

DRAFT

THE ROUGE RIVER AREA OF CONCERN



BENEFICIAL USE IMPAIRMENTS DELISTING STRATEGY



April 27, 2011

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The Project Team (comprised of the individuals listed below) would like to acknowledge the Great Lakes Commission for funding this important initiative.

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GLOSSARY

The following is a glossary of commonly used acronyms and abbreviations for this report to assist the reader in understanding this document:

ARC – Alliance of Rouge Communities
AOC – Area of Concern
BMP – Best Management Practice
BUI – Beneficial Use Impairment
CSO – Combined Sewer Overflow
DO – Dissolved Oxygen
FOTR – Friends of the Rouge
GI – Green Infrastructure
GLRI – Great Lakes Restoration Initiative
GLWQA – Great Lakes Water Quality Agreement
IJC – International Joint Commission
IDEP – Illicit Discharge Elimination Program
LID – Low Impact Development
MDEQ – Michigan Department of Environmental Quality
MDNR – Michigan Department of Natural Resources
NPDES – National Pollutant Discharge Elimination System
PAC – Public Advisory Council
PEP – Public Education Program
RAP – Remedial Action Plan
RGC – Rouge Green Corridor
ROUGE PROJECT – Rouge River National Wet Weather Demonstration Project
RRAC – Rouge RAP Advisory Council
SSO – Sanitary Sewer Overflow
SWAG – Subwatershed Advisory Group
TMDL – Total Maximum Daily Load
USACE – United States Army Corp of Engineers
USEPA – United States Environmental Protection Agency
WMP – Watershed Management Plan
WQS – Water Quality Standards

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1.0 Project Introduction and Rationale

The original designation of Areas of Concern (AOCs) within the Great Lakes was based on the presence of beneficial use impairments (BUIs) which are defined by the U.S. - Canada Great Lakes Water Quality Agreement (GLWQA), Annex 2 of the 1987 Protocol, as “geographic areas that fail to meet the general or specific objectives of the agreement where such failure has caused or is likely to cause impairment of beneficial use of the area’s ability to support aquatic life.” Forty- three such areas were identified including the Rouge River. The BUIs were defined by the International Joint Commission (IJC) along with generalized criteria for determining when a beneficial use was impaired (*IJC approved guidelines for listing and delisting Areas of Concern in the Great Lakes Basin Ecosystem, 1991*). These criteria were fairly general and led to a more specific set of guidance published by the U.S. Environmental Protection Agency (EPA) in 2001 (Policy Committee, 2001). In 2008, the Michigan Department of Environmental Quality (MDEQ) updated the Guidance for Delisting Michigan’s Great Lakes Areas of Concern (MDEQ, 2008).

The GLWQA advises the governments to work with the state and provincial governments to develop and implement Remedial Action Plans (RAPs) for each AOC. These RAPs are designed to identify the BUIs for each AOC and present restoration methods. Because each AOC is faced with a different collection of BUIs, each RAP is unique.

The Alliance of Rouge Communities (ARC) working in partnership with the Rouge RAP Advisory Council (RRAC) received Public Advisory Committee funding in 2010 through the Great Lakes Commission to work with its MDEQ coordinator to assess the current Rouge River BUIs and develop delisting strategies for the Rouge AOC. The purpose of this project was to 1) refine and prioritize the list of activities recommended in 2008 to remove the loss of fish and wildlife habitat BUI in the Rouge AOC, 2) use the draft Rouge River Watershed Management Plan and other sources to categorize projects that should be in the Rouge AOC delisting strategy, and 3) inform and educate the public on restoration criteria and AOC delisting goals.

This report is intended to assist the RRAC, the ARC and MDEQ to strategically prioritize BUI delisting projects for possible grant funding opportunities in 2011 and beyond. Ultimately this report will assist the MDEQ Rouge AOC Coordinator to prepare the Rouge River AOC Stage 2 RAP Update.

2.0 The Rouge River Area of Concern

2.1 History of the Rouge River Area of Concern

The Rouge River Watershed (Figure 1) is located in southeast Michigan. It is a heavily urbanized and industrialized area that includes portions of three counties and encompasses 48 communities and a population of over 1.5 million people. The watershed is a designated AOC under the GLWQA, and is characterized by nine BUIs. They are:

- Restrictions on Fish and Wildlife Consumption
- Fish Tumors or Other Deformities
- Degradation of Benthos
- Restrictions on Dredging Activities
- Eutrophication or Undesirable Algae
- Beach Closings
- Degradation of Aesthetics
- Degradation of Fish and Wildlife Populations
- Loss of Fish and Wildlife Habitat

The 2004 Rouge RAP Revision recognized the improvements in the Rouge River because of the federally-funded Rouge Project, which initially funded the construction of combined sewer overflow controls that removed thousands of gallons of raw sewage from the river. Additionally, Rouge River Watershed communities came together to apply for voluntary watershed storm water permits and ultimately created the ARC, a quasi-governmental organization, supported by enabling legislation, to work together to restore the river. In tandem with the stewardship of organizations such as RRAC, Friends of the Rouge (FOTR) and others, the ARC and the Rouge Project have realized tremendous improvements in the Rouge River. They are:

- Significant water quality improvements are being realized
- All major sources of pollution are under National Pollutant Discharge Elimination System (NPDES) permits
- Illicit connections are being identified and corrected
- Fish and wildlife habitat is being improved
- Public education and stewardship activities are bringing more people to the river, and,
- Communities and others are working together to improve the Rouge River.

Figure 1: The Rouge River Area of Concern



2.2 Existing Planning and Implementation Documents

There are multiple planning and implementation documents that have been developed during Rouge River Watershed management planning activities. They can be viewed at www.allianceofrougecommunities.com. They are listed below.

- *Guidance for Delisting Michigan's Great Lakes Areas of Concern*, 2006, Updated 2008
- *2004 Rouge River Remedial Action Plan*, 2004
- *Draft Rouge River Watershed Management Plan*, 2009
- *Delisting Targets for Fish & Wildlife Habitat & Population Beneficial Use Impairments for the Rouge River Area of Concern*, 2008

2.3 Existing Programs and Projects

Various programs have also been implemented to restore the Rouge River. They are:

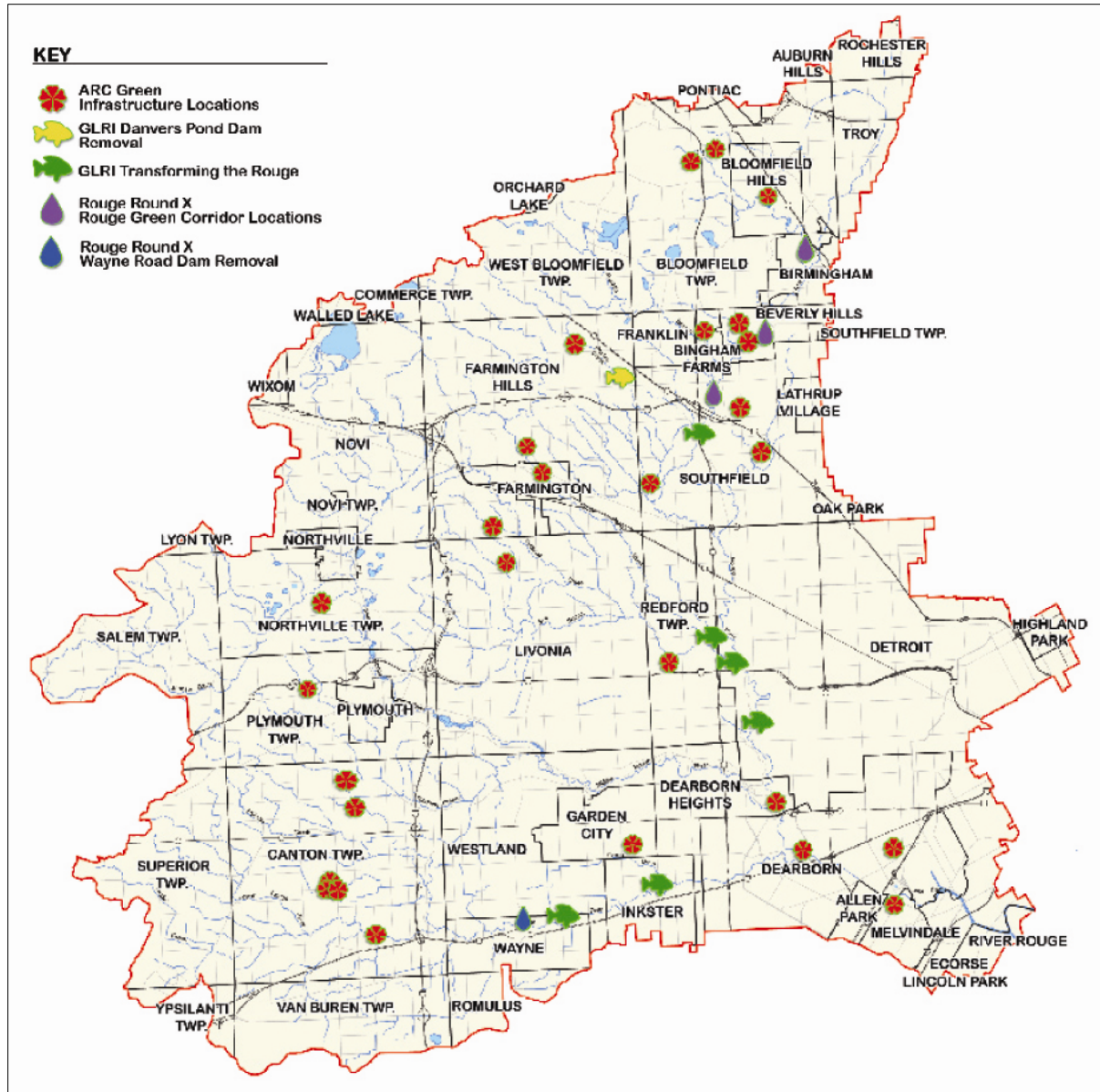
- SSO Corrective Actions and Permits
- CSO Corrective Action and Permits
- Illicit Discharge Elimination Programs (IDEP)
- Public Education Programs (PEP)
- Green Infrastructure Projects
- Community-specific projects

Several projects have been implemented recently by the ARC throughout the watershed. The list below is not an exhaustive list, but includes the most recent projects and some of the most noteworthy:

- Danvers Pond Dam Removal- Implementation scheduled 2011
- Wayne Road Dam Removal- Design to be completed 2011
- Transforming the Rouge AOC from Mowed Down to Grown Up
- ARC grow zone projects

A map containing existing project site locations is included as Figure 3.

Figure 2: Existing ARC Project Site Locations



2.4 Status of the Beneficial Use Impairments

As a result of the progress that has been made over the past several years, the water quality in the Rouge River AOC has improved significantly. For example, 89 of the 127 miles of the larger streams and tributaries in the watershed are now free from public health threats associated with uncontrolled CSO discharges. And, the water quality continues to improve, as shown by improvement in dissolved oxygen which is needed to sustain fish and aquatic life. All eight water quality monitoring stations in the Rouge River Watershed have reported meeting water quality standards 99% of the time for dissolved oxygen for the past seven years as compared to 30% of the time at the inception of the Rouge Project, a federally-funded program created in 1992 to remove sewage from the river and address sources of non-point source pollution to the Rouge River.

Increased populations and diversity of benthos, fish and wildlife have been measured along the river since 1999. Also, the United States Environmental Protection Agency (USEPA) Office of Inspector General (OIG) declared the Rouge Project “a blueprint for success” (USEPA OIG report number 2002-P-00012). As a result of this progress RRAC requested in January, 2011 that the MDEQ formally assess the following BUIs on the Rouge River AOC’s list of BUIs:

- Restrictions on Fish and Wildlife Consumption
- Fish Tumors or Other Deformities, and
- Restrictions on Dredging Activities

Subsequently, these BUIs are being reviewed by the MDEQ through statewide assessments.

3.0 The Rouge River Area of Concern Beneficial Use Impairments Delisting Strategy

Despite the progress that has been made within the Rouge River AOC, there is more work to be done. As indicated previously, the purpose of this project was to assess the current Rouge River BUIs and develop an AOC-specific delisting strategy for the Rouge River AOC. This project was completed through six tasks.

Task 1: The Project Team compiled a master list of projects or actions previously identified in the documents listed below. In addition, the Project Team added some projects to the list and removed some projects that have been completed. The list was then categorized into types of actions and the resulting list is included in the Appendix as Table 1.

- *The Rouge River Watershed Management Plan (Draft)*
- *Delisting Targets for Fish & Wildlife Habitat & Population Beneficial Use Impairments for the Rouge River Watershed*
- *The Riparian and Aquatic Habitat Inventory & Management Plan Rouge Green Corridor Urban Habitat Conservation & Stewardship Project*
- *The Upper Rouge Subwatershed in Farmington Hills: Streambank Erosion Inventory Report*
- *Rouge Main 1-2 Streambank Erosion Inventory and Site Prioritization Report*
- *Rouge Main 1-2 Subwatershed Detention Basin Inventory Study*

Task 2: Once the master list was established, the Project Team identified which BUI(s) each action addressed. It should be noted here that it became clear to the Project Team through this task that many projects and actions address more than one BUI. The master list contains indication of the addressed BUI(s) for each project/action is included in the Appendix as Table 1.

Task 3: Once the master list was established and BUIs addressed were identified, the Project Team identified 21 priority activities and projects to work toward the AOC's delisting. This was done based on the project's corrective impact to a BUI or multiple BUIs and also the project's shovel readiness. A list of priority projects is included the Appendix as Table 2.

Task 4: Based on the outcomes of Tasks 1-3, the report was drafted.

Task 5: The products of Tasks 1-4 were then presented to the ARC Technical Committee on March 10, 2011. ARC members were given the opportunity to review the list of projects and make comments.

Task 6: Once the ARC Technical Committee comments were incorporated, this report was finalized and submitted to the MDEQ Rouge AOC Coordinator and the project funder.

A description of each Rouge AOC BUI and priority projects selected to address the BUI follows. The MDEQ's *Guidance for Delisting Michigan's Great Lakes Areas of Concern* contains guidance for the delisting of each BUI.

As mentioned above, there are three BUIs that have been recommended for formal assessment and are currently being addressed by the MDEQ through a statewide assessment. The text below addresses those BUIs and the six remaining BUIs.

3.1 Restrictions on Fish and Wildlife Consumption

3.1.1 Description of BUI

IJC Definition: When contaminant levels in fish or wildlife populations exceed current standards, objectives or guidelines, or public health advisories are in effect for human consumption of fish or wildlife. Contaminant levels in fish and wildlife must be due to contaminant input from the watershed.

State of Michigan Delisting Criteria: Fish and wildlife consumption advisories in Michigan are determined by the Michigan Department of Community Health (MDCH), based on levels of contaminant concentrations in fish or wildlife tissue. Currently, all of Michigan's 14 AOCs have consumption advisories for specific contaminants in certain species of fish. No AOCs have advisories for wildlife consumption. Fish consumption advisories range from no human consumption to restrictions on consumption for specific amounts of fish for certain human populations.

The restoration criteria for this BUI uses a tiered approach for evaluating restoration success. This BUI will be considered restored when:

1. The fish consumption advisories in the AOC are the same or less restrictive than the associated Great Lake or appropriate control site. OR, if the advisory in the AOC is more stringent than the associated Great Lake or control site:
2. A comparison study of fish tissue contaminant levels demonstrates that there is no statistically significant difference in fish tissue concentrations of contaminants causing fish consumption advisories in the AOC compared to a control site. OR, if a comparison study is not feasible because of the lack of a suitable control site:
3. Analysis of trend data (if available) for fish with consumption advisories shows similar trends to other appropriate Great Lakes trend sites. (Guidance for Delisting Michigan's Great Lakes Areas of Concern, MDEQ, 2008)

3.1.2 Current Status

The MDEQ has been requested to formally assess the status of Restrictions on Fish and Wildlife Consumption BUI in the Rouge AOC. It is anticipated that the status of this BUI will be assessed by the end of 2014.

3.2 Fish Tumors or Other Deformities

3.2.1 Description of BUI

IJC Definition: When the incidence rates of fish tumors or other deformities exceed rates at unimpacted control sites or when survey data confirm the presence of neoplastic or preneoplastic liver tumors in bullheads or suckers.

State of Michigan Delisting Criteria:

This BUI will be considered restored when:

- No reports of fish tumors or deformities due to chemical contaminants which have been verified through observation and analysis by the MDNR or MDEQ for a period of five years.
- OR, in cases where any tumors have been reported:
- A comparison study of resident benthic fish (e.g., brown bullhead) of comparable age and at maturity (three years), or of fish species which have historically been associated with this BUI, in the AOC and a non-impacted control site indicates that there is no statistically significant difference (with a 95% confidence interval) in the incidence of liver tumors or deformities (Guidance for Delisting Michigan's Great Lakes Areas of Concern, MDEQ, 2008)

3.2.2 Current Status

The MDEQ has been requested to formally assess the status of Fish Tumors or other Deformities BUI in the Rouge AOC. It is anticipated that the status of this BUI will be assessed by the end of 2014.

3.3 Restrictions on Dredging Activities**3.3.1 Description of BUI**

IJC Definition: When contaminants in sediments exceed standards, criteria, or guidelines such that there are restrictions on dredging or disposal activities.

State of Michigan Delisting Criteria:

This BUI will be considered restored when:

- There have been no restrictions on routine commercial or recreational navigational channel dredging by the U.S. Army Corps of Engineers (USACE), based on the most recent dredging cycle, such that special handling or use of a confined disposal facility is required for dredge spoils due to chemical contamination.

OR, in cases where dredging restrictions exist:

- A comparison of sediment contaminant data from the commercial or recreational navigation channel (at the time of proposed dredging) in the AOC indicates that contaminant levels are not statistically different from other comparable, non-AOC commercial or recreational navigation channels. (Guidance for Delisting Michigan's Great Lakes Areas of Concern, MDEQ, 2008)

3.3.2 Current Status

The MDEQ has been requested to formally assess the status of the Restrictions on Fish and Wildlife Consumption BUI in the Rouge AOC. It is anticipated that the status of this BUI will be assessed by the end of 2012.

3.4 Degradation of Benthos

3.4.1 Description of BUI

IJC Definition: When the benthic macroinvertebrate community structure significantly diverges from un-impacted control sites of comparable physical and chemical characteristics. In addition, this use will be considered impaired when toxicity (as defined by relevant, field-validated, bioassays with appropriate quality assurance/quality controls) of sediment associated contaminants at a site is significantly higher than controls. (IJC approved guidelines for listing and delisting Areas of Concern in the Great Lakes Basin Ecosystem, 1991).

State of Michigan Delisting Criteria:

This BUI will be considered restored when:

- An assessment of benthic community, using either MDEQ's Surface Water Assessment Section (SWAS) Procedure #51 for wadeable streams or MDEQ's pending rapid assessment procedure for non-wadeable rivers yields a score for the benthic metrics which meets the standards for aquatic life in any 2 successive monitoring cycles (as defined in the two procedures).

OR, in cases where MDEQ procedures are not applicable and benthic degradation is caused by contaminated sediments, this BUI will be considered restored when:

- All remedial actions for known contaminated sediment sites with degraded benthos are completed (except for minor repairs required during operation and maintenance) and monitored according to the approved plan for the site. Remedial actions and monitoring are conducted under authority of state and federal programs, such as the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund), Resource Conservation and Recovery Act, Great Lakes Legacy Act, or Part 201 of Michigan's National Resource and Environmental Protection Act (NREPA) of 1994. (Guidance for Delisting Michigan's Great Lakes Areas of Concern, MDEQ, 2008)

3.4.2 Current Status

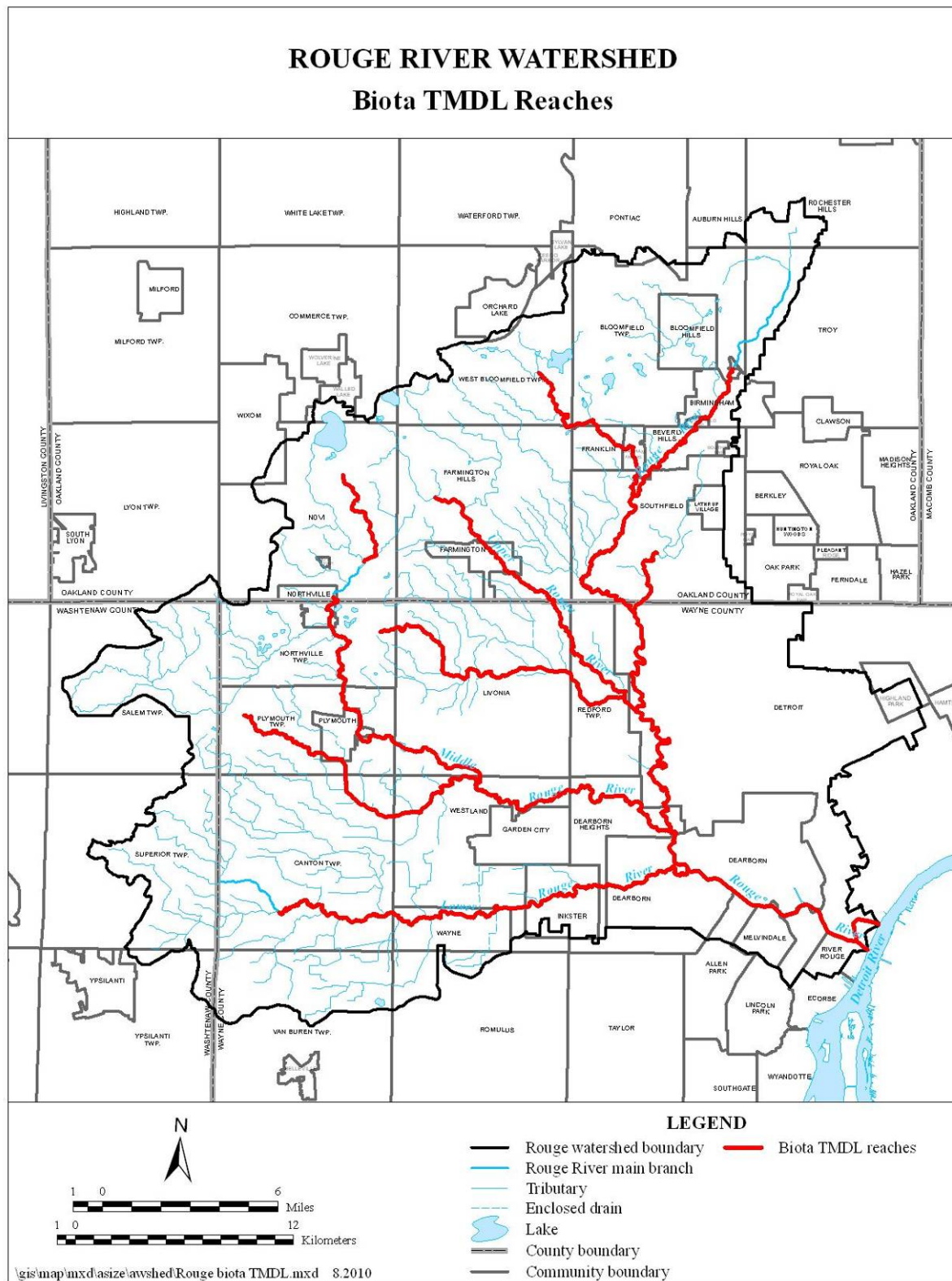
The benthos is impaired across the entire watershed as illustrated by Figure 3: The Rouge River Watershed – Biota Total Maximum Daily Load (TMDL) Reaches.

3.4.3 Priority Projects

- Rouge Collaborative IDEP & Toxic Material Collections
- Rouge Collaborative PEP & GI/LID Education Campaign
- Green Infrastructure Implementation Projects
- Michigan Avenue and Evergreen Storm Water Treatment and Habitat Restoration
- Fordson Island Habitat Restoration
- Concrete Channel Modifications/ Enhancements
- Oakwood Commons Oxbow Restoration
- Rouge River Oxbow- Phase 3- Reconnect Oxbow Segment at the Henry Ford
- Great Lakes Legacy Act Projects
- Rouge Green Corridor Land Acquisition Planning
- Rouge Green Corridor Maintenance Planning and Programs

- Rouge River Clean-Up/ Rouge Rescue
- Environmental Indicator Monitoring
- Sustainable Watershed Management Funding

Figure 3: The Rouge River Watershed- Biota TMDL Reaches



3.5 Eutrophication or Undesirable Algae

3.5.1 Description of BUI

IFC Definition: When there are persistent water quality problems (e.g. dissolved oxygen depletion of bottom waters, nuisance algal blooms or accumulation, decreased water clarity, etc.) attributed to cultural eutrophication, which is an excessive growth of algae as a result of nutrients being introduced to the waterways. (IJC approved guidelines for listing and delisting Areas of Concern in the Great Lakes Basin Ecosystem, 1991).

State of Michigan Delisting Criteria:

This BUI will be considered restored when:

- No waterbodies within the AOC are included on the list of impaired waters due to nutrients or excessive algal growths in the most recent Clean Water Act *Water Quality and Pollution Control in Michigan: Section 303(d) and 305(b) Integrated Report* (Integrated Report), which is submitted to USEPA every two years.

In addition, the MDEQ is in the process of developing nutrient criteria for state surface waters which will be adopted into Michigan's WQS. The MDEQ will evaluate restoration of this BUI consistent with the nutrient criteria when the nutrient criteria are approved by the USEPA and adopted into rule. (Guidance for Delisting Michigan's Great Lakes Areas of Concern, MDEQ, 2008)

3.5.2 Current Status

It is understood that the impairment extends across the entire watershed, and is of particular impairment in the Rouge AOC's small lakes and ponds and the Middle Rouge impoundments.

3.5.3 Priority Projects

- Rouge Collaborative PEP & GI/LID Education Campaign
- Green Infrastructure Implementation Projects
- Michigan Avenue and Evergreen Storm Water Treatment and Habitat Restoration
- Concrete Channel Modifications/ Enhancements
- Oakwood Commons Oxbow Restoration
- Rouge River Oxbow- Phase 3- Reconnect Oxbow Segment at the Henry Ford
- Rouge Green Corridor Land Acquisition Planning
- Rouge Green Corridor Maintenance Planning and Programs
- Rouge River Clean-Up/ Rouge Rescue
- Sustainable Watershed Management Funding

3.6 Beach Closings

3.6.1 Description of BUI

IJC Definition: When waters, which are commonly used for total-body contact or partial-body contact recreation, exceed standards, objectives, or guidelines for such use. The Beach Closings BUI pertains to the impairment of a waterbody due to the presence of bacterial contaminants. The bacteria that most contributes to the Rouge River AOC Beach Closing BUI is *E.coli*. (IJC approved guidelines for listing and delisting Areas of Concern in the Great Lakes Basin Ecosystem, 1991).

State of Michigan Delisting Criteria:

This BUI will be considered restored when:

1. No waterbodies within the AOC are included on the list of non-attaining waters due to contamination with pathogens in the most recent Clean Water Act *Water Quality and Pollution Control in Michigan: Section 303(d) and 305(b) Integrated Report* (Integrated Report), which is submitted to USEPA every two years.
2. OR, in cases where the waterbodies within the AOC are on the list of non-attaining waters due to the presence of CSOs or are impacted by upstream CSOs, this BUI will be considered restored when:
 - Updated information reveals that the CSOs have been eliminated or are being treated.
3. OR, in cases where CSOs still exist and significant progress has been made towards their elimination or treatment, this BUI will be considered restored when:
 - Monitoring in the AOC during the recreation period, using the sampling protocol outlined in Rule 62 of the Michigan WQS, meets the following criteria:
 - The sampling plan and Quality Assurance Project Plan are approved by the MDEQ;
 - *E. coli* concentrations are below a 30-day geometric mean of 130 counts per 100 milliliters (ml);
 - At least 90% of sample results are below the daily geometric mean limits of 300 counts *E. coli* per 100 ml;
 - No more than 1 of the sample results exceed the partial-body contact water quality standard of 1,000 counts *E. coli* per 100 ml based on a daily geometric mean; and
 - DEQ-approved plans in a NPDES permit are in place for addressing any remaining CSOs that are causing BUIs and the implementation plan is on schedule.

Sampling under Approach 3 is done systematically throughout the recreation season, and does not specifically monitor wet weather discharges from CSOs. Meeting the above criteria does not negate regulatory requirements for separating CSOs in order to meet water quality standards. (Guidance for Delisting Michigan's Great Lakes Areas of Concern, MDEQ, 2008)

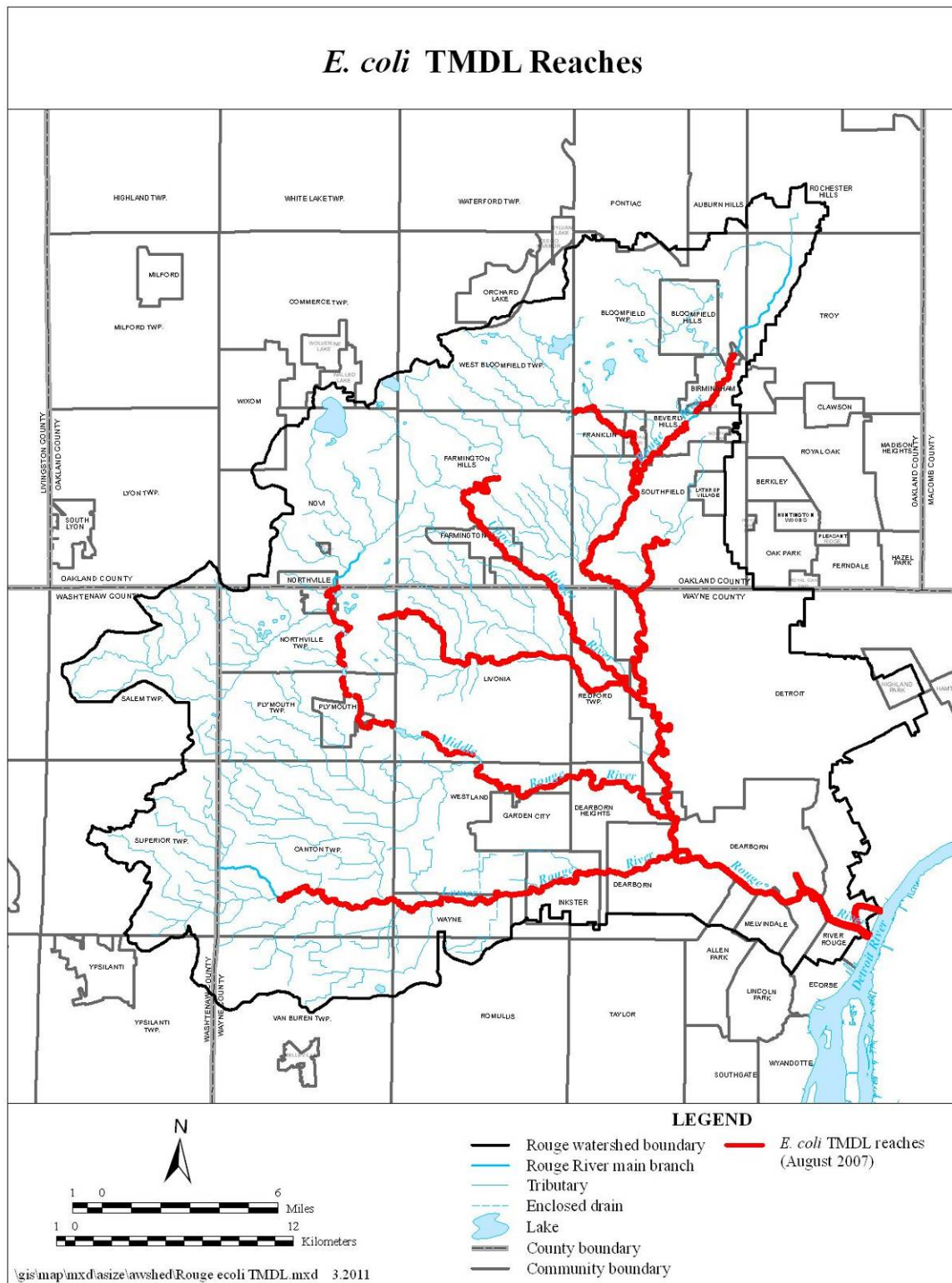
3.6.2 Current Status

The impairment exists across the entire watershed as illustrated by Figure 3: *E.Coli* TMDL Reaches map.

3.6.3 Priority Projects

- Rouge Collaborative IDEP & Toxic Material Collections
- Rouge Collaborative PEP & GI/LID Education Campaign
- Green Infrastructure Implementation Projects
- Michigan Avenue and Evergreen Storm Water Treatment and Habitat Restoration
- Lakes and Impoundments- Feasibility Studies and Restoration
- Sustainable Watershed Management Funding

Figure 4: The Rouge River Watershed- *E. coli* TMDL Reaches



3.7 Degradation of Aesthetics

3.7.1 Description of BUI

IJC Definition: When any substance in water produces a persistent objectionable deposit, unnatural color or turbidity, or unnatural odor (e.g. oil slick, surface scum). The State of Michigan defines degradation of aesthetics to a waterbody when it exhibits any of the eight “unnatural physical properties” as identified in Rule 323.110 of the Michigan WQS): turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, deposits. These properties are considered to impair aesthetic values if they are unnatural, or manmade, or natural properties which are exacerbated by human-induced activities. (IJC approved guidelines for listing and delisting Areas of Concern in the Great Lakes Basin Ecosystem, 1991).

State of Michigan Delisting Criteria:

This BUI will be considered restored when:

Monitoring data for two successive monitoring cycles indicates that water bodies in the AOC do not exhibit persistent, high levels of the following “unnatural physical properties” (as defined by Rule 323.1050 of the Michigan WQS) in quantities which interfere with the State’s designated uses for surface waters:

- turbidity
- foams
- color
- settleable solids
- oil films
- suspended solids
- floating solids, or
- deposits

For the purposes of this criteria, these eight properties impair aesthetic values if they are unnatural – meaning those that are manmade (e.g., garbage, sewage), or natural properties which are exacerbated by human-induced activities (e.g., excessive algae growth from high nutrient loading). Persistent, high levels are those defined as long enough in duration, or elevated to the point of being injurious, to any designated use listed under Rule 323.1100 of the Michigan WQS.

Natural physical features which occur in normal ecological cycles (e.g., logjams/woody debris, rooted aquatic plants) are not considered impairments, and in fact serve a valuable role in providing fish and wildlife habitat. (*Guidance for Delisting Michigan’s Great Lakes Areas of Concern, MDEQ, 2008*)

3.7.2 Current Status

This impairment is understood to exist across the entire watershed. The MDEQ is currently developing monitoring criteria to assess this BUI. Once the criteria are developed, then projects assessing and correcting, if necessary, aesthetic conditions in the Rouge AOC can be targeted to the specific needs of the AOC.

3.7.3 Priority Projects

Many of the projects or activities that address other BUIs can also contribute to the removal of Degradation of Aesthetics BUI.

- Develop Degradation of Aesthetics BUI Removal Criteria
- Rouge Collaborative IDEP & Toxic Material Collections
- Rouge Collaborative PEP & GI/LID Education Campaign
- Green Infrastructure Implementation Projects
- Michigan Avenue and Evergreen Storm Water Treatment and Habitat Restoration
- Fordson Island Habitat Restoration
- Concrete Channel Modifications/ Enhancements
- Oakwood Commons Oxbow Restoration
- Rouge River Oxbow- Phase 3- Reconnect Oxbow Segment at the Henry Ford
- Rouge Green Corridor Land Acquisition Planning
- Rouge Green Corridor Maintenance Planning and Programs
- Lakes and Impoundments- Feasibility Studies and Restoration
- Rouge River Clean-Up/ Rouge Rescue
- Sustainable Watershed Management Funding

3.8 Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat

3.8.1 Description of BUIs

IJC Definition, Degraded Fish and Wildlife: When fish and wildlife management programs have identified degraded fish or wildlife populations due to a cause within the watershed. In addition, this use will be considered impaired when relevant, field-validated, fish or wildlife bioassays with appropriate quality assurance/quality controls confirm significant toxicity from water column or sediment contaminants. (IJC approved guidelines for listing and delisting Areas of Concern in the Great Lakes Basin Ecosystem, 1991).

IJC Definition, Loss of Fish and Wildlife Habitat: When fish and wildlife management goals have not been met as a result of loss of fish and wildlife habitat due to a perturbation in the physical, chemical, or biological integrity of the Boundary Waters, including wetlands. (IJC approved guidelines for listing and delisting Areas of Concern in the Great Lakes Basin Ecosystem, 1991).

These two BUIs are often considered jointly as they are closely related. Because of this, they are considered jointly when assessing their restoration.

State of Michigan Delisting Criteria:

Restoration of this BUI requires that a local aquatic habitat or population restoration plan be developed and implemented. The plan must be part of the RAP for the AOC, and contain at least the following components:

- A. A short narrative on historical fish and wildlife habitat or population issues in the AOC, including how habitat or populations have been impaired by water quality.
- B. Description of the impairment(s) and location for each aquatic habitat or population site, or for multiple sites where determined appropriate at the local level to address all habitat or population issues identified in the RAP and RAP updates.

- C. A locally derived restoration target for each impacted habitat or population site. Sources of information for targets may include data from social science surveys, if appropriate. Habitat restoration targets may be based on restoration of fish and wildlife populations, if appropriate.
- D. A list of all other ongoing habitat or population planning processes in the AOC, and a description of their relationship to the restoration projects proposed in the plan.
- E. A scope of work for restoring each impacted aquatic habitat or population site. The scope of work should describe specific habitat or population restoration action(s) to be completed, including:
 - 1. Timetable
 - 2. Funding
 - 3. Responsible entities
 - 4. Indicators and monitoring
 - 5. Evaluation process based on indicators
 - 6. Public involvement
- F. A component for reporting on habitat or population restoration implementation action(s) to the MDEQ.

(Guidance for Delisting Michigan's Great Lakes Areas of Concern, MDEQ, 2008)

3.8.2 Current Status

This impairment exists across the entire watershed.

3.8.3 Priority Projects

- Rouge Collaborative PEP & GI/LID Education Campaign
- Green Infrastructure Implementation Projects
- Michigan Avenue and Evergreen Storm Water Treatment and Habitat Restoration
- Wayne Road Dam Modification
- Henry Ford Estate Dam Modification for Fish Passage
- Fordson Island Habitat Restoration
- Concrete Channel Modifications/ Enhancements
- Oakwood Commons Oxbow Restoration
- Rouge River Oxbow- Phase 3- Reconnect Oxbow Segment at the Henry Ford
- Rouge Green Corridor Land Acquisition Planning
- Rouge Green Corridor Maintenance Planning and Programs
- Lakes and Impoundments- Feasibility Studies and Restoration
- Rouge River Clean-Up/ Rouge Rescue
- Environmental Indicator Monitoring
- Sustainable Watershed Management Funding

4.0 Recommended Delisting Strategy Summary – Priority Activities & Projects

This delisting strategy is built upon past success and is consistent with the ARC's recommended actions in the Rouge River Watershed Management Plan (2008). Within the Rouge AOC the approach for restoration has evolved from merely improving water quality to maximizing ecological integrity. Watershed-wide there are issues with flow, impaired biota and pathogens as illustrated by the TMDLs for *E.coli* and biota. The entire watershed is a designated AOC. Impervious surfaces, altered hydrology, loss of green infrastructure and the resultant increase in polluted storm water has been identified as the root cause of all these problems.

Consequently, the philosophy/recommendation of the RRAC is to attack these root causes at each and every opportunity, document success, highlight restoration by subwatershed, and not limit actions by type or geography. It should be noted here that delisting the BUIs by subwatershed can be an internal tracking mechanism for the RRAC as it has been decided by the EPA that they will not take this approach at this time.

The RRAC endorses the ARC's overall action strategy to protect and maintain what is healthy, restore what is degraded and keep working collaboratively to continuously improve environmental conditions and the efficiency of activities. The RRAC also supports:

- ARC's development of a collaborative action plan to implement green infrastructure projects that result in storm water volume reduction across the watershed;
- Addressing priority pollutants through collaborative IDEP and PEP activities (Figure 5);
- Right-sizing and implementing wastewater treatment system improvements;
- Realizing AOC delisting, and
- Expanding on the volume reduction BMP scenarios developed by the subwatershed groups.

Within this action plan the ARC is essentially combining the USEPA's *Managing Wet Weather with Green Infrastructure Action Strategy* (http://cfpub.epa.gov/npdes/home.cfm?program_id=298) and the Water Environment Federation's *Water is Life and Infrastructure Makes it Happen* (<http://www.wef.org/wil.aspx>) campaigns to achieve storm water runoff volume reduction and pollutant loading reductions. The basic components of the ARC's Collaborative Action Plan and RRAC's recommendations for the delisting strategy are:

1. Wastewater Treatment System Improvements
2. Collaborative IDEP Activities
3. Collaborative PEP Activities
4. Green Infrastructure Projects and Retrofits
5. Fish Passage and Habitat Projects
6. Progress Evaluation
7. Collaborative Planning, Financing and Reporting

Critical Areas for Priority Pollutant Reductions

Draft Collaborative Action Plan

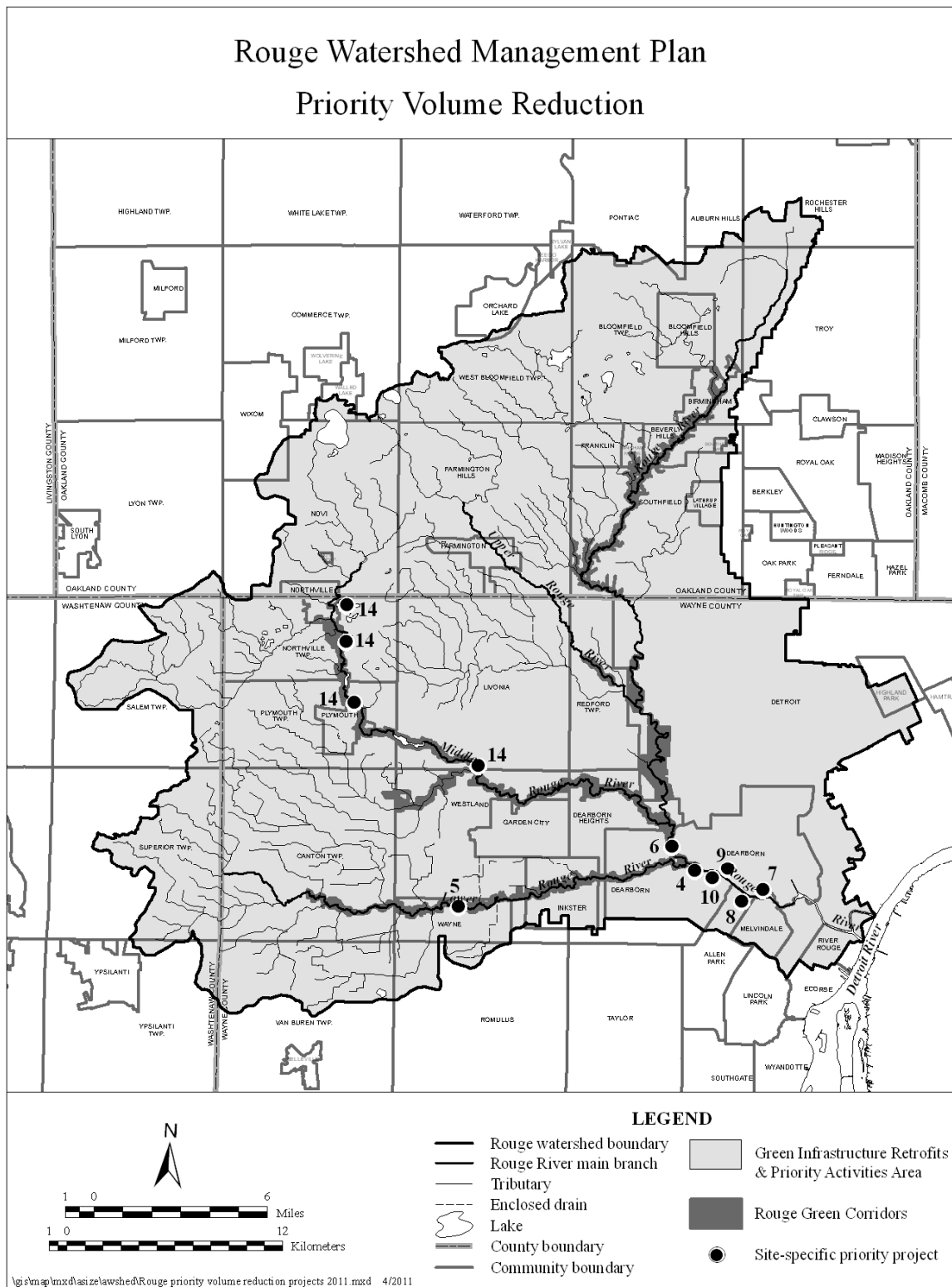
LEGEND

- Rouge watershed boundary
- Rouge River main branch
- Tributary
- Enclosed drain
- Lake
- County boundary
- Community boundary
- IDEP/PEP 1st priority areas
- IDEP/PEP 2nd priority areas
- WWTS improvements
- Routine IDEP / PEP areas

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As indicated above, the Priority Project Activities and site-specific Projects included here represent a cross section of the types of implementation projects that will address the Rouge River AOC BUIs. Implementation of these projects will be a key step toward full restoration to accomplish delisting , thus benefiting the watershed residents and users of the Rouge River as well as the Detroit River connecting channel and Lake Erie. A map of the location of site specific projects is included as Figure 6.

Figure 6: Priority Project Activities and Site Specific Projects



1) Rouge Collaborative IDEP & Toxic Material Collections

Description: The GLRI Action Plan has a target of collecting 45 million pounds of e-waste, 45 million pills of unwanted medicines, and 4.5 million pounds of household hazardous waste through prevention and waste minimization projects. Through this project, the ARC will improve and expand its collaborative illicit discharge elimination program and toxic material collections to significantly contribute to this GLRI Action Plan goal. Private commercial and industrial facilities with high potential of handling/mishandling these materials will be targeted for illicit discharge advanced investigations and outreach. Household hazardous waste and e-waste collections will be held and coordinated to maximize the proper handling, disposal and documentation of the amount of these materials prevented from entering the Rouge River and Detroit River

AOCs and subsequently Lake Erie. Over a four-year period it is estimated that annually over 4,000,000 gallons of polluted water will be removed; and over one million pound of e-waste, 4,800 pounds of unwanted medicines and over two million pounds of household hazardous waste will have been collected, properly disposed of and/or prevented from entering the Great Lakes system.

Timetable: 2011-2014

Funding Estimate: \$1,200,000

Responsible Entities: ARC, Wayne and Oakland counties.

Indicators and Monitoring: Number of facilities investigated, number and volume of illicit discharges eliminated, pounds of e-waste, unwanted medicines and other household hazardous wastes collected.

Evaluation Process based on Indicators: Actual volume of illicit discharge prevented versus project goals and actual amount of waste materials collected versus project goals.

Public Involvement: The RRAC and ARC committee structure will be used to plan and implement the project. Existing and new public education materials will be used to raise awareness of the negative impacts these materials have on our great water resources and to encourage participation in collection events.

Addressed Beneficial Use Impairments

- ☒ *Restrictions on fish and wildlife consumption*
- ☐ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☒ *Beach closings*
- ☒ *Fish tumors or other deformities*
- ☒ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☒ *Restriction on dredging activities*
- ☐ *Loss of fish and wildlife habitat*

2) Rouge Collaborative Public Education Plan (PEP) & GI/LID Education Campaign

Description: The Rouge AOC has watershed-wide issues with flow, biota and *E.coli* as illustrated by the TMDLs for *E.coli* and biota. The entire watershed is designated an AOC. Impervious surfaces, altered hydrology, loss of green infrastructure and the resultant increase in polluted storm water along with aging sanitary sewer infrastructure have been identified as the primary root causes of all these problems. Consequently, the philosophy/recommendation of the RRAC is to attack these root causes at each and every opportunity. Public education, focused on demonstrating and promoting green infrastructure and LID BMPs, is the most efficient and cost effective method to attack the root cause of all the Rouge AOC's BUIs.

Through this project the ARC will implement the RRAC's recommendation by essentially combining the *Managing Wet Weather with Green Infrastructure Action Strategy* (http://cfpub.epa.gov/npdes/home.cfm?program_id=298 with the Water Environment Federation's *Water is Life and Infrastructure Makes it Happen* (<http://www.wef.org/wil.aspx>) campaigns. GI stewardship projects, workdays and presentations will be implemented to demonstrate and encourage municipal and schoolyard GI BMPs, GI literature and tree seedlings will be distributed at ARC and community events including household hazardous and e-waste collections and rain barrel sales, a "Green Schools" program will be actively managed and implemented to encourage Great Lakes stewardship activities and curriculum including schoolyard tree planting and native plant grow zones. The ARC's website will be enhanced to specifically promote and help track success of GI outreach activities and encourage adequate public investment in the ARC communities' green and gray infrastructure assets.

Timetable: 2011-2014

Funding Estimate: \$1,000,000

Responsible Entities: ARC, FOTR, Wayne and Oakland counties.

Indicators and Monitoring: In the short-term, performance activities will be documented including the numbers of demonstration projects implemented, trees planted, workshops and presentations held and the number of teachers, students and citizens reached. In the mid-term existing environmental monitoring activities including the ARC's collaborative progress evaluation activities including the benthos monitoring, frog & toad survey and geomorphology monitoring. In the long-term the increase in percentage of GI land cover will be monitored in the Rouge River AOC.

Addressed Beneficial Use Impairments

Restrictions on fish and wildlife consumption

- ☑ *Eutrophication or undesirable algae*
- ☑ *Degradation of fish and wildlife populations*
- ☑ *Beach closings*

Fish tumors or other deformities

- ☑ *Degradation of aesthetics*
- ☑ *Degradation of benthos*

Restriction on dredging activities

- ☑ *Loss of fish and wildlife habitat*

Evaluation Process based on Indicators: Specific performance objectives will be established for each of the GI outreach activities and the evaluation will be performed by comparing the project objectives with the project actual results. Mid-term the ARC will be looking for improving trends in the environmental indicator monitoring in particular the benthos monitoring. Long-term the 2008 baseline biological indicator of green infrastructure land cover will be compared to a future percentage of green infrastructure land cover assessment with the anticipated out-coming being a measurable increase.

Public Involvement: The RRAC and ARC committee structure and programs will be used to plan and implement the project. See project description above.

3) Green Infrastructure (GI) Implementation Projects

Description: The 2008 Rouge River WMP Update has outlined a long-term (30 year) storm water runoff volume reduction target for the entire AOC of approximately 300 million cubic feet, with a short-term target of 10% of the total estimate. Storm water runoff volume control can be achieved through numerous types of green infrastructure or low-impact development technologies. Examples of these types of projects include grow zones, rain gardens, bioswales, infiltration basins, storm water basin retrofits, green roofs and pervious pavement. While not typically described as a best management practice, increasing tree canopy coverage provides storm water runoff volume reduction. Other mechanisms with which to reduce volume include capture and reuse of storm water runoff. Initial priority areas for implementation of these strategies include the following:

- Public parkland available for conversion to grow zone or reforestation;
- School properties available for implementation of schoolyard habitats with conversion of turf/impervious areas to grow zone or trees as one type;
- Public impervious parking available for porous pavement retrofitting; and
- Public facility roof top available for conversion to green roof.

Timetable: 2009-2030

Funding Estimate: Variable

Potential Stakeholders: Wayne County Department of Environment/ARC, schools, school districts and other public institutions.

Indicators and Monitoring: Land cover percentages of tree canopy, open space/scattered trees, meadow/grow zone, impervious, bare urban land and water will be compared before and after implementation of the selected management strategies. At the same time, volume control estimates will be documented and tracked through the CITYgreen© mechanism.

Evaluation Process based on Indicators: Removing the BUIs for fish and wildlife populations and the fish and wildlife habitats is about achieving a better balance between the “green” infrastructure and the “gray” impervious infrastructure. The volume reduction achievements will be monitored over time to evaluate progress towards meeting the long-term targets.

Public Involvement: Public involvement activities will be project-specific; however, the RRAC and ARC community structure will be utilized to continue promoting green infrastructure implementation.

Addressed Beneficial Use Impairments

- ☑ *Restrictions on fish and wildlife consumption*
- ☑ *Eutrophication or undesirable algae*
- ☑ *Degradation of fish and wildlife populations*
- ☑ *Beach closings*
- ☑ *Fish tumors or other deformities*
- ☑ *Degradation of aesthetics*
- ☑ *Degradation of benthos*
- ☑ *Restriction on dredging activities*
- ☑ *Loss of fish and wildlife habitat*

4) Michigan Avenue and Evergreen Road Storm Water Treatment And Habitat Restoration (USACE, 2003)

Description: Storm water runoff from Michigan Avenue, Evergreen Road and a significant developed area to the north is discharged directly to the Rouge River, contributing to erosion on the south side of the river and increasing non-point source pollution loading, including oil and grease, silts and nutrients to the river. Two alternatives are under consideration.

The first alternative consists of restoring the floodplain forest and shoreline habitat that was once present. The actual planting composition would be determined by the extent of excavation and grading in the upstream and downstream restoration areas. Storm water runoff from Michigan Avenue and Evergreen would be routed to create marsh areas suitable to support the constructed wetland hydrology. Key features would include the following:

- Plant floodplain and upland forest where gaps exist;
- Restoration of habitat functions provided by high marsh, low and deep marsh, floodplain shrub/scrub and upland forest;
- Management of exotic and/or nuisance plant species through the project area;
- Implementation of a habitat management and maintenance program; and
- Improvement of the storm water treatment of roadway runoff.

The second alternative incorporates substantial improvements to fish and wildlife resources and substantial water quality improvements. A series of filtration marshes that would collect and treat water from the tributary area would be fully integrated with the successful creation of freshwater marsh and wet prairie and restoration of floodplain forest and shoreline habitat. Two constructed wetlands are proposed on the north and south sides of the Rouge River. Inlet and outlet control structures will be constructed to manage the volume of storm water routed through the constructed wetlands. A sediment forebay area will be incorporated with an inlet control structure to trap coarse sediment before entering the wetland. Each constructed wetland will be designed using a two-tiered, meandering flow path to provide a diversity of depths to promote diversity of wetland plants and extend the retention time for treatment of pollutants. Inclusion of a micropool area near the outlet control structures will

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☒ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☒ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☒ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*

provide a low and deep marsh habitat and ensure cooler temperatures for the water discharged to the Rouge River. Key project components include:

- Excavation of the project area to facilitate construction of a storm water treatment system, maximizing storm water treatment efficiency and allowing for the creation of submerged and emergent herbaceous and/or shrubby wetlands;
- Planting of existing and historic floodplain and uplands forests;
- Control of nuisance species within the project area;
- Design and use of a long-term habitat management and maintenance program; and
- Education/demonstration of storm water treatment alternatives within the Rouge River Basin.

Timetable: While this project has had some preliminary reviews, it is anticipated that design and construction timeframes would be on the order of 5 – 10 years, depending on funding availability.

Funding Estimate: \$2,500,000

Potential Stakeholders: RRAC, Wayne County Department of Environment, ARC, USACE, Rouge Gateway Partnership, other local communities and groups.

Indicators and Monitoring: Project-specific monitoring would include those components outlined in the habitat management and maintenance program developed under this program. It is anticipated that a level of annual vegetation monitoring would be included. In addition, a level of storm water volume and water quality control will be achieved through management of the runoff from Michigan Avenue, Evergreen Road and adjacent developments. Monitoring river quality following completion of the project will demonstrate effective management of this excess storm water runoff. At the same time, storm water volume control may be monitored through updates through the CITYgreen© mechanism.

Evaluation Process based on Indicators: Indicators described above including storm water volume, water quality and vegetation/habitat will determine the restoration success. Long-term evaluation is consistent with the delisting targets previously described. Previously described where?

Public Involvement: The RRAC committee structure would be utilized to promote public involvement activities. At the same time, the project design process would include significant permitting that would entail a public involvement/comment period. Promotion could also be considered through the ARC committee structure with press releases and other communication documents.

5) Wayne Road Dam Removal

Description: The MDNR Fisheries Special Report 22, Rouge River Assessment (Beam, Jennifer D. and Jeffrey J. Braunscheidel. 1998. Rouge River Assessment. Michigan Department of Natural Resources, Fisheries Division, Special Report 22. Ann Arbor, Michigan) identified the Wayne Road Dam as an impediment to the Rouge AOC's fishery. The EPA also provided funding for a dam removal feasibility study. Removing or providing fish passage at this site would be extremely helpful in achieving the delisting targets for the Rouge River by reconnecting the Rouge River AOC to the Detroit River and Lake Erie ecosystem.

The Wayne Road Dam is located on the Lower Branch and is about eight miles upstream of the Henry Ford Estate Dam but since the Lower Branch splits off from the Main Rouge downstream of the Henry Ford Estate, fish can travel from the Detroit River to the Wayne Road Dam unimpeded and salmon spawn there in the fall. Removal of the dam at Wayne Road would increase aquatic diversity throughout the upper and lower portions of the Main Branch and the Lower Branch, not only for fish species, but also for macro-invertebrates, mussels and other aquatic life forms. Fish species that have been identified downstream of the Wayne Road Dam include small mouth bass, white suckers, walleye, redhorse suckers, northern pike and steelhead.

Timetable: Design of the Wayne Road Dam removal will be completed in June, 2011. Implementation can occur immediately once funding is secured.

Funding Estimate: \$1,300,000

Potential Stakeholders: Wayne County Department of Environment, Wayne County Parks, FOTR, ARC, Army Corps of Engineers, City of Wayne, MDEQ.

Indicators and Monitoring: Fish and wildlife population monitoring upstream of the dam as outlined in the delisting targets.

Evaluation Process based on Indicators: Building upon and relying on the watershed monitoring efforts of FOTR, Wayne County and the ARC would collaborate with the MDNR to add fish monitoring to the suite of parameters being monitored for watershed management progress evaluation.

Addressed Beneficial Use Impairments

- ☐ Restrictions on fish and wildlife consumption
- ☐ Eutrophication or undesirable algae
- ☒ Degradation of fish and wildlife populations
- ☐ Beach closings
- ☐ Fish tumors or other deformities
- ☐ Degradation of aesthetics
- ☒ Degradation of benthos
- ☐ Restriction on dredging activities
- ☒ Loss of fish and wildlife habitat



Wayne Dam

Public Involvement: The RRAC and ARC committee structure will be used to publicize the project. The process for the project design and permitting will be used as a mechanism for public involvement. Reports and project profiles will be developed, press releases will be issued and State of the Watershed workshops and conferences will be implemented throughout the duration of the project to bring attention to and build awareness of the importance of reconnecting the Rouge AOC (ecologically) to the Detroit River and Lake Erie AOC's and to provide information on the progress of ecological restoration.

6) Henry Ford Estate Dam Modification for Fish Passage

Description: In addition to the removal of Wayne Road Dam, the MDNR 1998 Fisheries Assessment identified the Henry Ford Estate in Dearborn on the Main Branch of the Rouge River as an impediment to the Rouge River AOC's fishery. Providing fish passage at this site would be extremely helpful in achieving the delisting targets for the Rouge River by reconnecting the Rouge River AOC to the Detroit River and Lake Erie ecosystem.

The Henry Ford Estate Dam is approximately eight miles upstream of the Rouge River's confluence with the Detroit River and the first upstream dam from the mouth of the Rouge River. The next upstream dams along the Middle and Upper Branches of the Rouge are 18 and 36 miles from the confluence, respectively. A fish passageway at the Henry Ford Estate would increase aquatic diversity throughout the upper and lower portions of the Rouge River Main Branch, and the Upper and Middle branches not only for fish species, but also for macro-invertebrates, mussels and other aquatic life forms. Fish species that have been identified at the Henry Ford Estate dam include small mouth bass, white suckers, walleye, redhorse suckers, northern pike and steelhead.

The Army Corp of Engineers has been studying the feasibility of providing fish passage around the Henry Ford Estate Dam.

Timetable: While these projects have been actively discussed amongst stakeholders, the timing for implementation is anticipated to be within the next five years.

Funding Estimate: \$1,700,000

Potential Stakeholders: Wayne County Department of Environment, FOTR, ARC, USACE, University of Michigan-Dearborn, Henry Ford Estate, City of Dearborn, MDEQ.

Indicators and Monitoring: Fish population monitoring upstream of the two dams as outlined in the delisting targets.

Evaluation Process based on Indicators: Building upon and relying on the watershed monitoring efforts of FOTR, Wayne County and the ARC would collaborate with the MDNR to add fish monitoring to the suite of parameters being monitored for watershed management progress evaluation.

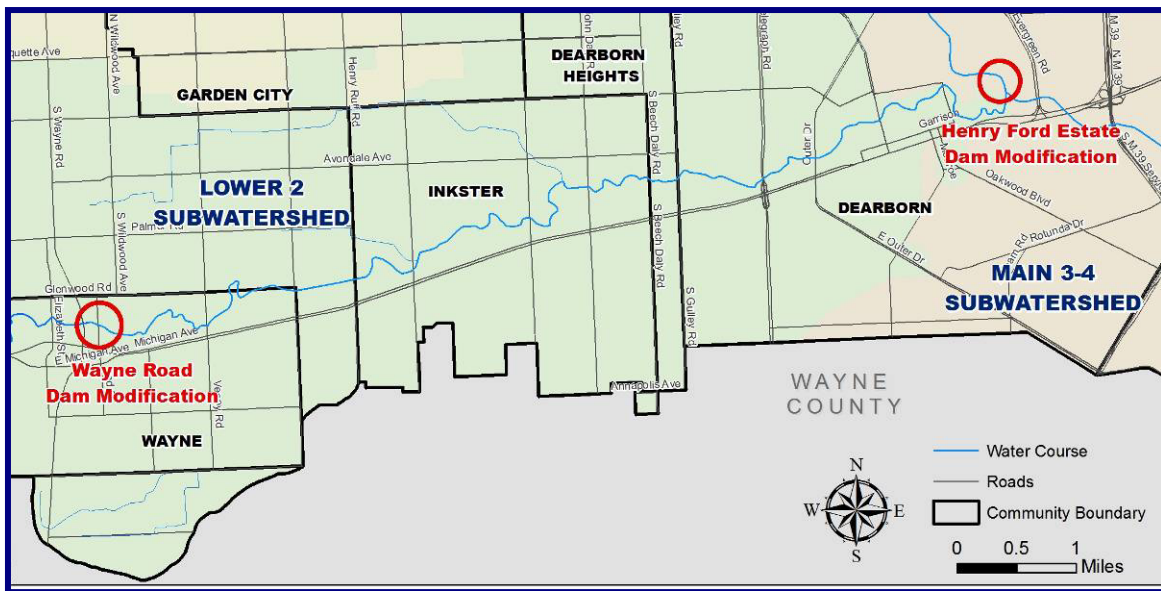
Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☐ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☐ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☐ *Degradation of aesthetics*
- ☐ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*



Henry Ford Estate Dam

Public Involvement: The RRAC and ARC committee structure will be used to publicize the project. The process for the project design and permitting will be used as a mechanism for public involvement. Reports and project profiles will be developed, press releases will be issued and State of the Watershed workshops and conferences will be implemented throughout the duration of the project to bring attention to and build awareness of the importance of reconnecting the Rouge AOC (ecologically) to the Detroit River and Lake Erie AOC's and to provide information on the progress of ecological restoration.



Location of Henry Ford Estate and Wayne Road Dams

7) Fordson Island Habitat Restoration (USACE, 2003)

Description: Fordson Island is located in the City of Dearborn, just downstream of the Turning Basin on the southwest side of the river. Ongoing negotiations between the property owner and Wayne County have created an opportunity for possible riparian and upland habitat creation/restoration, public recreation and access to the Rouge River. The project objectives include successful restoration of the onshore and offshore habitat of a small island in the Rouge River and providing improved public access and passive recreation opportunities for the local community.

The U.S. Department of Justice and EPA have a consent decree with Marathon Ashland Petroleum LLC, which involves a supplemental project on Fordson Island with an estimated cost of \$3.5 million. The anticipated work involves restoration, removal of equipment and environmental assessments. Marathon Ashland Petroleum currently owns a majority of the island and is in the process of transferring this land to Wayne County.

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☐ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☐ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☒ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*

Specific project features important to the success of this project include:

- Removal of solid waste, construction materials and abandoned boats along the shoreline of the island (funded by a grant from the National Oceanic and Atmospheric Administration (NOAA));
- Shoreline restoration with a herbaceous, emergent riparian shelf that is interspersed with pockets of willow overhangs to benefit the adjacent fishery and existing wading bird roost site;
- Creation of upland and wet meadows that are dominated by native grass and shrub species and maximization of passive recreation interaction with pollinator and avian species;
- Restoration and enhancement of forested and scrubby wetland that currently occurs on the island and provides habitat to wading bird species;
- Creation of reef habitat in deep water on the Rouge River side of the island to improve fishery opportunities in the immediate project area;
- Development of an interpretive trail to describe the importance of urban habitat restoration of fish and wildlife species; and
- Management of exotic and/or nuisance vegetation and animal species throughout the project area.

In 2011 the City of Dearborn applied for land acquisition grant funding from NOAA to acquire Fordson Island. Further investigations to determine federal interest in this project would look at the deepening of the channel west of Fordson Island to determine whether commercial or recreational vessels will use and benefit from the deepening. An evaluation of “incremental depths” to dredge the channel would be needed to determine the greatest achievable benefits versus cost in addition to determining the locations for greatest habitat benefits.

The Fordson Island Marine Debris Removal Project is one component of the larger project and is currently being implemented. This portion of the project has been funded by the Marine Debris Program grant from the National Oceanic and Atmospheric Administration. The project activities include ecological and habitat surveys, shoreline clean up which includes removal, characterization, loading, transportation, and disposal of shoreline debris and the monitoring of cleaned areas to determine re-accumulation rates. Additionally, a targeted outreach and education component for the community is included in the program. This part of the project will be completed in the fall of 2011.

Timetable: The Marine Debris Removal Project will be complete by fall of 2011. The rest of the project is not currently funded and it is anticipated that design and construction timeframes would be approximately 5 – 10 years, depending on funding availability.

Funding Estimate: \$3,500,000

Potential Stakeholders: RRAC, Wayne County Department of Environment, FOTR, Marathon Ashland Petroleum LLC, USACE, ARC and other local communities or groups, MDEQ.

Indicators and Monitoring: Indicators would include restoration of native vegetation species along with storm water runoff volume and river water quality. Monitoring river quality following completion of the project will demonstrate effective management of this excess storm water runoff. At the same time, storm water volume control may be monitored through updates through the CITYgreen© mechanism described previously.

Evaluation Process based on Indicators: Indicators described above including storm water volume, water quality and vegetation/habitat will determine the restoration success. Long-term evaluation is consistent with the delisting targets previously described.

Public Involvement: As a part of the Marine Debris Removal Project, there is a targeted outreach and education component, including a community clean up held every June in conjunction with Rouge Rescue. For the rest of the project the RRAC committee structure would be utilized to promote public involvement activities. At the same time, the project design process would include significant permitting that would entail a public involvement/comment period. Promotion could also be considered through the ARC committee structure with press releases and other communication documents.

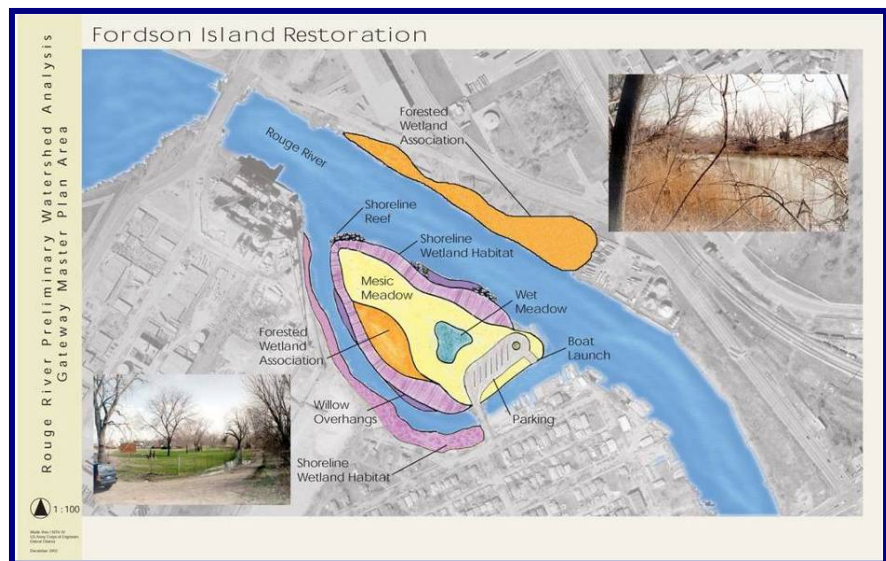


Figure 7-3: Fordson Island Restoration

8) Concrete Channel Modifications/Enhancements for Habitat and Fish Populations Rouge River Channel Restoration, Upper and Lower Sections (USACE)

Description: Approximately 2.3 miles of concrete-lined channel exists, between Michigan Avenue and I-94, in the eight-mile long Gateway Partnership area of the Rouge River. This represents approximately one-half of the USACE's flood control project completed in the mid-1970s. The flood control project reduced the channel length from 5.8 miles to 4.2 miles through realignment and straightening. Restoration of this portion of the river would include restoration of riparian shoreline and submerged habitat through the removal of hardened shoreline and inclusion of habitat features such as submerged rock overhangs, willow overhangs and re-creation of clusters of emergent aquatics (i.e. cover habitat) on select riparian littoral shelf locations.

Timetable: It is anticipated that this project will occur within the next ten years.

Funding Estimate: \$15,000,000

Potential Stakeholders: RRAC, Wayne County Department of Environment, ARC, USACE, MDEQ and the Rouge Gateway Partnership, including the cities of Dearborn, Melvindale and Allen Park.

Indicators and Monitoring: Indicators would include the various habitat types constructed as part of this project, including the riparian and submerged areas. Monitoring of these indicators is anticipated to include annual vegetation monitoring for a period of time determined through the design process as well as types of wildlife observed during monitoring periods.

Evaluation Process based on Indicators: Removing the BUIs for Fish and Wildlife Populations and the Fish and Wildlife Habitats is about achieving a better balance between the "green" infrastructure and the "gray" impervious infrastructure as mentioned in previous project descriptions. The evaluation process will be in the establishment of a diverse native vegetation and wildlife population from this project.

Public Involvement: The RRAC committee structure would be utilized to promote public involvement activities. At the same time, the project design process would include significant permitting that would entail a public involvement/comment period. Promotion could also be considered through the ARC committee structure with press releases and other communication documents.

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☒ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☐ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☒ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*

9) Oakwood Common Oxbow Restoration (USACE, 2003)

Description: The Flood Control Project straightened the natural river alignment in this area and effectively created an oxbow wetland behind the Oakwood Common senior residence development community and adjacent to the Tournament Player's Club (TPC) Golf Course. This wetland is hydrologically isolated from the river and has partially filled with sediment. Three (3) alternatives have been considered with the most challenging being a complete reconnection of the oxbow to the Rouge River Channel. This project description focuses on the complete reconnection alternative.

Detailed feasibility studies, funding availability and public involvement may ultimately select one of the other two alternatives, each of which provides habitat restoration, Hydraulic reconnection of this area with the Rouge River would require dredging to provide adequate flow-through characteristics. Native upland and wetland planting would be installed along the existing shoreline and the reconnected oxbow. The plantings would effectively enhance recreation, provide erosion control, improve storm water management and enhance ecological habitat functions. Numerous fish will benefit from the hydraulic reconnection, including largemouth bass, bowfin and numerous sunfishes.

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☒ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☐ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☒ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*

Timetable: While this project has had some preliminary concepts, it is anticipated that design and construction timeframes would be approximately 5 – 10 years, depending on funding availability.

Funding Estimate: \$20,000,000

Potential Stakeholders: RRAC, Wayne County Department of Environment, ARC, USACE, Rouge Gateway Partnership, other local communities and groups, MDEQ.

Indicators and Monitoring: Indicators would include restoration of native vegetation species along with storm water runoff volume and river water quality. Monitoring river quality following completion of the project will demonstrate effective management of this excess storm water runoff. At the same time, storm water volume control may be monitored through updates through the CITYgreen© mechanism described previously.

Evaluation Process based on Indicators: Indicators described above including storm water volume, water quality and vegetation/habitat will determine the restoration success. Long-term evaluation is consistent with the delisting targets previously described.

Public Involvement: The RRAC committee structure would be utilized to promote public involvement activities. At the same time, the project design process would include significant permitting that would entail a public involvement/comment period. Promotion could also be

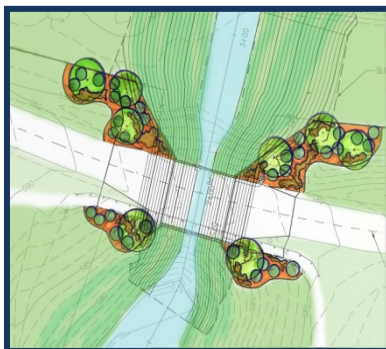
considered through the ARC committee structure with press releases and other communication documents.

10) Rouge River Oxbow- Phase 3 (USACE, 2008)- Reconnect Oxbow Segment at the Henry Ford

Description: A Flood Control Project straightened the natural river alignment in this area and effectively cut off all the meanders (oxbows) to the Rouge River Channel. The Oxbow Restoration Project is located at the Henry Ford Museum and Greenfield Village adjacent to the Lower Branch of the Rouge River in Dearborn, Michigan. The Henry Ford is registered on the National Registry of Historic Places. The main objective of the project is to restore valuable fish and wildlife habitat within the Rouge and to restore functioning riverine wetlands that have been lost due to channelization of the river. Secondary objectives include improvement of water quality, increased floodplain storage, educational/interpretative opportunities, and improved aesthetics. The overall project is being completed in three phases: Phase I—Oxbow Wetland Restoration, Phase II—CSO Modifications, and Phase III—Open Connection to the Rouge. Phase I has been completed with the establishment of the riverine wetland and uses an existing 60-inch storm sewer that was modified to provide river water to the oxbow during Phase I. A Phase II siphon provides the hydraulic connection of the wetlands on both sides of the existing CSO. Finally work has begun on Phase III the open cuts from the oxbow into the existing USACOE flood control section of the Rouge River. Currently the downstream open cut of the oxbow has completed and all that remains for full habitat completion of the project is providing the upstream open cut to the flood channel that is now connected by the 60-inch pipe.

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☒ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☐ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☒ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*



Hydraulic reconnection of this area with the Rouge River would require cutting (with a bridge) through the existing channelized portion of the river to provide adequate flow-through characteristics. Native upland and wetland planting would be installed along the open

connection to the Phase I oxbow. The plantings would effectively enhance recreation, provide erosion control, improve storm water management and enhance ecological habitat functions. Numerous fish will benefit from the hydraulic reconnection, including largemouth bass, bowfin and numerous sunfishes.

Timetable: While this project has had some preliminary concepts, it is anticipated that design and construction timeframes would be approximately 5 – 10 years, depending on funding availability.

Funding Estimate: \$3,500,000

Potential Stakeholders: The Henry Ford, RRAC, , Wayne County Department of Environment, ARC, USACE, Rouge Gateway Partnership, other local communities and groups, MDEQ.

Indicators and Monitoring: Indicators would include restoration of native vegetation species. Monitoring river flow into the oxbow and monitoring of fish species and benthos.

Evaluation Process based on Indicators: Indicators described above including vegetation/habitat will determine the restoration success. Long-term evaluation is consistent with the delisting targets previously described.

Public Involvement: The RRAC committee structure would be utilized to promote public involvement activities. At the same time, the project design process would include significant permitting that would entail a public involvement/comment period. Promotion could also be considered through the ARC committee structure with press releases and other communication documents.

11) Great Lakes Legacy Act Projects – Investigation & Assessment

Description: Some of Michigan’s most intensive industrial activities have been concentrated along the lower portion of the Rouge River’s Main Branch. Sediment contamination has long been a concern and is a “legacy” of the Detroit area’s long history of industrialization. It may have the potential to affect human health and the environment. The EPA and the MDEQ have been trying to identify the contaminated areas and determine the level of contamination. This data will help the agencies evaluate potential cleanups. In 2007, the MDEQ identified six sites with contaminated sediment. Two years later, the EPA’s Great Lakes National Program Office gathered additional data on the contamination and its effect on aquatic life. Study results show the most common contaminants are heavy metals; polyaromatic hydrocarbons, or PAHs; and polychlorinated biphenyls – commonly known as PCBs.

Addressed Beneficial Use Impairments

- ☒ *Restrictions on fish and wildlife consumption*
- ☐ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☐ *Beach closings*
- ☒ *Fish tumors or other deformities*
- ☐ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☒ *Restriction on dredging activities*
- ☐ *Loss of fish and wildlife habitat*

In some areas of the river, high levels of contamination were found in all depths of the sediment. In other areas, elevated levels were found only in the deeper sediments. In still other areas, potentially harmful levels of contaminants were found only in the top layers.

Additionally, laboratory tests showed the contamination had a negative effect on aquatic life.

The Great Lakes Legacy Act (GLLA) was signed into law in 2002 to tackle the problem of “legacy” sediment contamination. The EPA’s Great Lakes National Program Office administers this program. To be eligible for Legacy Act funding, a project must evaluate or clean up sediment, or prevent new contamination from occurring in the AOC. At least 35 percent of project funds must come from state, local or private sponsors. *(Source: Investigation of Sediment Begins in Old Channel Section of River/ Lower Rouge River Legacy Act Project, Detroit MI)*

Timetable: Work has begun on a \$2.4 million GLLA project to determine the location and extent of contaminated sediment in the Zug Island “Old Channel” section of the lower portion of the Rouge River’s Main Branch in southwest Detroit. It is part of a larger project in the three-mile section of the river extending downstream from the concrete-lined channel in Dearborn to the Detroit River. Honeywell International is providing 35 percent of the funds for the Old Channel phase. The project will assess sediment conditions and develop cleanup alternatives. If sediment cleanup is required, and the EPA and Honeywell reach an agreement, work may begin in late 2012.

The second part of the project will be in the main stem of the Rouge River. This work may also be done under the GLLA and will require a sponsor to provide non-federal funds.

Funding Estimate: Unknown

Potential Stakeholders: RRAC, EPA, industrial stakeholders, communities.

Indicators and Monitoring: Determined by on a project-specific basis.

Evaluation Process based on Indicators: NA

Public Involvement: The RRAC committee structure would be utilized to promote public involvement activities. At the same time, the project design process would include significant permitting that would entail a public involvement/comment period. Promotion could also be considered through the ARC committee structure with press releases and other communication documents.

12) Rouge Green Corridor (RGC) Strategic Plan

Description: Much of the Lower and Middle branches of the Rouge River are surrounded by public parkland. Along the Main Branch there are several large parks within the City of Detroit. The Main 1-2 communities have been pursuing a Rouge Green Corridor project aimed to assist the Main 1-2 RGC communities in undertaking a community-based planning and communications “branding” approach to create and promote a unique identity for a specific and distinct riparian greenway corridor. The Rouge Green Corridor Land Acquisition Planning project would extend the Main 1-2 RGC effort to all branches of the Rouge River as well as along smaller tributaries to encourage the connection and extension of existing riparian public greenways as well as facilitate the establishment of RGC along smaller creeks to improve habitat, minimize storm water pollution and create healthy riparian corridors with expanded flood

water storage capacity. If grant funding is secured, the Rouge River Watershed public lands map would be updated and a consultant hired to facilitate the planning and identification of potential key parcels of property that could be targeted for extending and connecting existing riparian parkland. This project would position the local Rouge communities to be better prepared to pursue land acquisition and/or conservation easement funds as they become available. The project would also provide local communities with the tools to promote, protect and enhance existing Rouge Green Corridor areas as unique and important community assets.

Timetable: 2011-2014

Funding Estimate: \$500,000

Potential Stakeholder: RRAC, ARC, Wayne and Oakland counties, FOTR, local stakeholder groups.

Indicators and Monitoring: Over the long term, the increase in percentage of green infrastructure land cover will be monitored in the Rouge River AOC. As this project focuses on developing an overall coordinated initiative across the Rouge AOC, indicators of success will be reflected in the participation by AOC stakeholders and their involvement in helping to identify and prioritize target areas.

Evaluation Process based on Indicators: Over the long term, the 2008 baseline biological indicator of green infrastructure land cover will be compared to a future percentage of green infrastructure land cover assessment with the anticipated measurable increase being the outcome.

Public Involvement: Project stakeholders will publicize their existing riparian parklands as part of the larger RGC with signage, newsletter articles and/or brochures, as well as via their

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☒ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☐ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☒ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*

websites. The ARC committee structure and programs will also be used to plan and implement the public involvement elements of the project.

13) Rouge Green Corridor Maintenance Planning & Programs

Description: Wayne County, the cities of Southfield, Birmingham, Beverly Hills and Detroit as well as a number of other local Rouge communities are significant riparian corridor landowners in the Rouge River AOC (approximately 5,200 acres of riparian corridor) and have spent hundreds of millions of dollars over the last 20 years to help restore the river. Many of the most recent projects have been green infrastructure grow zone projects that are re-establishing a more natural/native landscape within the parklands managed by these stakeholders. Many of these projects have also involved FOTR and Southeast Oakland County Water Authority (SOCWA) volunteers or others in their establishment and ongoing maintenance. This project would assess the options and opportunities for improving the coordination, effectiveness and implementation of the on-going maintenance of

these more natural/native landscapes within the Rouge AOC. An institutional assessment would be performed to explore the idea of creating a Rouge River Watershed Cooperative Weed Management Area to initiate efforts leading to the establishment of a sustainable funding source and public/private partnership to control invasive plant species. A clear long-term invasive species management plan based on an integrated pest management approach would be developed and it would likely include an Adopt-A-Grow Zone program to sustain and expand the involvement of volunteers in these efforts. This Adopt-A-Grow program would serve as a specific, ongoing, and adaptive public outreach and education effort. Funding for such a project is available under the National Fish and Wildlife Foundation's *Pulling Together Initiative*, a grant program that funds projects that will help control invasive plant species, mostly through the work of public/private partnerships such as Cooperative Weed Management Areas.

Timetable: 2012-2014

Funding Estimate: \$200,000

Potential Stakeholder: RRAC, ARC, Wayne and Oakland counties, FOTR, local stakeholder groups.

Indicators and Monitoring: The increase in percentage of green infrastructure land cover will be monitored in the Rouge River AOC over the long term. As this project focuses on developing an overall coordinated initiative across the Rouge AOC, indicators of success will be reflected in the participation by AOC stakeholders and their involvement in helping to identify and prioritize target areas.

Evaluation Process based on Indicators: Over the long term, the 2008 baseline biological indicator of green infrastructure land cover will be compared to a future percentage of green

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☒ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☐ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☒ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*

infrastructure land cover assessment with the anticipated out-coming being a measurable increase.

Public Involvement: Existing volunteer involvement activities of FOTR, SOCWA, Wayne County and the local communities. The RGC signage, newsletter articles and/or brochures will also aid in this effort. The ARC committee structure and programs will also be used to plan and implement the public involvement elements of the project.

14) Lakes and Impoundments – Feasibility Study & Restoration

Description: A number of lake restoration projects, including Newburgh and Carpenter lakes, have been completed within the watershed with demonstrated improvements in both fish and wildlife habitat and populations. Other lakes and impoundments across the watershed have significant habitat and recreational potential provided a level of restoration will take place. The extent of restoration for these impoundments would be determined during an initial feasibility study followed by implementation of restoration techniques. Lakes or impoundments for consideration would include, at the least, Walled, Nankin, Phoenix and Wilcox lakes.

First, an overall evaluation of lakes in the AOC would be completed to prioritize restoration opportunities based on criteria such as environmental, economic and public involvement factors. Environmental factors for feasibility evaluation would include topics such as level of water quality improvements, extent of benefits provided in working towards the delisting targets, storm water runoff quality and quantity management and the public education value achieved by providing improvements in the local water resources.



Carpenter Lake

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☒ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☒ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☐ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*

Restoration practices for each lake would be determined during this initial feasibility study. Techniques for consideration would include all or some combination of the following: dam/impoundment structural modifications, sediment removal, removal of exotic fish and vegetation species, fish and wildlife habitat enhancements, aesthetic and recreational opportunities, shoreline restoration/stabilization, riparian buffer modifications/conversion to green infrastructure and installation of additional storm water management strategies to control runoff from adjacent areas.

Timetable: As the remaining lakes and impoundments are prioritized, it is anticipated that lake restoration projects would occur over the next decade as funding permits.

Funding Estimate: To be determined based on feasibility study.

Potential Stakeholders: RRAC, Wayne and Oakland counties, ARC, FOTR and other local groups and stakeholders.

Indicators and Monitoring: Project-specific monitoring would include documenting fish populations both before and after restoration, and documenting changes in water quality and enhancements in native riparian habitat.

Public Involvement: The RRAC committee structure would be utilized to promote public involvement activities. At the same time, the project design process would include significant permitting that would entail a public involvement/comment period. Promotion could also be considered through the ARC committee structure with press releases and other communication documents.

15) Rouge River Clean Up/Rouge Rescue

Description: With promotional and logistical support from FOTR, the Rouge AOC communities have been implementing an annual volunteer clean up event for over 25 years. This event is highly visible and is credited with launching the Rouge River restoration efforts back in the mid 1980s. As the conditions in the river have improved and the awareness of what activities are most helpful to its restoration have increased, the activities implemented on Rouge Rescue day have evolved from log jam and trash removal to green infrastructure restoration projects and river celebration events. The RRAC applauds the FOTR for this long-standing program and appreciates and encourages each of the ARC communities to continue their participation indefinitely. The RRAC also urges the MDEQ and the local Rouge River Watershed communities to recognize and help financially sustain this activity as a priority project of the delisting strategy for the Rouge River AOC.

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☒ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☒ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☒ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*

Timetable: 2011-2050

Funding Estimate: \$100,000/year

Potential Stakeholders: FOTR, ARC, Oakland and Wayne counties, local communities and stakeholder groups.

Indicators and Monitoring: Number of sites, number of volunteers, variety of projects. Over the long term, the improvement in the progress evaluation environmental indicator parameters of benthic communities, geomorphology and increase in percentage of green infrastructure land cover.



Evaluation Process based on Indicators: Long-term the improvement in the progress evaluation environmental indicator parameters of benthic communities, geomorphology and increase in percentage of green infrastructure land cover.

Public Involvement: Existing volunteer involvement activities of FOTR , Wayne County and the local communities. The RGC signage, newsletter articles and/or brochures will also aid in this effort. The ARC committee structure and programs will also be used to plan and implement the public involvement elements of the project.

16) Environmental Indicator Monitoring Assessment

Description: With financial support from grants and the ARC, FOTR, Wayne County and the ARC have established a framework for monitoring the progress of Rouge River Watershed restoration efforts. The monitoring program is designed to monitor the biological, physical and ecological integrity of the Rouge River watershed based on the watershed management needs. The purpose of the monitoring program is to characterize river and ecosystem health trends, identify problem areas to be addressed, provide information for watershed planning, document progress toward achieving restoration goals and encourage public involvement and stewardship. Implementation of the program occurs through both professional staff planning and monitoring as well as with citizen volunteers. The major physical and biological indicators involved including benthos, amphibians, land cover, geomorphology, flow, dissolved oxygen and bacteria. The RRAC applauds the ARC, FOTR and Wayne County for establishing this framework and urges the MDEQ to recognize and help financially sustain this activity as a priority activity/project of the delisting strategy for the Rouge River Area of Concern.

Timetable: 2011-2050

Funding Estimate: \$100,000/year

Potential Stakeholders: FOTR, the ARC, Oakland and Wayne counties, local communities, local stakeholder groups.

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☐ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☐ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☐ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*



Indicators and Monitoring: Number of sites, number of volunteers, variety of projects. Long-term the improvement in the progress evaluation environmental indicator parameters of benthic communities, geomorphology and increase in percentage of green infrastructure land cover.

Evaluation Process based on Indicators: Long-term the improvement in the progress evaluation environmental indicator parameters of benthic communities, geomorphology and increase in percentage of green infrastructure land cover.

Public Involvement: Existing volunteer involvement activities of FOTR, Wayne County and the local communities. The RGC signage, newsletter articles and/or brochures will also aid in this effort. The ARC committee structure and programs will also be used to plan and implement the public involvement elements of the project.

17) Sustainable Watershed Management Funding

Description: The Rouge Project has been matching federal grant dollars with local community ARC membership dues to help continue restoration and compliance activities leading to the eventual restoration and delisting of the Rouge River AOC. Federal funding through the Rouge Project is nearly exhausted and financial resources generated only from ARC membership dues will result in significant reductions in the collaborative IDEP, PEP, progress evaluation, planning and reporting that have been established and ongoing. If a project sponsor can be found and funding secured, this project would result in a local institution of higher learning conducting a comprehensive assessment of options and opportunities for creating new and/or utilizing existing fee structures to enable the ARC members to sustain and, ideally, expand the collaborative programs underway in the Rouge River AOC. Results of the assessment would be shared with a broad public stakeholder audience, comprehensive recommendations would be developed and a public relations/outreach campaign designed to pursue implementation of the recommendations.

Addressed Beneficial Use Impairments

- ☐ *Restrictions on fish and wildlife consumption*
- ☒ *Eutrophication or undesirable algae*
- ☒ *Degradation of fish and wildlife populations*
- ☒ *Beach closings*
- ☐ *Fish tumors or other deformities*
- ☒ *Degradation of aesthetics*
- ☒ *Degradation of benthos*
- ☐ *Restriction on dredging activities*
- ☒ *Loss of fish and wildlife habitat*

Timetable: 2011-2050

Funding Estimate: \$80,000

Potential Stakeholders: The RRAC will work with the local universities to find a sponsor for this project.

Indicators and Monitoring: Indicators of success will be reflected in the participation and involvement of AOC stakeholders.

Evaluation Process based on Indicators: NA

Public Involvement: Project sponsor will develop a public involvement and outreach strategy for implementing the project.

Appendix

Table 1: Project Master List

Activity/Project	Stakeholders	SubWatershed	Cost (if available)	Beneficial Use Impairment Addressed									Timeline (from WMP)	Priority (from WMP)
				Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degradation of benthos	Restrictions on dredging activities	Eutrophication or undesirable algae	Beach Closings	Degradation of aesthetics	Degradation of fish and wildlife populations	Loss of fish and wildlife habitat		
Wastewater Treatment System Improvements (WWTSI)														
SSO Corrective Action Plans & Permits		All							✓					
CSO Corrective Actions & Permits		All						✓	✓	✓	✓			
Colony Estates Subdivision Footing Drain disconnection (from sanitary)	Northville Twp	Middle 1	\$25,000						✓	✓	✓		Short	Low
Bloomfield Township Sewer and Water Improvements	Bloomfield Township		\$3,720,000					✓	✓	✓	✓			
Lathrup Village Sanitary Sewer Rehabilitation	Lathrup Village		\$2,344,000					✓	✓	✓	✓			
Collaborative IDEP Activities														
County-Based Complaint Response	ARC, Communities, Counties	All							✓					
Rouge Collaborative IDEP & Toxic Material Collections	ARC, Communities, Counties	All	1.2 Million	✓	✓	✓	✓		✓	✓	✓			
County-Based Advanced Investigations	ARC, Communities, Counties	All						✓	✓	✓	✓			
Staff Training	ARC, Communities, Counties	All												
Minimize Seepage from Sanitary Sewers	ARC, Communities, Counties	All							✓					
Minimize OSDS	ARC, Communities, Counties	All							✓					
Inspection of ARC Member Owned Facilities	ARC, Communities, Counties	All												

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Activity/Project	Stakeholders	SubWatershed	Cost (if available)	Beneficial Use Impairment Addressed										Timeline (from WMP)	Priority (from WMP)
				Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degradation of benthos	Restrictions on dredging activities	Eutrophication or undesirable algae	Beach Closings	Degradation of aesthetics	Degradation of fish and wildlife populations	Loss of fish and wildlife habitat			
Collaborative IDEP Activities (cont.)															
Visual Inspection During Routine Field Investigations	ARC, Communities, Counties	All													
Point of Storm Water Discharge - Dry Weather Survey	ARC, Communities, Counties	All													
Map of Storm Water Discharge Points to Waters of the State	ARC, Communities, Counties	All													
Unique Method to Evaluate IDEP Effectiveness	ARC, Communities, Counties	All													
IDEP Volunteer Training	ARC, Communities, Counties	All													
Collaborative PEP Activities															
Distribute pollution prevention literature (coordinated procurement)	ARC, Communities, Counties, Stewardship Groups	All													
Rouge Collaborative PEP & GI/LID Education Campaign	ARC, Communities, Counties	All	1.0 Million	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Coordinated Community Newsletter Articles & Ads (Graphics)	ARC, Communities, Counties, Stewardship Groups	All													
Displays - Events & Static	ARC, Communities, Counties, Stewardship Groups	All													
Environmental Hotline Promotion	ARC, Communities, Counties, Stewardship Groups	All													
Advertisements	ARC, Communities, Counties, Stewardship Groups	All													
Fertilizer Point of Sale	ARC, Communities, Counties, Stewardship Groups	All													

Table 1: Project Master List

Activity/Project	Stakeholders	SubWatershed	Cost (if available)	Beneficial Use Impairment Addressed									Timeline (from WMP)	Priority (from WMP)
				Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degradation of benthos	Restrictions on dredging activities	Eutrophication or undesirable algae	Beach Closings	Degradation of aesthetics	Degradation of fish and wildlife populations	Loss of fish and wildlife habitat		
Collaborative PEP Activities (cont.)														
Workshops & Projects - GZ Sites	ARC, Communities, Counties, Stewardship Groups	All												
Rain Barrel Sales	ARC, Communities, Counties, Stewardship Groups	All												
Green Schools Activities	ARC, Communities, Counties, Stewardship Groups	All												
Value of Trees Campaign	ARC, Communities, Counties, Stewardship Groups	All												
Technical Advisory Committees	ARC, Communities, Counties, Stewardship Groups	All												
River Day	ARC, Communities, Counties, Stewardship Groups	All												
Volunteer Monitoring - Benthics	ARC, Communities, Counties, Stewardship Groups	All				✓					✓	✓		
Volunteer Monitoring - Frog & Toad	ARC, Communities, Counties, Stewardship Groups	All									✓	✓		
System Labelling/Signage	ARC, Communities, Counties, Stewardship Groups	All												
ARC Public Involvement and Education Committee Coordination	ARC, Communities, Counties, Stewardship Groups	All												
SE Michigan Partners Coordination	ARC, Communities, Counties, Stewardship Groups	All												
Animal Waste Management	Communities, Counties, Stewardship Groups, Public/Private Stakeholders	Overall	\$500 - \$15,000						✓	✓			Short	Medium / High

Table 1: Project Master List

Activity/Project	Stakeholders	SubWatershed	Cost (if available)	Beneficial Use Impairment Addressed									Timeline (from WMP)	Priority (from WMP)
				Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degradation of benthos	Restrictions on dredging activities	Eutrophication or undesirable algae	Beach Closings	Degradation of aesthetics	Degradation of fish and wildlife populations	Loss of fish and wildlife habitat		
PEP - Animal Waste Management														
Provide pet-waste bags, trash cans and educational signage regarding proper disposal.	Rouge Green Corridor								✓	✓				
PEP - Rain Barrel Programs														
Rain barrel program for local businesses located within the historic lakefront district and possibly promote it for homeowners. Probably 50 to 100 rain barrels would be needed.	Walled Lake	Middle 1	\$5,000 - \$10,000			✓		✓	✓	✓	✓	✓	Short	High
Develop downspout disconnection programs/rain barrel use	Rouge Green Corridor					✓		✓	✓	✓	✓	✓		
Green Infrastructure/Low Impact Development Retrofit Projects & Activities (GI/LID)														
Green infrastructure assessment/visioning and implementation to address volume storage.	ARC, Communities, Counties, Stewardship Groups	Overall	\$5,000-5 Million			✓				✓	✓	✓	Short	High
Green Infrastructure Implementation Projects	ARC, Communities, Counties	All	50 Million	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Pervious pavement installation (Riley Park parking lot, E. V. Mercer Beach parking area, possibly city-owned road in subdivisions, and sidewalks in the historic lakefront district)	Walled Lake	Middle 1	\$5,000-\$50,000							✓	✓		Long	Medium
Lower Rouge DOE, Road & Park Maintenance Yard Impervious & GI Assessments and Capital Improvement Recommendations	Wayne County	Lower 2	\$10,000							✓	✓		Short	High
DOE LID/LEED Offices – Green Roof, Pervious Pavement & Green Infrastructure Demonstration Facility	Wayne County	Lower 2	\$1,000,000			✓				✓	✓	✓	Mid	High
Wayne County Main 3/4 Rouge DOE, Road & Park Maintenance Yard Impervious & GI Assessments and Capital Improvement Recommendations	Wayne County	Main 3-4	\$10,000			✓				✓	✓	✓	Short	High
Implement Green Streets projects via construction of green infrastructure along roadways and parking lots.	City of Detroit	Main 3-4	\$30 Million			✓				✓	✓	✓	Mid	High
Increase tree canopy along roadways, municipal properties and open spaces.	City of Detroit	Main 3-4	\$15 Million			✓				✓	✓	✓	Short	High

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Activity/Project	Stakeholders	SubWatershed	Cost (if available)	Beneficial Use Impairment Addressed									Timeline (from WMP)	Priority (from WMP)
				Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degradation of benthos	Restrictions on dredging activities	Eutrophication or undesirable algae	Beach Closings	Degradation of aesthetics	Degradation of fish and wildlife populations	Loss of fish and wildlife habitat		
Green Infrastructure/Low Impact Development Retrofit Projects & Activities (GI/LID) (cont.)														
Implement downspout disconnection in Residential, Commercial and Industrial areas and replace with green infrastructure techniques where feasible.	City of Detroit	Main 3-4	\$10 Million			✓				✓	✓	✓	Mid	High
Middle Rouge Road & Park Maintenance Yard GI and Impervious Reduction Retrofits	Wayne County	Middle 1	\$1,000,000			✓				✓	✓	✓	Long	Medium
Storm Water Retrofit Analysis	ARC, Communities, Counties	Overall	\$200,000						✓				Short	Medium
Storm Water Retrofit Practices	Communities, Counties	Overall	\$5,000 - \$500,000						✓				Mid	Medium
Community Park Storm Water Enhancements (Pervious Pavement, Grow Zones, Tree Planting, etc.)	Northville Twp	Middle 1	\$250,000			✓		✓	✓	✓	✓	✓	Short	High
Millennium Park Storm Water Enhancements (Grow Zones, Detention Pond Retrofit, etc.)	Northville Twp	Middle 1	\$200,000			✓		✓	✓	✓	✓	✓	Mid	High
Dept of Public Works Storm Water Enhancements (Rain Gardens, Green Roof, Grow Zones, Pervious Pavement, etc.)	Northville Twp	Middle 1	\$300,000			✓		✓	✓	✓	✓	✓	Mid	High
Ridge Pond Grow Zone	Northville Township	Middle 1	\$35,000			✓		✓		✓	✓	✓	Mid	Hlgh
City Hall Grow Zone	Northville Township	Middle 1	\$50,000			✓		✓		✓	✓	✓	Long	High
Thayer's Corner Habitat Enhancement (Grow Zones, Native Plantings, Rain Gardens, Pervious Pavement, etc.)	Northville Twp	Middle 1	\$300,000			✓		✓	✓	✓	✓	✓	Long	Medium
Rain garden/bioretenention implementation on public property (E. V. Mercer Beach parking area and possibly at Veterans' Memorial at S. Pontiac Trail and W. Walled Lake Drive, in curbed area along W. Walled Lake Drive, and in Riley Park.	Walled Lake	Middle 1	\$5,000-\$25,000			✓		✓	✓	✓	✓	✓	Short	High

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Green Infrastructure/Low Impact Development Retrofit Projects & Activities (GI/LID) (cont.)														
Rouge Green Corridor Networking/Initiative	Communities, Counties, Stewardship Groups, Public/Private Stakeholders	Overall	\$250,000										Long	Medium
Storm water implementation projects (rain gardens, tree planting, pervious pavement, grow zones, etc.) at Riley Park	Walled Lake	Middle 1	\$5,000-\$100,000			✓		✓	✓	✓	✓	✓	Short	High
Rain garden/bioretention implementation in residential neighborhoods (Virginia Park Subdivision, Jenny Park Subdivision, Philipskis Walled Lake Subdivision, Hillcroft Subdivision, Clutz Lakeview Subdivision, and Welfare Lakeview Subdivision)	Walled Lake	Middle 1	\$2,000-\$25,000			✓		✓	✓	✓	✓	✓	Long	Medium
Middle Rouge Grow Zones, Tree Planting and Signage	Wayne County	Middle 1	\$100,000			✓		✓		✓	✓	✓	Short	High
Middle Rouge Road & Park Maintenance Yard Impervious & GI Assessments and Capital Improvement Recommendations	Wayne County	Middle 1	\$10,000							✓	✓	✓	Mid	High
Middle Rouge Road & Park Maintenance Yard GI and Impervious Reduction Retrofits	Wayne County	Middle 1	\$1,000,000			✓		✓		✓	✓	✓	Long	Medium
City Hall Storm Water Enhancements	Dearborn Heights, Wayne County, Non-profit Groups	Middle 3	\$80,000						✓	✓	✓	✓	Short	High
Canfield Recreation Center Storm Water Enhancements	Dearborn Heights, Wayne County, Non-profit Groups	Main 3-4, Lower 2, Middle 3	\$100,000						✓	✓	✓	✓	Short	High
Middle Rouge DOE, Road & Park Maintenance Yard Impervious & GI Assessments and Capital Improvement Recommendations	Wayne County	Middle 3	\$10,000										Mid	High
Grow Zone Implementation at Barchester Park, Griffin Park, Freedom Park, Heritage Park & Patriot Park.	Canton Township	Lower 1	\$3,000 - \$80,000			✓		✓		✓	✓	✓	Short	High
Wayne County Lower Rouge Parkway Grow Zones and Signage	Wayne County	Lower 1	\$100,000			✓		✓		✓	✓	✓	Short	Hlgh

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Green Infrastructure/Low Impact Development Retrofit Projects & Activities (GI/LID) (cont.)														
Municipal Parking Lot No. 1 (Michigan Ave & Wayne Rd) storm water improvements.	City of Wayne	Lower 2	\$1.5 Million					✓		✓	✓		Short	Medium
Lower Rouge Grow Zones, Tree Planting and Signage	Wayne County	Lower 2	\$100,000			✓		✓		✓	✓	✓	Short	High
Lower Rouge Road & Park Maintenance Yard GI and Impervious Reduction Retrofits	Wayne County	Lower 2	\$1,000,000			✓		✓	✓	✓	✓	✓	Long	Medium
Shiawassee Park Storm Water Improvements (rain gardens/bioretenation)	City of Farmington	Upper	\$30,000			✓		✓		✓	✓	✓	Short	High
Complete City-wide BMP analysis.	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$150,000										Short	High
Update Storm Drainage Master Plan and incorporate BMP solutions.	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$250,000										Short	High
City Hall Storm Water Enhancement Project (i.e. porous pavement, green roofs, cisterns, bioswales, public education, etc.)	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$500,000			✓		✓	✓	✓	✓	✓	Short	High
Native vegetation demonstration areas on City-owned properties, including Natural Beauty roads, fire stations and City projects.	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$25,000			✓				✓	✓	✓	Short	High
Porous pavement installation at City facilities (i.e. Costick Center, Ice Arena, Founders Sports Park, City Hall, DPW, Fire Stations, etc.)	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$2 Million			✓		✓	✓	✓	✓	✓	Short	High
Public and private storm water enhancements on various land uses (i.e. grow zones, riparian buffers, rain gardens, etc.).	City of Farmington Hills, Private Stakeholders	Middle 1, Upper, Main 1-2	\$300,000			✓		✓	✓	✓	✓	✓	Short	High
Grow zone implementation on City-owned property that are currently turf grass or other non-native plants and covered by impervious surfaces.	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$250,000			✓		✓	✓	✓	✓	✓	Short	High
City of Farmington Hills storm water enhancements on commercial property owners in Community Development Block Grant.	City of Farmington Hills, Private Stakeholders	Middle 1, Upper, Main 1-2	\$1 Million					✓	✓	✓	✓	✓	Short	Medium

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Green Infrastructure/Low Impact Development Retrofit Projects & Activities (GI/LID) (cont.)														
Regional storm water facilities in southeast section of City.	City of Farmington Hills	Main 1-2	\$500,000					✓	✓	✓	✓	✓	Mid	High
Implementation of City-wide BMP analysis.	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$3 Million					✓	✓	✓	✓	✓	Mid	High
Orchard Lake Road Corridor Storm Water Enhancement Projects.	City of Farmington Hills	Main 1-2	\$250,000					✓	✓	✓	✓	✓	Long	Medium
Rain Garden Installation and Municipal Offices	Redford Township	Upper	\$50,000			✓		✓	✓	✓	✓	✓	Short	High
Beverly Elementary School Rain Garden	Beverly Hills, School System, Private Stakeholders, SOCWA	Main 1-2	\$30,000			✓		✓	✓	✓	✓	✓	Short	High
Identify opportunities to redirect storm water into enhancement areas.	Birmingham	Main 1-2	\$35,000										Mid	Medium
Bioswale implementation Bloomfield Hills right-of-way, on the south side of Long Lake Road, off of Barden Road, west of Woodward	Bloomfield Hills	Main 1-2	\$70,000			✓		✓	✓	✓	✓	✓	Short	High
Birmingham Country Club Grow Zone	Bloomfield Township, Birmingham Country Club	Main 1-2	\$35,000			✓		✓	✓	✓	✓	✓	Short	High
Franklin Historical Museum and Village Wide Storm Water & Ecological Enhancements	Franklin Historical Museum, Franklin, Private Stakeholders	Main 1-2	\$50,000			✓		✓	✓	✓	✓	✓	Short	High
Franklin Community Rain Garden Installation	Franklin, Private Stakeholders	Main 1-2	\$80,000			✓		✓	✓	✓	✓	✓	Long	High
Lathrup Village Rain Garden Installation and Education	Lathrup Village, SOCWA, Private Stakeholders	Main 1-2	\$20,000			✓		✓	✓	✓	✓	✓	Short	High
Southfield Adler School Rain Garden	Southfield, Alder School, SOCWA	Main 1-2	\$15,000			✓		✓	✓	✓	✓	✓	Short	High

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Green Infrastructure/Low Impact Development Retrofit Projects & Activities (GI/LID) (cont.)														
Implement native vegetative buffer along river at Beech Woods Park Golf Course	Southfield	Main 1-2	\$50,000			✓		✓	✓	✓	✓	✓	Short	High
Restore area near Bridge Street to mesic wet meadow at Valley Woods Nature Preserve South	Southfield, SRRLC	Main 1-2	\$25,000			✓		✓	✓	✓	✓	✓	Short	High
Beech Woods Storm Water Enhancement & Greening Project	City of Southfield	Main 1-2	\$2 Million			✓		✓	✓	✓	✓	✓	Short	High
Storm Water Enhancements on public and private property (i.e. porous pavements, green roofs, cisterns, bioswales, grow zones, rain gardens, tree planting, etc.).	City of Southfield, Private Stakeholders, Corporate Stakeholders, Stewardship Groups	Main 1-2	\$2 Million			✓		✓	✓	✓	✓	✓	Short	High
Washington Heights Drainage Improvements – regional storage or onsite BMPs.	City of Southfield, Private Stakeholders	Main 1-2	\$3 Million					✓	✓	✓	✓	✓	Short	High
Holy Sepulchre Storm Water Retention Project – lake improvements to alleviate flooding and erosion downstream.	City of Southfield	Main 1-2	\$2 Million			✓		✓	✓	✓	✓	✓	Long	Medium
Bioretention along Parking Lot- LID implementation on Lawrence Tech	Lawrence Tech University	Main 1-2	\$80,000					✓	✓	✓	✓	✓	Long	High
West Bloomfield Township private storm water enhancements (i.e. rain gardens, grow zones, etc.)	West Bloomfield Township, Private Stakeholders	Main 1-2	Various			✓		✓	✓	✓	✓	✓	Long	High
Wayne County Main 3/4 Rouge Grow Zones, Tree Planting and Signage	Wayne County	Main 3-4	\$100,000			✓		✓	✓	✓	✓	✓	Short	High
Wayne County Main 3/4 Rouge DOE, Road & Park Maintenance Yard GI and Impervious Reduction Retrofits	Wayne County	Main 3-4	\$1,000,000					✓	✓	✓	✓	✓	Long	Medium
Michigan Avenue /Evergreen Road storm water treatment and habitat restoration. (USACE –Rouge River 905(B), 2003)	Wayne County, ARC, USACE, Rouge Gateway Partnership Members, other local communities and groups.	Main 3-4	2.5 Million			✓		✓	✓	✓	✓	✓	Long	High
Basin Naturalization and Retrofitting of Basins listed in the Rouge Main 1-2 Subwatershed Detention Basin Inventory Study-	Communities, Oakland County	Main 1-2						✓	✓	✓	✓	✓		

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Green Infrastructure/Low Impact Development Retrofit Projects & Activities (GI/LID) (cont.)															
Identify where direct connections and outfalls can be daylighted	Beverly Hills, Birminham, Southfield	Main 1-2													
Tree canopy enhancement program.	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$500,000			✓		✓		✓	✓	✓	Short	High	
Conservation Easement at Sisters of Mercy Property	Farmington Hills	Main 1-2	\$50,000					✓			✓	✓	Short	High	
Lathrup Village Tree Planting	Lathrup Village, Private Stakeholders, Non-Profits	Main 1-2	\$10,000			✓		✓		✓	✓	✓	Short	Hlgh	
Purchase Berberian Property to preserve natural habitat and rare plant species.	City Southfield, Private Stakeholders, Corporate	Main 1-2				✓		✓		✓	✓	✓	Short	High	
Tree canopy enhancement program.	City of Southfield	Main 1-2	\$500,000								✓	✓	Short	Hlgh	
Rouge Park Master Plan & Implementation Activities	City of Detroit Recreation Dept, Friends of Rouge Park	Main 3-4	\$100,000								✓	✓			
Rouge Park Natural Areas Management	City of Detroit Recreation Dept, Friends of Rouge Park	Main 3-4	\$200,000										Short	High	
Demolish and remove vacant structures and replace with pervious land cover.	City of Detroit	Main 3-4	\$84 Million								✓	✓	Short / Long	Hlgh	
Develop and implement woodland protection ordinances in Birmingham and Beverly Hills	Birminham, Beverly Hills	Main 1-2													
GI/LID - Detention and Retention Basin Mainteneance and Retrofits															
C&O Basin Storm Water Enhancements (Water Quality Improvements, Habitat Enhancements, Native Plant Buffer)	City of Novi	Middle 1	\$300,000			✓		✓	✓	✓	✓	✓	Short	High	
Cedar Springs Basin Storm Water Enhancements (Water Quality Improvements, Habitat Enhancements, Native Plant Buffer	City of Novi	Middle 1	\$100,000			✓		✓	✓	✓	✓	✓	Short	High	

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GI/LID - Detention and Retention Basin Maintenance and Retrofits (cont.)														
Civic Center Basin Storm Water Enhancements (Water Quality Improvements, Habitat Enhancements, Native Plant Buffer)	City of Novi	Middle 1	\$160,000			✓		✓	✓	✓	✓	✓	Mid	Medium
Meadowbrook Glens Basin Storm Water Enhancements (Water Quality Improvements, Habitat Enhancements, Native Plant Buffer)	City of Novi	Middle 1	\$100,000			✓		✓	✓	✓	✓	✓	Mid	Medium
Ingersol Basin Storm Water Enhancements (Water Quality Improvements, Habitat Enhancements, Native Plant Buffer)	City of Novi, MDOT	Middle 1	\$15,000			✓		✓	✓	✓	✓	✓	Mid	Medium
Jamestown Green Basin Storm Water Enhancements (Water Quality Improvements, Habitat Enhancements, Native Plant Buffer)	City of Novi	Middle 1	\$70,000			✓		✓	✓	✓	✓	✓	Mid	Medium
Leavenworth Basin Storm Water Enhancements (Water Quality Improvements, Habitat Enhancements, Native Plant Buffer)	City of Novi	Middle 1	\$100,000			✓		✓	✓	✓	✓	✓	Long	Low
Lexington Green Basin Storm Water Enhancements (Water Quality Improvements, Habitat Enhancements, Native Plant Buffer)	City of Novi	Middle 1	\$40,000			✓		✓	✓	✓	✓	✓	Long	Low
Thornton Basin Storm Water Enhancements (Water Quality Improvements, Habitat Enhancements, Native Plant Buffer)	City of Novi	Middle 1	\$140,000			✓		✓	✓	✓	✓	✓	Long	Low
East Bay Village Condominiums Detention Basin Enhancements	Walled Lake, Private Stakeholders	Middle 1	\$50,000			✓		✓	✓	✓	✓	✓	Mid	Medium
Public and private Detention Basin Storm Water Enhancements (i.e. Founders Sport Park, Cass Road, Farmington Hills Golf Club, Fire Stations, etc.)	City of Farmington Hills, Private Stakeholders	Middle 1, Upper, Main 1-2	\$1 Million			✓		✓	✓	✓	✓	✓	Short	High
West Bell Branch Regional Storm Water Storage Basins from <i>City of Livonia Storm Water Management Plan</i>	City of Livonia	Upper	\$700,000			✓		✓	✓	✓	✓	✓	Mid	High
Whispering Willows Regional Storm Water Storage Basins from <i>City of Livonia Storm Water Management Plan</i>	City of Livonia	Upper	\$400,000			✓		✓	✓	✓	✓	✓	Mid	Medium
Shamrock Village Retention Basin Retrofit	Redford Township	Upper	\$120,000			✓		✓	✓	✓	✓	✓	Long	Low

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GI/LID - Detention and Retention Basin Maintenance and Retrofits (cont.)														
Riparian & Upland Management	Communities, Counties, Stewardship Groups, Public/Private Stakeholders	Overall	\$3,000 - \$50,000			✓		✓		✓	✓	✓	Short	High
Acquisition of riparian lands, develop trails, connecting pathways and other City-owned properties.	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$2 Million			✓		✓		✓	✓	✓	Long	Medium
MDOT Tamarack Basin Storm Water Enhancements	City of Southfield, MDOT, Private Stakeholders	Main 1-2	\$2-\$4 Million			✓		✓	✓	✓	✓	✓	Short	High
City of Southfield Detention Ponds Storm Water Enhancements	City of Southfield, Private Stakeholders	Main 1-2	\$5 Million			✓		✓	✓	✓	✓	✓	Short	High
GI/LID - Stream and Streambank Repair & Protection														
Stream Repair & Protection	Communities, Counties, Stewardship Groups	Overall	\$3,000 – 2 Million							✓	✓	✓	Long	Low / Medium
Brookfarm Park Streambank Stabilization	City of Novi	Middle 1	\$115,000			✓		✓		✓	✓	✓	Long	Low
Rotary Park Streambank Stabilization	City of Novi	Middle 1	\$165,000			✓		✓		✓	✓	✓	Long	Low
Ford Field Streambank Stabilization	City of Dearborn	Lower 2	\$80,000			✓		✓		✓	✓	✓	Long	Low
Implementation of restoration activities based on City of Wayne stream bank erosion inventory.	City of Wayne	Lower 2	\$15,000 - \$500,000			✓		✓		✓	✓	✓	Long	Low
Public and private riparian property improvements (i.e. erosion control, natural vegetation, etc.)	City of Farmington Hills, Private Stakeholders	Middle 1, Upper, Main 1-2	\$500,000			✓		✓		✓	✓	✓	Mid	Medium
Minnow Pond Drain (Farmington Rd)- Farmington Hills Streambank Erosion Inventory	Farmington Hills	Upper	\$15,000										Long	Low
Seeley Drain – 620’ (Halsted Rd)- Farmington Hills Streambank Erosion Inventory - Sediment removal and streambank stabilization	Farmington Hills	Upper	\$500,000										Long	Low

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GI/LID - Stream and Streambank Repair & Protection (cont.)														
Bell Branch @ 5 Mile & Levan - Stream Bank Stabilization from <i>City of Livonia Storm Water Management Plan</i>	City of Livonia	Upper	\$110,000			✓		✓		✓	✓	✓	Long	Low
Bell Creek near Bell Creek Court	City of Livonia	Upper	\$531,000			✓		✓		✓	✓	✓		
5 Mile Road and Levan Road	City of Livonia	Upper	\$450,000			✓		✓		✓	✓	✓		
I-275 and Hix Road	MDOT, Livonia	Lower 1	\$1,100,000			✓		✓		✓	✓	✓		
Tarabusi Creek and North Bell Branch Intersection	City of Livonia	Upper	\$900,000			✓		✓		✓	✓	✓		
Tarabusi Creek South of 8 Mile - Stream Bank Stabilization from <i>City of Livonia Storm Water Management Plan</i>	City of Livonia	Upper	\$2.1 Million			✓		✓		✓	✓	✓	Long	Low
Booth Park Streambank Stabilization Project & Floodplain Enhancements	Birmingham	Main 1-2	\$600,000			✓		✓		✓	✓	✓	Long	Medium
Tributary to Rouge River Site # 20825 Streambank Erosion	Bingham Farms	Main 1-2	\$5,000			✓		✓		✓	✓	✓	Medium	Low
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 10649-10652 Evans Drain	City of Southfield	Main 1-2	\$165,000			✓		✓		✓	✓	✓		
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 20154 Rouge River, Troy	City of Troy	Main 1-2	\$10,000			✓		✓		✓	✓	✓	Medium	Low
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 20156 Rouge River, Troy	City of Troy	Main 1-2	\$1,500			✓		✓		✓	✓	✓		
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 20562 Rouge River, Troy	Farmington Hills	Main 1-2	\$13,000			✓		✓		✓	✓	✓		

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GI/LID - Stream and Streambank Repair & Protection (cont.)														
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 20774 Main Ravines Drain, Farmington Hills	Farmington Hills	Main 1-2	\$12,000			✓		✓		✓	✓	✓		
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 20776 Main Ravines Drain, Farmington Hills	Farmington Hills	Main 1-2	\$11,000			✓		✓		✓	✓	✓		
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 20825 Unnamed Tributary, Bingham Farms	Bingham Farms	Main 1-2	\$1,200			✓		✓		✓	✓	✓		
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 20893 Unnamed Tributary, Southfield	Southfield	Main 1-2	\$143,000			✓		✓		✓	✓	✓		
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 21051 Pebble Creek, Southfield	Southfield	Main 1-2	\$18,000			✓		✓		✓	✓	✓		
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 21112 Farmington Branch, Southfield	Southfield	Main 1-2	\$18,000			✓		✓		✓	✓	✓		
Rouge Main 1-2 Streambank Erosion Inventory Report Site No. 21159 Rouge River, Southfield	Southfield	Main 1-2	\$29,000			✓		✓		✓	✓	✓		
Upper River Rouge Stream Bank Erosion Inventory Report SiteNo. 5158- Upstream of Farmington Road Crossing Minnow Pond Drain, Farmington Hills	Farmington Hills	Upper	\$3,327			✓		✓		✓	✓	✓		
Streambank Erosion and Douglas Evans	Beverly Hills	Main 1-2	\$100,000			✓		✓		✓	✓	✓		
City Wide Streambank Stabilization	Birmingham	Main 1-2	\$300,000			✓		✓		✓	✓	✓		
Upper River Rouge Stream Bank Erosion Inventory Report SiteNo. 5158- Downstream of Farmington Road Crossing Minnow Pond Drain, Farmington Hills	Farmington Hills	Upper	\$5,100			✓		✓		✓	✓	✓		
Upper River Rouge Stream Bank Erosion Inventory Report SiteNo. 5423 Seeley Drain, Farmington Hills	Farmington Hills	Upper	\$6,780			✓		✓		✓	✓	✓		

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GI/LID - Stream and Streambank Repair & Protection (cont.)														
Establish deep-rooted native plantings along river banks in the 13 Mile/Lahser river reach in Beverly Hills. Work with riparian land owners in this area.	Beverly Hills	Main 1-2				✓		✓		✓	✓	✓		
Expand upon Limno-Tech inventory to develop a RGC corridor-wide large woody debris management plan	Beverly Hills, Birmingham	Main 1-2												
Franklin Branch Streambank Stabilization	Bloomfield Township	Main 1-2	\$300,000			✓		✓		✓	✓	✓		
Continue to address high priority erosion identified in 2004 Limno-Tech and Franklin Branch Erosion inventories	Southfield	Main 1-2				✓		✓		✓	✓	✓		
Continue stream bank stabilization for high priority sites identified in the Franklin Branch Erosion Inventory.	Southfield	Main 1-2				✓		✓		✓	✓	✓		
10 Mile to Beech Road between 8 & 9 Mile roads. (Southfield): Stabilize eroding gullies and crumbling infrastructure. Enhance floodwater storage in former oxbows, meander channels and drained wetlands.	Southfield	Main 1-2				✓		✓		✓	✓	✓		
Stabilize eroding gullies and crumbling infrastructure. (Beech Woods Park)	Southfield	Main 1-2				✓		✓		✓	✓	✓		
Repair infrastructure and stabilize stream bank erosion at the 4th hole of the golf course. (Beech Woods Park)	Southfield	Main 1-2				✓		✓		✓	✓	✓		
Birmingham City Wide Woody Debris Management	Birmingham	Main 1-2	\$50,000			✓		✓		✓	✓	✓		
Graves Drain Sediment Removal and Streambank Stabilization	West Bloomfield Township	Main 1-2	\$400,000			✓		✓		✓	✓	✓		
GI/LID - Wetland and Floodplain Creation and Enhancement														
Woods of Edenderry Wetland Enhancement	Northville Twp	Middle 1	\$30,000			✓		✓	✓	✓	✓	✓	Short	Medium
Pheasant Run Golf Course wetland and floodplain creation, expansion, enhancement.	Canton Township	Lower 1	\$100,000-\$800,000			✓		✓	✓	✓	✓	✓	Long	Medium

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Activity/Project	Stakeholders	SubWatershed	Cost (if available)	Beneficial Use Impairment Addressed									Timeline (from WMP)	Priority (from WMP)
				Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degradation of benthos	Restrictions on dredging activities	Eutrophication or undesirable algae	Beach Closings	Degradation of aesthetics	Degradation of fish and wildlife populations	Loss of fish and wildlife habitat		
GI/LID - Wetland and Floodplain Creation and Enhancement (cont.)														
Evans Creek Constructed Wetland <i>LID</i> Implementation on Lawrence Tech	Lawrence Tech University & Southfield	Main 1-2	\$600,000			✓		✓	✓	✓	✓	✓	Short	High
Using MDEQ wetland/hydric soils maps restore 85 acres wetlands in Valley Woods Nature Preserve South	Southfield	Main 1-2	\$250,000			✓		✓	✓	✓	✓	✓	Mid	High
Tournament Players Golf Course storm water treatment and wetland restoration (USACE –Rouge River 905(B), 2003)	Wayne County, ARC, USACE, Rouge Gateway Partnership Members, other local communities and groups.	Main 3-4	5.5 Million			✓		✓	✓	✓	✓	✓		
Restore capacity of wetlands to store and detain storm water by removing or blocking existing culverts and shallow ditches and placing rock armored inlets within spoil banks and upstream and downstream ends of Valley Woods Nature Preserve at Civic Center	Southfield	Main 1-2				✓		✓	✓	✓	✓	✓		
Explore the potential for a conservation easement on the hillside owned by the DENSO Corporation to facilitate restoration and protection activities. (Valley Woods Nature Preserve)	Southfield	Main 1-2												
Identify areas out of play that could be used/restored as created wetlands for flood storage and water quality protection (Beech Woods Park)	Southfield	Main 1-2												
GI/LID - Invasive Species Removal Programs														
Invasive species removal program throughout City-owned properties (i.e. heritage Park, Woodland Hills Park, Memorial Park, Founders Sport Park, Farmington Hills Golf Club, etc.).	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$150,000								✓		Short	High
Invasive Species Removal in Riverside Park.	SRRLC, Beverly Hills	Main 1-2	\$30,000								✓		Short	Medium
Invasive Species Removal in Douglas Evans Nature Park Preserve	SRRLC, Beverly Hills	Main 1-2	\$30,000								✓		Short	Medium
Develop Invasive Species Management Programs	Beverly Hills, Birminham, Southfield	Main 1-2									✓			
Manage Invasive Species	Beverly Hills, Birminham, Southfield	Main 1-2									✓			

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GI/LID - Green Streets Projects															
Implement Driveway Closures and Consolidations Consistent with the Ford Road Access Mgt Plan (Canton Township) (8 driveway closures @ 1,000 SF = 8,000 SF)	MDOT, Canton Township, Canton DDA	Lower 1	\$300,000			✓					✓			Short	High
Ford/Lotz Road Intersection Improvements	MDOT, Canton Township, Canton DDA	Lower 1	\$350,000			✓					✓			Short	High
I-275 Northbound Off-Ramp to Ford Road Improvements	MDOT, Canton Township, Canton DDA	Lower 1	\$250,000			✓					✓			Short	High
Ford/Sheldon Roads- Add northbound through lane and an exclusive northbound right-turn lane on Sheldon Road	MDOT, Canton Township, Canton DDA	Lower 1	\$300,000			✓					✓			Short	High
Ford/Canton Center Roads- Add exclusive right-turn lane on Ford Road	MDOT, Canton Township, Canton DDA	Lower 1	\$150,000			✓					✓			Short	High
Ford/Beck Roads- Add eastbound and westbound through lanes on Ford Road	MDOT, Canton Township, Canton DDA	Middle 1	\$2 million			✓					✓			Mid	High
Ford/Haggerty Roads- Provide exclusive right-turn lanes in each direction on Ford Road. Convert continuous right-turn lane into shared and through lane in WB direction. Add new through lane in EB direction (halfway to Lilley to I-275)	MDOT, Canton Township, Canton DDA	Lower 1	\$1 million			✓					✓			Mid	High
Provide exclusive right-turn lanes in each direction on Ford Road. Extend continuous right-turn lane into shared/through lane to west of Lilley in WB direction. Add new through lane in EB direction (west of Lilley to halfway to Haggerty)	MDOT, Canton Township, Canton DDA	Lower 1	\$1 million			✓					✓			Mid	High
Implement Boulevard Recommendations with Green Infrastructure Design on Ford Road between I-275 and Lilley Road	MDOT, Canton Township, Canton DDA	Lower 1	\$3 million			✓				✓	✓			Mid	High
Implement Driveway Closures and Consolidations Consistent with the Ford Road Access Mgt Plan (Canton Township) (8 driveway closures @ 1,000 SF = 8,000 SF)	MDOT, Canton Township, Canton DDA	Lower 1	\$300,000											Short	High
Implement Driveway Closures and Consolidations Consistent with the Ford Road Access Mgt Plan (Westland, Garden City, Dearborn, Dearborn Heights) (30 driveway closures @ 44,000 SF of Impervious Surface)	MDOT, Westland, Garden City, Dearborn, Dearborn Heights	Middle 3, Lower 2	\$500,000											Short	High

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Fish Passage & Habitat - Dam Modification, Improvements and Removal														
Meadowbrook Lake Dam Improvements (Peak flow attenuations and downstream protection)	City of Novi	Middle 1	\$350,000							✓	✓	✓	Short	High
Wayne Rd Dam Modification	Wayne County, FOTR, Communities	Lower 2	\$3 Million								✓	✓	Mid	Medium
Danvers Pond dam removal and riparian restoration.	City of Farmington Hills	Main 1-2	\$500,000								✓	✓	Short	High
Henry Ford Estate Dam Modification for Fish Passage (USACE –Rouge River 905(B), 2003)	Wayne County, local communities, FOTR, ARC, U.S. Army Corps of Engineers (USACE)	Main 3-4	3 Million								✓	✓		
Quarton Dam Modification for Fish Passage	Birmingham	Main 1-2									✓	✓		
Maybury Fish Pond Dam Modification	Northville	Middle 1									✓	✓		
Lovett Dam Modification for Fish Passage	Bloomfield Hills	Main 1-2									✓	✓		
Franklin Drain Dam Removal	Birmingham	Main 1-2									✓	✓		
River Rouge Dam #1 Modification for Fish Passage	Bloomfield Hills	Main 1-2									✓	✓		
Franklin Drain Dam #3 Removal	Birmingham	Main 1-2									✓	✓		
Northbrook Gardners Dam Modification	Farmington Hills	Main 1-2									✓	✓		
Northfield Hills Dam Modification for Fish Passage	Troy	Main 1-2									✓	✓		

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Fish Passage & Habitat - Dam Modification, Improvements and Removal (cont.)														
San Marino Golf Club Dam Modification for Fish Passage	Farmington Hills	Middle 1									✓	✓		
San Marino Golf Club #2 Removal	Farmington Hills	Middle 1									✓	✓		
Woodcreek Hills Dam #2 Removal	Bloomfield Hills	Main 1-2									✓	✓		
Dunn-Rovin Golf Course Dam #2 Removal	Plymouth	Middle 1									✓	✓		
Outwood Sub Dam Removal	Bloomfield Hills	Main 1-2									✓	✓		
Fordson Island Habitat Restoration (USACE –Rouge River 905(B), 2003)	Wayne County, Marathon Ashland Petroleum, USACE, ARC and other local communities or groups	Main 3-4	1 Million			✓				✓	✓	✓	Long	High
Concrete Channel Modifications/Enhancements-For Habitat And Fish Populations (USACE, 2003)	Wayne County, ARC, USACE, Rouge Gateway Partnership Members, other local communities and groups.	Main 3-4	15 Million			✓		✓		✓	✓	✓	Long	High
Oakwood Commons Oxbow Restoration (USACE, 2003)	Wayne County, ARC, USACE, Rouge Gateway Partnership Members, other local communities and groups.	Main 3-4	20 Million			✓		✓		✓	✓	✓	Long	High
Rouge River Gateway Project (USACE, 2008)	Wayne County, ARC, USACE, Rouge Gateway Partnership Members, other local communities & groups	Main 3-4	5 Million			✓		✓		✓	✓	✓	Long	High
Rouge River Oxbow – Phase 3 (USACE, 2008) –Reconnect oxbow segment at The Henry Ford	Wayne County, ARC, USACE, Rouge Gateway Partnership Members, other local communities & groups	Main 3-4	6.8 Million			✓		✓		✓	✓	✓	Long	High
Newburgh Lake Floating Islands Project for Eutrophication mitigation and fish spawning	Wayne County, Middle Rouge Communities	Middle 3				✓		✓		✓	✓	✓		

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Fish Passage & Habitat - Dam Modification, Improvements and Removal (cont.)														
Nankin Impoundment Dredging for Fisheries Enhancement	Wayne County, Middle Rouge Communities	Middle 3				✓	✓	✓	✓	✓	✓			
Lower Rouge River WDM Management Project - Fisheries and Recreation	Wayne County, Lower Rouge Communities	Lower 1 & 2				✓				✓	✓	✓		
Collaborative Watershed Planning, Financing and Reporting														
General Facilitation	ARC	Overall												
Website maintenance	ARC	Overall												
Watershed Data maintenance	ARC	Overall												
Annual Report Development System & Sections	ARC	Overall												
Grant Writing	ARC	Overall												
Regional Relationships	All	Overall	Various										Short	Hlgh
Financial Programs	All	Overall	Various										Short	Medium / High
Ordinance Update	Communities, Counties	Overall	\$5,000-\$50,000										Short	Medium / High
Recreational Enhancement & Access	Communities, Counties, Stewardship Groups, Public/Private Stakeholders	Overall	\$5,000 – 5 Million										Mid	Medium

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Progress Evaluation Monitoring														
Planning & Reporting	ARC	Overall												
Physical Monitoring	ARC	Overall												
Biological Monitoring	ARC	Overall												
Water Quality/Chemistry Monitoring	ARC	Overall												
Public Education/Involvement	ARC	Overall												
Pollution Prevention/Restoration Projects	ARC	Overall												
Monitoring Activities (FOTR, RPO, Green Infrastructure & Impervious Mapping)	ARC	Overall	\$150,000										Short	High
Progress Evaluation Monitoring - MDNRE BUI Status														
Formally Assess Removal - Fish Consumption Advisory	MDNRE	All		✓										
Formally Assess Removal - Fish Deformities BUI	MDNRE	All			✓									
Formally Assess Removal - Restrictions on Dredging BUI	MDNRE	All					✓							
Assess Aesthetic BUI Removal Criteria	MDNRE	All								✓				
Rouge Fish Community Assessment	MDNRE	All												

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Other														
Great Lakes Legacy Act Projects	USEPA	Main 3-4				✓								
Rouge Green Corridor Land Acquisition Planning	ARC, Communities, Counties	All	1 Million			✓		✓		✓	✓	✓		
Rouge Green Corridor Maintenance Planning and Programs	ARC, Communities, Counties	All	200,000			✓		✓		✓	✓	✓		
Flow Monitoring at Lake Level Structures	ARC, Communities, Counties	All	\$270,000											
Lakes and Impoundments- Feasibility Studies and Restoration	ARC, Communities, Counties	Middle 1 and 3	30 Million						✓	✓	✓	✓		
Removal of Contaminated Sediments	USACE				✓	✓								
Rouge River Supplemental Watershed Study (USACE, 2008)	USACE, Communities, Counties	Overall	\$400,000										Short	Medium
Implementation of Turfgrass Stewardship Program on City-owned golf courses and parks.	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$150,000			✓		✓			✓		Short	High
Rouge River Clean-Up/ Rouge Rescue	ARC, Communities, Counties, Private Stakeholders, Stewardship Groups	All	\$100,000/annual			✓		✓		✓	✓	✓	Short	High
Educational workshops on lake friendly lawn care.	Walled Lake	Middle 1	\$5,000										Short	High
Hydroseeder for in-house erosion control and native seeding projects.	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$250,000										Short	High
Jet cleaning unit for storm sewer system sediment removal.	City of Farmington Hills	Middle 1, Upper, Main 1-2	\$200,000										Short	High

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Other (cont.)														
City Wide Bike Trail	Birmingham, Oakland County	Main 1-2	\$100,000										Short	Medium
Septic Program – low interest loan or funding for residents to connect to sanitary sewer when septic system fails.	City of Southfield	Main 1-2	\$2-\$4 Million										Short	High
Vacuum sweeper to maintain porous pavement and provide additional sediment removal.	City of Southfield	Main 1-2	\$150,000										Long	Medium
Carpenter Lake Nature Center and Program Development to include a 'green building' and public education.	City of Southfield	Main 1-2	\$2 Million										Long	High
Develop and enact a Fertilizer Ordinance to require or maximize the use of no-phosphorus fertilizers by commercial applicators.	ARC Communities	All												
Environmental Indicator Monitoring	ARC, Communities, Counties, FOTR	All				✓					✓	✓		
Sustainable Watershed Management Funding	ARC, Communities, Counties, FOTR, Universities	All				✓		✓	✓	✓	✓	✓		

Table 2: Priority Project List

	Activity/Project	Stakeholders	SubWatershed	Cost (if available)	Beneficial Use Impairment Addressed								
					Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degradation of benthos	Restrictions on dredging activities	Eutrophication or undesirable algae	Beach Closings	Degradation of aesthetics	Degradation of fish and wildlife populations	Loss of fish and wildlife habitat
1	Rouge Collaborative IDEP & Toxic Material Collections	ARC, Communities, Counties	All	1.2 Million	✓	✓	✓	✓		✓	✓	✓	
2	Rouge Collaborative PEP & GI/LID Education Campaign	ARC, Communities, Counties	All	1.0 Million	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Green Infrastructure Implementation Projects	ARC, Communities, Counties	All	50 Million	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	Michigan Avenue /Evergreen Road storm water treatment and habitat restoration. (USACE –Rouge River 905(B), 2003)	Wayne County, ARC, USACE, Rouge Gateway Partnership Members, other local communities and groups.	Main 3-4	2.5 Million			✓		✓	✓	✓	✓	✓
5	Wayne Rd Dam Modification	Wayne County, FOTR, Communities	Lower 2	\$3 Million								✓	✓
6	Henry Ford Estate Dam Modification for Fish Passage (USACE –Rouge River 905(B), 2003)	Wayne County, local communities, FOTR, ARC, U.S. Army Corps of Engineers (USACE)	Main 3-4	3 Million								✓	✓
7	Fordson Island Habitat Restoration (USACE –Rouge River 905(B), 2003)	Wayne County, Marathon Ashland Petroleum, USACE, ARC and other local communities or groups	Main 3-4	1 Million			✓				✓	✓	✓
8	Concrete Channel Modifications/Enhancements- For Habitat And Fish Populations (USACE, 2003)	Wayne County, ARC, USACE, Rouge Gateway Partnership Members, other local communities and groups.	Main 3-4	15 Million			✓		✓		✓	✓	✓
9	Oakwood Commons Oxbow Restoration (USACE, 2003)	Wayne County, ARC, USACE, Rouge Gateway Partnership Members, other local communities and groups.	Main 3-4	20 Million			✓		✓		✓	✓	✓
10	Rouge River Oxbow – Phase 3 (USACE, 2008) –Reconnect oxbow segment at The Henry Ford	Wayne County, ARC, USACE, Rouge Gateway Partnership Members, other local communities & groups	Main 3-4	6.8 Million			✓		✓		✓	✓	✓
11	Formally Assess Removal - Fish Consumption Advisory	MDNRE	All		✓								

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12	Formally Assess Removal - Fish Deformities BUI	MDNRE	All			✓							
13	Formally Assess Removal - Restrictions on Dredging BUI	MDNRE	All					✓					
14	Develop Aesthetic BUI Removal Criteria	MDNRE	All								✓		
15	Great Lakes Legacy Act Projects	USEPA	Main 3-4				✓						
16	Rouge Green Corridor Land Acquisition Planning	ARC, Communities, Counties	All	1 Million			✓		✓		✓	✓	✓
17	Rouge Green Corridor Maintenance Planning and Programs	ARC, Communities, Counties	All	200,000			✓		✓		✓	✓	✓
18	Lakes and Impoundments- Feasibility Studies and Restoration	ARC, Communities, Counties	Middle 1 and 3	30 Million						✓	✓	✓	✓
19	Rouge River Clean-Up/ Rouge Rescue	ARC, Communities, Counties, Private Stakeholders, Stewardship Groups	All	\$100,000/annual			✓		✓		✓	✓	✓
20	Environmental Indicator Monitoring	ARC, Communities, Counties, FOTR	All				✓					✓	✓
21	Sustainable Watershed Management Funding	ARC, Communities, Counties, FOTR, Universities	All				✓		✓	✓	✓	✓	✓