UPPER ROUGE DELISTING STRATEGY



Alliance of Rouge Communities

OURS TO PROTECT

Working together, restoring the river

ROUGE RIVER RAP

REMEDIAL ACTION PLAN

May 2012

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ACKNOWLEDGMENTS

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

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. In 2011 the ARC and RRAC partnership again received funding through the Great Lakes Commission to complete the work started in 2010 on current Rouge River BUIs and Rouge AOC delisting strategies as well as prepare a similar effort at the subwatershed scale.

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 within the Upper Branch of the Rouge River.

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:

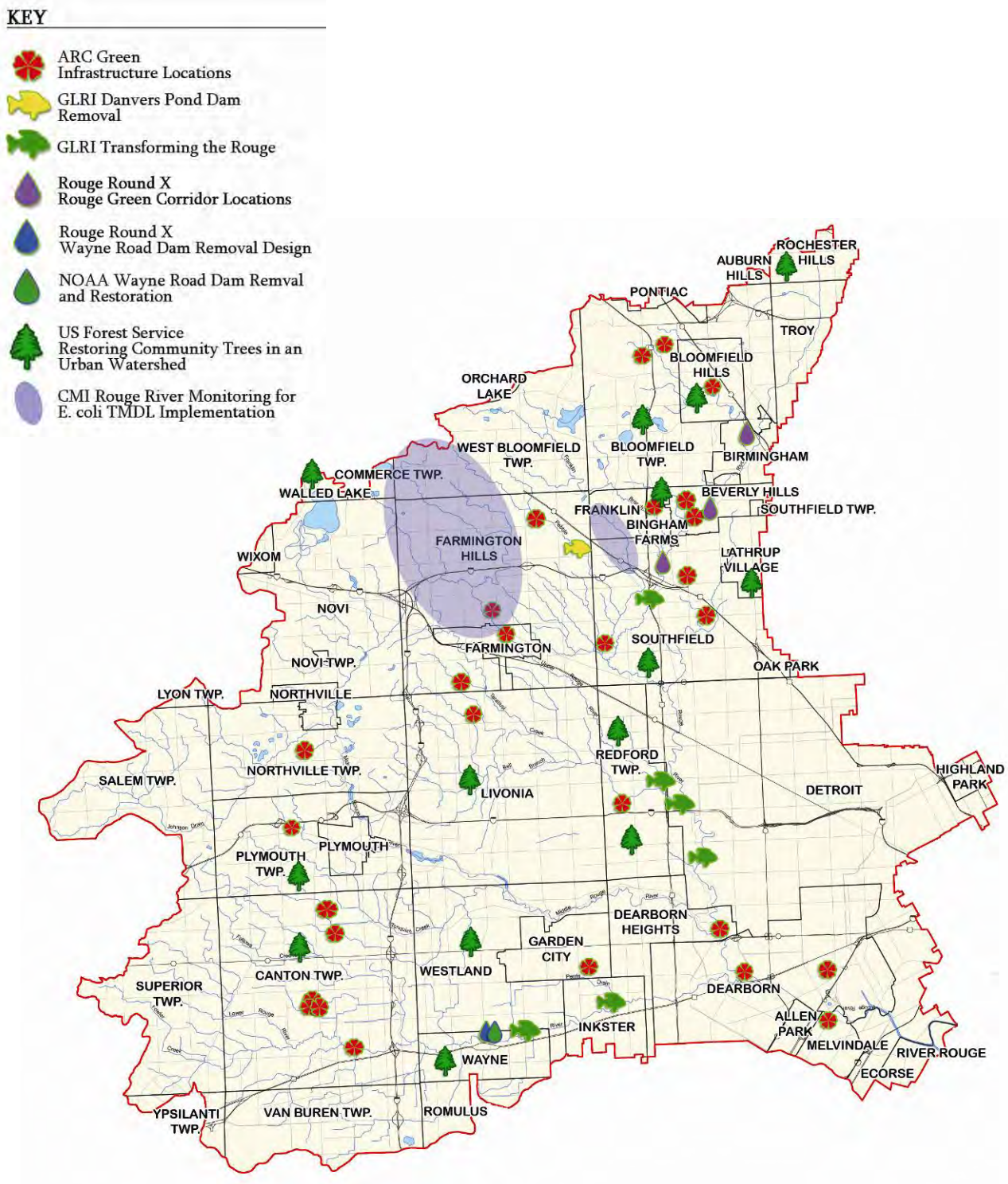
- SSO Corrective Actions and Permits
- CSO Corrective Action and Permits
- Illicit Discharge Elimination Programs (IDEP)
- Public Education Programs (PEP)
- Green Infrastructure Projects
- Community-specific projects

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 completed 2013 (GLRI)
- Wayne Road Dam Removal- Implementation completed 2013 (NOAA)
- Transforming the Rouge AOC from Mowed Down to Grown Up – Implementation completed 2012 (GLRI)
- ARC grow zone projects - ongoing (ARC and Rouge Project)
- Tree Planting (2,000 trees) in 12 communities and Wayne County in 2012 and 2013 (USFS)
- Rouge River Monitoring for E. coli TMDL Implementation scheduled 2012 and 2013 (CMI)

A map containing existing project site locations is included as Figure 2.

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, in 2010, the ARC and RRAC assessed the current Rouge River BUIs and developed the *Rouge River AOC Beneficial Use Impairments Delisting Strategy* (aka the *Rouge Delisting Strategy*). The Project Team created a master list of projects for the entire watershed and identified the BUIs addressed by these projects. The Project Team then identified priority activities and site specific 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.

The *Rouge 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. 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:

- Addressing priority pollutants through collaborative IDEP and PEP activities (Figure 3);
- ARC's development of a collaborative action plan to implement green infrastructure projects that result in storm water volume reduction across the watershed (Figure 4);
- Right-sizing and implementing wastewater treatment system improvements;
- MDEQ's acceptance of Green Infrastructure as viable tool for wastewater treatment system improvements, and
- Expanding on the volume reduction BMP scenarios described in the Rouge Watershed Management Plan.

The ARC's Collaborative Action Plan is essentially a combining of 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) campaign. The primary objective is to reduce storm water runoff at the source (treat water as a resource not a waste) and thereby improve the hydrologic and biologic integrity of the watershed. The seven basic components of the ARC's Collaborative Action Plan and thus RRAC's recommendations for the *Rouge 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

Figure 3: Critical Areas for Priority Pollutant Reductions

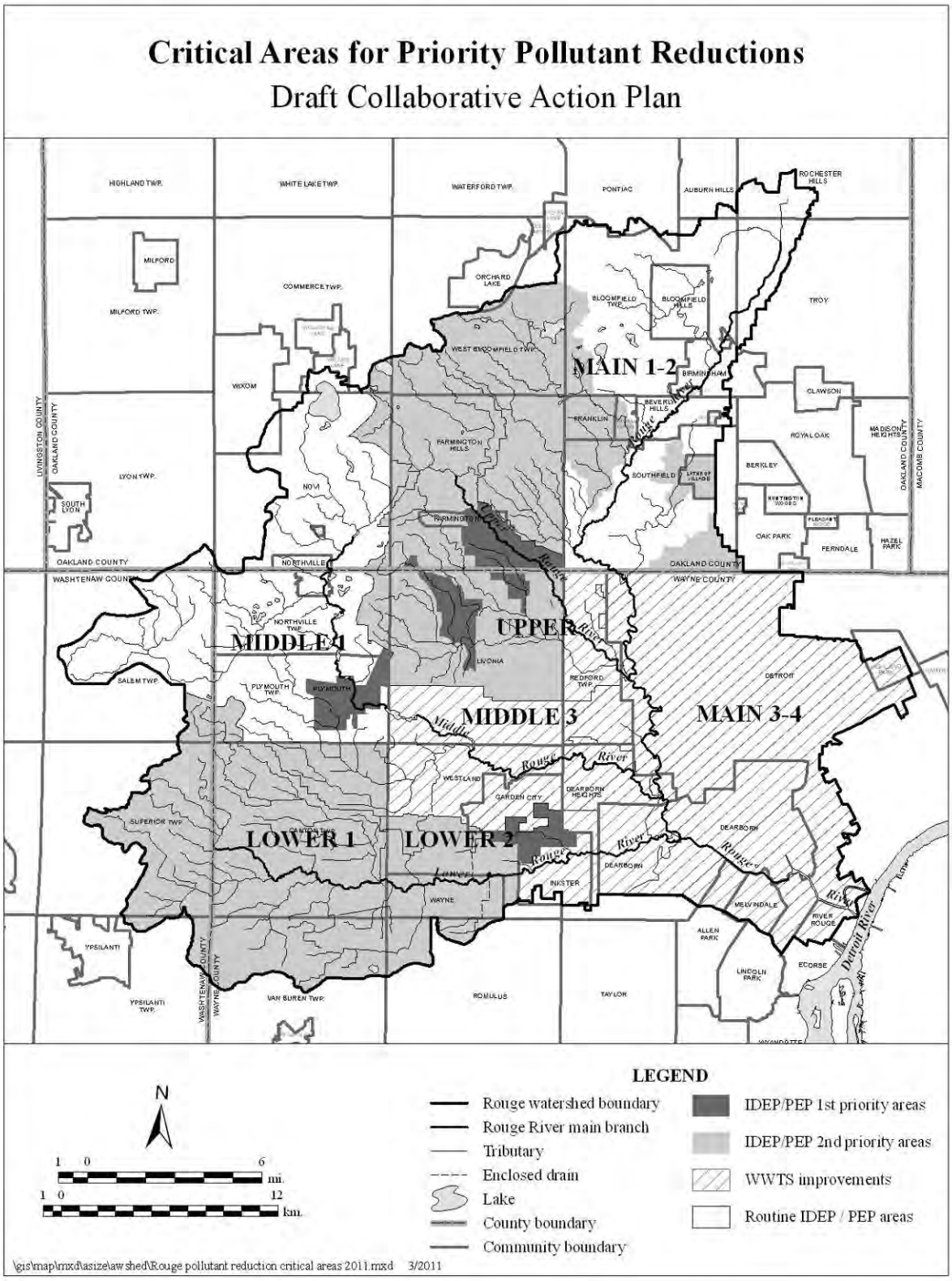
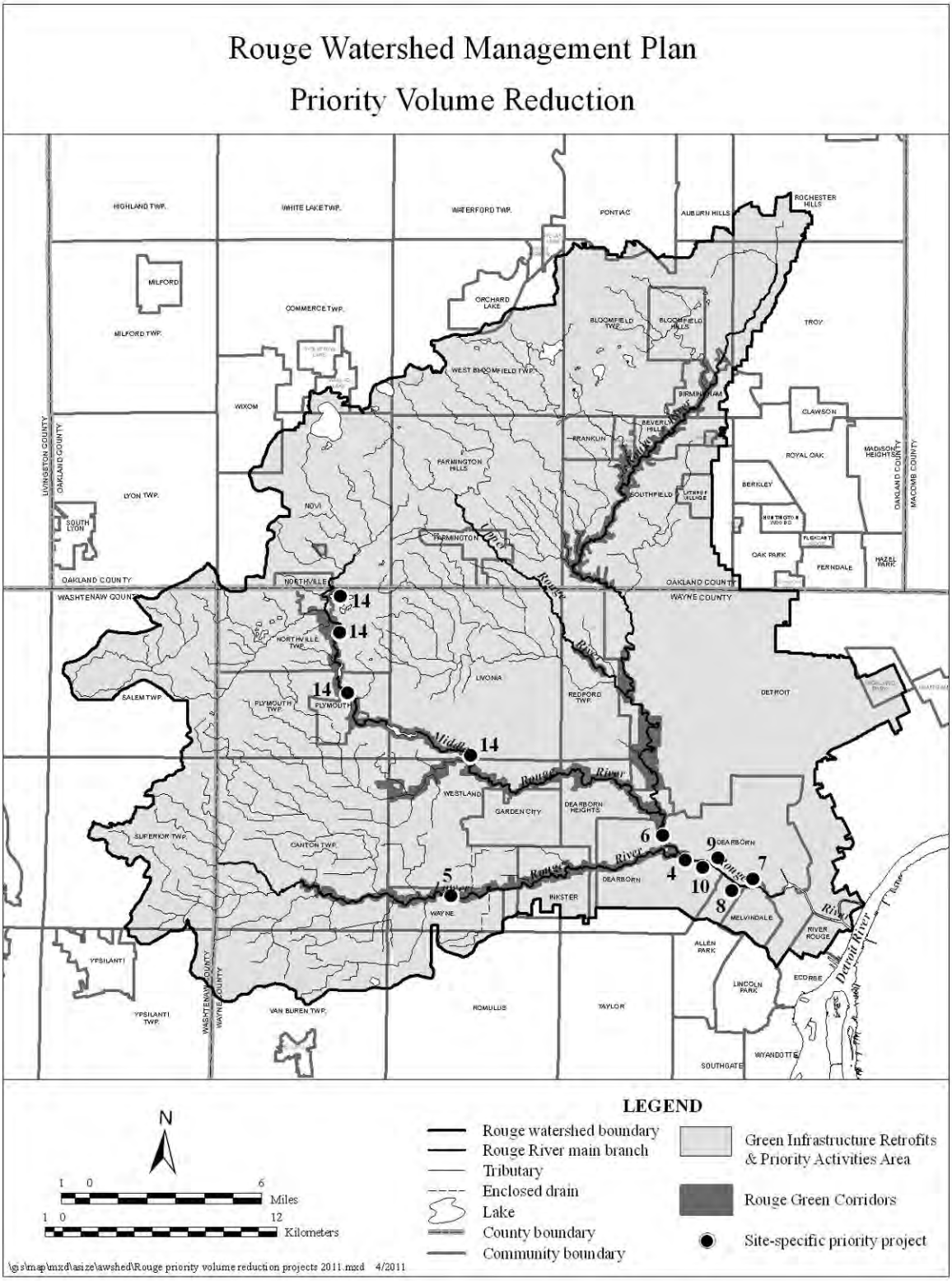


Figure 4: Priority Project Activities and Site Specific Projects



A description of each Rouge AOC BUI, MDEQ's BUI delisting criteria, the current status of the BUI and the priority activities/projects identified to address the BUI in the *Rouge Delisting Strategy* follows.

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 associate 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 Rouge RAP Advisory Council (RRAC) has requested that the MDEQ formally assess the status of Restriction on Fish and Wildlife Consumption BUI in the Rouge AOC. The request was made because the RRAC believes that one or more of the State of Michigan's Delisting Criteria for the Restriction on Fish and Wildlife Consumption, as listed above, are being met. It is anticipated that the status of this BUI will be determined by MDEQ 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

RRAC has requested that the MDEQ formally assess the status of Fish Tumors or other Deformities BUI in the Rouge AOC. The request was made because the RRAC believes that one or more of the State of Michigan's Delisting Criteria for the Fish Tumors or other Deformities, as listed above, are being met. It is anticipated that the status of this BUI will be determined by MDEQ 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

In 2010, RRAC requested that the MDEQ formally assess the status of Restriction on Dredging Activities BUI in the Rouge River AOC. The request was made because RRAC believed that one or more of the State of Michigan's Delisting Criteria for the Restrictions on Dredging Activities, as listed above were being met.

In 2011, the MDEQ was able to perform an assessment on this BUI within the Rouge River AOC. The Michigan Department of Environmental Quality, Office of the Great Lakes, Great Lakes Management Unit, 2011 Statewide Restrictions on Dredging Activities Assessment clarifies that the Restrictions on Dredging only applies to the Federal navigation channel within the Main 3-4 subwatershed of the Rouge River watershed. The Federal navigation channel is the last 2.5 miles of the Rouge River

before it discharges into the Detroit River. The conclusion of the MDEQ's 2011 Assessment is that the Rouge River AOC is not yet ready to remove the Restrictions on Dredging BUI. This is based on MDEQ analysis of the Army Corp of Engineer's 2003 sediment data which indicate that sediment samples from the Federal navigation channel have PCB, dioxin, furan, metal, and PAH concentrations that do not meet the requirements for upland unrestricted disposal or beach nourishment; and also because the 2003 sediment contaminant concentrations are statistically different (i.e. worse) than the sediment contaminant concentrations from the Bolles Harbor which was chosen as the comparable non-AOC commercial or recreational navigation channel (refer to State of Michigan's Delisting Criteria for Restrictions on Dredging Activities, as listed in 3.3.1 above).

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)

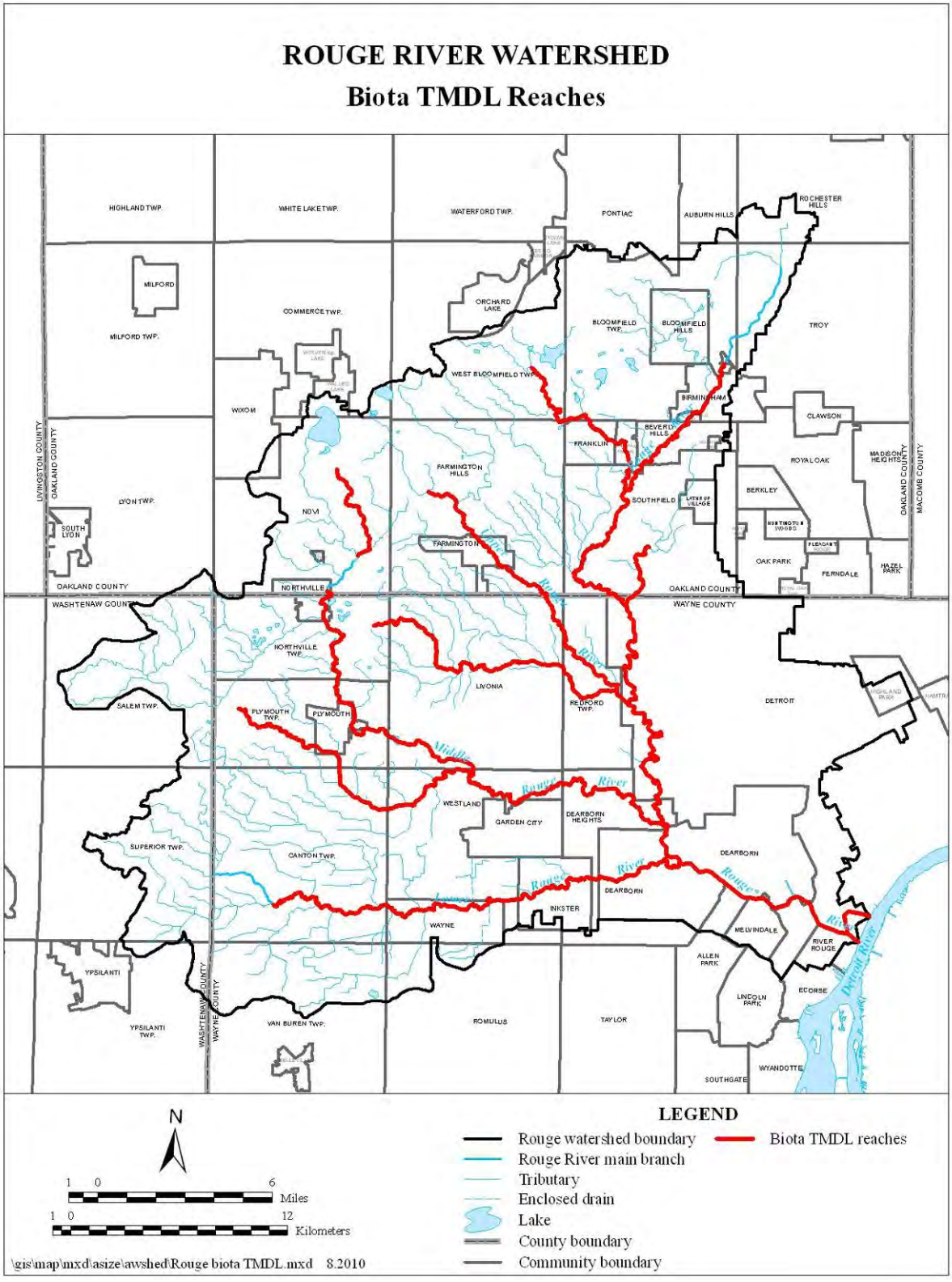
3.4.2 Current Status

Benthos is impaired across the entire watershed as illustrated by Figure 5: 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

Figure 5: The Rouge River Watershed- Biota TMDL Reaches



- 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

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 water bodies 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:

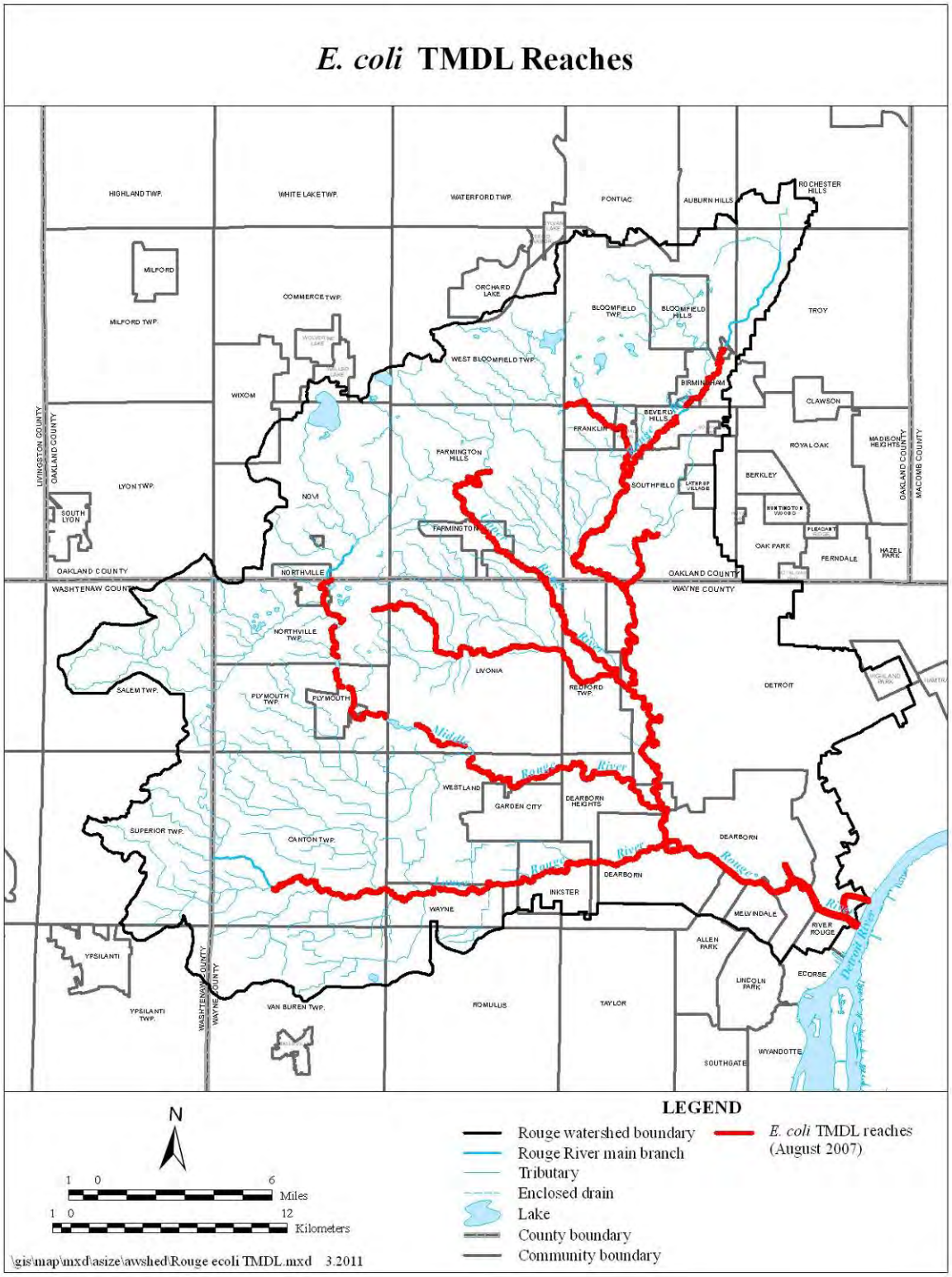
1. No waterbodies within the AOC are included on the list of non-attaining waters due to contamination with pathogens in the most recent Clean Water Act *Water Quality and Pollution Control in Michigan: Section 303(d) and 305(b) Integrated Report* (Integrated Report), which is submitted to USEPA every 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

According to the Michigan Department of Environmental Quality, Office of the Great Lakes, Great Lakes Management Unit, 2012 Statewide Beach Closings Assessment Report : "Thirty-one areas within the Rouge River AOC boundary did not support designated uses due to contamination by pathogens. The large number is due to the fact that the AOC boundary is the Rouge River watershed. A TMDL was written for Escherichia coli in 2007 and 2008." Therefore, the impairment exists across the entire watershed as illustrated by Figure 6: E Coli TMDL Reaches map.

Figure 6: The Rouge River Watershed- *E. coli* TMDL Reaches



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

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 water body 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
- settable 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 was understood to exist across the entire watershed. In 2011 the MDEQ was able to develop monitoring aesthetic survey criteria and perform the necessary fieldwork to assess the status of the Aesthetics BUI for the Rouge River AOC. While the formal report for the aesthetics assessment has not been completed, initial findings suggest that the Aesthetics BUI will be limited to the lower Main Branch of the river (i.e. the Main 3-4 Subwatershed).

3.7.3 Priority Projects

- 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 Populations: 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

These impairments exists across the entire watershed consistent with the Biota TMDL (Figure 5 on page 13).

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
- Lake and Impoundments – Feasibility Studies and Restoration
- Rouge River Clean-Up/Rouge Rescue
- Environmental Indicator Monitoring
- Sustainable Watershed Management Funding

4.0 Upper Rouge BUI Status & Recommended Delisting Strategy – Priority Activities & Projects

4.1 The Upper Rouge Delisting Strategy

In 2011, RRAC in partnership with the ARC received a PAC grant to build on the activities it accomplished in 2010-11 by working on the following tasks: 1) Improve and refine the *Rouge River AOC Beneficial Use Impairments Delisting Strategy* (*Rouge Delisting Strategy*), 2) Create a Subwatershed Delisting Strategy Template based on the activities and projects included in the *Rouge Delisting Strategy* but specific to the Upper Rouge subwatershed, and 3) Coordinate activities in the Rouge AOC.

4.2 The Upper Subwatershed

The Upper Subwatershed is the most stable major branch in the watershed, however, the hydrologic trends along the Upper continue to cause excessive erosion and habitat destruction. The wet weather water quality in the Upper has improved, due in part to CSO control program projects over the past several years, including the Redford Township Retention Treatment Basin. A unique feature of the Upper is the river gradient or the change in its elevation from the northern portion of the subwatershed to its southern end just prior to entering the Main Rouge River.

The characteristics and conditions of this subwatershed and the associated stream indicators described in this chapter demonstrate that much progress has been made in improving the quality of the water and natural resources since the completion of the 2001 Upper Subwatershed Management Plan. Challenges exist with managing flow variability, including both flow rates and storm water runoff volume, along with bacterial loading in wet weather conditions. This subchapter provides a synopsis of the conditions of each of the above stream indicators with associated challenges for restoration.

4.2.1 Subwatershed Demographics

The Upper Subwatershed is situated in the northern central portion of the Rouge Watershed and is approximately 63 square miles. In addition to the upstream half of the Upper Branch of the Rouge River, the Upper Subwatershed's water resources include the tributaries of both the Bell Branch and Tarabusi Creek.

The Upper Subwatershed is located in Oakland and Wayne counties encompassing portions of Commerce, West Bloomfield, Northville, and Redford townships and the cities of Novi, Farmington, Farmington Hills, and Livonia.

4.2.2 Upper Rouge BUI Status

Table 1 summarizes the official status of each of the Rouge BUIs for the Upper Rouge Subwatershed and presents RRAC's current recommendation for the assessment of each BUI specific to the Upper Rouge subwatershed.

Table 1: Status of Upper Rouge Subwatershed BUIs

BENEFICIAL USE IMPAIRMENT	IMPAIRMENT STATUS*	RRAC'S 2012 SUBWATERSHED RECOMMENDATION
Restrictions on Fish Consumption	Impaired	Assess for Removal
Fish Tumors or Other deformities	Impaired	Assess for Removal
Restrictions on Dredging Activities	Not Impaired	Not Impaired
Degradation of Benthos	Impaired	Impaired
Eutrophication or Undesirable Algae	Impaired	Assess for Removal
Beach Closings	Impaired	Impaired
Degradation of Aesthetics	Impaired	Assess for Removal
Degradation of Fish & Wildlife Populations	Impaired	Impaired
Loss of Fish & Wildlife Habitat	Impaired	Impaired

**Per 2004 Rouge River remedial Action Plan Revision; Table 1*

4.3 Restrictions on Fish and Wildlife Consumption

4.3.1 Current Status – Upper Rouge Subwatershed

The RRAC believes that this BUI is ready to be removed for the Upper Rouge Subwatershed. This is based in part on the 2010 Fish Consumption Advisory (FCA) having a FCA in Upper Rouge for only PCBs in Suckers with "Unlimited Consumption" for "General Population" and "One meal per week" for "Women & Children". This level of FCA is believed to be equivalent to the level of restriction for Suckers caught within Lake Erie. This BUI is currently being assessed statewide by the MDCH and MDEQ. Once this assessment is complete it will be determined by MDEQ whether this BUI is ready for removal in the Rouge River AOC.

4.4 Fish Tumors or Other Deformities

4.4.1 Current Status – Upper Rouge Subwatershed

The RRAC believes that this BUI is ready to be removed for the Upper Rouge Subwatershed because there were no external deformities reported in the 1995 MDNR fish assessment and to the best of our knowledge no reports of fish tumors or deformities due to chemical contaminants have been reported to and verified by the MDNR or MDEQ on fish collected in the Upper Rouge Subwatershed for a period of five years. This BUI is currently being assessed statewide by the MDCH and MDEQ. Once this assessment is complete it will be determined by MDEQ whether this BUI is ready for removal in the Rouge River AOC.

4.5 Restrictions on Dredging Activities

4.5.1 Current Status – Upper Rouge Subwatershed

This BUI is not applicable to the Upper Rouge Subwatershed.

4.6 Degradation of Benthos

4.6.1 Current Status – Upper Rouge Subwatershed

The RRAC believes that this BUI is still impaired. This is due to the existing Biota TMDL and the predominantly "Fair" ratings and statistically significant downward trend (Fall data) the Friends of the Rouge/Wayne County benthic monitoring data is indicating for the Upper Rouge Subwatershed. During MDEQ's Rouge River biological assessment surveys of 2000 (Goodwin, 2002), macroinvertebrate communities were sampled at nine locations in the Upper Subwatershed with all sites earning a rating of Acceptable. In 2005 another biological assessment was performed by the MDEQ at nine stations in the Upper Rouge River and its tributaries (MDEQ, 2005). Seven of the stations were assessed an Acceptable rating and two of the stations were assessed a Poor rating. Friends of the Rouge (FOTR) began sampling in the Upper Subwatershed in 2002 and have 12 sites located for spring sampling, 14 for fall sampling and six sites for winter stonefly sampling. The number of sites sampled per event varies from year to year depending on the number of volunteers who participate, however, the site locations have not changed for long-term evaluation. Stoneflies have only been observed in 2003 at the Upper Branch site at Shiawassee Park in Farmington.

4.6.2 Notable Areas – Upper Rouge Subwatershed

Overall aquatic macroinvertebrate populations in the Upper Rouge Subwatershed are of fair quality. Assessments of Tarabusi Creek at Eight Mile Road in Farmington Hills and the Minnow Pond Drain near Farmington Road consistently exhibit the higher quality populations of aquatic macroinvertebrates.

4.6.3 Priority Projects– Upper Rouge Subwatershed

- Rouge Collaborative IDEP & Toxic Material Collections
  -- Upper IDEP Program
- Rouge Collaborative PEP & GI/LID Education Campaign
- Green Infrastructure Implementation Projects
  - ARC Grow Zones
  - Municipal Grow Zone/Habitat Restoration
  - Storm Water Detention
  - Habitat Restoration – Streambank Stabilization
  - Schools
  - Municipal Storm Water Quality Infrastructure Improvements
- Rouge Green Corridor Land Acquisition Planning
- Fish Passage and Dam Modification
- Rouge Green Corridor Maintenance Planning and Programs
- Rouge River Clean-Up/Rouge Rescue
- Environmental Indicator Monitoring
- Sustainable Watershed Management Funding
- Wastewater Treatment System Improvements

4.7 Eutrophication or Undesirable Algae

4.7.1 Current Status – Upper Rouge Subwatershed

Although it is understood that the impairment extends across the entire watershed, the RRAC believes that this impairment has been in recovery and may be ready for removal within the Upper Rouge Subwatershed. This is based upon RRAC review of State of Michigan's TMDL listing which does not list any waterbodies within the Rouge River AOC on the list of impaired waters due to nutrients or excessive algal blooms.

4.7.2 Priority Projects – Upper Rouge Subwatershed

- Rouge Collaborative PEP & GI/LID Education Campaign
- Green Infrastructure Implementation Projects
    - ARC Grow Zones
    - Municipal Grow Zone/Habitat Restoration
    - Storm Water Detention
    - Habitat Restoration – Streambank Stabilization
    - Schools
    - Municipal Storm Water Quality Infrastructure Improvements
- Rouge Green Corridor Land Acquisition Planning
- Rouge Green Corridor Maintenance Planning and Programs
- Rouge River Clean-Up/ Rouge Rescue
- Sustainable Watershed Management Funding
- Wastewater Treatment System Improvements

4.8 Beach Closings

4.8.1 Current Status – Upper Rouge Subwatershed

This impairment extends across the entire watershed and the RRAC believes that it remains impaired throughout the Upper Rouge Subwatershed. As described in the 2008 Rouge Watershed Management Plan, the *E. coli* information collected in the Upper Subwatershed indicates that pathogens continue to be a problem in this watershed. It is assumed that untreated sewage (and other sources) continues to enter this reach of the river. Water quality sampling for *E. coli* was completed by the MDEQ in 2005 for the development of the TMDL. Limited bacterial source tracking (BST) analysis was conducted as part of the MDEQ's effort to determine if areas with elevated *E. coli* were associated with human (sewage) sources. Continuing the efforts of the MDEQ, in 2006 the ARC completed a more comprehensive BST assessment to help identify areas where untreated sewage is entering the river. Specific sampling information may be found in the Rouge River *E. coli* TMDL and the RREMAR at www.allianceofrougecommunities.com.

The 2005 *E. coli* data indicated that the Upper Branch and its tributaries rarely met the state's total body contact water quality standards and frequently exceeded the partial body contact standards. In fact, the Upper Subwatershed had the highest *E. coli* concentrations of all the Rouge subwatersheds. These exceedences occurred during both dry and wet weather conditions (MDEQ, 2007c). Sources of *E. coli* include storm water runoff contaminated with feces from pets, urban wildlife like raccoons, deer and possum to and agricultural animals like horses, cows or pigs. Human sources of *E. coli* include untreated sewage from illicit connections, untreated combined sewer overflows (CSOs), aging sanitary sewers and failing septic systems which are also

called on-site sewage disposal systems (OSDSs). The BST data showed human sources of *E. coli* are suspected at seven sites during wet conditions and two sites during dry weather. The dry weather human *E. coli* sources are most probably associated with illicit connections, while the wet weather sources could be any of the human sources mentioned previously.

4.8.2 Priority Projects – Upper Rouge Subwatershed

- Rouge Collaborative IDEP & Toxic Material Collections
- Rouge Collaborative PEP & GI/LID Education Campaign
- Green Infrastructure Implementation Projects
    - ARC Grow Zones
    - Municipal Grow Zone/Habitat Restoration
    - Storm Water Detention
    - Habitat Restoration – Streambank Stabilization
    - Schools
    - Municipal Storm Water Quality Infrastructure Improvements
- Sustainable Watershed Management Funding
- Wastewater Treatment System Improvements

4.9 Degradation of Aesthetics

4.9.1 Current Status – Upper Rouge Subwatershed

This impairment is understood to exist across the entire watershed. In 2011 the MDEQ performed an assessment for aesthetics within the Rouge Watershed. Based on the results of their assessment, RRAC anticipates that the Upper Rouge is ready to be delisted for the aesthetics BUI.

4.9.2 Priority Projects – Upper Rouge Subwatershed

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
    - ARC Grow Zones
    - Municipal Grow Zone/Habitat Restoration
    - Storm Water Detention
    - Habitat Restoration – Streambank Stabilization
    - Schools
    - Municipal Storm Water Quality Infrastructure Improvements
- 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

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

4.10.1 Current Status – Upper Rouge Subwatershed

This impairment extends across the entire watershed and the RRAC believes that it remains impaired throughout the Upper Rouge Subwatershed. As described in the 2008 Rouge Watershed Management Plan, low DO levels, siltation in the spawning and feeding areas of the stream channels and degradation of physical habitat from bank erosion and streambed scouring linked to the high flow variability in the streams are the most significant factors limiting the abundance of fish species in the Upper Rouge Subwatershed. Biotic integrity quickly diminishes from the headwaters to the main branch of the Upper Rouge River. Tarabusi Creek (at Orchard Lake Road) and the Bell Branch (between Beech-Daly and Telegraph roads) exhibit unstable, eroded stream banks due to extreme flow patterns. Physical impacts to these tributaries and the river, including removal of riparian vegetation, channelization, relocation and enclosure have resulted in negative cumulative impacts on fish communities as well. The downstream portions of the subwatershed have historically experienced significantly degraded water quality due to combined sewer overflows (CSOs). Water quality and thus the diversity of habitat and aquatic communities will continue to improve as the effectiveness of the CSO controls is demonstrated.

4.10.2 Notable Areas

One of the more notable characteristics of the Upper Rouge subwatershed is its river gradient, or the change in elevation of the River from the upstream headwater areas to its confluence with the Main Rouge River. The average river gradient in the Rouge River Watershed is approximately five feet per mile while the gradient in the Upper Rouge River Sub watershed averages 21 feet per mile, the highest of the four main river branches. The Bell Branch, within this Subwatershed, is known for its high gradient characteristic, which could potentially support a wide range of fish and aquatic organism communities due to the regular riffle-pool sequences; however, it also experiences significant flow variability that inhibits establishment of a diverse aquatic community (Catalfio et.al, 2006).

The Upper Rouge River at both Powers and Drake Roads, along with the Seeley Drain and Minnow Pond Drain, were rated "Good" in both the 1995, 2000 and 2005 assessments using GLEAS 51 protocols (Catalfio et.al, 2006). The Minnow Pond and Seeley Drains contain aquatic habitat that supports both sensitive fish and aquatic macroinvertebrate species. Of the four locations sampled, Minnow Pond Drain (near Farmington Road) and Seeley Drain (at Halsted Road) contained sensitive fish species (e.g., redside dace and mottled sculpin) and the most diverse aquatic habitat. Adult rainbow trout have been stocked near Powers Road to support short-term fishing derbies; however, there is no evidence of the establishment of a permanent population. Protection efforts, such as maintaining/ restoring riparian vegetation, minimizing flow variability, and maintaining good water quality, have been completed to ensure that this reach of the Rouge River continues to support sensitive species is essential. (*Delisting Targets for Fish & Wildlife Habitat & Population Beneficial Use Impairments for the Rouge River Watershed)*

4.10.3 Priority Projects – Upper Rouge Subwatershed

- Rouge Collaborative PEP & GI/LID Education Campaign
- Green Infrastructure Implementation Projects
    - ARC Grow Zones
    - Municipal Grow Zone/Habitat Restoration
    - Storm Water Detention
    - Habitat Restoration – Streambank Stabilization
    - Schools
    - Municipal Storm Water Quality Infrastructure Improvements
- 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
- Wastewater Treatment System Improvements

Figure 7 illustrates the location of the Upper Rouge Subwatershed site specific projects and a list of the specific projects is provided in Table 2.

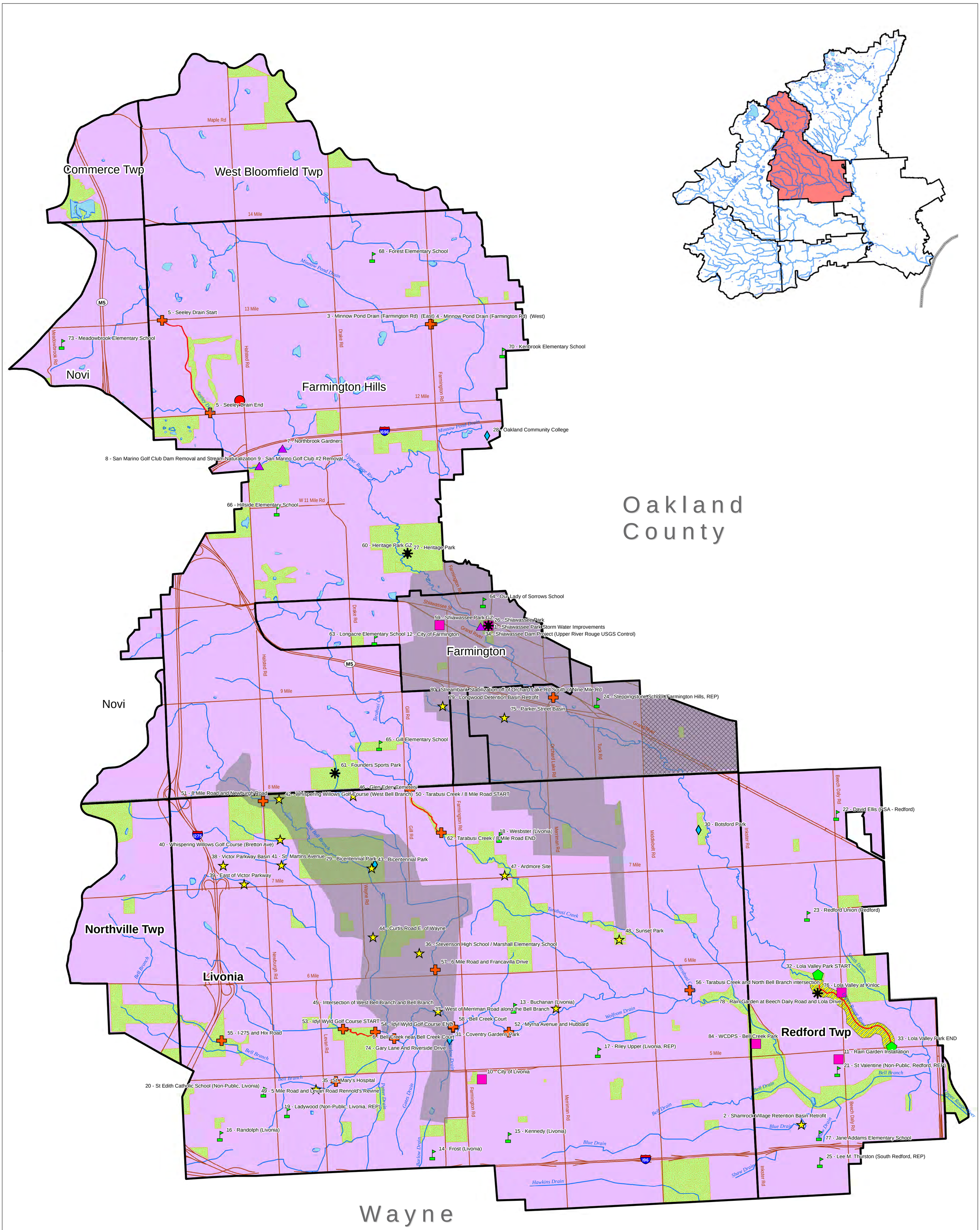


Figure 7: Upper Rouge Subwatershed Strategy Projects

Legend

- ARC Grow Zone
- Fish Passage
- Habitat Restoration
- River Day Location
- Municipal Stormwater Quality Infrastructure Improvements
- School
- Stormwater Detention
- Municipal Grow Zone
- Municipal Grow Zone and Habitat Restoration
- County Boundary
- Community Boundary
- Park
- Lake
- Grow Zone Streambank
- 1st Priority areas (IDEP)
- IDEP
- Major Road
- Rouge streams/Tributaries
- Start and End Hydrology

Source: State of Michigan

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Table 2: Upper Rouge Subwatershed Strategy Projects

Project Number	Project Name	Project Type	Location	Project Lead / Owner	Project Cost	Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degredation 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	Notes/Status
Green Infrastructure (GI) Implementation Projects															
ARC Grow Zones															
59	Shiawassee Park GZ	ARC Grow Zone	Shiawassee Rd & Power Rd, Farmington, MI 48336	Alliance of Rouge Communities	$75,000 - 2.1 million			X		X	X	X	X	X	COMPLETE
60	Heritage Park GZ	ARC Grow Zone	Farmington Road S of 11 Mile, Farmington Hills	Alliance of Rouge Communities				X		X	X	X	X	X	COMPLETE
61	Founders Sports Park GZ	ARC Grow Zone	35500 W.8 Mile Road, Farmington Hills, MI 48335	Alliance of Rouge Communities				X		X	X	X	X	X	COMPLETE
76	Lola Valley at Kinloch	ARC Grow Zone	In Lola Valley Park at Kinloch Street, Redford Township	Alliance of Rouge Communities				X		X	X	X	X	X	COMPLETE
	Transforming the Rouge	ARC Grow Zone	Various locations throughout Redford Township	Wayne County, ARC				X		X	X	X	X	X	Will be complete 12/31/2012
77	Jane Addams Elementary School	ARC Grow Zone (*erroniously included on map as a School)	14025 Berwyn, Redford, MI	Alliance of Rouge Communities				X		X	X	X	X	X	
Municipal Grow Zones															
1	Shiawassee Park Storm Water Improvements	Municipal Grow Zone	Shiawassee Rd & Power Rd, Farmington, MI 48336	Farmington	$30,000			X		X	X	X	X	X	
10	City Hall (Livonia)	Municipal Grow Zone	33000 Civic Center Drive Livonia, Michigan 48154	Livonia				X		X	X	X	X	X	
11	City Hall (Redford Township)	Municipal Grow Zone	15145 Beech Daly, Redford, Michigan, 48239	Redford Township				X		X	X	X	X	X	
12	City Hall (Farmington)	Municipal Grow Zone	23600 Liberty Street, Farmington, MI, 48335	Farmington				X		X	X	X	X	X	
78	Rain Garden at Beech Daly Road and Lola Drive	Municipal Grow Zone	Intersection of Beech Daly Road and Lola Drive, Redford Township	Redford Township				X		X	X	X	X	X	COMPLETE
84	WCDPS - Bell Creek Park	Tree Planting	NE corner - Intersection of Inkster & 5 Mile roads, Redford Township	Wayne County				X		X	X	X	X	X	
	Upper Subwatershed Tree Planting Program	Tree Planting	Throughout subwatershed					X		X	X	X	X	X	
	Livonia Emerald Ash Borer Program	Tree Planting	Throughout city	Livonia				X		X	X	X	X	X	Will be complete 12/31/2013
	Redford Township Emerald Ash Borer Program	Tree Planting	Throughout city	Redford Township				X		X	X	X	X	X	Will be complete 12/31/2013

Table 2: Upper Rouge Subwatershed Strategy Projects

Project Number	Project Name	Project Type	Location	Project Lead / Owner	Project Cost	Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degredation 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	Notes/Status
Green Infrastructure (GI) Implementation Projects															
Municipal Grow Zone / Habitat Restoration Combined															
32	Lola Valley Park	Municipal Grow Zone	16100 Beech Daly Rd, Redford, MI 48240	Redford Township				X		X	X	X	X	X	
Stormwater Detention															
2	Shamrock Village Retention Basin Retrofit	Regional Detention Retrofit	North of 1-96 / Schoolcraft, East of Inkster, Redford Township	Redford Township				X		X	X	X	X	X	
35	St. Mary's Hospital	New Regional Detention	36475 5 Mile Road, Livonia, MI 48154	Livonia	$875,000 - $925,000			X		X	X	X	X	X	
36	Stevenson High School / Marshall Elementary School	New Regional Detention	33500 6 Mile Road, Livonia, MI 48152	Livonia	$150,000 - $175,000			X		X	X	X	X	X	
37	Merriman Road / Bell Branch	New Regional Detention	Merriman Road between 5 Mile and 6 Mile, west of Merriman Road along the Bell Branch, Livonia	Livonia	$125,000 - $150,000			X		X	X	X	X	X	
38	Victor Parkway Basin	New Regional Detention	North of Seven Mile east of I-275 along Denmar Drain	Livonia	$200,000 - $225,000			X		X	X	X	X	X	
39	East of Victor Parkway	New Regional Detention	North of Seven Mile east of Victor Parkway along Denmar Drain	Livonia	$900,000 - $950,000			X		X	X	X	X	X	
40	Whispering Willows Golf Course near Bretton Avenue	New Regional Detention	East of Newburgh Road north of Bretton Avenue along Denmar Drain	Livonia	$200,000 - $225,000			X		X	X	X	X	X	
41	St. Martins Avenue	New Regional Detention	East of Newburgh Road north of 7 Mile Road	Livonia	$200,000 - $225,001			X		X	X	X	X	X	
42	Whispering Willows along West Bell Branch	New Regional Detention	East of Newburgh Road south of 8 Mile along the West Bell Branch	Livonia	$325,000 - $375,000			X		X	X	X	X	X	
43	Bicentennial Park	New Regional Detention	East of Wayne Road north of 7 Mile along the West Bell Branch	Livonia	$650,000 - $700,000			X		X	X	X	X	X	
44	Curtis Road east of Wayne	New Regional Detention	South of Curtis Road east of Wayne Road along West Bell Branch	Livonia	$125,000 - $150,000			X		X	X	X	X	X	

Table 2: Upper Rouge Subwatershed Strategy Projects

Project Number	Project Name	Project Type	Location	Project Lead / Owner	Project Cost	Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degredation 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	Notes/Status
Green Infrastructure (GI) Implementation Projects															
Stormwater Detention															
45	Intersection of West Bell Branch and Bell Branch	New Regional Detention	1) Along West Bell Branch east of Munger Drive to the drain's intersection with the Bell Branch, 2) Along the Bell Branch near Burton Lane	Livonia	$625,000 - $675,000			X		X	X	X	X	X	
46	Glen Eden Cemetery	New Regional Detention	West of Wayne Road south of 8 Mile along the Beitz Drain	Livonia	$200,000 - $225,000			X		X	X	X	X	X	
48	Sunset Park	New Regional Detention	West of Middlebelt north of 6 Mile along the Tarabusi Creek	Livonia	$75,000 - $100,000			X		X	X	X	X	X	
47	Ardmore Site	New Regional Detention	East of Farmington Road north of 7 Mile along Tarabusi Creek	Livonia				X		X	X	X	X	X	
75	Parker Street Basin	New Regional Detention	On the North Bell Branch, west of Parker Street, South of Nine Mile Road. (Parker Street is located between Orchard Lake Road and Farmington Road.	Livonia				X		X	X	X	X	X	
79	Longwood Detention Basin Retrofit	New Regional Detention	South of Longwood Drive, South of Nine Mile Road, West of Farmington Road	Livonia				X		X	X	X	X	X	
Habitat Restoration - Streambank Stabilization															
3	Minnow Pond Drain / Farmington Rd (East)	Streambank Stabilization / Restoration	East side of crossing of Farmington Road at the Minnow Pond Drain, Farmington Hills	Farmington Hills	$15,000 - 1 million (from Rouge Watershed Management Plan)			X		X		X	X	X	
4	Minnow Pond Drain / Farmington Rd (West)	Streambank Stabilization / Restoration	West side of crossing of Farmington Road at the Minnow Pond Drain, Farmington Hills	Farmington Hills				X		X		X	X	X	

Table 2: Upper Rouge Subwatershed Strategy Projects

Project Number	Project Name	Project Type	Location	Project Lead / Owner	Project Cost	Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degredation 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	Notes/Status
Green Infrastructure (GI) Implementation Projects															
Habitat Restoration - Streambank Stabilization															
5	Seeley Drain – 620' (Halsted Rd)	Streambank Stabilization / Restoration	Seeley Creek/Drain between 13 and 12 Mile Roads (and Haggerty and Halstead).	Oakland County Water Resources Commission	$500,000			X		X		X	X	X	Gully erosion repair, channel resectioning to enhance stability and wetland restoration (north and south ends of project study area) recommended in report. No design has been done on this project. Project already identified in WMP update; Identified as a Critical Area for Sediment and Nutrients in the WMP. The pollutants addressed by the implementation of this project are sediment, nutrients and flow/volume.
6	Bell Creek near Bell Creek Court	Streambank Stabilization / Restoration	Bell Creek near Bell Creek Court, Livonia	Livonia				X		X		X	X	X	
49	5 Mile Road and Levan Road - Rennolds' Ravine	Streambank Stabilization / Restoration	Rennolds' Ravine, South of 5 Mile Road, East of Levan Road, Livonia	Livonia	$105,000			X		X		X	X	X	
50	Tarabusi Creek / 8 Mile Road	Streambank Stabilization / Restoration	Tarabusi Creek south of 8 Mile Road, Livonia	Livonia	$2,100,000			X		X		X	X	X	
80	Streambank Stabilization off of Orchard Lake Road south of Nine Mile Road	Habitat Restoration	At river crossing on Orchard Lake Road south of Nine Mile Road, Farmington Hills	Farmington Hills				X		X		X	X	X	
51	8 Mile Road / Newburgh Road	Streambank Stabilization / Restoration	West Bell Branch at Newburgh Road crossing just south of 8 Mile Road, Livonia	Livonia	$150,000			X		X		X	X	X	
52	Myrna Avenue / Hubbard	Streambank Stabilization / Restoration	On the North Bell Branch near Myrna Avenue and Hubbard, Livonia	Livonia	$780,000			X		X		X	X	X	
53	Idyl Wyld Golf Course	Streambank Stabilization / Restoration	Idyl Wyld Golf Course, Livonia	Livonia	$320,000			X		X		X	X	X	
55	I-275 / Hix Road	Streambank Stabilization / Restoration	I-275 and Hix Road, Livonia	Livonia	$660,000			X		X		X	X	X	

Table 2: Upper Rouge Subwatershed Strategy Projects

Project Number	Project Name	Project Type	Location	Project Lead / Owner	Project Cost	Restrictions on fish and wildlife consumption	Fish tumors or other deformities	Degredation 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	Notes/Status
Green Infrastructure (GI) Implementation Projects															
Habitat Restoration - Streambank Stabilization															
56	Tarabusi Creek / North Bell Branch	Streambank Stabilization / Restoration	Tarabusi Creek and North Bell Branch intersection, Livonia	Livonia	$390,000			X		X		X	X	X	
74	Gary Lane / Riverside Drive	Streambank Stabilization / Restoration	On Tarabusi Creek located northeast of intersection of Gary Lane and Riverside Drive, Livonia	Livonia	$600,000			X		X		X	X	X	
57	6 Mile Road / Francavilla Drive	Streambank Stabilization / Restoration	6 Mile Road and Francavilla Drive, Livonia	Livonia	$60,000			X		X		X	X	X	
58	Bell Creek Court	Streambank Stabilization / Restoration	Bell Creek Court, Livonia	Livonia	$150,000			X		X		X	X	X	
Schools															
13	Buchanan (Livonia)	Tree Planting	16400 Hubbard, Livonia, MI 48154					X		X	X	X	X	X	
14	Frost (Livonia)	Tree Planting	14041 Stark Road, Livonia MI 48154					X		X	X	X	X	X	
15	Kennedy (Livonia)	Tree Planting	14201 Hubbard, Livonia MI 48154					X		X	X	X	X	X	
16	Randolph (Livonia)	Tree Planting	14470 Norman, Livonia, MI 48154					X		X	X	X	X	X	
18	Wesbster (Livonia)	Tree Planting	32401 Pembroke, Livonia, MI 48152					X		X	X	X	X	X	
20	St Edith Catholic School (Non-Public, Livonia)	Tree Planting	15089 Newburgh Road, Livonia, MI 48154					X		X	X	X	X	X	
22	David Ellis (PSA - Redford)	Tree Planting	19800 Beech Daly, Redford, MI 48240					X		X	X	X	X	X	
23	Redford Union (Redford)	Tree Planting	17711 Kinloch, Redford, MI 48240					X		X	X	X	X	X	
63	Longacre Elementary School	Tree Planting	34850 Arundel Drive Farmington, Michigan 48335					X		X	X	X	X	X	
64	Our Lady of Sorrows School	Tree Planting	24040 Raphael Road Farmington Hills, MI 48336-1752					X		X	X	X	X	X	
65	Gill Elementary School	Tree Planting	21195 Gill Road, Farmington Hills, Michigan 48335					X		X	X	X	X	X	

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Green Infrastructure (GI) Implementation Projects															
Schools															
66	Hillside Elementary School	Tree Planting	36801 W. 11 Mile Road Farmington Hills, Michigan 48335					X		X	X	X	X	X	
68	Forest Elementary School	Tree Planting	34545 Old Timber Road, Farmington Hills, MI 48331					X		X	X	X	X	X	
70	Kenbrook Elementary School	Tree Planting	32130 Bonnet Hill Road Farmington Hills, Michigan 48334					X		X	X	X	X	X	
73	Meadowbrook Elementary School	Tree Planting	29200 Meadowbrook Road Novi, Michigan 48377					X		X	X	X	X	X	
Municipal Stormwater Quality Infrastructure Improvements															
81	Farmington Hills DPW Yard Stormwater Improvements	Municipal Stormwater Quality Infrastructure Improvements	27245 Halsted Road, Farmington Hills, MI					X		X	X	X	X	X	
Fish Passage & Dam Modification															
7	Northbrook Gardners	Dam	Howard Road S of 696, Farmington Hills	Farmington Hills				X					X	X	
8	Farmington Hills Golf Club Dam Removal & Stream Naturalization	Dam	37777 Eleven Mile Court, Farmington Hills, MI 48335	Farmington Hills				X					X	X	
9	Farmington Hills Golf Club #2 Removal	Dam	37777 Eleven Mile Court, Farmington Hills, MI 48335	Farmington Hills				X					X	X	
34	Shiawassee Dam Project (Upper River Rouge USGS Control)	Dam	Shiawassee Park, Farmington	Farmington				X					X	X	
Rouge River Clean Up / Rouge Rescue															
River Day Locations															
26	Shiawassee Park	River Day Location	Farmington	Farmington				X		X	X	X	X	X	ONGOING
27	Heritage Park	River Day Location	Farmington Hills	Farmington Hills				X		X	X	X	X	X	ONGOING
28	Oakland Community College	River Day Location	Farmington Hills	Farmington Hills				X		X	X	X	X	X	ONGOING
29	Bicentennial Park	River Day Location	Livonia	Livonia				X		X	X	X	X	X	ONGOING
30	Botsford Park	River Day Location	Livonia	Livonia				X		X	X	X	X	X	ONGOING
31	Coventry Gardens Park	River Day Location	Livonia	Livonia				X		X	X	X	X	X	ONGOING

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Environmental Indicator Monitoring Assessment															
Schools															
17	Riley Upper (Livonia)	REP	15555 Henry Ruff, Livonia, MI 48154					X		X	X	X	X	X	ONGOING
19	Ladywood (Non-Public, Livonia)	REP	14680 Newburgh, Livonia, MI 48154					X		X	X	X	X	X	ONGOING
21	St Valentine (Non-Public, Redford)	REP	25875 Hope, Redford MI 48239					X		X	X	X	X	X	ONGOING
24	Steppingstone School (Farmington Hills)	REP	30250 Grand River, Farmington Hills, MI 48336					X		X	X	X	X	X	ONGOING
25	Lee M. Thurston (South Redford)	REP	26255 Schoolcraft, Redford, MI 48239					X		X	X	X	X	X	ONGOING
Progress Evaluation Monitoring															
	Biological Health Monitoring	FOTR/WC/ARC Benthic Macroinvertebrate Monitoring	Various locations throughout subwatershed	Friends of the Rouge, Wayne County		X	X	X		X		X	X	X	Consistent with ARC's Monitoring Plan
	Biological Health Monitoring	MDEQ/MDNR Fish, Macroinvertebrates, Habitat	Various locations throughout subwatershed	Michigan Department of Environmental Quality, Michigan Department of Natural Resources		X	X	X		X		X	X	X	Consistent with ARC's Monitoring Plan
	Biological Health Monitoring	FOTR - Frog & Toad	Various locations throughout subwatershed	Friends of the Rouge									X	X	
	Biological Health Monitoring	Land Cover - Green Infrastructure	Entire Subwatershed	Alliance of Rouge Communities		X	X	X		X	X	X	X	X	
	Physical Monitoring	ARC/USGS/WC precipitation, flow, geomorphology	Various locations throughout subwatershed. Flow US3 each yr + U05 1yr	Alliance of Rouge Communities, United States Geographical Survey, Wayne County		X	X	X		X	X	X	X	X	Consistent with ARC's Monitoring Plan
	Water Quality Monitoring	ARC/USGS - Continuous Dissolved Oxygen & Temperature	U05 - once every 5 yrs	Alliance of Rouge Communities, United States Geographical Survey		X	X	X		X		X	X	X	Consistent with ARC's Monitoring Plan
	Water Quality Monitoring	MDEQ - *e.coli* , Total Phosphorus, Total Suspended Solids	As selected by MDEQ - once every 5 yrs	Michigan Department of Environmental Quality						X	X			X	Consistent with ARC's Monitoring Plan

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Rouge Collaborative IDEP & Toxic Material Collections															
Illicit Discharge Elimination Program (IDEP)															
	City of Farmington Hills Illicit Connection Source Identification	IDEP	Area bordered by Shiawasse Road, Inkster Road, Eight Mile Road, and Middlebelt Road	Oakland County Water Resources Commission	$325,000	X	X	X		X	X	X	X	X	As a result of the identification work under this project, there are 13 known illicit discharge connections that are currently connected to Chapter 4 storm drain (3/13 need to have a new sanitary line constructed in order to connect to an existing sanitary sewer at the end of the street) that need to be removed. No design has been done on this project. Project addresses sediment and bacteria/nutrients.
	Environmental Hotline & Coordinated Complaint Response	IDEP	Various locations throughout the subwatershed	Wayne County, Oakland County		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Priority Area IDEP Advanced Investigations	IDEP	Various locations throughout the subwatershed	Wayne County, Oakland County		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	IDEP Staff Training	IDEP	Various locations throughout the subwatershed	Alliance of Rouge Communities, Wayne County		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Minimize Seepage from Sanitary Sewers	IDEP	Various locations throughout the subwatershed	Alliance of Rouge Communities		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Minimize Seepage from Onsite Disposal Systems	IDEP	Various locations throughout the subwatershed	Alliance of Rouge Communities		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Inspection of ARC Member Facilities	IDEP	Various locations throughout the subwatershed	Alliance of Rouge Communities		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Visual Inspection during Routine Field Operations	IDEP	Various locations throughout the subwatershed	Alliance of Rouge Communities		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Mapping of Storm Water Discharges to Waters of the State	IDEP	Various locations throughout the subwatershed	Alliance of Rouge Communities		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan

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Rouge Collaborative IDEP & Toxic Material Collections															
Illicit Discharge Elimination Program (IDEP)															
	SSO Corrective Actions & Permits	WWTS	Various locations	Alliance of Rouge Communities Members		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	CSO Corrective Action & Permits		Various locations	Alliance of Rouge Communities Members		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
Rouge Collaborative Public Education Plan (PEP) & GI/LID Education															
	Distribute Pollution Prevention Literature	PEP	Various locations throughout the subwatershed	Alliance of Rouge Communities Members		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Displays	PEP	Various locations throughout the subwatershed	Alliance of Rouge Communities Members		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Environmental Hotline Promotion	PEP	Various locations throughout the subwatershed	Alliance of Rouge Communities Members		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Websites & Cable TV	PEP	Various locations throughout the subwatershed	Alliance of Rouge Communities Members		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Workshops & Workdays	PEP	Various locations throughout the subwatershed	Alliance of Rouge Communities, Friends of the Rouge		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	River Day/Rouge Rescue	PEP	Various locations throughout the subwatershed	Friends of the Rouge Communities		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Volunteer Monitoring - macroinvertebrates	PEP	Various locations throughout the subwatershed	Friends of the Rouge, Wayne County		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan
	Volunteer Monitoring - Frog & Toad	PEP	Various locations throughout the subwatershed	Friends of the Rouge		X	X	X		X	X	X	X	X	Consistent with ARC's Collaborative Action Plan