Michigan Department of Environmental Quality

Water Division

July 7, 2003

Total Maximum Daily Load for Biota for the Ecorse River Watershed Wayne County, Michigan

INTRODUCTION

Section 303(d) of the federal Clean Water Act and the United States Environmental Protection Agency's (USEPA's) Water Quality Planning and Management Regulations (Title 40 of the Code of Federal Regulations, Part 130) requires 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 instream water quality. The TMDL provides states with a process whereby point and/or nonpoint pollutant sources can be reduced appropriately so that WQS can ultimately be attained. This TMDL focuses on identifying appropriate reductions in sediment loadings to the Ecorse River Watershed that will enable WQS to be attained.

PROBLEM STATEMENT

This TMDL focuses on the entire Ecorse River Watershed, which includes the Ecorse River, South Branch Ecorse River, Sexton and Kilfoil Drain, and smaller tributaries, all warmwater designated waterbodies in Wayne County (Figure 1). The TMDL reach is about 25 miles in length and is identified in the Section 303(d) list (Creal and Wuycheck, 2002) as follows:

ECORSE RIVER WBID# **061301I**
County: WAYNE HUC: 4090004 Size: 25 M
Location: Detroit River confluence u/s (so as to include Ecorse Creek and La Blanc)
Problem: **Macroinvertebrate community rated poor; untreated sewage discharges, pathogens (Rule 100).**
TMDL Year(s): 2003 RF3RchID: 4090004 175 0.00

The impaired designated use in the Ecorse River Watershed addressed in this TMDL is aquatic life. The pathogen problem will be addressed in a separate TMDL at a future date.

The Ecorse River Watershed flows through both the Southern Michigan - Northern Indiana Till Plain, and Huron - Erie Lake Plain ecoregions (Omernik and Gallant, 1988) in southeast Michigan. The watershed is approximately 46 square miles in drainage and is heavily developed, including the Detroit Metropolitan Airport property (Metro Airport) in the headwater region of the South Branch Ecorse River.

Various surveys and site visits have been conducted in the Ecorse River Watershed by the Michigan Department of Environmental Quality (MDEQ) over the past thirty-plus years, all with similar findings. A 1969 water quality study on the lower Ecorse River 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, and excessive algal growth resulting in low dissolved oxygen concentrations and combined sewer overflow impacts (Rydquist and Willson, 1969). The 1969 report also mentions the high rate of overland runoff due to the predominance of residential and commercial land use.

The Great Lakes and Environmental Assessment Section reports from surveys in 1990 and 1996 (Jones, 1991 and Oemke, 1997, respectively), found degraded conditions in the Sloss and Ganoing Drain, and Sexton and Kilfoil Drain reaches of the watershed. Similarly, surveys in 2001 found degraded conditions throughout the watershed (Goodwin, 2002). All three reports reflected surveys using Procedure #51 (P51) survey protocols and scoring (MDEQ 1997 and 1998). The P51 protocol uses a multimetric index approach to produce a qualitative rating for a survey location for either fish or macroinvertebrate communities (excellent, acceptable, or poor) or habitat conditions (excellent, good, fair, or poor).

The 1990, 1996, and 2001 surveys in the Ecorse River Watershed 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 and 2001 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 instream 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.

NUMERIC TARGETS

The Ecorse River Watershed is not meeting designated uses for “other indigenous aquatic life and wildlife,” as required under Rule 100 (R 323.1100[1][f]). The biota in the watershed are impacted on a broad scale by unstable flows and excessive sedimentation resulting in the loss of stable habitat. Macroinvertebrate community assessment conducted using P51 is the mechanism by which the attainment of the aquatic life designated-use portion of the WQS is measured. The use, therefore, of P51 is appropriate for assessing future attainment of aquatic life in the Ecorse River Watershed.

The primary numeric target used in this TMDL will be based on P51 survey results and scoring. For macroinvertebrate community data the target will be a reproducible acceptable macroinvertebrate community rating at established monitoring locations throughout the watershed. An acceptable rating correlates to a cumulative score of equal to or greater than -4 for the macroinvertebrate multimetric index. Achievement of the WQS 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 habitat quality of the stream will also be assessed using P51 and considered an additional numeric target. A habitat quality score of 65 will be used as the target for instream habitat conditions. This score is in the upper end of the fair range (35 to 70) and is based on the 2001 survey results in the watershed. Of eight stations sampled in 2001, three scored above a 60 (61 to 72) while the other five scores ranged from 33 to 54. A large source of the variation in scores at these stations was due to individual metric scores reflective of depositional and sedimentation conditions. A score of 65 is the median of the three higher scoring stations and will be used as representative of successful sedimentation control. The P51 habitat scoring

methodology was revised in May 2002; an analogous score would be a 96 using the new methodology, falling in the upper end of the marginal range (56 to 104).

A secondary numeric target used in this TMDL is a total suspended solids (TSS) mean annual in-stream concentration of 80 milligrams per liter (mg/L) during wet-weather and snowmelt/runoff events, to be used as a further indication of sedimentation control in the watershed. The target of 80 mg/L is based on a review of existing data and published information on TSS effects. The TSS concentration is also used herein as a correlate for depositional loading of sediments in the stream channel. Given the low gradient of the Ecorse River Watershed (Rydquist and Willson, 1969) the addition of TSS during high water events results in the increased availability of this material to settle out as waters recede and become more quiescent.

The target concentration of 80 mg/L TSS is the result of information from published literature on the effects of TSS, as well as existing conditions in the Ecorse River Watershed. Published information on the relationship between TSS concentration and biotic communities showed significant decreases (to about 40 percent of normal) in macroinvertebrate density with TSS concentrations above 80 mg/L (Gammon, 1970). A review of fish community relationships to TSS concentration found no harmful effects below 25 mg/L, and only somewhat reduced yields at 25 to 80 mg/L; good fisheries were unlikely above 80 mg/L (Waters, 1995). Recent and historic data on TSS concentrations in the Ecorse River at West Jefferson Road show that low flow TSS concentrations are typically well below 80 mg/L indicating that the focus of TSS mitigating activities should be on runoff events.

The Simple Method of pollutant loading estimation from the USEPA's PLOAD manual was used to approximate wet-weather TSS loadings in the Ecorse River Watershed (USEPA, 2001). The current TSS load based on land use in the watershed, precipitation, and land use-specific TSS loading was estimated to be 6.2 million pounds per year (Table 1). The Rouge River National Wet-Weather Demonstration Program (Rouge River Program) estimated land use-specific event mean concentration loadings for TSS in runoff in the Rouge River basin (Cave et al., 1994), which were then used in the PLOAD calculations. Estimations from the Rouge River Watershed were considered applicable because of the close proximity of the Rouge River to the Ecorse River Watershed and the continuity of land use patterns in the entire region.

The Rouge River Program predicted industrial-classified land use to produce a concentration of 149 mg/L TSS (Cave et al., 1994). The wet-weather TSS target of 80 mg/L, besides being supported by the aforementioned literature, represents an approximate fifty percent reduction in the estimated industrial land use-specific TSS concentration. Using a phased approach, the reduction of the TSS loading by fifty percent is expected to help restore conditions in the Ecorse River Watershed and meet the WQS for biota.

If the wet-weather TSS target of 80 mg/L is achieved and biotic communities do not achieve the primary numeric target, the TSS target will need to be reevaluated. The 80 mg/L TSS target is designed to focus efforts on reducing the input of fine material into the watershed so it does not settle out in the stream channel obscuring habitat that is necessary for the maintenance of healthy biotic communities. The concentration of TSS is also 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.

SOURCE ASSESSMENT

Land use throughout the Ecorse River Watershed is dominated by residential, commercial, and industrial development (SEMCOG, www.semcog.org). The headwater tributaries in the western edge of the watershed also consist of a significant amount of row-crop agriculture, as well as the Detroit Metropolitan Airport property.

The types of urban and suburban development found in the Ecorse River Watershed have dramatic effects on surface waters in terms of altered runoff patterns, increased flashiness/changed hydrologic response curve, increased suspended solid loading, and shifts in temperature characteristics among other effects. 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 combine to 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 instream habitats by new TSS loadings and resuspension of sediments previously deposited in the system. Therefore, the sediment and water volume additions to the Ecorse River Watershed result from residential, commercial, industrial, and agricultural lands.

A total of 73 permitted dischargers are located within the Ecorse River Watershed. Three facilities are covered under individual National Pollutant Discharge Elimination System (NPDES) permits, 70 are covered under a general NPDES permit (Figure 2), 66 of which have general storm water permits (Figure 2, Table 3). The combined daily maximum allowable discharge volume (design flow) for the five continuously discharging permitted facilities (excluding the 66 storm water facilities and two storm water-only NPDES facilities) is 2.7 million gallons per day (mgd) (Table 4). Four of the five continuously discharging facilities have TSS limits of 30 mg/L as an average or maximum; for purposes of estimating loading from these facilities, 30 mg/L was used for all of them resulting in an annual TSS load of below 250,000 pounds (Table 4).

Typical background TSS concentrations in the Ecorse River Watershed, based on historic STORET data, range from less than 10 mg/L to 40 mg/L; sediment introduction, therefore, primarily comes from high water conditions when TSS concentrations increase by 10 to 20 times the background levels (200 to 600 mg/L) (Woods and Boersen, 1980). This is further supported by data from rainfall events in 1980 that produced pronounced increases in instream flow concurrent with increases in TSS loading (see Woods and Boersen, 1980).

Data from a rainfall event in April 1980 provides an indication of the percentage of TSS loading that sources from nonpoint storm water runoff versus that resulting from background conditions and permitted dischargers. Measurements taken over the course of the 8-hour, 1.06 inch rainfall showed flow increasing over ten-fold and TSS concentrations increasing 50-fold or greater (Woods and Boersen, 1980). If background conditions are assumed to account for the combined flow volume and TSS concentrations from permitted point sources and normal background stable flow conditions, then the storm water runoff constituted an average of approximately 99 percent of the TSS loading during the 12 hours of data following the storm. This estimation of TSS loading from storm water is similar to published information from the heavily developed and urbanized Anacostia River Watershed in Maryland, in which studies attributed over 95 percent of TSS loading to nonpoint storm water sources (Shepp and Cummins, 1997).

The impact of the storm water and melt water runoff contribution to the Ecorse River Watershed was assessed by using land use patterns, their associated TSS export rates, and local

precipitation (Table 1). Runoff associated with industrial, commercial, and urban municipal land uses was combined to estimate the runoff either currently permitted under general or individual NPDES permits or likely to be permitted in the future under the Phase II MS4 storm water permitting program. These heavily developed urban lands comprised 75 percent of total land use, and are estimated to contribute 5.97 million pounds per year of TSS (96 percent; Table 1). The estimation of the storm water and melt water runoff assumes that the background flow conditions and TSS concentrations are relatively stable and the increases in flow and TSS concentration in the Ecorse River Watershed is attributable to the runoff, as well as the resuspension of previously settled solids in the river channel.

LINKAGE ANALYSIS

The Ecorse River Watershed is largely devoid of suitable, stable, colonizable habitat for stream biota due to an overabundance of deposited sediment, primarily from storm water-related sources. The development of a TMDL is an appropriate method of addressing the sediment loading issue in this watershed.

The loss of suitable, colonizable substrate due to excessive siltation has been demonstrated to cause significant impairment in biotic communities in streams (Waters, 1995). Conversely, the reduction or elimination of excessive sedimentation and a subsequent increase in the availability of suitable habitat can result in a rebounding in the macroinvertebrate community (Gammon, 1970).

As sediment loading and sedimentation rates decline, the scores (and associated ratings) of P51 assessments for the macroinvertebrate community and habitat quality are expected to increase reflective of increases in habitat availability and macroinvertebrate recolonization. Ultimately, an acceptable macroinvertebrate community rating will demonstrate the attainment of WQS, as well as improved habitat conditions and biotic community.

TMDL DEVELOPMENT

The TMDL represents the maximum loading that can be assimilated by a water body while still achieving WQS. This TMDL is based on the macroinvertebrate community response to decreased sedimentation because the primary cause of the nonattaining aquatic life criteria is most probably linked to flow instability and excess sediment loading. The TMDL is focused on the reduction of sediment loading throughout the watershed to a level that allows stream biota to meet WQS. A composite score of -4 (acceptable) based on P51 assessments of the macroinvertebrate community will serve as the primary target for this TMDL. A habitat quality score of 96, using P51 (2002) will be used as an additional target to provide a causative assessment of aquatic life attainment.

The development of TMDLs calls for critical conditions to be addressed as part of the analysis. Because the primary sediment inputs to the Ecorse River Watershed occur during wet-weather conditions, and because the instream flow response to precipitation events has been dramatically changed, there is not a single critical condition that will be protective for all conditions. The combination of numeric targets based on P51 biota and habitat assessments and the secondary wet-weather and snowmelt/runoff TSS target of 80 mg/L, act in concert at working toward a critical condition, that being the mitigation of sediment loading with the likely concurrence of tempering stream flow response to runoff events so that all numeric targets are achieved.

ALLOCATIONS

A TMDL represents the maximum loading of a pollutant (TSS in this case) that can be discharged to a waterbody and still meet WQS. The TMDL consists of the sum of individual point source waste load allocations (WLAs) including individual and general NPDES permitted facilities and permitted industrial and municipal storm water outfalls, as well as load allocations (LAs) made up of the combined nonpoint and background sources. Uncertainty in the relationship between pollutant load and receiving water quality is accounted for by including a margin of safety (MOS) in the TMDL, either explicitly incorporated in the allocation calculations, or implicitly integrated into other target areas for the TMDL. The equation representative of the TMDL calculation is:

$$TMDL = ?^{WLAs} + ?^{LAs} + MOS$$

The annual wet-weather TSS loading to the Ecorse River Watershed was estimated based on land use to be 6.2 million pounds plus 0.25 million pounds for permitted continuous dischargers (Table 4) and 0.35 million pounds as background TSS loading (Table 2). A fifty percent reduction in wet-weather land use-related TSS results in a total loading of 3.7 million pounds for allocation among all sources (Table 5).

WLA

There are 3 individual and 70 general permitted point source dischargers in the Ecorse River Watershed. The five non-storm water only dischargers' annual loading of TSS to the Ecorse River Watershed is estimated at 250,000 pounds. The industrial and municipal storm water dischargers (both currently permitted and future Phase II MS4 permitted) annual TSS load estimate is 5.97 million pounds. A fifty percent reduction in the current estimated storm water TSS load results in a target of 2.99 million pounds per year. The WLA is therefore equal to 3 million pounds for storm water permits plus 0.25 million pounds per year allocated to continuous point sources (Table 4) for a total WLA of 3.24 million pounds per year. Land use associated with the Detroit Metropolitan Airport was removed from the analysis due to it's inclusion in the allocation for point source dischargers.

LA

The Nonpoint Source (NPS) and natural background levels of TSS are combined to produce the LA. The primary NPS of TSS in the Ecorse River Watershed are runoff from the heavily developed and modified land, erosion, and resuspension of sediment. Estimated NPS loading (defined as loading not attributable to permitted point sources or industrial and municipal storm water) is 0.23 million pounds per year. Based on a fifty percent reduction, the LA is 0.12 million pounds per year for storm water plus 0.35 million pounds per year for background for a total LA of 0.47 million pounds per year.

MOS

The MOS is implicitly integrated into a biota TMDL because the biological communities and instream habitat conditions reflect the effects of variability in sediment loadings on both spatial and temporal scales. Assessments of macroinvertebrates and habitat using P51 will be made between June and September 30 under stable flow conditions following the implementation of sediment control measures. Results from these follow-up assessments will be reflective of the variability of TSS loading into the Ecorse River Watershed and will act as an implicit MOS for this TMDL.

SEASONALITY

Seasonality is addressed in this TMDL through the use of mean monthly flows in TMDL development and through established sampling periods for P51 assessments. The biological community and habitat quality will be sampled at the same locations between June and September 30 under stable flow conditions to minimize temporal and spatial variability.

MONITORING PLAN

Following the implementation of sediment control measures and other control measures in the watershed, the MDEQ will conduct monitoring to assess the progress toward meeting the TMDL targets. Annual sampling of macroinvertebrate community and habitat quality using P51 will be conducted at Beverly Road, Beech Daly Road, and Toledo Highway on the Ecorse River and at Telegraph Road and Abbot Road on Sexton and Kilfoil Drain, as resources allow. Assessments will continue until results from two consecutive years demonstrate attainment of WQS and the primary TMDL target at these sites. These follow-up assessments will be conducted between June and August under stable flow conditions to lend strength to comparison between years and sites.

TSS and stream flow sampling will be initiated following the implementation of sediment control measures and other mitigative tools aimed at the reduction of runoff rates and sediment loading in the Ecorse River Watershed. Sampling during critical high flow events, as well as during stable flow events, will enable the development of better TSS loadings and elucidate the patterns of such loadings in the watershed.

REASONABLE ASSURANCE

The focus of the recommended actions designed to protect the Ecorse River Watershed is directed toward the installation of sediment control measures and other measures that will reduce sediment loadings and minimize surface runoff rates to the watershed. The decrease of sediment to the streams is aimed at reducing the impacts of sedimentation on instream habitat while the mitigation of runoff rates will lessen the erosive potential and sediment resuspension in the stream channel. Control measures toward these goals include NPDES permit limits for individual and general permits, and the incorporation of sediment control measures and in storm water permits and in identified problem areas not covered under the permit process. Sediment loadings reductions from urban and other land use in the Ecorse River watershed will be driven by the implementation of Best Management Practices and storm water pollution prevention plans to be developed by stakeholders within the watershed.

The existing individual NPDES permit requirements will be sufficient to meet the WLA target for TSS. The upcoming watershed management plan for the Ecorse River will be developed by collective units of government within the watershed with assistance by staff of the MDEQ, Southeast Michigan District Office, among others.

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Table 1. Total annual wet-weather TSS loading calculation based on the Simple Method using PLOAD (USEPA 2001) and concentration and imperviousness data from the Rouge River National Wet-Weather Demonstration Program (Cave, 1994).

Land Use	Acres (*Au*)	TSS concentration (*Cu*)	Percent Imperviousness (*Iu*)	Annual Precipitation (*P*)	*Pj*	Runoff Coefficient* (*Rvu*)	TSS annual load**	% of total load	% of land use
Residential	13699	79	0.36	31	0.9	0.374	**2,559,643**	41.2	49.8
Transportation	1268	141	0.53	31	0.9	0.527	**595,855**	9.6	4.6
Commercial	1846	77	0.56	31	0.9	0.554	**497,994**	8.0	6.7
Forest and Rural Open	4729	51	0.02	31	0.9	0.068	103,715	1.7	17.2
Water	56	6	0.51	31	0.9	0.509	1,082	0.0	0.2
Agricultural	2064	145	0.02	31	0.9	0.068	128,700	2.1	7.5
Urban Open	502	51	0.11	31	0.9	0.149	**24,124**	0.4	1.8
Industrial	3320	149	0.76	31	0.9	0.734	**2,296,214**	37.0	12.2
Total Acres	27484					Total Load	6,207,326		
			Current Loading			Urban land use	5,973,830	96	75
						Other	233,496	4	25
			Target Loading (50% of Current)			Urban land use	2,986,915		
						Other	116,748		

BOLD: Urban land use categories

* Runoff coefficient (Rvu) is defined as: 0.05+(0.009**Iu*).

** Annual Load is defined as: *P*Pj*Rvu*Cu*Au*2.72/12

Table 2. Calculations used to estimate background, stable flow, TSS loading to the Ecorse River Watershed based on monthly low flows and monthly mean TSS concentrations.

	Mean Monthly flow		
	cfs	mgd	Mean TSS (mg/L)*
January	2.1	3.2	22.8
February	3.1	4.8	12.1
March	8.4	13.0	25.0
April	9.9	15.3	59.2
May	4.2	6.5	17.0
June	1.9	2.9	11.8
July	1.3	2.0	18.0
August	0.9	1.4	33.3
September	1.1	1.7	20.1
October	1.4	2.2	14.4
November	1.7	2.6	24.9
December	2.1	3.2	20.2
Grand Mean	**3.2**	**4.9**	**23.2**
	Total annual background TSS loading**		**347,626**

* Monthly mean TSS concentration based on STORET data (1968-1991) from the Ecorse at West Jefferson Avenue.

** 23.2 mg/L x 4.9 mgd x 8.345 (to convert to pounds) x 365

Table 3. Permitted outfalls in the Ecorse River Watershed. (source: MDEQ/WD's NPDES Permit Management System)

PERMIT NUMBER	FACILITY NAME	RECEIVING WATER
Individual NPDES Permits:		
MI0046264	Buckeye Tank Terminals-Taylor	Ecorse River
MI0036846	Detroit Metro Wayne Co Airport	Sexton and Kilfoil Drain
MI0055565	Env Disposal Systems Inc	Godfrey Drain
General Permits:		
MIG670013	Clark Oil Co-Co Snow Drain	Snow Drain
MIG670283	Equilon Enterprises-Metro	Sloss and Ganoing Drain
MIG670291	Marathon Ashland-Romulus	Sexton and Kilfoil Drain
MIG640029	Southwest WTP	Sexton and Kilfoil Drain
Storm Water Permits:		
MIR010117	Hawkins Steel Cartage	
MIR010160	Vacuum Orna Metal-Romulus	
MIR010197	Allen Screw Products-Taylor	
MIR010266	Voest-Alpine Services-Romulus	
MIR010395	Control Manufacturing	
MIR010439	Angelo Iafrate-Taylor	
MIR010514	Van Born Auto Wrecking	
MIR010518	Trenton Auto Parts	
MIR010537	Fields Auto Parts-Wyandotte	
MIR010568	Indian Trails-Romulus	
MIR010634	ASC-Southgate	
MIR010643	Kerr Mfg Co-Romulus	
MIR010652	GKN Sinter Metals-Romulus	
MIR010670	Summit Industries-Taylor	
MIR010690	Central Detroit Warehouse Co	
MIR010776	Air Conditioning Products	
MIR010780	Quality Wire Processing	
MIR010835	Ash Stevens-Riverview	
MIR010848	Ford-Allen Park Clay Mine LF	
MIR010864	Mid-Lakes Recycling-Taylor	
MIR010901	UPS-Taylor	
MIR010909	USF Holland Inc-Romulus	
MIR010935	Murray Grinding-Dearborn Hgts	
MIR010957	Trenton Forging Co	
MIR010960	Downriver Deburring Inc	
MIR010966	Co Pipe Products-Taylor	
MIR010993	Linc-Romulus	
MIR011004	Ricks Cove-Wyandotte	
MIR011123	House of Auto Parts	
MIR011133	Overnite Transportation-Rom	
MIR011399	Link Tool & Manufacturing	
MIR011518	Nat Steel Corp-GLS-Mich Plt	
MIR011519	Modern Cam & Tool-Taylor	

PERMIT NUMBER	FACILITY NAME	RECEIVING WATER
Storm Water Permits (continued):		
MIR011521	Cousins Petroleum-Taylor	
MIR011522	Manfredi Motor Transit Co	
MIR011525	Process Prototype-Romulus	
MIR011528	Crown Enterprises-Ecorse	
MIR011529	Crown Enterprises-Romulus	
MIR011530	Detroit Yacht Club	
MIR011532	EFTEC North America LLC	
MIR011613	Woodbridge Corp	
MIR011664	Shiloh of MI-Romulus	
MIR011676	Glens Car & Truck Parts II	
MIR011678	Abdite Industries Inc-Taylor	
MIR011679	Nor-Dic Tool-Romulus	
MIR011683	ABF Freight System Inc	
MIR011688	Dix Automotive Recyclers	
MIR011706	Swift Transport-Romulus	
MIR011709	Automotive Comp Carrier-Taylor	
MIR011720	Voss Industries-Taylor	
MIR011729	FedEx Freight East-Detroit	
MIR020026	Marathon Ashland-Romulus	
MIR020029	BP Amoco Oil-Taylor	
MIR020030	Atlas Oil Terminal-Taylor	
MIS210341	Worthington Steel-Taylor	
MIS210369	Causley Trucking-Melvindale	
MIS210376	B & E Machine Products Co	
MIS210418	Reilly Plating Co-Melvindale	
MIS210535	Norfolk & Western RR-Melvinda	
MIS210540	Means Industries-Melvindale	
MIS210542	US Postal Service-Allen Park	
MIS210618	Delray Steel Castings	
MIS220017	Central Wayne Air Quality	
MIS220028	Angelos Crushed Concrete Inc-	
MIS310008	Nor-Dic Tool-Romulus	
MIS310011	FedEx Freight East-Detroit	

Table 4. Individual and general NPDES permitted facilities in the Ecorse River Watershed and estimated loadings of total suspended solids (TSS) based on a concentration of 30 mg/L (**bold** facilities have a permit limit of 30 mg/L).

Permit No.	Facility Name	Design Flow (mgd)	Mean TSS (mg/L)	Daily Load (#)	Annual Load (#)
MI0046264	Buckeye Tank Terminals-Taylor	0.6	30	150	54,827
MI0036846	Detroit Metro Wayne Co Airport*	unspecified	*	*	*
MI0055565	Env Disposal Systems Inc*	unspecified	*	*	*
MIG670013	**Clark Oil Co-Co Snow Drain**	0.5	30	125	45,689
MIG670283	**Equilon Enterprises-Metro**	0.7	30	175	63,964
MIG670291	**Marathon Ashland-Romulus**	0.5	30	125	45,689
MIG640029	**Southwest WTP**	0.4	30	100	36,551
		2.7 (Total Flow)			246,720 (Total Load)

* Unspecified quantity of storm water, loading from these facilities is accounted for in the industrial/municipal storm water component of the Waste Load Allocation.

Table 5. Ecorse River watershed Total Maximum Daily Load allocation information (loads are in million of pounds per year).

TSS Source	Current Annual TSS Load	Annual Target TSS Load	WLA	LA
Industrial / Municipal stormwater	5.97	2.99	2.99	
Other land use sources	0.23	0.12		0.12
Background – low flow	0.35	0.35		0.35
Individual / general NPDES permits	0.25	0.25	0.25	
Total Annual TSS Load	**6.8**	**3.71**	**3.24**	**0.47**

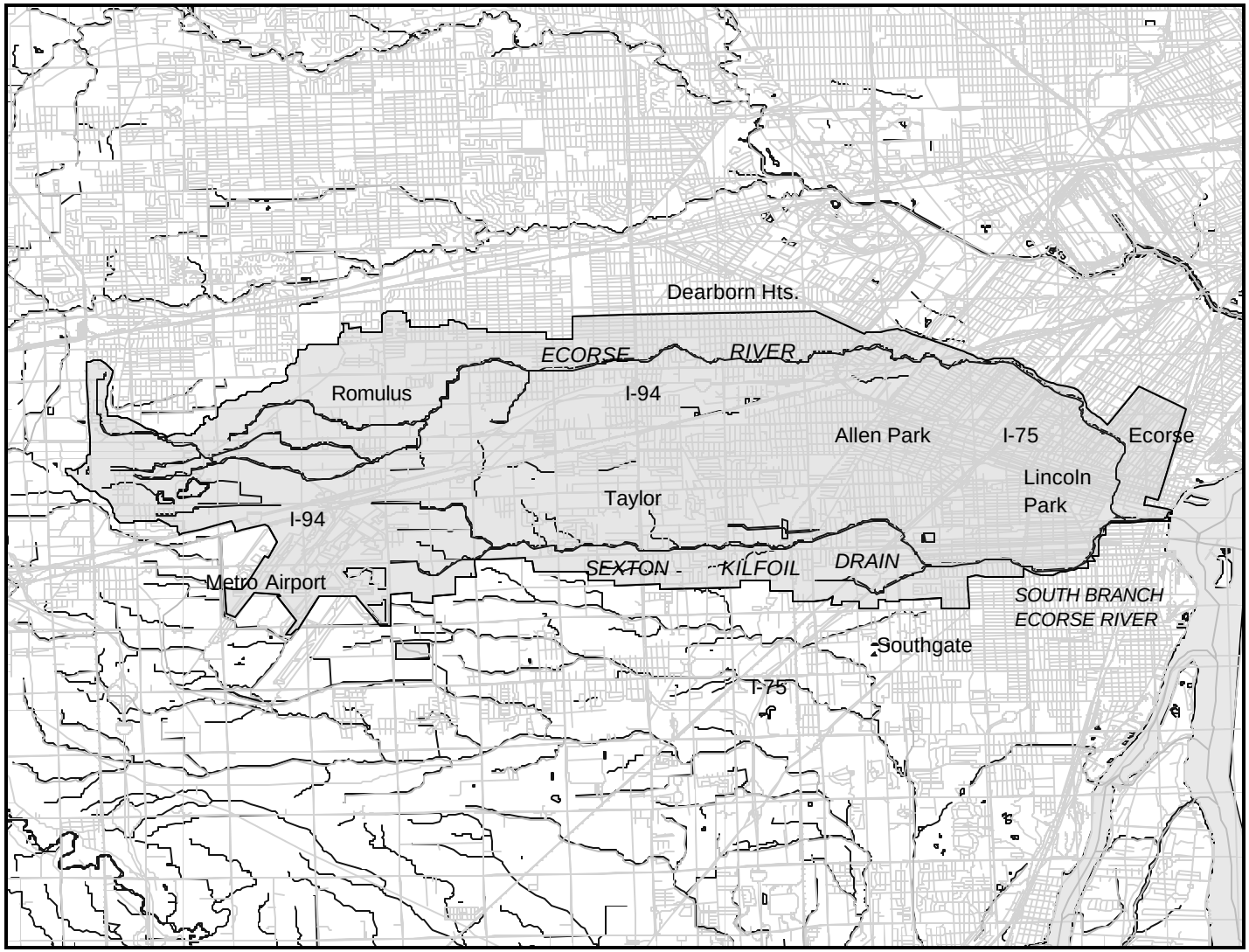

Figure 1. The Ecorse River Watershed, Wayne County, Michigan.

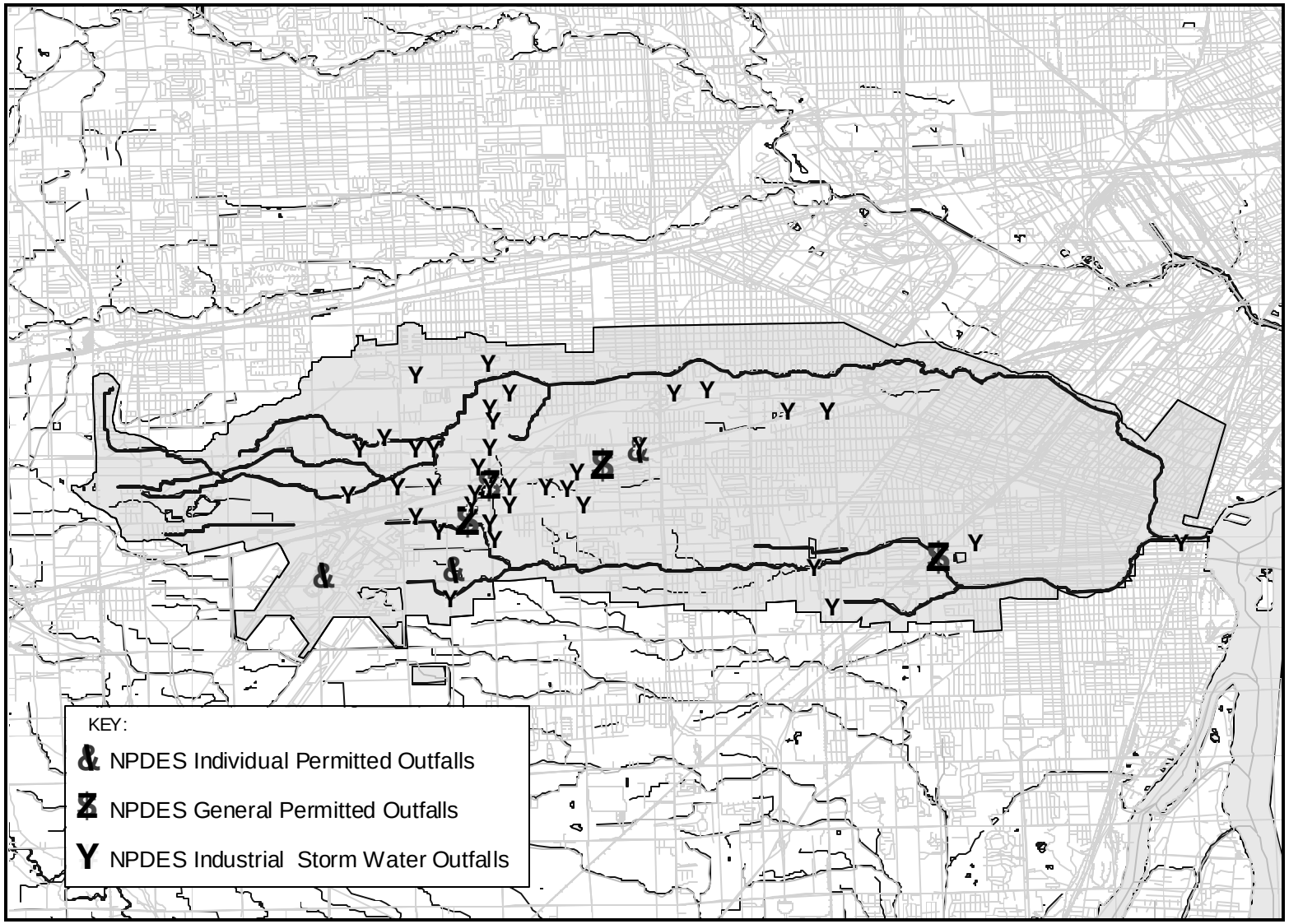

Figure 2. Ecorse River Watershed individual, general, and storm water permit locations.