

Section 7

Action Plan

The general storm water permit requires that communities determine short and long term actions to achieve short and long term goals for the watershed. Long term goals are those which will take longer than 5 years to accomplish. Wayne County, Michigan Department of Transportation (MDOT) and the communities of Dearborn Heights, Garden City, Livonia and Westland have identified the following goals and short term and long term actions to achieve the goals for the Middle 3 Rouge River. Short term actions are planned to be in place before the expiration of the current permits, (by 2005). With the addition of schedules and estimated budgets, these action items will become Storm Water Pollution Prevention Initiatives (SWPPIs). Table 13 shows the actions identified by Wayne County, MDOT and each community.

Table 13
Short Term and Long Term Actions

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
Michigan Department of Transportation				
MD1	Prevent Polluted Runoff from storage/loading and unloading sites, outdoor work areas, vehicle and equipment management sites	X	X	
MD2	Hotline reporting system	X	X	
MD3	Deicing practices regularly reviewed	X	X	
MD4	Public education material for fertilizers, herbicides, pesticides	X	X	
MD5	Chemical use management reviewed	X		
MD6	Outfall inspection/testing	X	X	
MD7	Plan to use storm water media filters	X	X	
MD8	Construct storm water sediment ponds	X	X	
MD9	Outlet stabilization for new projects	X	X	
MD10	Engineered stream bank measures	X		
MD11	Stencil storm drains	X	X	
MD12	Post river signs	X		
MD13	Make available information brochures	X	X	
MD14	Catchbasin cleaning	X	X	
MD15	Street sweeping (contracted)	X	X	
MD16	Maintaining detention ponds	X	X	
MD17	Illicit connection program training for employees	X	X	
MD18	Require retention/detention for new projects	X	X	
City of Livonia				
L1	IDEP - Trained Staff	X	X	
L2	Outfall inspection/ testing		X	
L3	Local Ordinances/Enforcement	X	X	X

Table 13
Short Term and Long Term Actions

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
L4	Household Hazardous Management		X	X
L5	Storm Water Development	X	X	X
L6	Home Lawn and Garden Maintenance	X	X	X
L7	Admin. Soil and Sedimentation Controls	X	X	X
L8	Pavement Cleaning	X	X	X
L9	Deicing Practices Review	X		X
L10	Golf Course/Recreation	X		X
L11	Inspections at Time of Sale	X	X	X
L12	Septage Disposal Reporting	X	X	X
L13	Catch Basin Cleaning	X	X	X
L14	Sewer System Cleaning		X	
L15	SSO Identification/Control	X	X	
L16	System Master Planning/GIS	X	X	
L17	Off-Channel Storm Water Retention	X	X	
L18	Constructed Wetlands	X	X	
L19	Storm System Media Filters	X	X	
L20	Sediment Ponds	X	X	
L21	Oil and Grease Trap Devices	X	X	
L22	Outlet Stabilization	X	X	
L23	Engineered Streambank Measures	X	X	
L24	Flow Obstruction Prevention/Removal	X	X	
L25	Direct Mailings to Homes			
L26	Rouge Clean-up	X	X	
L27	Rouge Education Project	X	X	
L28	River Friendly Business Program	X	X	
L29	Storm Drain Stenciling	X	X	X
L30	River Signage	X	X	X
L31	Brochures (Residential Car Washing, etc.)	X	X	X
L32	Cable Broadcasts/Web Site	X	X	X
L33	Video Tapes		X	
L34	Community Meetings on Subwatershed Plan	X	X	X
L35	Hot Line Reporting System & Compliant Follow Up	X	X	X
L36	Staff training on soil erosion	X	X	X
L37	Audit of Chemical Use Storage	X	X	
City of Westland				
WL1	Mailings to every resident in Westland, watershed protection	X	X	X

Table 13
Short Term and Long Term Actions

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
WL2	Mailings to important people	X	X	X
WL3	Mailings to business people	X	X	X
WL4	Hire Consultant for public education	X	X	X
WL5	Hire Consultant for storm management	X		X
WL6	250 outfalls - checking	X	X	
WL7	Yearly outfall checks	X	X	
WL8	Pictures for outfalls	X	X	X
WL9	Signs for outfalls	X	X	X
WL10	IDEP for outfalls	X		
WL11	G.I.S. for storm database	X	X	X
WL12	T.V. inspection for storm	X		
WL13	T.V. inspection for sanitary	X	X	X
WL14	Repairs for T.V. inspection storm	X	X	
WL15	Repairs for T.V. inspection sanitary	X	X	
WL16	Catchbasin cleaning	X	X	
WL17	Catchbasin repair	88% complete	X	
WL18	Maintaining G.I.S. for catch basin clng., SSO, IDEP, T.V. inspection, leaf maps, outfalls, street sweeping	X	X	X
WL19	Street sweeping	Apr.-Sept	X	
WL20	Yard waste composing program	Apr.2 - Dec.15	X	
WL21	Remove leaves from streets	X	X	
WL22	SSO identification	X	X	
WL23	Outfall identification	X	X	
WL24	Cross connection program	X	X	
WL25	PPC (project performance certification) for CSO	X	X	
WL26	Certification for sanitary	X	X	
WL27	Storage for sanitary	X	X	
WL28	Maintaining detention, retention ponds	X	X	
WL29	Public education for cable, schools, future web	X	X	
WL30	Household Hazardous Waste Program (HHHW)	X	X	
WL31	Drainage program	X	X	
WL32	Land use map - G.I.S.	X	X	
WL33	Future land use - G.I.S.	X	X	
WL34	Zoning map - G.I.S. & web	X	X	

Table 13
Short Term and Long Term Actions

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
WL35	Soil erosion program	X	X	
WL36	Enforce soil erosion	X	X	
WL37	Sanitary sewer extensions for elimination of septic sewers	June - Sept.	X	
WL38	Sewer lead connection program to eliminate onsite septic	X	X	
WL39	Illicit connection program	X	X	
WL40	Evaluate costs to correct illicit connections	X	X	
WL41	Public participation program	X	X	
WL42	Tree ordinance program	X	X	
WL43	Participation in River Day	X	X	
WL44	Create cable T.V. programs	X	X	
WL45	Require retention/detention for new projects	X	X	
WL46	Develop subwatershed plan	X	X	
WL47	Identify SWPPI program costs	X	X	
WL48	Develop pollution prevention initiative	X	X	
WL49	Cost of general permit requirements	X	X	
WL50	Apply for State/Federal grants	X	X	
WL51	Sanitary Sewer Lining	X	X	
WL52	Sanitary Sewer for Relief	X	X	
WL53	Manhole Evaluation and Rehabilitation	X	X	
WL54	Develop Sewer Maintenance	X	X	
Garden City				
G1	Mailing to non-residential land owners/tenants (businesses) on BMPs with Rouge Repair Kit.	X	X	X
G2	Mailings to residential owners/tenants on BMP/actions they can do to impact storm water quality.	X	X	X
G3	IDEP testing/investigations - (Consider contracting with County to assist in this).	X	X	X
G4	TV inspection of storm drains - looking for problems (structural, illicit connections, etc.)	X	X	X
G5	Continue GIS Data Base Development - Field structure investigations, build & link data base.	X	X	X

Table 13
Short Term and Long Term Actions

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
G6	Staff training in GIS usage - ArcView/ ArcInfo.	X		X
G7	Public Education - Web Site: Create & Maintain City Web Site, with links to County sites, etc.	X	X	X
G8	Catch Basin Cleaning/Repair	X	X	X
G9	Site & Install In-Line and/or CB sited BMPs to reduce/control sediment, oil, & greases and floatables (idea bags like at Cleveland)	X	X	X
G10	Apply for CWI/RPO Grants	X	X	
G11	Leaf Removal Program	X	X	
G12	Household Hazardous Waste Program - Expand & Public Information Efforts	X	X	
G13	DPS Site Improvements to Control runoff volume and characteristics	X	X	X
G14	Yard Waste Composting Program	X	X	
G15	TV Inspection of Sanitary CSO - look for possible cross connections.	X	X	X
G16	Downspout disconnection program. Continue inspections/testing/enforcement. Non City Owned Sites.	X	X	
G17	Downspout disconnection program. Continue inspections/testing/enforcement. City Owned Sites.	X	X	
G18	SSO/CSO Identification. Identify, characterize (storm event that causes, quantify, quality characterizations).	X	X	X
G19	Regional SSO/CSO Water Quality Sizing Criteria determination - through SWAG/RPO	X	X	X
G20	Storm Water Ordinance - Adoption/Enforcement (Control quantity/quality impacts)	X	X	X
G21	Eliminate (address) OSDS - Especially any that are failing.	X	X	
G22	Sewer System (storm & sanitary/combined) cleaning program.	X	X	
G23	Construct Storm detention (flow reduction) facilities (ponds) at key City sites (i.e. City Hall complex, Sr. High Rise,	X	X	X

Table 13
Short Term and Long Term Actions

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
	DPS, etc.)			
G24	Build/maintain CSO/SSO retention/treatment facility(ies).	X	X	X
G25	Sanitary/Combined system improvements to reduce volume and frequencies of overflows or storage required. (List of immediate improvements for City)	X	X	X
G26	Continue/Expand/Advertise "Hot Line" for reporting potential problems, IDEPs, etc.	X	X	
G27	Additional CB Stenciling and/or signage.	X	X	
City of Dearborn Heights				
DH1	Recreational vehicle ordinance	X		X
DH2	SSO Identification	X		X
DH3	Streambank Stabilization/Ecorse Creek	X		
DH4	Illegal dumping coordination with fire and police	X		X
DH5	Educating residents about BMPs	X		X
DH6	IDEP pilot project	X		
DH7	TV Inspection for storm drains	X		
DH8	GIS/Storm sewers	X		
DH9	Public education Web site	X		
DH10	Illicit connection ordinance	X		X
DH11	Ecorse Creek clean-up	X		
DH12	Log jam removal/Rouge Rescue	X		
DH13	Repair/restore erosion/Ecorse Creek	X		
DH14	Catch basin cleaning/repair	X		
DH15	Annual HHW program	X		
DH16	GIS Study/street sweeping	X		
DH17	TV Inspection of CSOs	X		
DH18	Downspout disconnection program	X		
DH19	Weekly street sweeping	X		
DH20	Ecorse Creek drainage district assessment (per house)	X		
DH21	Storm and sanitary drain cleaning	X		
DH22	GIS grant for storm water management	X		
DH23	Household battery collection	X		
DH24	Assist RRAC with RAP development	X		
DH25	Bi-annual newsletter to residents and businesses	X		

Table 13
Short Term and Long Term Actions

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
DH26	Watershed Stewards Commission	X		X
DH27	TIFA support for Ecorse Creek clean-up	X		X
DH28	Support FOTR Education Center	X		X
DH29	River Oaks Pond restoration (w/Wayne County)	X		X
DH30	Lift station for SSOs(with other communities)			
DH31	CSO basin monitoring	X		
DH32	Septics Program	X		
DH33	Flooding education	X		
DH34	Ecorse Creek flood mitigation plan	X		
DH35	Referrals to Wayne County hotline	X		
DH36	Rouge and Ecorse Creek Info on Cable TV	X		
DH37	Hired Storm Water Consultant	X		
DH38	Cross Connection Program	X		
DH39	Address 10 remaining CSOs		X	
DH40	Ecorse Creek detention pond			X
DH42	Tree planting program	X		
DH43	Broadcast Rouge Video	X		
DH44	Require retention/ detention for new projects	X		
DH46	Develop P2 Initiative	X		
DH47	Sanitary Sewer Lining	X		
DH48	Apply for grants	X		
DH49	Install flood mitigation sensors in Ecorse Creek/reverse 911			X
DH50	Storm drain stenciling	X		
DH51	Dearborn Heights share of DWSD CSO			
DH52	Corrective Action Plan for increased sewer capacity	X		
DH53	Periodic council meetings on Rouge matters	X		
DH54	Citizens survey		X	X
DH55	Downriver sewer project (sanitary sewer relief)	X		
DH56	Annual Ecorse Creek operational maintenance	X		
DH57	Parkland Park improvements	X		
DH58	Environmental Awareness Center/parkland Park		X	X

Table 13
Short Term and Long Term Actions

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
DH59	Purchase land along Ecorse Creek to prevent development		X	X
DH60	Flood mitigation grant from FEMA	X		
DH61	Building Dept. and DPW Staff Training	X		
DH62	Develop Ecorse Creek Watershed Mgmt. Plan		X	X
Wayne County				
WC1	IDEP - Trained Staff	X	X	
WC2	IDEP - Inspected Public Owned Facilities	X	X	
WC3	IDEP - Inspected Public Storm Drains	X	X	
WC4	Local Ordinances/Enforcement	X	X	X
WC5	Hot Line Reporting System & Compliant Follow Up	X	X	X
WC6	Household Hazardous Management		X	X
WC7	Storm Water Development	X	X	X
WC8	Home Lawn and Garden Maintenance	X	X	X
WC9	Admin. Soil and Sedimentation Controls	X	X	X
WC10	Staff Trained/Planned Training	X	X	X
WC11	Storage/Loading/Unloading Operations	X	X	X
WC12	Outdoor Work Area Management	X	X	X
WC13	Vehicles and Equipment Management	X	X	X
WC14	Pavement Cleaning	X	X	X
WC15	Deicing Practices Review	X		X
WC16	Golf Course/Recreation	X		X
WC17	Audit of Chemical Use/Storage		X	X
WC18	Inspections at Time of Sale	X	X	X
WC19	Septage Disposal Reporting	X	X	X
WC20	Regional Septage Disposal	X	X	X
WC21	Catch Basin Cleaning	X	X	X
WC22	Sewer System Cleaning		X	
WC23	SSO Identification/Control	X	X	
WC24	System Master Planning/GIS	X	X	
WC25	Wet Detention Ponds	X	X	
WC26	Dry Extended Detention	X	X	
WC27	Off-Channel Storm Water Retention	X	X	
WC28	Constructed Wetlands	X	X	
WC29	Swales and Filter Strips	X	X	
WC30	Storm Water Infiltration Basin		X	

Table 13
Short Term and Long Term Actions

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
WC31	Storm System Media Filters	X	X	
WC32	Sediment Ponds	X	X	
WC33	Oil and Grease Trap Devices	X	X	
WC34	CSO Retention/Treatment Facilities	X	X	
WC35	Outlet Stabilization	X	X	
WC36	Engineered Streambank Measures	X	X	
WC37	Bioengineered Streambank Measures	X	X	
WC38	Biotechnical Streambank Measures	X	X	
WC39	Flow Obstruction Prevention/Removal	X	X	
WC40	Habitat Restoration	X	X	
WC41	Rouge Clean-up	X	X	
WC42	Rouge Education Project	X	X	
WC43	River Friendly Business Program	X	X	
WC44	Storm Drain Stenciling	X	X	X
WC45	River Signage	X	X	X
WC46	Brochures (Residential Car Washing, etc.)	X	X	X
WC47	Cable Broadcasts/Web Site	X	X	X
WC48	Video Tapes	X		X
WC49	Public Building Displays	X	X	X
WC50	Presentation to Local Organizations/Schools	X	X	X
WC51	PSA Radio Spots		X	X
WC52	Community Meetings on Subwatershed Plan	X	X	X
WC53	On-Site Storm Water Retention Required	X		
WC54	Direct Mailings to Homes	X	X	

7.1 Short And Long-Term Actions Related To The Goals

The communities and agencies have identified over 200 short and long-term actions to address the goals that have been identified. These action items are in many cases best management practices (BMPs) for storm water. The information from Table 13 has been used to identify for each BMP category what each community is proposing to do to address the goal. The following is a brief description of the categories of BMPs. The Matrix, Middle 3 Subwatershed actions to achieve goals, relates the long-term goals and short-term actions to BMP categories.

7.1.1 Reduce Peak Flows

Disconnecting downspouts from discharging directly to storm and sanitary sewers and installation and maintenance of retention/detention basins, wetlands, and sediment ponds will result in a reduction in storm water peak discharge, a reduction in runoff volume and the removal of storm water pollutants.

Storm water infiltration basins are any storm water device or system, which causes the majority of runoff from small storms to infiltrate into the ground rather than be discharged over land into a stream. Most infiltration devices also remove waterborne pollutants by filtering the water through the soil. Storm water infiltration can provide a means of maintaining the hydrologic balance by reducing the effects of impervious areas. Infiltration devices could include any of the following: basins, trenches, permeable pavement, modular pavement or other systems that collect runoff and discharge it into the ground. Infiltration devices should only be used on locations with gentle slopes, permeable soils and relatively deep water tables (bedrock levels are not an issue in Southeast Michigan.) Typical long-term pollutant removal rates for infiltration basins and trenches range from 75 to 90% for sediment, metals, bacteria and BOD, 50 to 70% for phosphorus, and 45 to 60% for nitrogen. The removal rates for porous pavement range from 80 to 99% for sediment, nitrogen, organic matter, zinc, and lead, and 65% for phosphorus.

Wet detention ponds are small man-made ponds that can include emergent wetland vegetation around the banks designed to capture and remove particulate and certain dissolved constituents. Wet ponds are ideal for large, regional tributary areas (10 to 300 acres) where there is a need to achieve high levels of particulate and some dissolved nutrient removal. The pond should be sized to treat runoff, accumulate sediment and route floods. The outlet should be designed to maximize the capture of extreme events, yet release the captured water in a controlled manner. The pond should be configured for aesthetics, safety and maintenance.

Short Term and Long Term Actions to Reduce Flows

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
MD8	Construct storm water sediment ponds	X		
MD16	Maintain detention ponds	X	X	
MD18	Require retention/detention for new projects	X	X	
L5	Storm Water Development	X	X	X
L17	Off-channel storm water retention	X	X	
L18	Constructed wetlands	X	X	
L20	Sediment Ponds	X	X	
WL11	GIS for storm database	X	X	X
WL28	Maintaining detention, retention ponds	X	X	
WL31	Drainage program	X	X	

**Short Term and Long Term Actions
to Reduce Flows**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
WL32	Land use map-GIS	X	X	
WL33	Future Land use-GIS	X	X	
WL34	Zoning map-GIS &web	X	X	
WL45	Require retention/detention for new projects	X	X	
DH8	GIS/storm sewers	X		
DH18	Downspout disconnection program	X		
DH22	GIS grant for storm water management	X		
DH44	Require retention/detention for new projects	X	X	
DH60	Flood mitigation grant from FEMA	X		
WC7	Storm water development	X	X	X
WC25	Wet detention ponds	X	X	
WC26	Dry detention ponds	X	X	
WC27	Off-channel storm water retention	X	X	
WC28	Constructed wetlands	X	X	
WC30	Storm water infiltration basin	X	X	
WC32	Sediment Ponds	X	X	
WC39	Flow obstruction prevention/removal	X	X	
WC53	Onsite storm water retention required	X		
G13	DPS site improvements to control runoff volume and characteristics	X	X	X
G16	Downspout disconnection program. Continue inspections/testing/enforcement. Non City Owned Sites.	X	X	
G20	Storm water ordinance-adoption/enforcement (control quantity/quality impacts)	X	X	X
G23	Construct storm detention facilities at key city sites	X	X	X
G17	Downspout disconnection program. Continue inspections/testing/enforcement. City Owned Sites.	X	X	

7.1.2 Reduce Sediment Loads

Install/Maintain In-line Sewer Treatment Devices

In-line sewer treatment devices perform primary treatment to remove grit, sediment and floatable material from storm and combined sewer flows. These devices can take the form of catch basin inserts or swirl separators. Catch basin inserts are devices that are used to filter out grit and sediments, and filter absorb hydrocarbon products from storm

runoff before it can get into the storm sewer system. Inserts are installed in each catch basin as reusable cartridges or as disposable filters. The reusable cartridges are more expensive initially, but require less maintenance than the disposable filters, which must be changed frequently.

Swirl separators are devices, which are placed in-line in the sewer system. During dry weather flow, sewage and/or "storm water" is allowed to flow into the unit and out through a sanitary sewer outlet, into the interceptor sewer. During wet weather conditions, flow enters the separator tangentially and begins to swirl. A flow director directs the flow toward the inside of the tank and does not allow it to remix with incoming flow. The concentrated slurry is allowed to flow to the interceptor, while the high volume of overflow is relatively clear and overflows into a center downshift that carries the water away for storage, treatment or discharge into a receiving water. Swirl separators are highly effective and require very little maintenance, because they have no moving parts.

Control Soil Erosion

Soil erosion control is the process of stabilizing soils and slopes in an effort to prevent or reduce erosion due to storm water runoff. Soils can be stabilized by various physical, chemical or vegetative methods. Slopes are stabilized by reshaping the ground to grades which will facilitate surface drainage yet reduce the amount of soil eroding from a site. Streambank and soil stabilization methods have been described in separate BMPs. Other erosion control efforts can take the form of a soil erosion control ordinance.

Perform Sewer System Cleaning

Sewer system cleaning is particularly beneficial for pipes with grades which are too flat for self-cleaning velocities to be achieved on a regular basis. Cleaning the systems helps to remove pollutants and will ensure that the pipes convey their intended design flow, as well as allowing the in-system storage capacity of the sewers to be fully utilized. The removal of deposited material can be accomplished with vacuum trucks, jetters, and scrapers or by flushing with water. It has been found that the removal efficiency for organics is between 65-75% and 55-65% for grit and non-organic material.

Street Sweeping

When performed regularly, street sweeping can remove 50-90 % of street pollutants that can potentially enter surface waters through runoff. Street sweeping can also make road surfaces less slippery during light rains, improve aesthetics by removing litter and control pollutants which can be captured by the equipment. Street sweeping involves

the use of specialized equipment to remove litter, loose gravel, soil, pet waste, vehicle debris and pollutants, dust and industrial debris from road surfaces. Street sweeping equipment consists of mechanical brooms, vacuum sweepers, or a combination of both.

Perform Catch Basin Cleaning

When performed on a regular basis, catch basin cleaning removes pollutants from the storm drainage system, reduces the concentration of pollutants during the first flush of storms, prevents clogging of downstream systems, restores the catch basins sediment

trapping ability and allows the in-system storage capacity of the sewers to be fully utilized. Catch basin cleaning requires the use of a vacuum truck and cleaning should be performed on a sump before it is 40% full.

Construct/Maintain Dry Retention/Detention Pond

A dry retention/detention basin is usually dry between storms. It is designed to capture runoff and release it slowly to allow most of the pollutant-laden sediments to settle. Dry retention/detention basins are used for tributary watersheds, 10 acres and larger in size, to attenuate peak flow and remove particulates. The basin should be designed to treat runoff, accumulate sediments and route floods. The outlet should be sized to draw down the first 50% of volume in 12-16 hours and the remaining water in 24- 32 hours. The basin should be configured for aesthetics, safety and maintenance.

Construct/Maintain Media Filters

A media filter is essentially a settling basin followed typically by a sand filter for particulate removal. Other filters may be used to provide dissolved pollutant removal. While the most common media utilized is sand, others use a peat/sand mixture or cartridge filter. Media filters are used on sites with limited space or that are unsuitable for vegetation. Sand filters remove up to 90% of suspended materials.

Utilize Streambank Stabilization Measures

Streambank stabilization measures work by either reducing the force of flowing water and/or by increasing the resistance of the bank to erosion. Streambank stabilization methods are divided into three basic categories. They include engineered methods, bioengineered methods and biotechnical methods. Engineered structures include riprap, gabions, deflectors and revetments. Bioengineering refers to the use of live plants that are embedded and arranged in the ground where they serve as soil reinforcement, hydraulic drains, and barriers to the earth movement. Examples of bioengineering techniques include: live stakes, live fascines, brush mattresses, live cribwall and branch packing. Biotechnical measures include the integrated use of plants and inert structural components to stabilize channel slopes, prevent erosion and provide a natural appearance. Examples of biotechnical techniques include: joint plantings, vegetated gabion mattresses, vegetated cellular grids and reinforced grass systems. Whenever possible bioengineered or biotechnical methods should be implemented in lieu of engineered methods.

Utilize Soil Stabilization Measures for Construction Activities

Soil stabilization measures are any physical, chemical or vegetative method, which prevents or reduces soil erosion. Where possible, existing trees, vegetation in and along streams, and vegetative slopes should be preserved during soil disruption activities. Attempts should be made to schedule clearing and grading for periods where erosion is least likely and construction should be performed in phases to minimize the amount of exposed area at any time. In addition, channels, stabilized dikes and swales, or slope drains can be utilized to divert runoff away from exposed areas such as at the top of a slope, across the slope face, at the site perimeter or for drainage areas greater than 10 acres. Erosion caused by concentrated runoff and streams should be identified and stabilized.

Install/Maintain Sediment Trapping Devices

Sediment trapping devices such as a barrier, basin or other devices are designed to remove sediment from runoff. Sediment basins should be located at the downstream end of drainage areas larger than 5 acres. Dikes, temporary channels and pipes should be used to divert runoff from disturbed areas into the basin and runoff from undisturbed areas around the basin. Simpler devices for areas less than 5 acres include a sediment trap and sandbag barrier, silt fences and straw bales. Silt fences and straw bales can be placed along level contours downstream of exposed areas where only sheet flow is anticipated. Sediment trapping devices can also be used on storm drain inlets and can include filter fabric, excavated drop traps, gravel filters and sandbags. Maintenance is a key requirement of this BMP. Sediment traps, barriers, basins and filters should be inspected frequently for repairs and sediment removal.

Prevent and Remove Stream Obstructions

This BMP involves the detection of stream flow problems that are caused by blockages of debris, sediment, and branches or trees that have fallen into the river. If cleanup is required, it is important to do so in an environmentally friendly manner, and minimize disruptions to habitat. Stream cleanup should always be considered before any drastic measures such as clearing and snagging, channelization or other severe modifications are taken. Both communities and individuals should be encouraged to get involved with the process of monitoring and maintaining stream flow conditions, checking for obstructions that are hindering the flow of the river and causing upstream ponding. Smaller obstructions should be removed before they become a major problem.

**Short Term and Long Term Actions
to Reduce Sediment Loads**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
G8	Catch basin cleaning/repair	X	X	X
G9	Site & Install In-Line and/or CB sited BMPs to reduce/control sediment, oil, & greases and floatables (idea bags like at Cleveland)	X	X	X
G11	Leaf removal program	X	X	
G13	Construct storm detention facilities (ponds) at key city sites (i.e. City Hall complex, Sr. High Rise, DPS, etc.)	X	X	X
DH14	Catch basin cleaning/repair	X		
DH16	GIS study/street sweeping	X		
DH19	Weekly street sweeping	X	X	
DH21	Storm and sanitary drain cleaning	X		
DH29	River Oaks pond restoration (with Wayne County)	X		
DH44	Require retention/detention for new projects	X		
WL16	Catch basin cleaning	X	X	
WL17	Catch basin repair	X	X	

**Short Term and Long Term Actions
to Reduce Sediment Loads**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
WL19	Street sweeping	X	X	
WL21	Remove leaves from street	X	X	
WL28	Maintaining detention, retention ponds	X	X	
WL35	Soil erosion program	X	X	
WL36	Enforce soil erosion	X	X	
MD1	Prevent polluted runoff from storage/loading and unloading sites, outdoor work areas, vehicle and equipment management sites	X	X	X
MD7	Plan to use storm water media filters	X	X	
MD8	Construct storm water sediment ponds	X	X	
MD9	Outlet stabilization for new projects	X	X	
MD10	Engineered stream bank measures	X	X	
MD14	Catch basin cleaning	X	X	
MD15	Street sweeping (contracted)	X	X	
MD16	Maintaining detention ponds	X	X	
MD18	Require retention/detention for new projects	X	X	
L7	Admin. Soil and sedimentation controls	X	X	X
L8	Pavement cleaning	X	X	X
L13	Catch basin cleaning	X	X	X
L16	System master planning/GIS	X	X	
L18	Constructed wetlands	X	X	
L19	Storm system media filters	X	X	
L20	Sediment ponds	X	X	
L22	Outlet stabilization	X	X	
L23	Engineered streambank measures	X	X	
WC9	Admin. Soil and Sedimentation Controls	X	X	X
WC12	Outdoor work area management	X	X	X
WC14	Pavement cleaning	X	X	X
WC21	Catch basin cleaning	X	X	X
WC24	System master planning/GIS			
WC25	Wet detention ponds	X	X	
WC26	Dry detention ponds	X	X	
WC27	Off-channel storm water retention	X	X	
WC28	Constructed wetlands	X	X	
WC29	Swales and filter strips	X	X	
WC30	Storm water infiltration basin		X	
WC31	Storm system media filters	X	X	
WC32	Sediment ponds	X	X	
WC35	Outlet Stabilization	X	X	
G22	Sewer System (storm & sanitary/combined) cleaning program	X		X
WC36	Engineered streambank measures	X	X	

**Short Term and Long Term Actions
to Reduce Sediment Loads**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
WC37	Bioengineered Streambank Measures	X	X	
WC38	Biotechnical Streambank Measures	X	X	

7.1.3 Reduce Sewage Entering the River

Identify and Control CSOs

Combined sewer overflows (CSOs) are discharges from collection systems that carry both sanitary and storm water. During dry weather, combined sewers carry wastewater directly to the wastewater treatment plant. However, during heavy rains storm water overwhelms the capacity of the collection system and wastewater has discharged to

surface waters without treatment. Many CSOs have been controlled by the construction of treatment basins, by separating the sanitary and storm water drainage and through in-system storage.

Sewer separation is usually the most expensive alternative, but it is most effective at eliminating sewage discharges to the river. Basins and tunnels require the availability and disruption of large areas, which are often not available in older communities. In-system storage utilizes the collection system itself in conjunction with a system of gates and dams to store wastewater and subsequently treat it at the wastewater treatment plant. The maintenance costs associated with in-system storage can be very high.

Identify and Control SSOs

Separate sewer overflows (SSOs) systems are similar to CSO systems. Unlike CSOs, SSOs cannot be permitted and are also illegal. In the worst cases, sanitary sewers are simply undersized for the sanitary load. This can lead to dry weather SSOs. More typically SSOs occur when excess storm water enters the sanitary system causing capacity problems. This can be the result of a leaky collection system, connected footing drains or incomplete sanitary sewer separation. To avoid the backup of wastewater into the streets and basements, overflow weirs and/or pumps are installed between the sanitary and storm sewers allowing wastewater to discharge to surface waters untreated. SSO identification and elimination requires the detection and removal of all physical sanitary connections to the storm water drainage system. To prevent basement flooding, the removal of the storm water inflow and infiltration from the sanitary system is typically required.

In some cases, sanitary sewers become plugged through usage and the wastewater overflows to the surface. Once identified, plugged systems can usually be rectified through sewer cleaning. A broken sewer pipe or a failure of a pump can also result in a SSO.

Sanitary Sewer Maintenance

Sanitary sewer maintenance measures can be used to prevent, detect and control spills, leaks, overflows and seepage from occurring. Televising of sanitary sewers has been helpful in finding cracked pipes, separated joints and obstructions. Infrastructure maintenance includes the upkeep of sanitary sewer lines in order to prevent sewer blockages and/or failures which can lead to sewage flowing into surface waters. Maintenance involves regular inspections of the pumps, pipes and regulator devices to locate partial blockages before they cause wastewater to back up into basements or onto the surface. Pipe failures are easy to identify but costly to repair. Lastly, cross connections between the sanitary and storm systems contribute excess storm water to the wastewater treatment plant or allowing untreated sanitary sewage to be discharged. Maintenance personnel can perform inspections by actually walking the sewers or using a video camera to document the sewer's condition.

Identify and Eliminate Illicit Discharges

Illicit discharge detection and elimination requires 1) the prevention, detection and removal of all physical connections to the storm water drainage system that conveys any material that could pollute surface water, 2) the implementation of measures to detect, correct and eliminate illegal dumping of materials into streets, storm drains and streams, and 3) implementation of spill prevention, containment, cleanup and disposal techniques for spilled materials to prevent or reduce the discharge of pollutants into surface water. Crews must be trained on how to identify illicit discharges and locate illicit connections. Although this effort can be labor intensive, the pay off is a reduction in the amount of sanitary sewage and chemicals that enters surface waters.

The detection of SSOs can be accomplished through a wet weather illicit discharge elimination program. Wet weather sampling would be conducted in the storm sewers to determine if there is a hydraulic connection to the sanitary system. Once a connection is identified, wet weather flow studies have to be performed on the sanitary system to determine where the storm water is entering the sanitary system. This identification process is time consuming and expensive to undertake, and the corrections are even more expensive.

Identify and Eliminate Failing OSDSs

Traditionally county health departments permitted the design and installation of onsite sewage disposal systems (OSDSs), but no mechanism was in place to inspect these systems following installation. Unfortunately as homeowners moved from sewered areas to unsewered areas, the knowledge of how to properly maintain OSDSs diminished. As these improperly maintained systems aged, they began to fail.

Identifying failed systems can occur through regular inspections (typically 5 years), during property transactions (at time-of-sale), or during septic tank pump outs. Wayne County has adopted a requirement for evaluation of OSDSs at the time of property transfer. About 21% of OSDSs evaluated in 2000 were found to be failing. Surface water sampling to detect failing systems is being developed and tested by some communities. The small volume of untreated sewage created by failing systems is difficult to detect in

surface waters. Once sewage is detected in surface waters, evaluation of all OSDs in an area has to be performed to show which systems are failing. This requires homeowner cooperation, which is sometimes difficult to obtain.

Once identified, mechanisms are usually in place to correct system failures. Depending on local ordinances and sanitary sewer availability, homeowners may be allowed to fix their failing systems, or may be required to hook up to the municipal system. This effort can be very costly to the homeowner especially if the systems are nontraditional or if sanitary sewers are not readily available.

On-site sewage disposal systems should be designed, sited, operated and maintained properly to prevent nutrient/pathogen discharges to surface waters and to reduce nutrient/pathogen discharges to groundwater. Septic tanks should be pumped at least every three years depending on the size of the family or group using the tank.

Short Term and Long Term Actions to Reduce Sewage Entering the River

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
WL6	250 outfalls-checking	X	X	
WL7	Yearly outfall checks	X	X	
WL8	Pictures of outfalls	X	X	X
WL10	IDEP for outfalls	X		
WL12	TV inspection of storm	X	X	
WL13	TV inspection of sanitary	X	X	X
WL14	Repairs for TV inspection storm	X	X	
WL15	Repairs for TV inspection sanitary	X	X	
WL18	Maintaining GIS for catch basin cleaning, SSO, IDEP, TV inspection, leaf maps, outfalls, street sweeping	X	X	X
WL22	SSO identification	X	X	
WL23	Outfall identification	X	X	
WL24	Cross connection program	X	X	
WL25	PPC (project performance certification) for CSO	X	X	
WL26	Certification for sanitary	X	X	
WL27	Storage for sanitary	X	X	
WL37	Sanitary sewer extensions for elimination of septic sewers	JUNE - SEPT.	X	
WL38	Sewer lead connection program to eliminate on-site septic	X	X	
WL39	Illicit connection program	X	X	
WL40	Evaluate costs to correct illicit connections	X	X	
WL51	Sanitary Sewer Lining	X	X	
WL52	Sanitary Sewer for Relief	X	X	
WL53	Manhole Evaluation and Rehabilitation	X	X	

**Short Term and Long Term Actions
to Reduce Sewage Entering the River**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
WL54	Develop Sewer Maintenance Program	X	X	
DH1	Recreational vehicle ordinance	X		X
DH2	SSO identification	X		
DH4	Illegal dumping coordination with fire and police	X		X
DH6	IDEP pilot project	X		
DH7	TV inspection for storm drains	X		
DH10	Illicit connection ordinance	X		X
DH17	TV inspection of CSOs	X		
DH30	Lift station for SSOs (with other communities)			
DH31	CSO basin monitoring	X		
DH32	Septics Program	X		
DH35	Referrals to Wayne County hotline	X		
DH38	Cross Connection program	X		
DH39	Address 10 remaining CSOs		X	
DH47	Sanitary sewer lining	X		
DH51	Dearborn Heights share of DWSD CSO			
DH52	Corrective action plan for increased sewer capacity	X		
DH55	Downriver sewer project (sanitary sewer relief)	X	X	
MD6	Outfall inspection/testing	X	X	
MD17	Illicit connection program training for employees	X	X	
G3	IDEP testing/investigations - (Consider contracting with county to assist in this)	X	X	X
G4	TV inspection of storm drains - looking for problems (structural, illicit connections, etc.)	X	X	X
G15	TV inspection of sanitary CSO - look for possible cross connections	X	X	X
G18	SSO/CSO identification. Identify, characterize (storm event that causes, quantify, quality characterizations)	X	X	X
G19	Regional SSO/CSO Water Quality Sizing Criteria determination - through SWAG/RPO	X	X	X
G21	Eliminate (address) OSDS - Especially any that are failing	X	X	
G22	Sewer system (storm & sanitary/combined) cleaning prog.	X	X	
G24	Build/maintain CSO/SSO retention/treatment facility(ies)	X	X	X

**Short Term and Long Term Actions
to Reduce Sewage Entering the River**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
G25	Sanitary/Combined system improvements to reduce volume and frequencies of overflows or storage required. (List of immediate improvements for City)	X	X	X
G26	Continue/Expand/Advertise "Hot Line" for reporting potential problems, IDEPs, etc.	X	X	
G27	Additional CB Stenciling and/or signage.	X	X	
L1	IDEP - trained staff	X	X	
L2	Outfall inspection/testing		X	
L3	Local ordinances/enforcement	X	X	X
L11	Inspections at time of sale	X	X	X
L12	Catch basin cleaning	X	X	X
L14	Sewer system cleaning		X	
L15	SSO identification/control	X	X	
WC1	IDEP-trained staff	X	X	
WC2	IDEP-inspected Public Owned Facilities	X	X	
WC3	IDEP-Inspected Public storm drainns	X	X	
WC4	Local ordinances/enforcement	X	X	X
WC5	Hotline reporting systems and complaint follow up	X	X	X
WC18	Inspections at Time of Sale	X	X	X
WC19	Septage Disposal Reporting	X	X	X
WC20	Regional Septage Disposal	X	X	X
WC22	Sewer system cleaning		X	
WC23	SSO identification/control	X	X	
WC34	CSO Retention/Treatment Facilities	X	X	

7.1.4 Preserve/Increase Habitat

Preserve and Enhance Existing Wetlands

Wetlands take in storm water during wet weather events allowing the water to infiltrate into the soil instead of running off directly to surface waters. As the storm water infiltrates into the soil, most pollutants are filtered out before it reaches groundwater. Wetlands serve to reduce storm water velocities, reduce peak flows and filter out storm water pollutants. They also provide habitat for numerous wildlife species.

Utilize Habitat Restoration Techniques

Habitat restoration techniques include instream structures that may be used to correct and/or improve animal 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 are to be installed with hand labor and tools. After construction, a maintenance program must be implemented to ensure long-term success of this BMP.

Preserve, Enhance and Support Wetland Mitigation Banking

Wetland mitigation is the replacement of an existing wetland function through the creation or restoration of another wetland. Mitigation is required as a condition of many permits issued under state law (Part 303, Wetland Protection of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended) and federal law (part 404 of the Clean Water Act). The goal of wetland mitigation is to replace wetland functions, which provide public benefits, such as flood storage, water quality protection, fish and wildlife habitat and groundwater recharge.

Wetland mitigation banking can facilitate compliance with permit requirements by providing a mechanism for the establishment of new wetland areas or “bank”, in advance of anticipated losses. Wetlands established in a mitigation bank provide “credits”, which can be sold to permit applicants, or used by the bank sponsor to meet permit conditions. Support for wetland banking can come from community/county construction projects and from permits requiring such banks.

Construct Wetlands

A constructed wetland is a man-made basin with over 50% of its surface area covered by wetland vegetation. It is ideal for large, regional tributary areas (10 to 300 acres) where there is a need to achieve high levels of particulate and some dissolved nutrient removal. Wetland size and configuration and vegetation selection must be considered during the design phase. Constructed wetlands provide a suspended solid removal of approximately 87%, while nutrient removal ranges widely due to a lack of standard design criteria.

**Short Term and Long Term Actions
To Preserve/Increase Habitat**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
L18	Constructed wetlands	X	X	
WC__	Wayne County Wetland Banking	X	X	X
WC28	Constructed Wetlands	X	X	
WC40	Habitat Restoration	X	X	
DH42	Tree planting program	X		
WL42	Tree ordinance program	X	X	

7.1.5 Enhance Recreational Activities

The Middle 3 Rouge River is a special urban area due to the preservation of the area along the river as parkland and its accessibility to the public. Preserving the areas adjacent to the river for open space and recreation will benefit the public and wildlife.

In some respects this habitat along the river has been too attractive for geese. The geese droppings are a nuisance and health hazard and have contributed to high bacteria levels and nutrients that stimulate algae blooms.

Reduce Geese Populations

Society's desire for lush green lawns and the requirement of onsite storm water retention has created an unlimited food and water source that has attracted the geese population. Although this habitat is ideal for the geese, it is usually undesirable for human recreation. The nutritional value of the geese's diet is very small therefore they require large quantities of food, which creates a large volume of feces. Geese populations can be controlled by a public education effort, landscape design, egg replacement and/or goose relocation. The public education effort often takes the form of "Don't Feed the Geese" signs. Landscape design involves creating an environment that is unfavorable to geese yet favorable to humans. Egg replacement involves the location of geese nests and the replacement of eggs before they are hatched, usually with plastic eggs. Goose relocation requires the corralling of geese into pens then hauling them off to other areas where they won't be considered a nuisance. Relocation is a temporary solution. If the habitat and food supply is abundant, geese will repopulate the area.

Land Use Planning and Management

Land use planning and management involves a comprehensive planning process to control or prevent certain land uses in areas where beneficial uses of receiving water are sensitive to development. This type of planning is most effective in undeveloped areas, although opportunities may be available in areas of existing development. The land use planning process involves the following steps: 1) determine water quality goals with respect of human health, aquatic life and recreation; 2) identify planning area and gather pertinent data; 3) determine and prioritize the water quality needs as they relate to land use; 4) develop recommendations for future courses of action 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.

Continue and Expand Litter and Debris Cleanup

Litter and debris cleanup can be achieved through adopt-a-road programs. Community organizations, schools, churches and private companies can pledge to collect debris along local, county and state roads prior to the onset of mowing season. This effort is coordinated with the local, county or state road agencies, who will remove the collected debris for proper disposal.

**Short Term and Long Term Actions
to Enhance Recreational Activities**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
L10	Golf course/ recreation	X		X
L24	Flow obstruction prevention/removal	X	X	
L26	Rouge cleanup	X	X	
DH12	Logjam removal/Rouge Rescue	X		
DH57	Parkland Park improvements	X		
WL31	Drainage program	X	X	
WL43	Participation in River Day	X	X	
DH11	Ecorse Creek clean-up	X		
DH12	Log jam removal/Rouge Rescue	X		
DH27	TIFA support for Ecorse Creek clean-up	X		X
WC16	Golf Course/Recreation	X		
WC40	Habitat restoration	X	X	
WC41	Rouge Clean-up	X	X	

7.1.6 Reduce Chemical Pollutants

Reduce Fertilizer Runoff and Phosphorus Discharge

Nitrogen, phosphorus, potassium and other nutrients are necessary to maintain optimum growth of most vegetation. Fertilizer management addresses the proper selection, use, application, storage and disposal of fertilizers. Nutrients that are applied beyond the plants needs may get washed off the soil and end up in lakes, streams, and wetlands, or may leach into groundwater. When nutrients associated with fertilizer run off into surface waters, they can cause algae blooms and excess nuisance aquatic plant growth. Practicing proper fertilizer management will minimize the potential for pollution of surface and ground waters.

Conduct Household Hazardous Waste Management

The average American household contains 3 to 10 gallons of hazardous chemicals including items such as automotive wastes, solvents and pesticides. In general the public is unaware of the problems associated with the over-use and improper disposal of these materials. In addition, the public generally does not recognize the toxicity of materials used in and around homes. The goal of a household hazardous waste program is to minimize the purchase and use of household hazardous materials. These materials can exhibit characteristics such as: corrosivity, ignitability, reactivity, and/or toxicity, and should be properly stored and disposed of. The proper disposal of hazardous materials will minimize the amount of hazardous materials that will enter surface waters and groundwater and eliminate the hazard of having toxic materials in the home environment.

Support Environmental Friendly Lawn and Garden Maintenance

Proper lawn and garden maintenance involves a combination of mechanical methods and careful application of fertilizer and pesticides. Mechanical methods include the proper selection of vegetation for various land uses; proper watering techniques to reduce runoff and excess transpiration; proper lawn mowing techniques to reduce the runoff rate and pollutant transport; proper organic debris disposal and proper pest control techniques to minimize the use of herbicides and pesticides. Particular maintenance techniques are required on steep slopes, in or around drainage channels, streams and detention basins, and adjacent to catch basins. This BMP is best carried out through public education efforts on non-point source pollution and/or through regulations requiring licensing for landscaping and lawn care professionals.

Install/Maintain Oil and Grease Trap Devices

Oil and grease traps remove abnormally high concentrations of petroleum products, grease and grit by gravity and differences in density to separate and trap these pollutants. These devices are particularly useful at industrial sites, vehicle maintenance and washing facilities, areas where heavy mobile equipment is used, restaurant kitchens and restaurant dishwashing equipment. Conventional oil/water separators have the appearance of septic tanks, but are much longer in relationship to the width. Separators for large facilities have the appearance of a municipal wastewater primary sedimentation tank. These devices are only effective for reducing abnormally high concentrations of oils and greases. Their performance is unproven for urban storm water runoff.

**Short Term and Long Term Actions
to Reduce Chemical Pollutants**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
MD1	Prevent polluted runoff from storage/loading and unloading sites, outdoor work areas, vehicle and equipment management sites	X	X	
MD3	Deicing practices regularly reviewed	X	X	
MD4	Public education material for fertilizers, herbicides, pesticides	X	X	
MD5	Chemical use management reviewed	X	X	
DH15	Annual HHW program	X		
DH23	Household battery collection	X		
DH46	Develop P2 initiative	X		
L4	Household Hazardous Waste Management		X	X
L6	Home lawn and garden maintenance	X	X	X
L9	Deicing practices review	X		X
L21	Oil and grease trap devices	X	X	
L37	Audit of chemical use storage	X	X	

**Short Term and Long Term Actions
to Reduce Chemical Pollutants**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
WL19	Street sweeping	APR.- SEPT	X	
WL20	Yard waste composting program	APR.2- DEC.15	X	
WL30	Households Hazardous Waste Program	X	X	
WL48	Develop pollution prevention initiative	X	X	
WC6	Household Hazardous Management		X	X
WC8	Home Lawn and Garden Maintenance	X	X	
WC11	Storage/loading/uploading operations	X	X	X
WC13	Vehicles and equipment management	X	X	
WC15	Deicing Practices Review	X		X
WC17	Audit of Chemical Use/Storage		X	
WC33	Oil and Grease Trap Devices	X	X	
WC43	River Friendly Business Program	X	X	
G9	Site & Install In-Line and/or CB sited BMPs to reduce/control sediment, oil, & greases and floatables (idea bags like at Cleveland)	X	X	X
G12	Household hazardous waste program-expand & public information efforts	X	X	
G14	Yard Waste Composting Program	X	X	

7.1.7 Educate the Public

Public Participation/Education Programs

Public participation and education programs can be used to learn about how people can work together to prevent or reduce storm water pollution. These programs would be based on the following four objectives: 1) promote a clear identification and understanding of the problem and solutions, 2) identify responsible parties, 3) promote community ownership of the problems and solutions and 4) integrate public feedback into program implementation. To achieve these objectives the audience needs to be identified, the program carefully designed and the program effectiveness periodically evaluated. Public participation/education programs can include the following activities:

- Program planning and tracking – public surveys and database
- Program identity – program message, logo and tag line
- Collateral material – newsletters, fact sheets, brochures, posters
- Coordinating committees
- Media campaign – press releases, advertising, public service announcements
- Residential programs – storm drain stenciling, home toxics checklist/alternatives and other neighborhood specific projects
- Presentations – environmental booths, speakers bureau and special events

- Business programs – workshops, publications and green business projects
- Construction programs – workshops, educational materials and certification
- Consumer programs – point of purchase displays and printed grocery bags
- School education – facility tours, contests and curriculum

Participate in Watershed Planning Forums

Most of the activities that have proven to be effective in watershed management have been tried before. Therefore, rather than reinventing the wheel, most stakeholders can gain much better insight into the process by participating in watershed planning forums. Forum targeting the watershed of interest can provide a vast amount of site specific information. Participation in watershed planning forums in other regions can provide another perspective for the interested stakeholder.

Short Term and Long Term Actions to Educate the Public

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
MD4	Public education material for fertilizers, herbicides, pesticides	X	X	
MD11	Stencil storm drains	X	X	
MD12	Post river signs	X		
MD13	Make available information brochures	X	X	
DH5	Educating residents about BMPs	X		X
DH9	Public education web site	X		
DH11	Ecorse Creek clean-up	X		
DH24	Assist RRAC with RAP development	X		
DH25	Bi-annual newsletter to residents and businesses	X		
DH26	Watershed Stewards Commission	X		X
DH28	Support FOTR Education Center	X		X
DH33	Flooding education	X		
DH36	Rouge and Ecorse Creek info on cable TV	X		
DH37	Hired storm water consultant	X		
DH43	Broadcast Rouge Video	X		
DH48	Apply for grants	X		
DH50	Storm drain stenciling	X		
DH53	Periodic council meetings on Rouge matters	X		
DH54	Citizens survey		X	X
DH58	Environmental Awareness Center/Parkland Park		X	X
DH60	Flood mitigation grant from FEMA	X		
DH61	Building Dept. and DPW staff training	X		
L25	Direct mailings to homes			
L27	Rouge Education Project	X	X	
L28	River Friendly Business Program	X	X	
L29	Storm drain stenciling	X	X	X

**Short Term and Long Term Actions
to Educate the Public**

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
L30	River signage	X	X	X
L31	Brochures (residential car washing, etc.)	X	X	X
L32	Cable broadcasts/web site	X	X	X
L33	Video tapes		X	
L34	Community meetings on subwatershed plan	X	X	X
L36	Staff training on soil erosion	X	X	X
WL1	Mailings to every resident in Westland, watershed protection	X	X	X
WL2	Mailings to important people	X	X	X
WL3	Mailings to business people	X	X	X
WL4	Hire consultant for public education	X	X	X
WL5	Hire consultant for storm management	X		X
WL9	Signs for outfalls	X	X	X
WL29	Public education for cable, schools, future web	X	X	
WL41	Public participation program	X	X	
WL43	Participation in River Day	X	X	
WL44	Create cable TV programs	X	X	
WL46	Develop subwatershed plan	X	X	
WL47	Identify SWPPI program costs	X	X	
WL49	Cost of general permit requirements	X	X	
WL50	Apply for state federal grants	X	X	
G1	Mailing to non-residential land owners/tenants (businesses) on BMPs w/ Rouge Repair Kit	X	X	X
G2	Mailings to residential owners/tenants on BMP/actions they can do to impact storm water quality	X	X	X
G5	Continue GIS Database Development - Field structure investigations, build & link database	X	X	X
G6	Staff training in GIS usage - ArcView/ArcInfo	X		X
G7	Public Education - Web Site: Create & Maintain City Web Site, with links to County sites, etc.	X	X	X
WC10	Staff trained/planned training	X	X	X
WC41	Rouge Clean-up	X	X	
WC42	Rouge Education Project	X	X	
WC43	River Friendly Business Program	X	X	
WC44	Storm Drain Stenciling	X	X	
WC45	River Signage	X	X	X
WC46	Brochures (Residential Car Washing, etc.)	X	X	

Short Term and Long Term Actions to Educate the Public

<i>Matrix Number</i>	<i>Action</i>	<i>Short</i>	<i>Long</i>	<i>New</i>
WC47	Cable Broadcasts/Web Site	X	X	
WC48	Video Tapes	X		
WC49	Public Building Displays	X	X	
WC50	Presentation to Local Organizations/Schools	X	X	
WC51	PSA Radio Spots	X	X	X
WC52	Community meetings on subwatershed plan	X	X	X
WC54	Direct Mailings to Homes	X	X	

7.2 Long Term Actions

The Water Resources Commission has designated the following uses for the Rouge River:

- Water Contact Recreation
- Warm water Fishery
- Industrial and Agricultural Water Supply
- Navigation (commercial and recreational)
- General Aesthetic

Long term goals must protect these uses. A long term goal of this subwatershed management plan is to meet the water quality requirements for the designated uses of the Middle 3 Rouge River which are; a warm water fishery, partial body contact recreation, and full body contact recreation each year between May 15 and October 15.

Long term actions identified by all communities and Wayne County are:

- Implement the Illicit Discharge Elimination Plan and Public Education Plan submitted with the General Permit application.
- Control untreated CSOs and untreated SSOs.

Additional individual community actions.

- Extend sanitary sewers to eliminate OSDS.
- Citizen surveys.
- Environmental Awareness Center/Parkland Park.

- Construct storm detention facility at key city sites.

7.3 Estimated Cost

Detailed information on cost estimates for the BMPs and scores for water quality improvement is included in Appendices A, B and C.

7.4 Matrix of Actions Versus BMPs

The matrix that follows presents community actions in relation to BMPs. The alphanumeric designations from Table 13 have been placed within the matrix under the appropriate BMP and also as it related to what impact it should have on the river. An example: G-20 is expected to improve water quality by reducing pollutant loading in storm water by slowing storm water runoff.