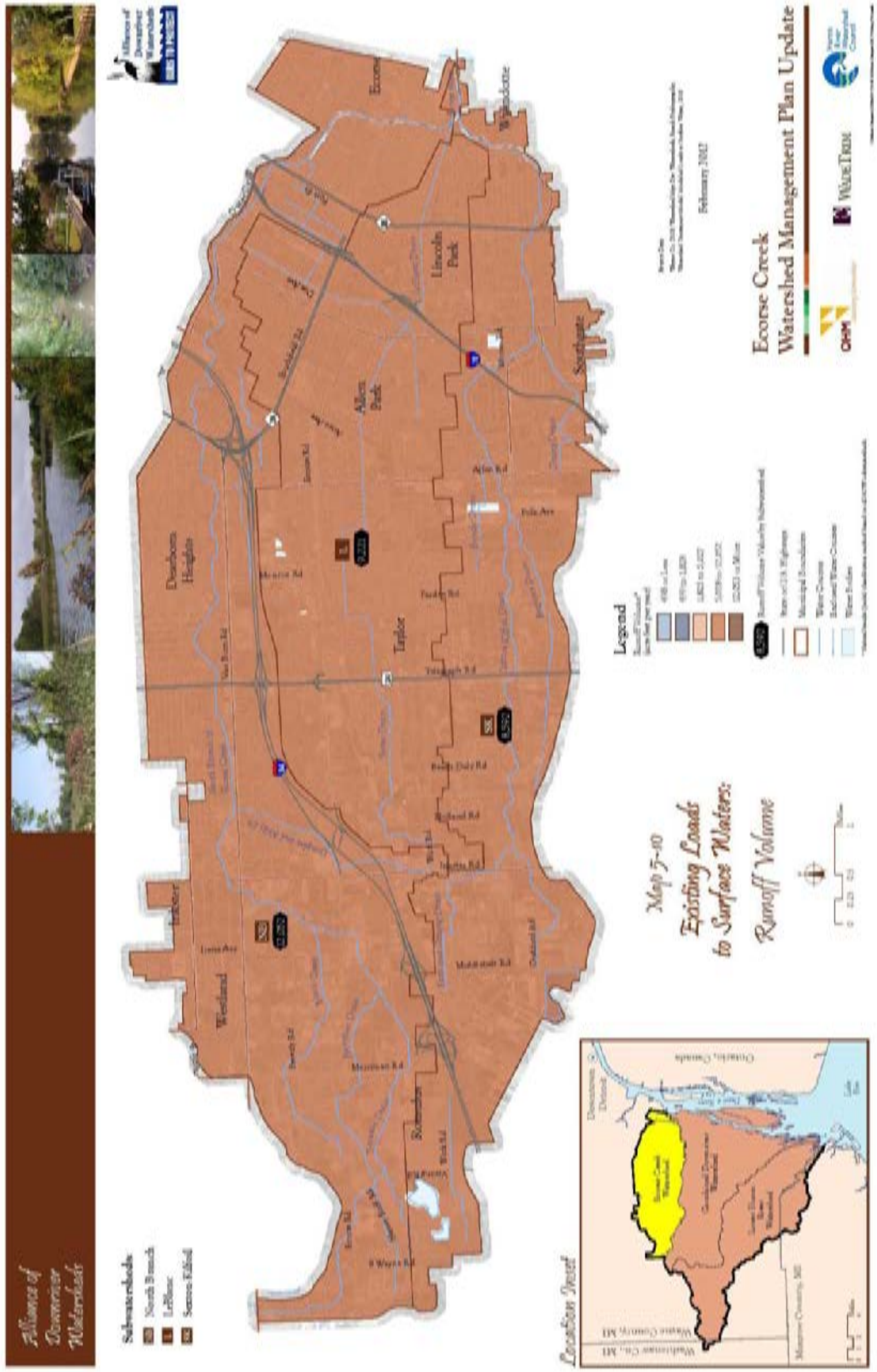
Daily pollutant loads being contributed by the studied subwatersheds were calculated in order to determine baseline conditions and prioritize critical subwatersheds. Critical areas based upon pollutant loads are shown in the following Maps (5-5 through 5-9). Analysis of the maps indicates pollutant loadings are, for several of the pollutants, fairly consistent across the watershed with the LeBlanc having higher Total Nitrogen and Fecal Coliform loadings, the Sexton-Kilfoil having higher TSS, and the North Branch seeing higher Runoff Volumes.


Map 5-6
Existing Loads
to Surface Waters:
Total Nitrogen
Ecorse Creek
Watershed Management Plan Update
Legend
Location Inset
Dearborn Heights
Taylor
Allen Park
Lincoln Park
Romulus
Westland
Inkster
Ecorse
Wyandotte
Southgate


Map 5-7
Existing Loads to Surface Waters:
Total Phosphorus
Ecorse Creek
Watershed Management Plan Update
Legend
Subwatersheds
Location Inset
Dearborn Heights
Taylor
Allen Park
Lincoln Park
Westland
Romulus
Southgate
Wyandotte
Ecorse
Inkster


Alliance of Downriver Watersheds
Map 5-8
Existing Loads to Surface Waters: Total Suspended Solids
Legend
Ecorse Creek
Watershed Management Plan Update
February 2012
Location Inset
Dearborn Heights
Taylor
Allen Park
Lincoln Park
Southgate
Ecorse
Wyandotte
Romulus
Westland


Map 5-9
Existing Loads to Surface Waters:
Fecal Coliform
Ecorse Creek
Watershed Management Plan Update
Legend
Subwatersheds
North Branch
LeBlanc
Location Inset
Dearborn Heights
Taylor
Allen Park
Lincoln Park
Westland
Romulus
Wyandotte


Map 5-10
Existing Loads to Surface Waters:
Runoff Volume
Ecorse Creek
Watershed Management Plan Update
Legend
Location Inset
Alliance of Downriver Watersheds
Dearborn Heights
Taylor
Allen Park
Lincoln Park
Southgate
Wyandotte
Ecorse
Westland
Inkster
Romulus
Subwatersheds
North Branch
LeBlanc
Sexton-Kilfoil
February 2012

5.4.5 Critical Areas For Flooding and Hydrologic Instability

Many of the watershed's water quality problems, the poor quality of in-stream habitat, and flooding problems are driven by the high amount of impervious surfaces within the watershed. Estimated categories of impervious cover were presented previously in Chapter 3. Map 5-10illustrates impervious surfaces and bare soil within the Ecorse Creek Watershed. This map was generated based upon the results of the Green Infrastructure Assessment the ADW completed in 2008. The Assessment was conducted using 2008 land cover data interpreted from USGS aerial photography. Land cover data was assessed to estimate stormwater storage capacity, air pollution removal and carbon sequestration of the existing green infrastructure in the ADW. Eventually this data will be used to estimate/track the increase in green infrastructure created by storm water/watershed restoration activities implemented by or facilitated through efforts of the ADW.

The Ecorse Creek Watershed is approximately 44% impervious surface (urban, urban bare) and approximately 56% green infrastructure (woody vegetation, open space). As discussed previously, Schueler classifies streams exhibiting greater than 25% imperviousness as unlikely to support designated uses.[22]

5.5 Estimated Pollutant Load Reductions

Potential reductions in annual loads stemming from the implementation of select actions and practices were estimated using information provided by the members of the ADW, published reports, and geographical information analysis and modeling using the Watershed Treatment Model.

The management practices for which there is sufficient quantitative information to allow modeling and estimation of pollutant reductions are a small subset of all available best management practices. Other, less quantifiable, but equally important actions should also be implemented, and some of these (e.g. public education) are required elements of the NPDES Phase II Stormwater permits held by the ADW communities and entities.

Chapter 6 presents the management practices and potential BMP projects selected by the communities. These activities were added to the Watershed Treatment Model and estimated pollutant reductions are shown in Table 5-8.

Table 5-8 Estimated Load Reductions from Existing Annual Pollutant Loads In the Ecorse Creek Watershed for Select BMPs (lb/yr/acre)

Reduction in Loads to Surface Waters w/ Future Practices					
Total Load to Surface Waters	TN lb/year/acre	TP lb/year/acre	TSS lb/year/acre	Fecal Coliform billion/year/acre	Runoff Volume (acre-feet/year)
Ecorse Creek					
North Branch	0.0105	0.0038	3.8310	0.8433	5
LeBlanc	0.0160	0.0057	5.8325	0.1539	3
Sexton-Kilfoil	0.0153	0.0055	5.5736	0.5624	11

[22] Schueler, T. 1994. The Importance of Imperviousness. Watershed Protection Techniques 1(3):100-111. Center for Watershed Protection. Ellicott City, Maryland.


Map 5-11
Critical Areas for Unstable Hydrology
Legend
Impervious Surfaces
Bare Soil
State or U.S. Highways
Municipal Boundaries
Water Courses
Enclosed Water Courses
Water Bodies
February 2012
Ecorse Creek
Watershed Management Plan Update
Location Inset
Alliance of Downriver Watersheds
Dearborn Heights
Allen Park
Lincoln Park
Ecorse
Wyandotte
Southgate
Taylor
Westland
Romulus
Inkster

5.5.1 Comparison to Anticipated Pollutant Reduction Target(s)

The Ecorse Creek TMDLs require increases in the macroinvertabrate and habitat scores using P-51 as well as achieving targets for *E. coli* in order to attain the partial body contact standard. A reduction in TSS loads is used as a secondary measure. TSS load reductions were calculated using available data and modeled BMPs and action items. It should be noted that TSS reductions could theoretically be met without increasing P-51 scores. The estimate for existing TSS load (Table 5-7) equals 1,936 lb./year/acre. A 50% reduction from this value would equal 968 lb./year/acre. The total of estimated pollutant removal attributed to implementation of BMPs at locations identified by Ecorse Creek Watershed members as well as estimated BMP implementation at private locations** equals 1,119,924 lb./year; a 6.25% reduction from existing loads. These estimated pollutant load reductions are based off of a 15-year timeline (2012-2026). As is detailed in Chapter 6, watershed communities identified specific projects that they desire to implement over the next 5 years (2012 – 2016). The acreage, number of installations, miles, etc. of the projects desired within the first 5 years was extrapolated an additional 10 years under the assumption that implementation projects would continue to occur at the same rate. In addition to BMPs on public properties, it has been assumed that BMPs on privately owned properties will take place at the same rate. Although these BMPs do not achieve the reduction targets, they are a step in the right direction and demonstrate a commitment by the ADW members to work toward achieving TMDL goals.

Table 5-9 Estimated Reduction in Loads to Surface Waters with Future Practices (2012 – 2026) (at both Public and Private Locations)

Estimated Reduction in Loads to Surface Waters w/ Future Practices (Public and Private)					
Total Load to Surface Waters	**TN lb/year**	**TP lb/year**	**TSS lb/year**	**Fecal Coliform billion/year**	**Runoff Volume (acre-feet/year)**
Ecorse Creek					
North Branch	2,642	947	963,439	212,084	101
LeBlanc	1,090	266	57,145	40,064	101
Sexton-Kilfoil	456	125	99,340	23,995	56
TOTAL	**4,188**	**1,338**	**1,119,924**	**276,143**	**258**

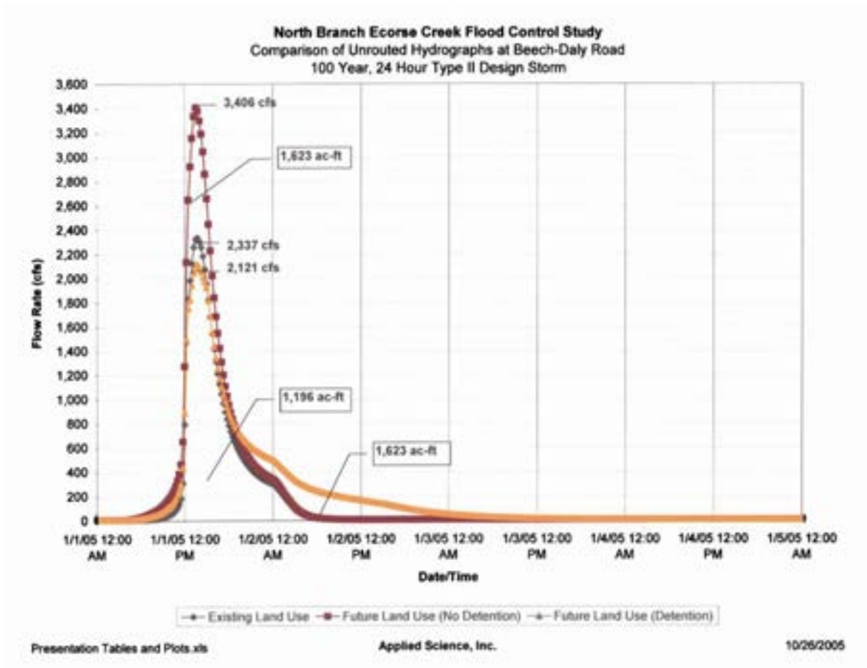
** Implementation of BMPs on privately owned property were estimated to be directly proportional to the amount of area of those anticipated at publicly owned locations.

Again, the BMPs modeled should not be considered the only best management practices that will assist communities in progress toward water quality goals. Public education, policy review and implementation of new or revised ordinances, demonstration of porous parking and paver materials, retro-fitting storm water treatment controls in areas of re-development, watershed wide tree planting programs, and other BMPs are underway and will lead to further reductions. The combined implementation of many management practices will contribute to pollutant reductions. The ADW will continue to evaluate progress of the Watershed Management Plans through a variety of means as is further described in Chapter 6.

At the outset of watershed planning efforts in the Ecorse Creek Watershed it was decided that quantitative evaluation of hydrology and flooding would be done separately by an on-going study of the North Branch of the Ecorse Creek (currently being conducted jointly by the US Army Corps of Engineers and Wayne County). Extrapolation from work performed to date in this study and from other watersheds, however, may provide insight into how the proposed BMPs may act to reduce peak flows or provide additional storage. Study of flooding in the Ecorse Creek North Branch is still underway. However, proposals for adding detention to the North Branch show a significant potential reduction in water grade lines (water surface elevations) following storm events and notable reductions in the extent of flooding.

Figure 5-2 presents how further increases in peak stream flows may be avoided even as watershed land use continues to intensify in the future. Figure 5-1 shows the effect of implementing the Wayne County Storm Water Ordinance for new development. Otherwise anticipated increases in storm flow peaks are reduced dramatically, almost to the point of current conditions.

Figure 5-2



6 Watershed Action Plan

North Branch
Near Banner Street

Chapter Contents

After gathering information and input from the various entities within the watershed, and reviewing current policies and programs that are in place, a variety of management alternatives were discussed to address the priority pollutants and causes and to work toward achieving the goals of the Watershed Management Plan. The following chapter highlights the ADW's plan for the next 5 years related to IDEP, Public Education, Monitoring, Planning and Reporting, as well as other storm water management activities. This chapter also summarizes a variety of related initiatives and efforts occurring in the area or region that have a direct effect on improving water quality and the quality of life in the region.

The ADW, including the Ecorse Creek Watershed communities have been working over the years to implement projects and activities that will have a positive impact on water quality, meet permit requirements, and document and measure progress. As is detailed in the ADW budget and financing plan, the ADW has organized its planned activities into one of five categories:

- Illicit Connection/Discharge Elimination Plan (IDEP)
- Public Education
- Progress Evaluation Monitoring
- Planning and Reporting
- Other Storm Water Management Activities

Each of these categories and a discussion of the plan for the next 5 years is on the following pages.

6.1 Illicit Connection/Discharge Elimination Plan (IDEP)

A major focus of the Alliance of Downriver Watersheds (ADW) is the elimination of illegal discharges to surface waters from illicit connections, illegal dumping, and lack of awareness. The Illicit Discharge Elimination Program (IDEP) directly results in the annual removal of significant quantities of raw sewage and other pollution which pose a threat to both human and aquatic life.

The Federal Clean Water Act was amended in 1987 to include municipal and other urban storm water discharges on the list of regulated sources of water pollution. In November 1999, the U.S. Environmental Protection Agency (EPA) promulgated Phase II of the National Pollutant Discharge Elimination System (NPDES) storm water regulations, which affects virtually all communities in southeast Michigan. One of the requirements of the federal Phase II NPDES storm water regulations and the MDEQ General Permit is to develop, implement, and enforce a program to eliminate improper connections to the storm sewer system and other improper discharges to surface waters. Within a given geographic area, multiple agencies (e.g., county, local unit of government, transportation agencies, etc.) typically have obligations and authority to manage storm water. An effective storm water management program, and particularly illicit discharge elimination efforts, requires a partnership between the County, local government, and other agencies that own, operate, or control storm water discharges within a given geographic area. The over 25 communities and agencies in the ADW have received coverage under the MDEQ storm water General Permit and have initiated the illicit discharge elimination program requirements of the permit.

The ADW, in collaboration with Wayne County staff, actively identifies and eliminates potential and existing improper discharges and sanitary sewer connections to storm water systems and open waterways. The Collaborative IDEP consists of 4 primary activities:

1. Coordinated Complaint Response
2. Staff Training
3. Visual Inspection During Routine Field Operations (to address seepage from sanitary sewers, on-site sewage disposal systems failures and illegal dumping)
4. County-Based Advanced investigations

Coordinated Complaint Response

The ADW members promote the use of the Wayne County Department of Public Services (WCDPS) telephone "hot line" (888-223-2363) to log and coordinate response to environmental complaints and concerns of all types. This effort is planned to continue.

Staff Training

The ADW also provides IDEP training for its members through the Wayne County IDEP Training Workshop. These workshops are typically held annually and provide technical information including identification and reporting of suspicious discharges observed during routine field operations, advanced investigation case studies, a "hands on" problem solving exercise, an examination, and a certificate of successful completion. Training will continue to be offered on an annual basis.

Advanced Investigations

County-based Advanced Investigations techniques include dry weather screening and mapping of points of storm water discharge to waters of the State as well as commercial, industrial and institutional facility dye-testing. These activities are focused in areas that have previously been identified as problem areas through in-stream IDEP investigative monitoring. Illicit discharges and connections are identified by dye testing facility sanitary sewer fixtures, observing “housekeeping” issues, and looking for signs of illicit discharges or material handling/storage practices that may allow material to migrate to a storm drain or watercourse. Facilities found to have improper sanitary sewer connections or illicit discharges to the storm sewer system, or to an open waterway, are notified. Follow-up work with facility owner/managers and local community staff to ensure corrective actions are taken and compliance with federal, state, and local regulations is achieved. Part of this effort includes education and technical assistance to businesses and facility staff regarding storm water pollution prevention. The ADW has been doing a significant amount of this work (through Wayne County) due to grant funding received. These advanced investigations are planned to continue based on funding availability over the next 5 years.

Finally, all onsite sewage disposal systems (OSDS) in Wayne County are subject to regular inspection via the Onsite Sewage Disposal System Management Ordinance. This ordinance requires inspection of systems at the time of property transfer. The ordinance also requires a septic tank evaluation report at each clean out that identifies the condition of the tank, quantity of sewage pumped out and disposal site.

6.2 Public Education

The ADW Public Education strategy for the ADW as a whole (outside of communities’ individual commitments as documented in their SWPPIs) is categorized into 3 primary activities:

- Distribute Pollution Prevention Literature
- System Labeling and Signage
- Volunteer Efforts

Each year, the ADW sets aside a portion of their dues for public education efforts and each year, the ADW Public Education Committee develops a plan based on the dollars available. Over the next 5 years it is anticipated that the ADW will continue these efforts as outlined below:

Distribute Pollution Prevention Literature

Continue to provide funds for pollution prevention literature (i.e. 7 simple steps, pet waste tip card, earth friendly stickers, 24-hour hotline card) to be distributed to the ADW members. Literature is printed and distributed by Wayne County to the ADW member communities for further distribution. In addition, the ADW is working to specifically target elementary and/or middle schools in the watershed for pollution prevention literature distribution.

System Labeling and Signage

Several years ago, with the assistance of the Detroit Riverkeeper, the ADW focused on a labeling campaign of storm water inlets with “No Dumping” stickers. Thousands were placed throughout the ADW. In 2010, the ADW switched the focus to the installation of “Entering Watershed” and “Creek Crossing” signs. ADW funds were used to coordinate a sign ordering program as well as coordination by Wayne County to get ordered signs made and installed. It’s anticipated that the signage program will continue for the next several years.

Volunteer Efforts

The Alliance of Downriver Watersheds partners with several agencies to assist with a variety of volunteer efforts. This includes significant volunteer coordination efforts by Wayne County. Wayne County and the ADW continue to recruit and support the involvement of the *Downriver Citizens for a Safe Environment - Stream Team* teachers and schools in the benthic macroinvertebrate monitoring efforts as well as in watershed restoration activities including riparian corridor management and grow zones projects. Wayne County is also administering the Michigan Green Schools Program within the ADW. In 2010, fourteen schools within the ADW were recognized by Wayne County as Green Schools based on their voluntary efforts to be "Green". Volunteer efforts and opportunities are also coordinated with the Detroit Riverkeeper, Friends of the Detroit River, and the Dearborn Heights Watershed Stewards. The Huron River Watershed Council is also heavily involved with the ADW. The HRWC organizes and facilitates a number of volunteer efforts throughout the watershed with a particular focus in the Lower Huron River Watershed and Friends of the Woods Creek. These partnerships and volunteer efforts are anticipated to continue over the next 5 years and beyond.

6.3 Progress Evaluation Monitoring

The Alliance of Downriver Watersheds (ADW) has been engaged in environmental monitoring since its inception in 2006. At that time, the initial monitoring program was developed based on strategies developed in the original Watershed Management Plans (2007). The ADW monitoring has continued to operate on this basis, with specific details established by the ADW's Technical Committee. Some of this monitoring has been in response to grant projects, but much has been collected using ADW budget funds. The following monitoring strategy has been developed with details to be refined by the ADW Technical Committee each year.

The monitoring strategy includes the monitoring and analysis of the following elements:

- Precipitation
- Stream Discharge/Flow
- Water Temperature
- Stream Channel Geomorphology
- Macroinvertebrate Monitoring
- Land Cover/Green Infrastructure
- MDEQ Fish, Macroinvertebrates, Habitat and Water Quality
- Water Quality

Each of the elements is detailed on the following pages and summarized in the Five-year Monitoring Plan Table 6-1.

Precipitation

Currently, five weather stations are operated in or near ADW watersheds. The station with the longest and most consistent record is located at the Detroit-Wayne Airport. Other stations are operated independently in Flat Rock, Woodhaven, Southgate, and Taylor. These stations provide critical precipitation data on a sub-hour basis that is useful for relating to other collected data. The data needs to be downloaded and processed for use, but this activity comes at little overall cost to the ADW and should continue.

Stream Discharge/Flow

Stream discharge data, coupled with water quality data can be used in pollutant modeling and pollutant loading calculations to determine areas where storm water pollution remediation efforts need to be undertaken. Discharge also impacts stream habitat for aquatic organisms, and can scour banks and stream bottoms. Much of the efforts and projects the ADW will engage in overtime are designed to store or infiltrate storm water and reduce large flow peaks. Therefore, discharge monitoring should continue in each watershed until the established targets are met and until stable aquatic life communities are established and maintained.

Seven stream gages are currently operated continuously in the watershed. One is operated by USGS (North Branch of Ecorse Creek) all year, and six others are operated by Wayne County and the Huron River Watershed Council (HRWC), roughly April through October. Theses gages are installed at the beginning of each monitoring season and removed prior to freeze over. The gages can be relocated relatively easily. Six of the gages have been in operation for three seasons following the 2010 season. With the exception of moving one gage from Woods Creek to the Smith Drain, all gages are recommended to remain for 2011 in order to gather one more year of data. Gage locations for 2012 and beyond will take place at the Technical Committee level to determine if it is desirable to monitor other locations. The operation and maintenance of the USGS gages is no direct cost to the ADW. The other six stations require staff support to install, download data, calibrate, and maintain. Minimal extra equipment cost is required. Original monitoring sites should be revisited after a five-year period to measure any change. Alternatively, the ADW could choose to remove or reduce the extra stations (to save cost) and return to original sites at a later time.

Water Temperature

Water temperature data, tracked over the summer, provides information about the habitat suitability for different fish and other aquatic wildlife. It is measured at the six flow gages operated by the ADW at little additional cost.

Stream Channel Geomorphology

Stream bank erosion has been identified as a major problem within ADW watersheds, but it is a difficult problem to measure. Using stream channel geomorphology field measurement techniques (as instructed by Joe Rathbun, MDEQ), and the Tractive Force calculations, Wayne County has assessed stream channel stability at 14 sites across the watershed through the 2010 season. This resulted in stream channel profiles and measurements of stream slope and substrate composition. These measures are used to estimate the stream stability as degrading (eroding), stable or aggrading (filling with sediment).

Geomorphology measurements require several hours of trained staff support, using already purchased equipment, and an amount of data entry and analytic time. It is recommended that the current level of effort (7 sites per year) continue until all (or most) macroinvertebrate sites are evaluated. This will require four – five years total. Then, return measures should be made on a 5-year return basis. This will provide channel stability measurements across the watershed, as well as, stabilizing or destabilizing trends over time. Wayne County will work with Stream Teams and others to encourage the participation and involvement of students and other volunteers in these efforts to further promote awareness and stewardship in the watershed. In 2011, the 7 sites completed in 2010 will be revisited to ensure results and determine usefulness of data.

Macroinvertebrate Monitoring

Macroinvertebrate density and diversity data are used as indicators for stream habitat and water quality. Data collection efforts have historically occurred three times a year (spring and fall for macroinvertebrates and winter for stoneflies) by Wayne County staff and Stream Team volunteers, who are organized by Wayne County and HRWC. This sampling currently occurs at 28 sites. Although much of the data is collected by volunteers, data is collected under a quality assurance plan. This data collection not only provides historical water and habitat quality conditions based on the presence of certain aquatic organisms, but also provides opportunities for public involvement. The use of volunteers is cost-effective and provides a broad, long-term, general assessment of conditions. Therefore, it is suggested that macroinvertebrate sampling continue in the watershed to provide stakeholders an overall assessment of conditions at multiple locations within each watershed and to promote stewardship within the watershed.

Land Cover/Green Infrastructure

Land cover mapping allows for an analysis of aerial photography to determine the extent of pervious (green) and impervious (gray) land cover across the watershed. A complete land cover fly over was completed and classified in 2008-09. A Green Infrastructure analysis was conducted at that time as well to measure the performance and value of green infrastructure in providing storm water benefits. This data can also be used on a project-level basis to estimate water quality and storm water benefits. Looking forward, this data will provide the ADW with a method to evaluate the impact of future development using traditional engineering methods verses more “green” engineering methods. The ADW does not need to perform additional land cover data collection for another five to ten years (to conduct a change analysis), or 2014 - 2019, thus no further investment is anticipated until that time.

MDEQ Fish, Macroinvertebrates, Habitat and Water Quality

MDEQ has established a five-year rotational watershed monitoring schedule, in which MDEQ field staff focus on selected watersheds in a given year and select sites for measurement of macroinvertebrates, habitat assessments and limited water quality parameters. Ecorse Creek and Downriver watersheds were last sampled in this way in 2006 and are scheduled again for 2011. The Lower Huron was monitored in 2007 and is scheduled again for 2012. ADW should provide input to the DEQ and DNR to suggest selection of sites consistent with ADW sites to provide a basis of comparison of methods and statewide trends. Fish assessments are done on a less predictable basis. This monitoring comes at no cost to the ADW.

Water Quality

Over 30 sites were sampled for a range of water chemistry parameters in 2007, as part of a grant project. These sites were sampled during dry weather (low flow) conditions and the focus was illicit discharge detection. Parameters included ammonia, detergent, conductivity, total phosphorus, TSS, and E. coli. Each site was sampled five times at irregular intervals. No assessment of loading or subwatershed assessments were conducted at that time. Additionally, the MDEQ contracted the collection of E. coli data across Ecorse and Combined Downriver sites to develop TMDLs for those watersheds in 2008. The lack of chemistry data presents a significant gap in monitoring coverage. The ADW should consider adding a program to select a subset of sites to conduct regular dry and wet-weather sampling and supplement with wet weather event sampling and investigation of storm water hot spots, based on the existing water quality data set. This will be investigated (in terms of approach and cost) in 2011 to determine what, if any, water quality monitoring can be accomplished by the ADW.

Evaluation

The monitoring strategy will be evaluated each year following data analysis and reporting. Each year the ADW Technical Committee will meet prior to the Spring/Summer monitoring season to evaluate the success of previous years and the long-term monitoring strategy. At that time, each of the monitoring parameters (described above) will be considered for the value of the information they provide to evaluating two overarching measures:

1. The degree to which the parameter informs the ADW about the status and trends of overall watershed health as compared to standard state and national benchmarks; and/or
2. The ability of the parameter to evaluate the success or failure of implementation projects and other watershed management efforts.

In addition to the parameters measured, additional aspects of the monitoring program will be evaluated including monitoring sites, measurement protocols and frequencies, analytical processes and the reporting framework. Monitoring sites will be re-evaluated for accessibility and measurability and overall representativeness of general watershed conditions. Protocols will be reviewed for improvement of implementation and compared to any new developments in monitoring procedures nationally. In this way, the monitoring program will be adaptive to the data and information needs of the ADW and other stakeholders, field conditions and new innovations and developments.

Table 6-1 summarizes the 5-year Monitoring Plan for the ADW (2010 – 2014).

6.4 Planning and Reporting

Planning and Reporting activities for the ADW consists of 4 primary items:

- ADW Operations
- Website
- Annual Report
- Grant Writing

Regularly scheduled ADW meetings, including sub-committee meetings, to provide information to ADW members and to take action on budgets, direction, grant applications, etc. will continue. The ADW as a whole typically meets on a quarterly basis and are anticipated to continue to do so.

This category also includes the regular maintenance of the ADW website which is anticipated to be a continued effort over the next 5 years. (www.allianceofdownriverwatersheds.com).

The ADW plans to continue to develop an annual report each October to summarize the efforts of the ADW (both permit requirements and non-permit required activities). The ADW Annual Report is typically included as an attachment to each entities annual report that is submitted to the MDEQ.

Grant writing tasks are budgeted for and will continue over the next 5 year period. The ADW has been successful in obtaining grant funds over the past several years, leveraging the pooled ADW funds together. The ADW will continue to seek outside funding sources to assist in implementing the Storm Water Management and Watershed activities identified in this Watershed Management Plan.

Table 6-1

Five Year Monitoring Plan Summary (2011-2015)
Ecorse Creek, Combined Downriver, and Lower Huron River Watersheds

Monitoring Activity	Proposed Responsible Party	Sites/Frequency/Season	Year Performed				
			2011	2012	2013	2014	2015
Planning & Reporting							
ADW develops/refines monitoring plan	ADW Facilitator	Not applicable	X	X	X	X	X
Data Handling, Data Management & Analysis	WQD/HRWC	Not applicable	X	X	X	X	X
Prepare Monitoring Report/Brochure/Press Release	ADW	Not applicable				X	
Physical Monitoring							
Precipitation	Communities	April - Oct at 5 sites	X	X	X	X	X
Flow	HRWC/WQD/USGS	April - Oct at 7 sites	X	X	X	X	X
Temperature	HRWC/WQD	April - Oct at 6 sites	X	X	X	X	X
Geomorphology/stream classification	HRWC/Stream Team/WQD	28 sites, 5-year returns	X	X		X	X
Biological Monitoring							
Macroinvertebrates	HRWC/Stream Team/WQD	3x per year at 28 sites	X	X	X	X	X
Green Infrastructure Monitoring	WQD	Across ADW					X
Fish, Macroinvertebrates, Habitat	MDNRE	As selected by MDEQ/DNR	X	X	?	?	?
Water Quality							
Dissolved Oxygen (DO)	ADW	April - September at 10 sites 2x per month		X	X	X	X
E. Coli	MDNRE	April - September at 10 sites 2x per month; wet event sampling		X	X	X	X
Total Phosphorus (TP)	ADW	April - September at 10 sites 2x per month; wet event sampling		X	X	X	X
Total Suspended Solids (TSS)	ADW	April - September at 10 sites 2x per month; wet event sampling		X	X	X	X
Public Education/Involvement							
Public Survey	SEMCOG	Not applicable		?	?		
Summary of Volunteer Restoration Efforts	HRWC/Stream Team/WQD	Not applicable	X	X	X	X	X
Pollution Prevention							
Illicit Discharges Identified & Eliminated	WQD/Communities	Not applicable	X	X	X	X	X

HRWC = Huron River Watershed Council
WQD = Wayne County Department of Public Works, Water Quality Division
USGS = United States Geological Survey
MDEQ = Michigan Department of Environmental Quality
DNR = Michigan Department of Natural Resources
SEMCOG = Southeast Michigan Council of Governments

6.5 Other Storm Water Management Activities

As part of the 2010 WMP Update, each community within the watershed identified a number of projects that they would like to implement if funding is available (outside of permit requirements). This information was collected through a series of meetings with the individual communities. Storm Water Management Activities and best management practices were categorized into one of 16 categories:

- Green Roof
- Green Street
- Porous Pavement Installation
- Grow Zones/Native Plantings/Rain Gardens
- Bank Stabilization/Restoration of Bank or Riparian Features
- Culvert/Bridge Replacement
- Storm Water Detention/Retention
- Increase Floodplain
- Public Education/Stewardship
- Hydrodynamic Separators (Vortechnics/Stormceptor)
- Land Acquisition or Conservation Easements
- Water Efficiency
- Comprehensive Street Tree Planting Program
- Water Harvesting/Reuse
- Downspout Disconnection Program
- Other

The best management practices identified above are described in further detail in Chapter 5.

Table 6-2. identifies (in years 1 through 5) which communities within the Watershed are proposing to implement BMPs and what year they would like to do so (if funding is available). It's anticipated that this table and the identified projects will be utilized for developing grant applications in the coming years. Map 6-1. geographically illustrates this information. Table 6-2 also summarizes BMP implementation activities for a longer timeline (years 6 through 15). For years 6 through 15, specific locations have not been identified, however, the desired area or amount of implemented BMPs in terms of size has been noted (as was used in the Model in Chapter 5).

Table 6-2

Best Management Practices by ADW Members in the Ecorse Creek Watershed

Best Management Practice	Year 1 2012	Year 2 2013	Year 3 2014	Year 4 2015	Year 5 2016	Years 6-15 2017-2026
Green Roof			No acreage within EC boundaries			
Romulus Proposed Fire Station			X			
Southgate DPW Building		X				4
Wayne Co Central Maintenance Yard					X	acres
Wayne Co Downriver WW Treatment Facility			X			
Green Street			14 Acres			
Southgate - High School/Nature Center				X	X	28
Taylor - Wick Road		X	X	X	X	acres
Porous Pavement			11.7 Acres			
Dearborn Heights Eton Rec Center			X	X	X	
Dearborn Heights DPW Parking Lot			X	X	X	
Ecorse City Hall Parking Lot			X	X		
Southgate City Complex				X	X	
Taylor Meadows Parking Lot		X	X			
Taylor Conservatory		X				
Taylor Wick Road		X	X	X	X	23.4
Wayne Co Central Maintenance Yard					X	acres
Wayne Co Goddard Yard			X			
Wayne Co Sibley Yard			X			
Wayne Co Elizabeth Park			X			
Wayne Co New Boston Yard			X			
Wayne Co Downriver WW Treatment Facility			X			
Wyandotte School Track	X					

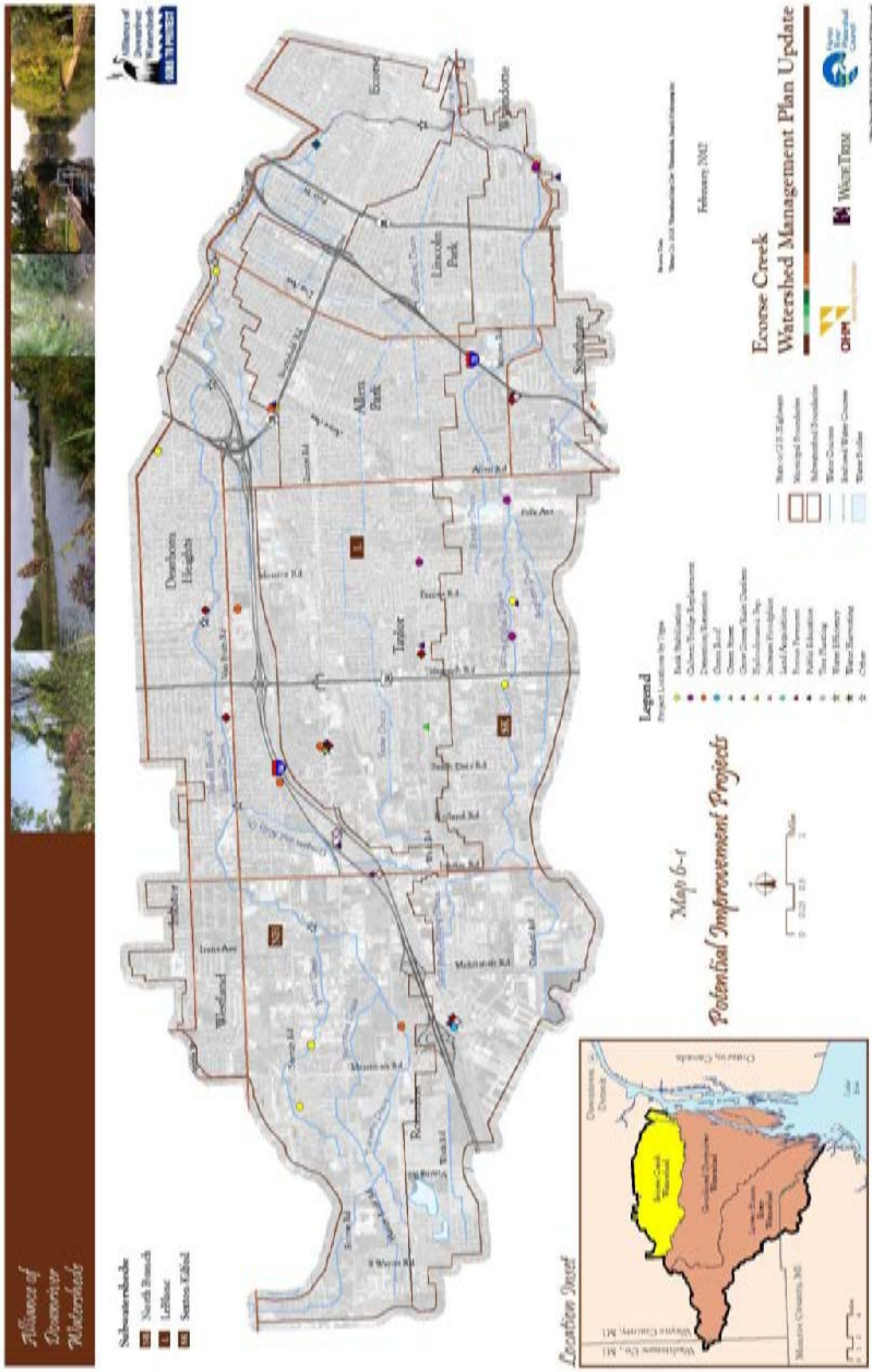
Best Management Practice	Year 1 2012	Year 2 2013	Year 3 2014	Year 4 2015	Year 5 2016	Years 6-15 2017-2026
Grow Zones/Rain Garden			8.5 acres			
Allen Park City Complex			X	X	X	
Dearborn Heights District Wide - Residential	X	X	X	X	X	
Ecorse City Hall Parking Lot			X	X		
Ecorse School District		X	X			
Romulus Animal Shelter	X					
Romulus Proposed Fire Station			X			
Southgate "The Gate" Golf Course		X	X	X		
Southgate City Complex		X	X	X		
Taylor Lakes of Taylor/Taylor Meadows (2)		X	X	X		
Taylor Conservatory			X			
Taylor Midtown Walkway		X	X			17 acres
Taylor Wick Road		X	X	X	X	
Wayne Co Inkster Rd at I-94	X					
Wayne Co Ecorse Rd at I-94	X					
Wayne Co Misc Road ROWs		X				
Wayne Co Elizabeth Park		X				
Wayne Co Central Maintenance Yard		X				
Wayne Co Goddard Yard		X				
Wayne Co Sibley Yard		X				
Wayne Co New Boston Yard		X				
Wayne Co Downriver WW Treatment Facility		X				

Best Management Practice	Year 1 2012	Year 2 2013	Year 3 2014	Year 4 2015	Year 5 2016	Years 6-15 2017-2026
Bank Stabilization			0.4 miles			
Dearborn Heights Croissant Ave at Bridges		X	X	X		
Melvindale Ecorse Creek from Laurence to Frank		X	X	X	X	
Romulus Elementary				X		
Romulus Black Creek Restoration				X		
Southgate Frank and Poet at Former State Reg. Ctr	X	X				
Southgate Frank and Poet West of Dix-Toledo	X	X				
South Rockwood Dodge Park West End of Huron River	X	X				0.8 miles
Taylor Midtown Walkway		X	X			
Taylor Sexton Kilfoil - Beech Daly to Pelham		X	X	X	X	
Taylor Frank and Poet at Gibraltar Trade Ctr			X	X	X	
Taylor Frank and Poet at Southland Mall		X	X	X		
Wayne Co - Drain ROWs Petitioned by LUGs		X				
Wayne Co Elizabeth Park Shoreline Protection		X				
Culvert/Bridge Replacement			10 locations			
Lincoln Park Harrison Bridge at River Drive		X				
Romulus McBride Drain at Huron River Dr		X				
Taylor Katherine/Williams/Jackson			X	X	X	
Taylor Sexton Kilfoil at RR - W of Pelham		X	X	X		20 locations
Taylor Sexton Kilfoil (Telegraph-Pardee)		X	X	X		
Taylor Blakely Drain at Beech Daly		X	X	X		
Taylor Frank and Poet between Seaway & I-75		X	X	X		
Wayne Co Road ROWs Petitioned by LUGs		X				
Detention/Retention			49.6 acres			
Allen Park City Complex			X	X	X	
Ecorse City Hall Parking Lot			X	X		
Romulus Smith/Middlebelt Regional Detention; NB EC				X		
Southgate E of I-75, N of Northline	X	X				99.2 acres
Southgate Former Reg. Center N of Pennsylvania			X	X		
Taylor Meadows		X	X			
Taylor I-94/Beverly Brownfield			X	X	X	
Taylor Jolly Rogers Site - S of Van Born, N of I-94			X	X	X	
Wayne Co Drain ROWs Petitioned by LUGs		X				

Best Management Practice	Year 1 2012	Year 2 2013	Year 3 2014	Year 4 2015	Year 5 2016	Years 6-15 2017-2026
Increase Floodplain			5 acres			
Southgate Nature Center			X	X		
Taylor Laing Park - Recreational Camping		X	X	X		10 acres
Taylor Lakes of Taylor		X	X	X		
Wayne Co Drain ROWs Petitioned by LUGs		X				
Public Education						
Ecorse Coordinating with School District	X	X				
Lincoln Park Ecorse Creek Cleanup	X					
Wayne Co Green School Grow Zones and Tree Plantings		X				
Wayne Co Home Owner Outreach - Grow Zones		X				
Wayne Co Stream Team Bug Hunts		X				Continue Program
Wayne Co Green Projects Virtual Tour		X				
Wayne Co Student Volunteer Geo/Flow Monitoring		X				
Wayne Co LI-LID Advertisements		X				
Wayne Co Green Schools - Bugs in a Bucket		X				
Wayne Co River Bend Outreach		X				
Hydrodynamic Seperators			11 installations			
Allen Park City Complex			X	X	X	
Dearborn Heights Watershed Stewards	X	X	X	X	X	22 installations
Melvindale Rialto Street Outlet				X	X	
Romulus Proposed Police Station					X	
Land Acquisition			5 acres			
Romulus Eureka/Huron River Drive W of I-75					X	10 acres
Taylor Eureka Drain by Taylor Lanes			X			
Wyandotte S of Golf Course/Extend Golf Course			X	X	X	
Water Efficiency			4 locations			
Romulus City-wide Ratio-Read Water Meters	X	X	X			
Romulus Low-Flow Fixtures for Proposed Fire and Police Bldgs			X	X	X	8 locations
Southgate City Complex/Ice Arena			X	X		
Taylor Golf Courses - Sprinklers			X	X		

Best Management Practice	Year 1 2012	Year 2 2013	Year 3 2014	Year 4 2015	Year 5 2016	Years 6-15 2017-2026
Tree Planting			500 trees			
Allen Park City-wide	X	X	X	X	X	
Ecorse City-wide	X	X	X	X	X	
Lincoln Park City-wide	X					
Melvindale City-wide	X	X	X	X	X	
Romulus City-wide	X	X	X	X	X	
Southgate City-wide	X	X	X	X	X	
Taylor City-wide	X	X	X	X	X	
Wayne Co Inkster Rd at I-94	X					
Wayne Co Ecorse Rd at I-94	X					1,000 trees
Wayne Co Misc Road ROWs		X				
Wayne Co Elizabeth Park		X				
Wayne Co Central Maintenance Yard		X				
Wayne Co Goddard Yard		X				
Wayne Co Sibley Yard		X				
Wayne Co New Boston Yard		X				
Wayne Co Downriver WW Treatment Facility		X				
Westland City-wide	X	X	X	X	X	
Wyandotte City-wide	X	X	X	X	X	
Water Harvesting			1.5 acres			
Allen Park City-wide	X	X	X	X	X	
Dearborn Heights City-wide	X	X	X	X	X	
Ecorse City-wide	X	X	X	X	X	
Lincoln Park City-wide	X					
Melvindale City-wide	X	X	X	X	X	
Romulus City-wide	X	X	X	X	X	3.0 acres
Romulus Senior Center at Community Gardens		X				
Southgate City-wide	X	X	X	X	X	
Taylor City-wide	X	X	X	X	X	
Westland City-wide	X	X	X	X	X	
Wyandotte City-wide	X	X	X	X	X	

Best Management Practice	Year 1 2012	Year 2 2013	Year 3 2014	Year 4 2015	Year 5 2016	Years 6-15 2017-2026
Other						
Allen Park Downriver Linked Greenways	X	X	X	X	X	
Allen Park North Branch Ecorse Creek Project	X	X	X	X	X	
Dearborn Heights North Branch Ecorse Creek Project	X	X	X	X	X	
Dearborn Heights City Park Areas; 1/2 Mile	X	X	X	X	X	
Ecorse Downriver Linked Greenways	X	X	X	X	X	
Ecorse North Branch Ecorse Creek Project	X	X	X	X	X	
Melvindale Downriver Linked Greenways	X	X	X	X	X	
Melvindale North Branch Ecorse Creek Project	X	X	X	X	X	
Romulus Downriver Linked Greenways	X	X	X	X	X	
Romulus North Branch Ecorse Creek Project	X	X	X	X	X	
Taylor Downriver Linked Greenways	X	X	X	X	X	
Taylor North Branch Ecorse Creek Project	X	X	X	X	X	
Wayne Co North Branch Ecorse Creek Project	X	X	X	X	X	
Wayne Co Pump Station GI/LID Retrofit Projects					X	
Wayne Co Flow Monitoring		X				
Wayne Co Benthic Monitoring		X				
Wayne Co Geomorphology Monitoring		X				
Wayne Co International Wildlife Refuge (Habitat/Naturalist Program)		X				
Wyandotte Transient Marina - Clean-up/Recreation	X	X	X			
Wyandotte Low RR Crossing W of Biddle					X	
Wyandotte Water Trail Signage/Markers	X	X	X	X	X	
Wyandotte Downriver Linked Greenways	X	X	X	X	X	



Ecorse Creek Watershed Management Plan

The management activities identified in Table 6-2 are further defined in Table 6-3 in order to assist the ADW and other interested parties in developing project proposals and tracking implementation of this Watershed Management Plan. In addition, the US EPA expresses the need for this information in its Nine Minimum Measures for Watershed Management Plans seeking eligibility for Section 319 funding. Table 6-3 focuses on the next 5 years, 2012 – 2016. For the 10 years after 2016, it has been estimated that the ADW members will complete projects at the same rate as the initial 5 years of the plan. It is anticipated that for years 2017-2026, the ADW members will continue to focus on implementing and encouraging Low Impact Development (LID) practices and Green Infrastructure projects on both public and private property within the watershed.

Table 6-3
Management Activities for the Ecorse Creek Watershed (Public Projects Only)

#	Implementation Activities	Entity Responsible for Meeting Management Objective	Schedule Short-Term 0-5 yrs; Long-Term 6-15 yrs	Measurable Indicators / Performance Measures	Monitoring and Party Responsible for Monitoring	Public Involvement, Outreach or Education Component	Technical, Financial and Regulatory Assistance Needed	Cost Estimate
1	Continue Coordinated Monitoring System	ADW, HRWC, Wayne County, WQD, MDNR, MDEQ	Detailed plan in place for 2012 – 2016. ADW assumes monitoring will continue after 2016, but no plan in place at this time.	Aquatic Macroinvertebrates, Stream Habitat, Fish, Stream Flow, Geomorphology, Temperature, Sediment, TSS, DO, TP, E. coli	See Five Year Monitoring Plan Summary	Public will be involved in surveys and restoration efforts. Trained volunteers participate in stream monitoring. Presentation of results to ADW and other interested parties.	EPA-certified laboratory to process water quality samples. Coordination with volunteer stream monitoring programs. Approved QAPP. Permits obtained to install stream gages, transducers. Review of new sites.	$37,500 to $75,000 per year. $187,500 to $375,000 for 5-year period.
2	Green Roofs	ADW	Implement and monitor: 2012 – 2016	ADW member(s) receive funding for installation; and installation complete by 2016 for sites identified in Table 6-2. Infiltration and pollutant reductions measured. Number of green roofs installed.	ADW and partnership with Lawrence Tech University	ADW member will notify residents, building users. Web postings and news articles. Inclusion in ADW virtual green infrastructure tool.	Funding through grants and loans; engineering services	Variable depending on application; Estimated between $100K - $500K per site. No green roof acreage is proposed within the EC boundaries at this time.

3	Porous Pavement	ADW	Implement and monitor: 2012 – 2016	ADW Ecorse Creek members receive funding for installation by 2016 for sites identified in Table 6-2. (11.7 acres) Acres of porous pavement installed. Infiltration and pollutant reductions measured.	ADW	Public education materials regarding benefits of porous pavement; interpretive signs at sites, web site postings, news articles. Inclusion in ADW virtual green infrastructure tool.	Funding through grants and loans; engineering services	Variable depending on application; $8 to $12/sq ft. 11.7 acres are proposed with an estimate of $4.07M to $6.12M.
4	Rain Gardens/Grow Zones	ADW	Implement and monitor: 2012 – 2016	Sites identified in Table 6-2 (8.5 acres) receive funding and installation complete by 2016. Infiltration and pollutant reductions measured. Acres of Grow Zones planted.	ADW	Public involved in planting and restoration efforts. Trained volunteers participate in monitoring. Presentation of results to ADW and other interested parties. Inclusion in ADW virtual green infrastructure tool.	Funding through grants and loans; engineering services	$12/sq ft estimate or $4.4 million .
5	Green Streets	ADW	Implement and Monitor: 2012 – 2016	Sites identified in Table 6-2 (Southgate High School and Wick Road in Taylor – 14 acres) receive funding and installation complete by 2016. Infiltration and pollutant reductions measured.	ADW	Public education materials regarding benefits of green street elements; interpretive signs at/along street; web site postings, public meetings during design, news articles. Inclusion in ADW virtual green infrastructure tool.	Funding through grants and loans; engineering services	Varies depending on location and mix of practices; Costs estimate between $15M and $21.3M.

6	Bank Stabilization/ Vegetated Stream Buffers	ADW	Implement and Monitor 2012 – 2015	Sites identified in Table 6-2 (0.4 miles – estimated 20 ft wide) receive funding and installation complete by 2016. Number of feet of bank stabilized and number of acres planted as buffers.	ADW	Public education materials regarding benefits of vegetated stream buffers; interpretive signs at sites, use of volunteer labor for installation; web site postings, news articles. Inclusion in ADW virtual green infrastructure tool.	Funding through grants and loans; engineering services	$10,000 to $30,000. More details at www.semcog.org/LowImpactDevelopment.aspx
7	Culvert/Bridge Replacement / Retrofit	ADW	Implement and Monitor 2012 – 2016	Sites identified in Table 6-2 (10 locations) receive funding and construction complete by 2016. Number of sites improved. Pollutant reductions measured and miles of stream passable by fish.	ADW	Public outreach to notify about project and public education on retrofit benefits for stream and habitat.	Funding through grants and loans; engineering services	Varies greatly depending on location and application. For estimating purposes, $400 - $2000/lf. Guesstimating 80’ replacements or $320,000 to $1.6M.
8	Detention/ Retention	ADW	Implement and Monitor 2012 – 2016	Sites identified in Table 6-2 (49.6 acres) receive funding and construction complete by 2015. Acre/feet of storage. Infiltration and pollutant reductions measured.	ADW	Public education through presentation of results to ADW and other interested parties	Funding through grants and loans; engineering services	Cost guesstimate from $1.4M to $2.9M.

9	Increase Floodplain	ADW	Implement and Monitor 2012-2016	Sites identified in Table 6-2 (5 acres) receive funding and installation by 2016. Acres of floodplain added. Infiltration and pollutant reductions measured.	ADW	Mailings to residents in project area.	Funding through grants and loans; engineering services	Varies depending on location and design.
10	Public Information and Education	ADW, Wayne County, HRWC and SEMCOG	Implement 2012 – 2016	Measuring / tracking homeowner behavior change as education process unfolds. Update public survey by SEMCOG and compare results to previous SEMCOG survey.	Behavior change measurement , participant involvement, household pollution reduced, volume of HH waste dropped off, etc. ADW, Wayne County and HRWC	Public involvement in homeowner behavior change process.	Grant funding through 319 NPS program and others	$75,000 for two year program or $187,500 for 5 year program.
11	Land Acquisition / Conservation	ADW, Southeast Michigan Land Conservancy, International Wildlife Refuge, Grosse Ile Nature and Land Conservancy	Implement and Monitor 2012 – 2016	Sites identified in Table 6-2 receive funding and purchased by 2016. Number of finalized land protection agreements; number of acres protected through easements.	Enrollment outreach and monitoring SE Michigan Land Conservancy, International Wildlife Refuge, Grosse Ile Nature and Land Conservancy	Mailings to high-priority parcel owners. Meetings with individual landowners to identify interest in conservation easements, purchase of development rights, and/or sale/donation of property to appropriate management organization	Funding to purchase properties or obtain easements	Purchase prices and/or easements vary depending on location and value of property.

12	Water Efficiency	ADW	Implement and Monitor 2012-2016	Sites identified in Table 6-2 (4 locations) receive funding and completed by 2016. Number of water efficiency projects completed and number of gallons of water conserved.	ADW	Public education materials developed on the benefits of water efficient projects, announcements about planned and completed projects via mailings, web page postings and news articles.	Funding through grants and loans	Varies based on project.
13	Tree Planting	ADW	Implement and Monitor 2012 - 2016	Sites identified in Table 6-2 (500 trees) receive funding and installation of plantings by 2016. Many programs are proposed city-wide. Number of trees planted and increase in tree canopy.	ADW	Education materials to residents	Funding through grants and loans	$250 - $400 per tree for balled and burlap installation; $100,000 to 200,000 for installation of 500 trees.
14	Water Harvesting	ADW	Implement and Monitor 2012-2016	Sites identified in Table 6-2 receive funding and completed by 2016. Many city-wide programs. Assume 150 rain barrels per 10 communities.	ADW	Education materials to residents for rain barrel distribution and proper use and maintenance. News articles and web page postings	Funding through grants and loans	$75-$100 per rain barrel; 1500 rain barrels proposed for estimate of $150,000.
15	Collaborative IDEP	ADW and Wayne County	Implement and Monitor 2012 – 2016	As described in IDEP Plan in Chapter 6 of this document including coordinated complaint response, staff training and advanced investigations. Number of illicit connections found, number of connections corrected and estimated pollutant reductions.	Wayne County and ADW members	Education piece to raise awareness of complaint hotline posted to web pages, flyers distributed to ADW members, articles in newspapers and newsletters.	Grants for investigations and monitoring	$500,000

16	Collaborative Green Infrastructure Education Campaign	ADW and Wayne County	Implement and Monitor 2012 – 2016		Wayne County and ADW members		Grants to assist in campaign development and distribution	$300,000
17	Wetlands Restoration and/or Preservation	County Conservation Districts, USDA Natural Resources Conservation Service, ADW	30 acres of wetlands preserved and/or restored by 2016 including at least 15 acres high performing for stream flow maintenance Plan: 2011 - 2012 using DEQ LLWFA Implement and monitor: 2012 – 2016	Number of acres preserved and/or restored. Pounds of nutrients and sediment reduced. Projects initiated in Ecorse Creek Watershed.	Tracking of preserved and/or restored wetland acres – ADW members and Conservation District. Pre-and post-water sampling for nutrients and sediment – ADW.	Targeted Conservation District outreach effort/ enrollment initiative. Presentation of results to ADW.	Grant funding through s. 319 NPS Program, GLBP for Soil Erosion and Sediment Control, GLRI. Supplemental budget requests to State legislature.	Restoration installation: $2,000/ac + staff. If 15 acres restored and 15 acres preserved, estimated to cost $50,000 plus cost of acquisition.

6.6 Related Initiatives and Efforts

There are several initiatives and efforts active in the area that are related to the work of the ADW. Coordination and awareness between the watershed management planning efforts and the initiatives described below is paramount for improved water quality, the success of the area and the overall quality of life in the region. The related activities include:

- North Branch Ecorse Creek Study
- Detroit River Area of Concern
- International Wildlife Refuge
- Downriver Linked Greenways Initiative
- Greater Detroit Heritage Water Trails
- Grosse Ile Nature Conservancy
- Downriver Stream Team
- Dearborn Heights Watershed Stewards Commission
- SE Michigan Partners for Clean Water
- Friends of the Detroit River / Riverkeeper Program

North Branch Ecorse Creek Study[1]

Flooding along the North Branch of Ecorse Creek (NBEC), which is located entirely within Wayne County, Michigan, has occurred repeatedly over the last 40 years. In large flood events, it is estimated that the NBEC flooding impacts up to 9,100 properties, including damage to property and sewage backups into homes and businesses. The U.S. Army Corps of Engineers (USACE) performed a Feasibility Study and Environmental Impact Statement in 1988; however, the recommended project was never built because of financial/economic conditions at that time.

The NBEC is a County Drain, established in 1926 with improvements dating back to 1863. Because it is a drain, the City of Dearborn Heights petitioned the Wayne County Drain Commissioner for flood relief after the flooding that occurred in May 2004. In response to the petition and in accordance with the Michigan Drain Code, a Board of Determination was convened in December 2004 and heard overwhelming testimony from property owners regarding flooding problems. The Board ordered the Wayne County Drain Commissioner to move forward with a flood control project. The Drain Commissioner commissioned a flood control study that was completed in 2008. The final recommendation was a $240 million greenway and improvements project. The Drain Commissioner continued to pursue opportunities to offset the cost of the project. In 2009, Wayne County requested that the USACE re-evaluate the 1988 Feasibility Study and Environmental Impact Statement to determine if there is federal interest in implementing a flood control project for NBEC.

The USACE and Wayne County are now collaboratively developing an updated Feasibility Study (General Reevaluation Report) for the NBEC. This report will assess whether there is sufficient technical and economic data to support federal assistance with design and construction of flood damage reduction measures along the NBEC. Field reconnaissance and survey work in the NBEC drainage district is underway, and the report will be complete in July 2011.

The U.S. Army Corps of Engineers successfully obtained over $1.5 million from the American Recovery and Reinvestment Act to offset costs of preparing the General Reevaluation Report. If the analysis finds that there is federal interest in implementing a flood control project for NBEC, portions of the design and construction of the recommended flood control project will be eligible for federal funding.

[1] North Branch Ecorse Creek http://www.northbranchecorsecreek.com

Remaining project costs will be assessed to the property owners and others in the drainage district in accordance with the Michigan Drain Code.

Detroit River Area of Concern[2]

The Ecorse Creek Watershed ultimately drains to the Detroit River. Actions and improvements within the watershed can assist in improving the Detroit River and work toward delisting the River as an Area of Concern. The Detroit River is a 32-mile, international connecting channel linking Lake St. Clair and the upper Great Lakes to Lake Erie. The Detroit River Area of Concern (AOC) includes the areas that drain directly to the river and the drainage area of its tributaries in Michigan and Ontario, as well as the City of Detroit "sewershed" area. Eleven of the 14 beneficial use impairments were identified in the Detroit River. The known causes of impairments included urban and industrial development in the watershed, bacteria, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), metals, and oils and greases. Combined sewer overflows (CSOs) and municipal and industrial discharges were major sources of contaminants within the AOC. Storm water runoff and tributaries in Michigan were also identified as major sources of contaminants. Additional environmental concerns include exotic species, changes in the fish community structure, and reductions in wildlife populations. Detroit River priorities include control of combined sewer overflows (CSOs), control of sanitary sewer overflows (SSOs), point/nonpoint source pollution controls, remediation of contaminated sediments, habitat restoration, and pollution prevention. In 2005, the Friends of the Detroit River became the lead local organization for the Detroit River AOC. In 2008, the RAP for the Detroit River AOC was updated.

Detroit River International Wildlife Refuge[3]

The Detroit River International Wildlife Refuge is located along the lower Detroit River and western shoreline of Lake Erie. It was established in 2001 as the first International Wildlife Refuge in North America. The authorized refuge boundary includes islands, coastal wetlands, marshes, shoals, and waterfront lands along 48 miles of shoreline. Its location is unique – situated in a major metropolitan area.

The Refuge will facilitate and promote hunting, fishing, wildlife observation, wildlife photography, environmental education, and wildlife interpretation. These are the priority wildlife-dependent public uses for the National Wildlife Refuge System.

The U.S. Fish and Wildlife Service has developed a Comprehensive Conservation Plan to guide management of the Refuge for the next 15 years. The preferred management alternative is to focus on cooperative management – where the Refuge would grow primarily through management agreements with industries, government agencies, and other organizations.

The Humbug Marsh and adjacent uplands are at the heart of the DRIWR, but the refuge also includes numerous islands in the Detroit River.

The Humbug Marsh area is one of the region's most ecologically significant sites due to its position and rarity within the Lower Great Lakes and connecting channels. As the last remaining mile of Great Lakes coastal marsh on the Michigan side of the Detroit River, the Humbug Marsh provides key habitat linkages between the nutrient poor upper Great Lakes, the St. Clair River delta, and nutrient rich Lake Erie, and provides key spawning and nursery habitat along the migration route of over 100 species of fish that live in the Great Lakes. Located at the junction of the Mississippi and Atlantic Flyways, two of North America's major migration routes, the Humbug Marsh is also important to a variety of bird species. Over 90 species of waterfowl, raptors, loons, neotropical songbirds, herons, egrets, cranes, and other land and shore birds use the Humbug Marsh area for stopover, feeding, and nesting sites.

2 Detroit River Area of Concern. www.epa.gov/glnpo/aco/detroit.html
3 Detroit River International Wildlife Refuge http://www.fws.gov/detroitriver/art/pfd/brochureAug23.pdf

Surrounded by industry, commercial enterprises, and residential land use; in close proximity to over 5 million people in the greater Detroit metropolitan area; and as the largest piece of undeveloped coastal property on the U.S. side of the Detroit River, the 400+-acre DRIWR has tremendous potential to provide recreational benefits in the forms of hunting, fishing, bird watching, hiking, canoeing and kayaking.

U.S. Fish & Wildlife Service
Detroit River International Wildlife Refuge
Wayne and Monroe Counties, Michigan
Land Status
Mud Island
Grassy Island
Mamajuda Island
Historic Wyandotte NWR
ONTARIO
CANADA
Calf Island
Army Corps of Engineers Property
Brancheau Tract
Monroe County
LAKE ERIE
Legend
Current Refuge Ownership
Approved Acquisition Boundary
Corps of Engineers - Permit
Detroit Edison - Cooperative Agreement
Conservation Management Lands

Downriver Linked Greenways Initiative

The Downriver Linked Greenways Initiative (DLGI) (began in 1999) is a culmination of many community, institutional and individual efforts. The purpose is to coordinate the Downriver communities' non-motorized transportation development efforts. Rather than planning, designing and constructing non-motorized facilities to benefit only individual communities, the DLGI has the foresight and vision to embrace a plan that benefits the greater good. The DLGI is working to improve the quality of life of residents and employees by connecting their communities to one another and to the larger Southeast Michigan Region. Several of the existing and/or planned non-motorized routes are along or near watercourses in the Ecorse Creek Watershed.

The DLGI has been successful in obtaining past grants, and anticipates continuing to make federal, state and local grant applications to implement the plan recommendations and create a trail system consistent with the Southeast Michigan Greenways Initiative and the American Heritage River Greenways vision.

Heritage Water Trail for Greater Detroit[4]

The Metropolitan Affairs Coalition (MAC), in partnership with community stakeholders, which includes the Downriver Linked Greenways Initiative, DTE Energy, and the Michigan Department of Environmental Quality, have made the development of a Heritage Water Trail one its priority projects. The Heritage Water Trail is envisioned to be a river version of a greenway trail. The Heritage Water Trail is conceived as a network of recreational trails on the Lower Huron, Detroit, and Rouge Rivers for canoeing, kayaking, and small boat paddling that would encourage residents and visitors to recreate, exercise, and experience the area's wildlife and natural resources. Besides providing navigational, historical, and ecological information, the Water Trail is being planned and designed to promote a broad range of uses, activities, and programs to accommodate the interests of the diverse population that lives, works, and plays in the region.

Planning for the overall regional system, as well as detailed implementation for Phase I of the water trail was completed in 2006. The ability to have a successful and enjoyable water trail system is directly associated to the water quality of the creeks, drains, rivers, and lakes within the watershed.

Grosse Ile Nature Conservancy[5]

The Conservancy is an independent 501(c)(3) that works to achieve the goal of protecting land through land acquisition, conservation easements and educational projects. Through gift or purchase, the Conservancy secures ownership of natural land needed to protect beautiful and fragile habitats. The Conservancy also seeks grants for conservation easements from private landowners. The Conservancy works to provide environmental knowledge, to all ages, that is necessary to understand the complex ecosystems and how intimately the human welfare is related to the health of the ecosystems.

4 Metropolitan Affairs Coalition RFP for Professional Services, February 2005.

5 Grosse Ile Nature Conservancy. www.ginlc.org

Downriver Stream Team[6]

The Downriver Stream Team is led by teachers at Southgate Anderson High School and has evolved over the past eighteen years to include over 5,700 individuals and nearly 60 organizations to conduct water quality testing, exotic species control, education, stream bank stabilization and habitat creation. Since the first event, the Stream Team has cleaned up and restored 61 sites during 39 events.

The Stream Team has conducted several spot benthic organism monitoring programs in the downriver area over the past few years. The Stream Team also works with Wayne County to standardize testing procedures to align monitoring protocols with MICORPS sampling and reporting techniques. In addition, to benthic monitoring, the Stream Team has indicated it has the ability to assess several other water quality parameters, including: pH, DO, temperature, turbidity, total dissolved solids (TDS), chloride, nitrates, phosphorus, total coliforms, and some water born (not sediment based) heavy metals (e.g. iron, copper, zinc, nickel, lead, and some others) using electronic CBL2 Texas Instruments/probes (pH, DO, temp., turbidity, TDS), Hach titration kit (Cl-), Hach Spectrophotometer (nitrates, phosphorus, heavy metals), or Filter Funnel Manifold and appropriate Hach sterile media (total coliforms).

The Stream Team has been involved as a Partner (e.g. non-voting member) of the ADW for many years , and, along with Wayne County, is seeking additional funds to formalize the Stream Team's future monitoring efforts. Concurrently, the Watershed is looking at the option of utilizing the Stream Team's efforts to assist in measuring the effectiveness of the various improvement projects and action items highlighted in this plan. Of course, the scope and quality of this expanded Stream Team monitoring program will be determined by availability of adequate funding to insure all Stream Team monitoring participants/schools are outfitted with technologies to assess the parameters needed.

Dearborn Heights Watershed Stewards[7]

In 2000, the Mayor of Dearborn Heights created the Watershed Stewards Commission to increase the level of public involvement in both the Rouge River and Ecorse Creek Watersheds. The Watershed Stewards assist with the City's efforts to comply with many of the public education and public involvement requirements of the City's Rouge River Watershed Management Plan (WMP) and Storm Water Pollution Prevention Initiative (SWPPI), and anticipates their continued participation in the Ecorse Creek activities. The Mission Statement of the Dearborn Heights Watershed Stewards is as follows:

The City of Dearborn Heights Watershed Stewards Commission will enhance understanding and encourage practices that lead to a healthy community and watershed through:

- Educating citizens of Dearborn Heights about watersheds and how individuals affect the watersheds.
- Partnering with government agencies and environmental organizations to promote community participation in local water quality and fish and wildlife enhancement projects.
- Working independently and alongside government agencies to monitor water quality in creeks, rivers and wetlands within the City of Dearborn Heights.
- Serving as a resource for watershed information to answer community member's questions on watersheds, water quality, and habitat enhancement projects.

SE Michigan Partners for Clean Water[8]

With the Phase II requirements affecting many communities that are SEMCOG members, SEMCOG established the Southeast Michigan Partners for Clean Water to coordinate storm water public education activities to help save local dollars and to send consistent messages. These messages are intended to be action-oriented with the primary

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[6] Downriver Citizens For a Safe Environment. www.dcseweb.org

[7] Dearborn Heights Watershed Stewards http://home.comcast.net/~dhwatershed/wsb/html/view.cgi-home.html-.html

[8] SEMCOG – Ours to Protect http://www.semcog.org/OursToProtect/OurstoProtect.htm

goals of protecting water resources and meeting permit requirements. The Southeast Michigan Partners for Clean Water includes representatives from various counties, communities, watershed councils, the private sector, and water quality professionals in Southeast Michigan. The Southeast Michigan Partners for Clean Water also decided that delivery of the messages would be most effective using a two-pronged approach. Region-wide public education is one level of distribution of the messages. This effort is most effective for dealing with broader distribution mechanisms, such as regional media outlets, and can be used to develop materials utilized at both the regional and local level. The second part of the delivery system is done locally. The messages are delivered through brochures, newsletters, workshops, river crossing signage, print ads, and local media. This allows the overall key messages to be tailored to an individual community's issues and concerns.

Friends of the Detroit River / Riverkeeper Program

The Friends of the Detroit River envisions an ever improving quality of life for people, plants and animals in southeast Michigan and southwest Ontario through development of a balance of grass roots advocacy and staffed programs forming an environmental group that watches and protects the Detroit River, including creation of a highly visible resource center focusing on Detroit River issues, programs, research, policies and partnerships.

The mission of Friends of the Detroit River is to enhance the environmental, educational, economic, cultural and recreational opportunities associated with the Detroit River watershed, through citizen involvement and community action. The Friends of the Detroit River are involved in numerous projects and efforts. They were instrumental in achieving the designation of the Detroit River as an American Heritage River and preservation of the Humbug Marsh, Humbug Island and Humbug Bay.

Many of the entities in the Watershed worked with the Detroit Riverkeeper group on their "Storm Drain Labeling and Educational Program." The Riverkeeper program worked with the Combined Downriver and Ecorse Creek Watershed groups to put together a program that involved storm drain labeling and a region wide storm water educational program. Over 12,000 labels were produced and distributed to the participating communities in these watersheds.

7

Measuring Progress

Sexton-Kilfoil Drain
Beech Daly Road, North of Goddard

Chapter Contents

Methods to measure progress have been included in order to evaluate the effectiveness of this Watershed Management Plan and its implementation. These methods are important in determining whether the activities being performed are sufficient in reaching the goals of the plan. If the activities in the plan are found not to be sufficient, the plan can be revised to make it more effective. Not only will measuring progress assist in finding deficiencies in the plan, but it will also help demonstrate which activities and actions are successful. Measuring progress will be done by both qualitative and quantitative techniques.

7.1 Qualitative Evaluation of Success

Qualitative measurements are important in determining changes in behavior and visible changes in the watershed. Surveys, participation records, and meeting/workshop evaluations can all be used to gauge whether activities aimed at public education and outreach are effective. Better survey results, an increase in participation, and favorable meeting/workshop evaluations can all be an indication of a greater understanding by the public on watershed-related issues. Results that don't yield improvements will signal that current activities and/or education methods should be modified and improved. One of the main focuses of evaluating changes in public understanding and behavior will be the use of the 2004 Regional Water Quality Survey that was performed by SEMCOG and the Southeast Michigan Partners for Clean Water. The purpose of the survey was to provide a benchmark to gauge the effectiveness of regional and local public outreach campaigns, leverage resources, and provide the opportunity to compare results from different areas of the SEMCOG region. A four-page survey and cover letter were mailed to a stratified random sample of 10,800 households in the SEMCOG planning area, which includes the City of Detroit along with Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties (SEMCOG). Results were given specifically for the Downriver Wayne County area. A comparable future survey will help gauge any changes that result as part of the actions of this Watershed Management Plan.

Visible changes in the watershed can also be used as an indication of progress in the watershed. Stream surveys can identify riparian and aquatic improvements and help identify recreational opportunities. BMP implementation can also be documented visibly, with the number and location of BMPs recorded.

Table 7-1 summarizes the qualitative methods that will be used to measure progress.

Table 7-1
Summary of Qualitative Methods to Measure Progress

Evaluation Method	Program/Project	What is Measured and/or Goals Addressed	Measurable Goals	Implementation
Public Surveys	Public education or involvement	Awareness; Knowledge; Behaviors; Attitudes; Concerns	Increase in the number of completed surveys showing greater awareness, more concerns, increase in knowledge	Pre- and post-survey recommended (SEMCOG survey utilized as pre-survey). Repetition on regular basis to show trends.
Ordinance Adoption	Adoption of such ordinances as wetland protection, open space preservation, natural features, tree conservation, etc.	Number of ordinances passed	Increase in the passage of storm water related ordinances	Track ordinance adoptions through the watershed advisory group. Also report positive and negative aspects.
Stream Surveys	Identify riparian and aquatic improvements, identify recreational opportunities	Habitat; Flow; Erosion; Recreation;	Increase in habitat; decrease in erosion; increase in recreation	Identify parameters to evaluate. Record observations. Summarize findings to identify sites needing observation. Use of specific criteria would make surveys also quantitative.
Written Evaluations	Public meeting or group education or involvement project	Awareness; Knowledge	Increase in number of written evaluations with positive comments	Post-event participants complete brief evaluations that ask what was learned, what was missing, what could be done better. Evaluations completed on site.
Visual Documentation	Structural and vegetative BMP installations, retrofits	Aesthetics. Pre-and post-conditions	Increase in number of structural and vegetative BMPs & retrofits	Provides visual evidence. Photographs can be used in public communication materials
Phone call/ complaint records	Education efforts, advertising of contact number for complaints/ concerns	Number and types of concerns. Location of problem areas (including flooding occurrences, debris in streams, drain blockages)	Increase in number of calls and complaints to show an increase in awareness & concern	Track calls and complaints and responses.
Participation tracking	Public involvement and education projects	Number of people participating. Geographic distribution of participants.	Increase in participation at events	Track participation by attendance.

Table adapted from Rouge River Lower One SWAG, 2001.

7.2 Quantitative Evaluation of Success

In addition to qualitative measures of program implementation and success, quantitative measures will also be required to assess progress toward, and attainment of, targets established in the Ecorse Creek TMDL(s). As described previously, the entire Ecorse Creek Watershed is identified as failing to meet Michigan water quality standards (WQS) for E. coli, and for the protection of warm water aquatic life (Biota). The MDEQ has developed a Total Maximum Daily Load (TMDL) allocation, water quality targets and quantifiable pollutant load reductions, to protect aquatic biota and recreational uses (full and partial body contact) within the watershed. The measurements of success for the protection of aquatic life and recreational uses are set forth in the TMDLs. Sources and causes of the current conditions summarized in Table 7-2 are detailed in Chapter 4 of this document (Table 4-4).

7.2.1 Numeric Targets Required in the Ecorse Creek TMDLs

Aquatic Life (Biota)

The Ecorse Creek TMDL establishes habitat assessment scores and scores rating the community composition and diversity of benthic macroinvertebrates as the primary measures of water quality improvements in the watershed. The health of macroinvertebrate communities within the Ecorse Creek drainage area will be assessed by the Michigan Department of Environmental Quality (MDEQ) using Procedure 51 assessment and scoring.[1,2]

The TMDL establishes reproducible ratings of "acceptable" scores throughout the watershed. An acceptable score correlates to a cumulative score of -4 or greater for the macroinvertebrate multimetric index (See Chapter 3). Achievement of the water quality standard for the protection of warm water aquatic life will be determined by reproducible acceptable scores in two consecutive years of monitoring. Habitat quality of the stream will also be assessed using Procedure 51 protocols. A habitat score of 65 has been established as the minimum target for in-stream habitat conditions.

Suspended Solids

The Ecorse Creek TMDL establishes a numeric target for mean, annual, in-stream TSS concentrations of less than or equal to 80 mg/l during wet weather and snowmelt events, as a secondary measure of documenting the re-attainment of designated uses. In addition, embeddedness is a more appropriate measurement of sediment for water quality in natural waters. Embeddedness measures the degree to which boulders, rubble, and debris in a sampling area are covered in fine sediments (clay, sand, or silt). Baseline data would need to be collected in order to compare to future data and show improvement in the watershed. The method for measuring embeddedness is outlined in the Manual of Fisheries Survey Methods II by the Surface Water Quality Division, MDEQ.

E. coli

The targets for this TMDL are 300 *E. coli* per 100 ml expressed as a daily maximum load and concentration from May 1 to October 31 (i.e., daily target) and 130 *E. coli* per 100 ml as a 30-day geometric mean, expressed as a concentration (i.e., monthly target). An additional target is the partial body contact standard of 1,000 *E. coli* per 100 ml as a daily maximum concentration year-round. Achievement of the total body contact daily maximum target is expected to result in attainment of the partial body contact standard.

[1] MDEQ. 2002. Qualitative Biological and Habitat Survey Protocols for Wadable Streams and Rivers. P51. MDEQ, Surface Water Quality Division, Lansing, Michigan. Revised May, 28, 2002.

[2] MDEQ. May 1996 Revision. Update of P51. Metric Scoring and Interpretation. MDEQ Report #MI/DEQ/SWQ-96/068

7.2.2 Other Numeric Targets Established by State Statute

Dissolved Oxygen (DO)

Rule 64 of the Michigan Water Quality Standards (Part 4 of Act 451)[3] states that surface waters protected for warm water fish and aquatic life must meet a minimum dissolved oxygen standard of 5 mg/l. As described previously (Chapter 3) field work in 2004 indicated that the warm water minimum of 5 mg/L DO was violated at several locations monitored.

Although the failure to meet the protection of aquatic life designated use has largely been attributed to flashy hydrology and high sediment yield, low oxygen concentrations may also be limiting both fish and macroinvertebrate populations. DO concentrations should be measured as part of the other MDEQ monitoring activities to ensure this standard is met throughout the watershed.

7.2.3 Additional Quantitative Measures

Flow Stability

As described in Chapter 3, the comparison of mean monthly high flows to mean monthly low flows can be used as an index of flow stability; and, stream gage data for the Ecorse Creek indicates highly unstable hydrology.[4] The ECIC recommends further analysis of stream gage data for the Ecorse Creek to determine a baseline utilizing the Richard-Baker Flashiness Index (the DEQ's standard measure for flashiness). Year-to-year calculation of this value should be conducted to determine if watershed plan implementation results in an improvement (reduction) in this ratio value.

Method and Frequency of Monitoring Activities

MDEQ water quality sampling and Procedure 51 assessment, conducted as part of MDEQ's standard, rotating, 5-year cycle of basin monitoring will be the primary means of determining attainment of TMDL target endpoints. MDEQ resources are limited however, and municipalities within the watershed are encouraged to expand upon the frequency and geographic coverage of the MDEQ's monitoring through support of the Downriver Stream Team, Wayne County, and/or other entities. Stream Team, Wayne County and/or other entity monitoring results should be provided to the MDEQ to help inform and prioritize the selection of 5-year cycle sampling locations for that agency. Evaluation of stream flow dynamics should be conducted by the ADW, in coordination with the U.S. Geological Survey, on a periodic basis.

Table 7-2 summarizes the quantitative methods that will be used to measure progress.

3 http://www.state.mi.us/orr/emi/admincode.asp?AdminCode=Single&Admin_Num=32301041&Dpt=EQ&RngHigh=

4 Hay-Chmielewski, E.M., P.W. Seelbach, G.E. Whelan, and D.B. Jester, Jr. 1995. Huron River Assessment. Michigan Department of Natural Resources, Fisheries Division, Special Report Number 16. Ann Arbor, Michigan.

Table 7-2

Summary of Quantitative Methods to Measure Progress of Locally Prioritized Watershed Goals

Locally Prioritized Watershed Plan Goal	Parameter Measured	Current Condition	Measurable Goal/Target	Evaluation Method	Implementation
1. **Reduce Flooding** 2. **Reduce Stream Flow Variability**	Stream Discharge, Flow Variability Benthics, Tractive Force Ratio	Frequent flooding due to high rate of imperviousness Unstable hydrology, Mean Monthly High: Mean Monthly Low Flow Ratio ~ 54.5..TMDL for Biota	Reduced flooding frequency and monetary damages, Stable R-B Index	Review of flood damage claims filed with FEMA, Geomorphology tractive force ratio	Trends as indicator of reduced Stream flow variability.
3. **Watershed Management Sustainability**	Institutional Relationships, Dollars Committed to Watershed Management	Alliance of Downriver Watersheds in Place	≥80% participation of watershed communities	Annual reports of ADW activities and budget contributions	Continued participation by ADW members will serve as an institutional mechanism for watershed wide cooperation and support to achieve WMP goals
4. **Improve Water Quality**	Macroinvertebrate Community Composition	Poor TMDL for BIota	" Acceptable" macroinvertebrate scores > -4 in two or more consecutive years of monitoring	MDEQ Procedure 51	MDEQ rotating, 5-year watershed monitoring cycle and annual MDEQ sampling per Biota TMDL Coordinate with Stream Team to augment MDEQ data collection and sampling network
4. **Improve Water Quality** 5. **Protect, Enhance, and Restore In-Stream Habitat**	Embeddedness	Highly turbid even in dry weather (visual observations 2004), TMDL for Biota Wet weather concentrations as high as 512 mg/L, TMDL for Biota	Attain rating of "good" or "excellent"	MDEQ rotating, 5-year watershed monitoring cycle sampling, IDEP monitoring and WCDOE sampling, Stream Team monitoring	Coordinate with WCDOE to expand IDEP monitoring to include embeddedness Coordinate with Stream Team to augment data collection and sampling network, including embeddedness monitoring
4. **Improve Water Quality** 5. **Protect, Enhance, and Restore In-Stream Habitat**	Dissolved Oxygen (DO) Phosphorus (P)	Localized violations of Michigan Water Quality Standard Measured DO concentrations as low as 1.05 mg/L Measured Total P concentrations from 0.07 - 0.194 mg/L	≥ 5 mg/L ≤ 0.1 mg/L	MDEQ rotating, 5-year watershed monitoring cycle sampling, IDEP monitoring and WCDOE sampling, Stream Team monitoring	MDEQ rotating, 5-year watershed monitoring cycle Coordinate with Stream Team to augment MDEQ data collection and sampling network

Table 7-2 (cont'd)

Summary of Quantitative Methods to Measure Progress of Locally Prioritized Watershed Goals

	Watershed Plan Goal	Parameter Measured	Current Condition	Measurable Goal/Target	Evaluation Method	Implementation
5.	**Protect, Enhance, and Restore In-Stream Habitat**	In-Stream Habitat	Fair to Poor: unstable hydrology, sedimentation and high embeddedness, general lack of in-stream habitat	"Marginal" habitat scores ≥ 96	MDEQ Procedure 51	MDEQ rotating, 5-year watershed monitoring cycle and annual MDEQ sampling per Biota TMDL. Coordinate with Stream Team to augment MDEQ data collection and sampling network
6.	**Preserve, Increase, and Enhance Recreational Opportunities**	*E. coli* bacteria	Localized violations of Michigan Water Quality Standard, concentrations as high as 7,013 cfu/100mL. E. coli TMDL	< 130 *E. coli*/100 mL (30-day geometric mean), <300 *E. coli* cfu/100 mL any individual sample	MDEQ rotating, 5-year watershed monitoring cycle sampling, WCDOE sampling, Stream Team monitoring	MDEQ rotating, 5 –year monitoring cycle and coordination with the Stream Team and WCDOE to expand sampling and sampling network in Ecorse Creek, including LeBlanc Drain (5 to 10 year cycle)
		Open Space Acquisition/Protection	755.5 acres of "Cultural, Outdoor Recreation, and Cemetery" (2.7%)	Increase over Current Conditions	GIS analysis, Report Acres of Open Space/Parks Protected	Work with SEMCOG to analyze changes as municipal master plans and regional GIS coverage are updated
7.	**Protect Public Health**	*E. coli* bacteria	Localized violations of Michigan Water Quality Standard, concentrations as high as 9,400 cfu/100mL. *E. coli* TMDL	< 130 *E. coli*/100 mL (30-day geometric mean), <300 *E. coli* cfu/100 mL any individual sample	MDEQ rotating, 5-year watershed monitoring cycle sampling, WCDOE sampling, Stream Team monitoring	MDEQ rotating 5- year monitoring cycle and coordination with Stream Team and WCDOE to expand and sampling network in Ecorse Creek, including LeBlanc Drain (5 to 10 year cycle)
8.	**Increase Public Education, Understanding, and Participation Regarding Watershed Issues**	NPS Funded I&E will require SIPES/SIDMA survey which will result in quantified social indicator scores for direct measure of social change				

7.3 Watershed Management Plan Review and Revision

These measures are intended to track progress toward the attainment of designated and desired uses, water quality standards, and other watershed management plan goals. As noted previously, pollutant reduction estimates from the modeled best management practices do not achieve a 50% reduction in total suspended solids as called for in the Ecorse Creek TMDL. Other best management practices and communities programs are expected to add to these water quality improvements. Likewise, the actual metrics established by the TMDL are in-stream measures of habitat quality, macroinvertebrate diversity and abundance, and wet weather water quality concentrations (including *E. coli*) ; not the actual quantification of suspended solids removed.

Periodic assessment and review will therefore be required to determine whether implementation is on-track and whether the plan is having the desired efficacy. The Ecorse Creek communities' Phase II Storm Water Certificate of Coverage and the 5-year permit cycle provide a natural mechanism for framing these periodic reviews. Activities and successful completion of scheduled tasks will need to be reviewed and reported annually (via Annual Report to the MDEQ), but the Watershed Plan itself should be reviewed, in the final year of each 5-year permit cycle, and revised, if deemed necessary, by that review.

Watershed Plan revisions may be triggered by the completion of major projects; the availability of new water quality data, flow, inventories, or other information; by major natural events such as significant flooding in the watershed; because of changes in laws or regulations; by changes in the drainage area; or other significant events. It is anticipated that periodic reviews will be the responsibility of the Alliance of Downriver Watersheds as discussed in Chapter 8.

8 Sustainability

Black Creek
Beverly Road, West of Henry Ruff

Chapter Contents

All or portions of the communities/entities within the Ecorse Creek Watershed have been identified by the Environmental Protection Agency (EPA) and/or the Michigan Department of Environmental Quality (MDEQ) as being in urbanized areas requiring a National Pollutant Discharge Elimination System (NPDES) storm water discharge permit. A requirement of the permit is for these communities /entities to work together to develop a single watershed-based management plan (WMP) to pursue compliance. The WMP serves as a guide for the entities to understand the water quality and quantity concerns and actions needed to meet the goals of the watershed.

The Phase II Storm Water regulations provide for the entities to begin implementation of the WMP as enforceable compliance standards in their individual required Storm Water Pollution Prevention Initiative (SWPPI). The SWPPI's are to be designed to reduce the discharge of pollutants to the maximum extent practicable with guidance from the goals and objectives set forth in the WMP. The Ecorse Creek Watershed entities created a formal watershed organization to cooperate on the development of the Ecorse Creek Watershed Management Plan. Documentation of the history of the formation of the Alliance of Downriver Watersheds (ADW) and its continuation to facilitate implementation of the Plan is the focus of this Chapter.

8.1 Ecorse Creek WAG

Watershed planning in the Ecorse Creek Watershed started as early as 1975, through the formation of the Ecorse Creek Pollution Assessment District (ECPAD), to discuss potential projects to address flooding and capacity issues in the District. However, the group did not maintain long-term viability. Several times from 1975 until 1999, the Ecorse Creek Watershed/Sub-watershed based group would re-emerge to discuss other specific watershed issues and then again become essentially dormant. In 1999, with facilitation through Wayne County, the group again began meeting to discuss common concerns relative to the North Branch of the Ecorse Creek. Then, in April, 1999, the group began discussing possible formation of a Subwatershed Advisory Group (SWAG) and of applying for coverage for the entire Ecorse Creek Watershed under the then new Michigan Voluntary Storm Water Permit. In May, 1999, the Detroit Metropolitan Airport also indicated a willingness to participate in the SWAG. Finally, on August 25, 1999, the Ecorse Creek Watershed Advisory Group (Ecorse Creek WAG) was officially formed, with voting membership consisting of the Cities of Allen Park, Dearborn Heights, Ecorse, Inkster, Lincoln Park, Melvindale, Romulus, Southgate, Taylor, and Westland, Wayne County and the Wayne County Metropolitan Airport Authority.

A vision statement and operation procedures were adopted. The Vision developed by the Ecorse Creek WAG was:

> "An Ecorse Creek Watershed and riverine corridor system that is aesthetically pleasant, clean, healthy and safe so that watershed residents and visitors can enjoy an improved quality of life, with reduced risk of flooding and better coordination of storm water management throughout the region."[1]

The identified responsibilities of the WAG were defined as:

- Coordinate actions between members to prepare a joint watershed storm water management plan for the Ecorse Creek Watershed under provisions of the Michigan Department of Environmental Quality [Voluntary] General Storm Water Permit (General Permit);
- Coordinate efforts to obtain funding for watershed management projects (e.g. under Clean Michigan Initiative);
- Provide a forum to discuss common needs and share information among members, and to explore potential mechanisms to reduce the cost and time needed to implement the requirements of the General Permit and other watershed initiatives;
- Help build consensus among communities, public agencies, and the general public on the goals, objectives and priority actions required to improve and maintain the Ecorse Creek Watershed as an asset to the residents of the watershed;
- Assist members in meeting the requirements of state and federal water quality laws and regulations;
- Provide watershed representation and/or input into regional water quality and flood control issues; and,
- Study regional initiatives to reduce the risk of watershed flooding.

[1] Operational Procedures for the Ecorse Creek Watershed Advisory Group (Ecorse Creek WAG) – approved by the Ecorse Creek Watershed Advisory Group on August 25, 1999.

8.2 Phase II Regulations

While the communities continued to discuss the idea of pursing coverage for the Watershed under the State's Voluntary Storm Water General Permit, formal action to make that happen didn't materialize. With the advent of the federally mandated Phase II Storm Water regulations, all communities located with EPA defined urbanized areas that had Municipal Separated Storm Sewer Systems (MS4s) had to apply for National Pollutant Discharge Elimination System (NPDES) permit coverage by March 10, 2003. Permit coverage was required for the communities/entities to continue to legally discharge storm water from their MS4 systems. During 2002 and into early 2003 the ECWAG members worked together to assist each other in preparing their individual Watershed Based Permit Coverage applications, and also continued discussions about how to coordinate and fund the development of the Watershed Management Plan that would be required. Discussion included investigation of the idea of forming a Drainage District under Chapter 20 or 21 of the Michigan Drain Code, as well as other options.

8.3 Ecorse Creek Inter-Municipality Committee

In April – May, 2003 discussions were held with the Ecorse Creek WAG regarding various statutory options available to the members to come together to fund the development of a watershed management plan for the Ecorse Creek. They concluded that formation of a committee of the Ecorse Creek communities and entities, pursuant to the Inter-Municipality Committee Act (PA 200, 1957; MCL 123.631, et seq.), was the preferable and recommended approach. Included among the reasons was that:[2]

- It is easy to form the inter-municipality committee; only a resolution is required.
- The committee's activities are limited to "studying of area governmental problems of mutual interest and concern, including such matters as facility studies on sewers and sewage disposal, water, drains … and to formulate recommendations for and actions thereon."
- The "committee may employ personnel to coordinate and conduct all types of surveys and studies relating to the mutual problems of its member municipalities."
- As to funding the activities of the committee, "the member governing bodies, by resolution, may authorize the allocation of municipal funds for such purpose. The proportion of the total amount of funds to be provided by each member municipality shall be based on the recommendation of the inter-municipality committee … which shall have been approved by the member governing bodies."
- A member's financial contribution may be of in kind services and the committee is authorized to accept gifts and grants in furtherance of the objectives for which the committee is established.

A draft Memorandum of Agreement (MOA) and individual resolutions to officially form the Ecorse Creek Inter-Municipality Committee (ECIC) were developed and the individual communities/entities began the process of adopting them. Finally, with affirmation of seven Ecorse Creek Watershed communities that had adopted the MOA (and which comprised 91% of the watershed), on September 9, 2003, the ECIC was officially formed. The City of Taylor was elected as the Chair, the City of Allen Park as the Vice-Chair and the City of Romulus as the Secretary. Wayne County was identified as the fiduciary for the ECIC.

The ECIC then set about the process of creating an RFP and soliciting a Consultant or Consultant Team to assist the ECIC in development of the Ecorse Creek Watershed Management Plan. On May 10, 2004 an agreement was signed between the ECIC (through the Chair) and the Consultant, and work on development of the first Watershed Management Plan officially began. The Watershed Management Plan was subsequently approved by the MDEQ in 2007.

[2] April 14, 2003 Memo to Kelly Cave from Patrick B. McCauley summarizing a meeting of Legal Counsel from several of the ECWAG member communities.

8.4 Alliance of Downriver Watersheds

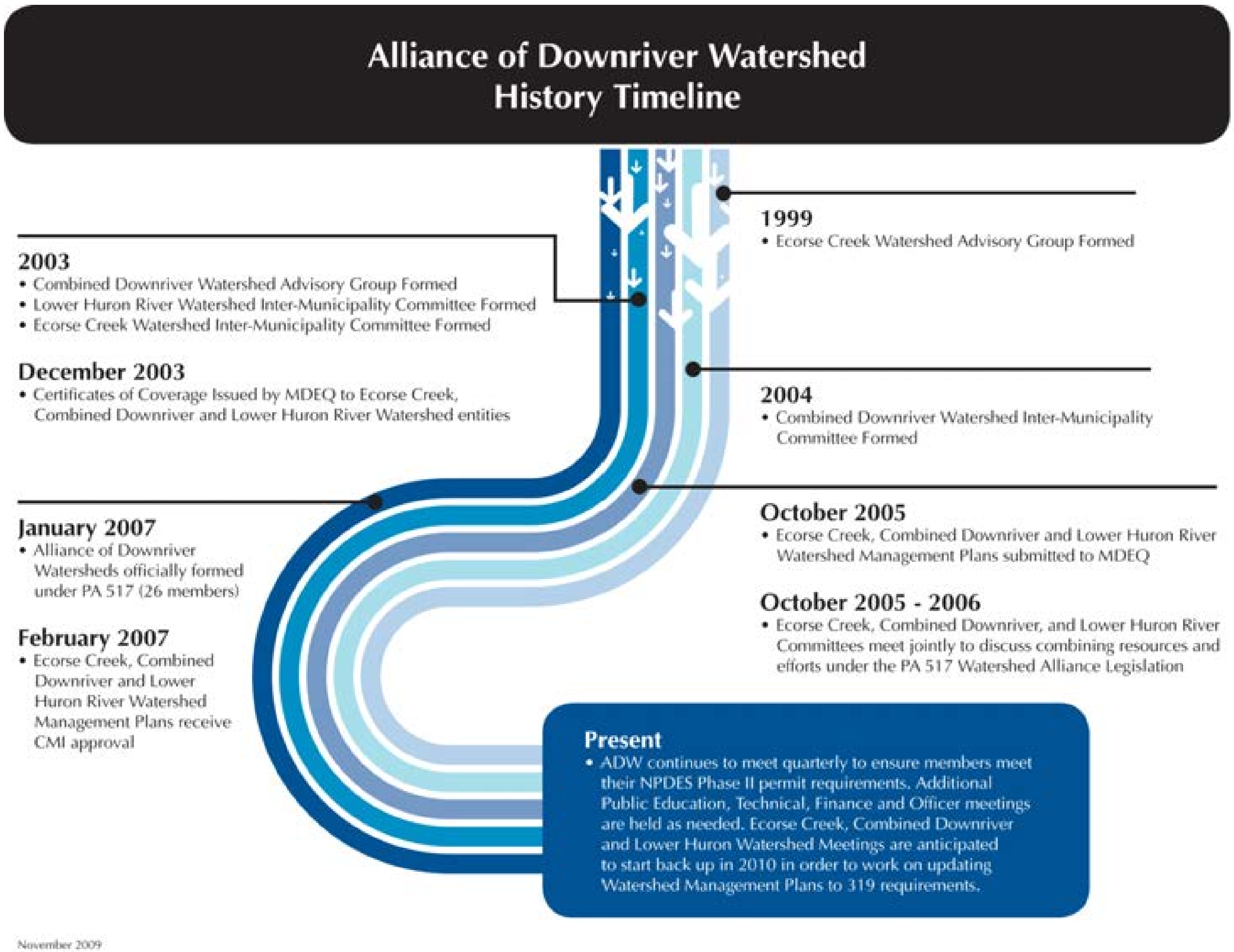
The Inter-Municipality Committees for the Ecorse Creek, Combined Downriver and Lower Huron River Watersheds successfully worked as independent groups for several years. In October 2005 and January 2006, a joint meeting was held between the Committee's, options for institutional arrangements for continuing collaboration on storm water permit compliance and watershed management issues was discussed. There was broad interest in forming a permanent watershed organization under the Watershed Alliance legislation (PA 517 of 2004). A subcommittee composed of members of the ECIC, CDWIC, and LHRWIC was formed to draft bylaws as required under the statute. The LHRWIC formally recommended that the Bylaws be presented to the respective governing bodies for adoption in May 2006, the CDWIC and ECIC followed with the same recommendation in June 2006. The ADW was officially formed when the bylaws were adopted by the governing bodies of 51% of the entities within the ADW boundaries. The ADW was formed in January 2007 and has 24 members. A graphic depiction of the history and formation of the ADW is included in this Chapter.

The agencies and communities that comprise the ADW believe there are substantial benefits that can be derived by joining together and cooperatively managing the rivers, lakes, and streams within the watersheds and in providing mutual assistance in meeting state water discharge permit requirements of the members. The ADW is relatively urban in nature with more open and rural lands as you move south within the watershed boundaries. Based on 2010 Census data, approximately 361,805 people reside within the watershed boundaries. ADW members (and NPDES permit holders) include:

- City of Allen Park
- City of Belleville
- Brownstown Township
- City of Dearborn Heights
- City of Ecorse
- City of Flat Rock
- City of Gibraltar
- Grosse Ile Township
- Huron Township
- City of Lincoln Park
- City of Melvindale
- City of Riverview
- City of Rockwood
- City of Romulus
- City of Southgate
- South Rockwood
- Sumpter Township
- City of Taylor
- Van Buren Township
- Wayne County
- City of Westland
- City of Woodhaven
- Woodhaven-Brownstown School District
- City of Wyandotte

8.5 Sustainability

It is the intention of the Alliance of Downriver Watersheds members to continue to operate as they have since forming in 2007. The ADW Bylaws (Article III) details the assessment of cost to members methodology. The members of the ADW developed a cost allocation methodology based on each members total area (acres) in all 3 watersheds and total population in all 3 watersheds. As of this writing, the ADW has sustained a bi-annual budget of approximately $300,000 - $350,000. Among other things, the annual membership dues provided by each member have been successful in serving as local match and leveraging several hundred thousand dollars in grant funds. The ADW will continue to look for opportunities to leverage their collective funds to continue making progress toward meeting the goals and actions outlined in this Watershed Management Plan. The ADW also anticipates seeking outside funding sources and grants in order to implement the more costly best management practices.



Alliance of Downriver Watershed
History Timeline
1999
• Ecorse Creek Watershed Advisory Group Formed
2003
• Combined Downriver Watershed Advisory Group Formed
• Lower Huron River Watershed Inter-Municipality Committee Formed
• Ecorse Creek Watershed Inter-Municipality Committee Formed
December 2003
• Certificates of Coverage Issued by MDEQ to Ecorse Creek, Combined Downriver and Lower Huron River Watershed entities
2004
• Combined Downriver Watershed Inter-Municipality Committee Formed
October 2005
• Ecorse Creek, Combined Downriver and Lower Huron River Watershed Management Plans submitted to MDEQ
October 2005 - 2006
• Ecorse Creek, Combined Downriver, and Lower Huron River Committees meet jointly to discuss combining resources and efforts under the PA 517 Watershed Alliance Legislation
January 2007
• Alliance of Downriver Watersheds officially formed under PA 517 (26 members)
February 2007
• Ecorse Creek, Combined Downriver and Lower Huron River Watershed Management Plans receive CMI approval
Present
• ADW continues to meet quarterly to ensure members meet their NPDES Phase II permit requirements. Additional Public Education, Technical, Finance and Officer meetings are held as needed. Ecorse Creek, Combined Downriver and Lower Huron Watershed Meetings are anticipated to start back up in 2010 in order to work on updating Watershed Management Plans to 319 requirements.
November 2009

9 Public Involvement

Grams Drain
Reeck Road, South of Railroad

Chapter Contents

The development of the original (2007) Watershed Management Plan (WMP) included and encompassed a wide range of efforts for public involvement opportunities, coordination between communities and entities within the watershed, and general awareness of the purpose of the project. When developing the 2012 WMP Update, multiple meetings were held with the ADW communities to gather input and guide the direction of the plan. A detailed meeting listing can be found in Chapter 5.

9.1 Inter-Municipality Committee Meetings and Workshops

The Ecorse Creek Watershed Inter-Municipality Committee (ECIC) met throughout the course of developing the original 2007 Watershed Management Plan. From April 2004 through November 2005, 16 meetings were held, several of which were held jointly with the Combined Downriver Watershed Inter-municipality Committee (CDWIC). Subsequent to the February 16, 2006 MDEQ comments on the Watershed Management Plan as submitted October 31, 2005, two additional meetings were held in preparation for resubmittal of the plan. All meetings were open to the public and the schedule was provided on the project webpage. Committee meetings were used to conduct regular business of the committee, solicit information necessary for the completion of the WMP from committee members, provide updates and discuss the progress of the WMP, and provide information regarding on-going local and regional watershed activities.

ECIC Meetings
April '04 – November '05

2004
April 20th
June 9th
June 30th
July 28th
August 25th
November 9th (Workshop)
November 23rd
December 6th

2005
February 9th (Workshop)
March 10th
April 13th
April 28th
May 18th
June 15th
July 27th
October 18th

2006
March 26th
April 27th

In addition to regularly scheduled ECIC meetings, two workshops were also held. These workshops were held jointly with both the CDWIC and Lower Huron River Watershed Inter-Municipality Committee. The purpose of these workshops was to provide general background information to the committees and to solicit input necessary for the development of the WMP.

- The first workshop, held on November 9, 2004, focused on finalizing the desired uses and goals of the watershed. The first portion of this workshop provided a characterization of each of the three watersheds and pointed out differences and similarities between the three. With this information in hand, representatives from the watershed came to a consensus on the designated and desired uses as well as goals for the watershed.
- The second workshop, held on February 9, 2005, focused on Management Alternatives. The desired outcomes of this workshop were to gain an understanding of the relationship between goals, objectives, and management alternatives; and to identify objectives and management alternatives to address problems and support the goals of the watershed. The first portion of this workshop focused on explaining the relationship between goals, objectives, and management alternatives and also provided an overview of different types of management alternatives. The watershed groups then divided and brainstormed short-term objectives to support the long-term goals for the watershed. In addition, the ECIC representatives reviewed a list of possible management alternatives and discussed and revised the list so it could be used for future selection.

9.2 Public Participation Process (PPP)

Early in the project schedule, the committee developed a Public Participation Process (PPP), which was subsequently approved by the MDEQ in August 2004 (Appendix J). The PPP was required by the MDEQ under the General Storm Water Discharge Permit (MIG619000). The purpose of the PPP was to facilitate the involvement of watershed jurisdictions, agencies, organizations, and the general public in the development of the original 2007 Ecorse Creek Watershed Management Plan. Special efforts were made by each of the entities to involve those with the authority, ability, and desire to bring about necessary change by developing and implementing the Watershed Management Plan. The PPP was posted on the project website and regular reminders were given at committee meetings that each individual community or agency was responsible for maintaining communication and encouraging participation regarding the development of the WMP. The PPP included the development of a project website (www.ecorsecreek.com), an email distribution list that people could be added to as the project continued, press releases during development of the WMP, updates at local meetings, public information meetings (3), cable television announcements, etc.

9.3 Project Website

A website was developed (www.ecorsecreek.com) as part of the Public Participation Process requirements, and to serve as a repository for information on the project including the location of the watershed, the ECIC structure and purpose, meeting schedule, agendas, summaries, and general happenings in the area including river clean up days, upcoming conferences, press releases (Appendix L) workshops, training opportunities, etc. The majority of those entities that have their own websites provided a link to the watershed webpage as well. Press releases and informational pieces included the website address to raise awareness and use of the resource. Once a draft WMP was developed, it was posted on the project website for all to access, review and comment on.

The Alliance of Downriver Watersheds created a website to share information and make announcements. The website continues to be regularly maintained and updated and includes postings such as meeting announcements, agendas, summaries, ADW bylaws and the ADW Annual Report. In 2009, the website address was renewed for another 3-year period. The website link/address is: www.allianceofdownriverwatersheds.com

9.4 Individual Community/Entity Meetings

Meetings with the individual Ecorse Creek communities were held during the development of the 2007 WMP in order to gain input on current practices, action items and potential improvement projects (March and April 2005). In order to develop the update for the Watershed Management Plan, another series of meetings and data gathering with the individual entities was necessary. These meetings proved to be invaluable in gaining a better understanding of the issues each community/entity is facing, as well as to brainstorm potential project ideas and locations (See Chapter 6). A worksheet was developed and emailed to the members in advance of the individual meetings. The brainstorming worksheet was developed to get ADW members thinking about potential wish list projects or action items over the next 5 years (2012 – 2016) (other than those required by permit). Throughout the summer and early Fall of 2010, representatives met with the majority of ADW members to review the worksheet and identify projects that they would like to pursue if funding should come available. These meetings resulted in the tables found in Chapter 6 that summarize the action items (by BMP) that are priorities over the next five years.

9.5 Public Information Meetings

In addition to the efforts described above, 3 formal public information sessions were held during the development of the original 2007 Watershed Management Plan (See agendas and summaries in Appendix K). The results of the public information meetings were utilized as another tool in understanding the issues and priorities in the watershed and in developing the action plan(s). Formal public involvement opportunities included:

Public Information Meeting #1
January 20, 2005
Hosted by City of Taylor at City Hall

Approximately 40 people attended the first public meeting. The purpose of the meeting was to provide an overview of the watershed management plan process, present an overview of the watershed including general findings to date, and to discuss the next steps in the project and how to stay involved. The overview of the watershed included discussion regarding the percent of population within the watersheds by community, population density, land area within the watershed by community, the primary water courses, topography, pre-settlement vegetation, existing land use, future land use, wetlands, flood prone areas, and general issues and concerns. Example goals for the watershed were also presented and participants were asked to indicate their priorities. All those in attendance were made aware of the project website address and how they can stay involved in the project. General input and comments were gathered from those in attendance. Comments and questions were received regarding partnering with schools and volunteers to assist in water quality monitoring, educating the public and youth regarding watershed protection, balancing the need to improve flows with the need to maintain habitat, the desire to develop and enforce tree ordinances, etc.

Public Information Meeting #2
June 1, 2005
Hosted by Brownstown Township at the Community Center

Approximately 14 people attended the second public information meeting that was held during the development of this Watershed Management Plan. The purpose of the meeting was to present an overview of WMP process, the designated and desired uses, major goals of the watershed, the draft recommended action plan for the watershed, and methods to measure progress. The meeting was also held to gather additional input and ensure continued awareness and involvement in the development of the plan. The goal development process was reviewed as were the priority pollutants and issues within the watershed. An overview of the actions and best management practices was given and a discussion took place regarding the number of actions being done or that will be done within the watersheds as part of the Phase II permit (short-term) as well as the numerous potential projects (long-term) that have been identified by the watershed committee. All those in attendance were made aware of the next steps in the planning process as well as the variety of methods to continue to provide input and review the draft plan including emailing or calling the watershed committee chair, the local watershed representatives, or project team members. The project website was also discussed as a means of staying up to date and aware of meetings, revised drafts, etc. Discussion also took place regarding how the watershed committee will move forward once the plan is completed to ensure its sustainability and implementation.

Public Information Meeting #3
September 22, 2005
Hosted by Friends of the Detroit River at the Westfield Center in Trenton

The purpose of the meeting was to present the final draft of the Watershed Management Plan and to gather any final comments and input prior to the plan being approved by the MDEQ. The meeting was held in conjunction with the Friends of the Detroit River Annual Meeting and approximately 52 people were in attendance. The components and process of developing the Watershed Management Plan were reviewed. An overview presentation was given regarding the designated and desired uses, priority pollutants and issues, goals, action items, related initiatives, how progress will be measured, and how the plan will be updated. Attendees were made aware that the draft plan is up on the project website and that the committee planned to submit the final plan to the MDEQ by November 1, 2005. Discussion took place about how the public participation meetings were published and advertised, what provisions are in place for implementation, specifics about the Drain Code, as well as questions regarding the field work methodology.

9.6 Presentations to Councils/Boards

After the ECIC reviewed a complete draft of the Watershed Management Plan at their May 18, 2005 meeting, comments and edits were received and made. Presentations were then scheduled with 4 of the participating watershed members to provide an overview of the process and the recommendations of the draft plan. These meetings also served to further the awareness and education regarding watersheds, things that affect water quality, and what can be done, or is currently being done to improve water quality in the area and region. Presentations were made in June, July, and August 2005 to the following:

- City of Wyandotte
- City of Southgate
- City of Dearborn Heights
- Wayne County

9.7 Public Survey (SEMCOG)

The Southeast Michigan Council of Governments and the Southeast Michigan Partners for Clean Water conducted a water quality survey during the summer of 2004. The purpose of the survey was to provide a benchmark to gauge the effectiveness of regional and local public outreach campaigns, leverage resources, and provide the opportunity to compare results from different areas of the SEMCOG region.[1] Results specific for the Downriver area can be found in Appendix M. Example findings include the following:

- Forty-five percent of those surveyed indicated that they “didn’t know” where storm water goes after it enters a storm drain or roadside ditch.

- Only 15% of those surveyed knew that they lived in a watershed.

- More than three-fourths (78%) of those surveyed agreed with the statement that the quality of local streams where they live affects the Great Lakes and Lake St. Clair.

- Sixty-six (66%) percent of those surveyed indicated that their household uses a community collection site to dispose of household hazardous waste, such as old oil, fluids from vehicles, batteries, and pesticides.

- The top four ways residents preferred to receive information about what they can do to protect lakes and streams were from community newspaper (45%), television news (43%), major newspapers (40%), and municipal newsletter (28%).

It's anticipated that a similar survey will be conducted again in the future and compared to the results of this initial survey to illustrate changes in public perception and knowledge over time.

9.8 Public Education Plan (PEP)

As required under the State of Michigan Phase II Watershed Based Storm Water General Permit (MIG619000), and individual communities/entities Certificate of Coverage, the members of the ECIC individually prepared Public Education Plans (PEPs) that were submitted to the MDEQ under separate cover (most by November 1, 2004). The PEPs were prepared to instill within the residents, commercial and industrial businesses, developers, visitors, officials and employees, a heightened awareness of the connection between individual actions and the health of the watershed and water resources. The objective of the PEPs is to promote, publicize, and facilitate watershed education for the purpose of encouraging the public to reduce the discharge of pollutants in storm water. Each of the individual PEPs address public education requirements of the MDEQ that fall under one of the six required categories:

- Personal Watershed Stewardship
- Ultimate Storm Water Discharge Locations and Potential Impacts
- Reporting of Illicit Discharges
- Personal Actions that can Impact the Watershed
- Waste Disposal
- Riparian Land Management

The PEPs are separate documents submitted to the MDEQ outside of this Watershed Management Plan. However, it is a goal of this WMP to raise the level of awareness and educate the community in regard to watersheds, what is being done to improve water quality, what an individual can do to help, etc.

To further this effort, and to continue to raise awareness, a board illustrating the location of the Ecorse Creek Watershed as well as a handout describing the watershed management plan process and project website were put on display and made available at a Friends of the Detroit River reception. The program was held at U of M Dearborn on June 16, 2005 with approximately 150 people in attendance. The primary purpose of the program was to update attendees about the plans for the International Wildlife Refuge Visitor Center. It's estimated that approximately 110 copies of the Ecorse Creek Watershed handout were picked up by program attendees.

9.9 Watershed Advisory Committee Meetings

During the process of updating the WMPs, a meeting was scheduled with each of the Watershed Advisory Committees (WAGs). The 3 WAG meetings were held in November 2010 with the Ecorse Creek WAG, the Combined Downriver WAG, and the Lower Huron River WAG. The primary purpose of the WAG meetings was to update the members on the status of the update, present results of the Watershed Treatment Model, and solidify the projects and BMPs that were identified by the individual watershed entities.

[1] SEMCOG Regional Water Quality Survey Findings Report. ETC Institute, Olathe, Kansas, September 2004.