

The Middle 1 Rouge River Subwatershed Advisory Group established long-term goals for its watershed management plan. Long-term goals were identified to establish a framework to guide long-term efforts to protect the existing values of the river and restore the impaired uses. Under each goal, short-term objectives were developed to identify the conditions or activities that were expected to be completed within five years, as interim steps in achieving the long-term goals. The long-term goals are listed below, along with highlighted successes. The complete list of short-term objectives can be found at www.rougeriver.com.

Rouge River Watershed Measuring Our Success



www.rougeriver.com

Goal: Reduce flow variability



The **City of Novi** Haggerty Regional Detention Basin was designed to minimize flow variability, improve water quality, and enhance habitat and wildlife. The basin, constructed in 2005, consists of three interconnected basins which treat storm water prior to discharge to Ingersoll Creek, a tributary of the Middle Rouge River.

Wayne County initiated a Grow Zone Strategy within Hines Park, along the Middle Rouge River, to increase infiltration, reduce flooding impacts and restore habitat.

Plymouth Township conducted a detention pond retrofit that included modifications to the outlet structure in order to capture and properly manage smaller rain events and minimize flow fluctuations within the local streams.

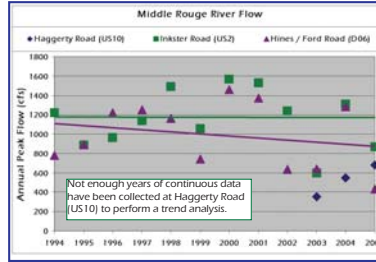


The **City of Novi** made improvements to the Dunbarton Detention Basin which improves water quality in Miller Creek, Thornton Creek and the Middle Rouge River. The project implemented water quantity and water quality improvements in two existing detention basins and utilized them for off-line storm water detention. Ultimately, the modified Dunbarton Detention Basin reduces storm water pollution to the Thornton Creek and the Middle Rouge River.

Northville Township has initiated a detention basin maintenance program that includes maintenance agreements which grant the Township a license to inspect all privately-owned detention basins and require maintenance to be performed, as needed. The program has proved very successful for dealing with privately-owned storm water systems that are not regulated under the National Pollutant Discharge Elimination System (NPDES) Phase II Storm Water Permit.

From 1990 to 2000 residential, commercial and industrial land use in the upstream communities of the Middle Rouge River have increased while agriculture, grasslands, and wetlands have decreased by approximately 10 percent. Urban development typically results in an increase in impervious area, leading to increased runoff during storm events. Moderate, stable river flows are generally best for aquatic life and stream habitats. Extreme variations of the river flow rate during storm events can result in severe bank erosion, which can significantly degrade game fish habitats.

The figure shows that peak river flows are remaining fairly consistent in the Middle Rouge River despite increasing development. This indicates that the measures taken to manage storm water runoff at upstream areas are developed are helping to protect the Middle Rouge River ecosystem.



Bennett Arboretum, Wayne County/Hines Park, Northville Township

Middle 1 Subwatershed

Goal: Reduce nutrient loading, especially with regard to all impoundments of the Middle Rouge River, upstream of and including Newburgh Lake

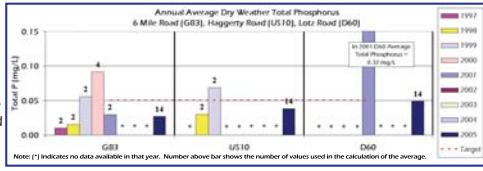
Since 1994, **Wayne County** has conducted an illicit discharge elimination program in the Middle 1 Subwatershed. In that time, 1,947 facilities were inspected and 104 facilities were found to have 599 illicit connections. Confirmed corrections have been made by 115 facilities. (This number includes corrections made in facilities inspected prior to 1994.)

Wayne County's on-site sewage disposal system (OSDS) ordinance went into effect for the Rouge Watershed in 2000. Regulations require the inspection of all residential OSDS by private evaluators at the time of property sale.



Washtenaw County conducts time of sale inspections for OSDS. In 2005, 42 septic systems were inspected in Salem Township and seven failures were identified and there were 11 drainfield replacements.

Elevated levels of phosphorus in our lakes and streams can contribute to nuisance algae blooms and excess aquatic plant growth, sometimes to the detriment of animal life. The Middle 1 Subwatershed Advisory Group has set a target to maintain total phosphorus levels below 0.05 mg/L. Mean values at all three locations in the Middle 1 in 2005 met this target level. These concentrations should control excessive algae growth in the river and downstream ponds, impoundments, and lakes.



Goal: Reduce soil erosion and sedimentation

Northville Township performed a streambank erosion inventory along the Rouge River within the Township identifying areas of concern or that may pose a future problem. All data was incorporated into the township's GIS database and erosion areas were prioritized so that corrective actions can be conducted when funding becomes available.



In 2004, **Wayne County** completed construction of 10 streambank stabilization projects along the Middle Rouge River. The projects used bioengineering and biotechnical methods, including live stakes, geogrid, riparian buffer expansions and crib walls.

In 2003, **Plymouth Township** modified a detention pond to provide controls over a broader range of storms which will help control erosion downstream of the facility.

The **City of Plymouth** conducts routine inspections along Tonquish Creek to identify areas of concern.

The **City of Novi** received a Clean Michigan Initiative (CMI) grant from the Michigan Department of Environmental Quality in 2002 to stabilize a portion of Bishop Creek, a tributary of the Walled Lake Branch of the Rouge River. Vegetated, deformable geogrid was utilized for this site.



Goal: Protect and mitigate the loss of natural features

Northville Township, City of Northville and **Wayne County** worked cooperatively to improve the water quality and habitat of Johnson Creek, a high quality headwater tributary of the Middle Rouge River and its riparian corridor by implementing streambank and pond enhancements at Fish Hatchery Park, which is owned by both communities.



The **City of Northville** restored its Mill Pond to treat storm water and increased its educational, recreational, environmental and neighborhood aesthetic potential.

Northville Township's Quail Ridge Drain Improvements Project, which was funded by the township, the **City of Novi**, the Rouge Project and CMI, created a conservation easement on the drain, used bioengineered streambank stabilization techniques, and used natural channel and compound channel design techniques.

Toll Brothers Landscaping donated to **Northville Township** the design and construction of two demonstration native landscape beds during Johnson Creek Day 2006. Native landscaping enhances water quality in several ways. Plants native to Michigan require less fertilizing which means less nutrients are transported to our rivers and streams. Other advantages of utilizing native plants are their root structure. Grass has a very shallow root structure while native plants' deep root structure can assist in stabilization of streambanks and water absorption/infiltration during a rain event.



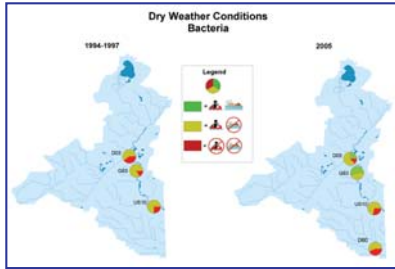
Goal: Increase opportunities for passive and active recreational uses

The Bennett Arboretum in Northville Township is a natural, historic resource that was the focus of a master planning process in 2005 through a partnership between **Wayne County, the State of Michigan, Northville Township, and the University of Michigan.**



Northville Township developed a master plan for both the Coldwater Springs Nature Area and the adjacent linear park, providing passive recreation and educational opportunities for residents. Located near Ridge Wood Elementary School, the nature area will be utilized for educational field trips to discuss water resource issues, wildlife habitat and natural features.

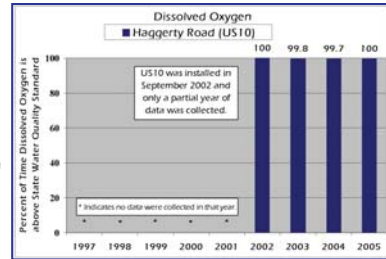
Recent dry weather water quality monitoring in the Middle 1 subwatershed shows that the river is not always suitable for recreational activities like swimming, but that conditions have improved in and downstream of Johnson Creek. Monitoring data from 2005 at D03 was collected by the MDEQ, all other data was collected by the Assembly of Rouge Communities, now the Alliance of Rouge Communities (ARC) and the Rouge Project. The chart shows the percent of the time conditions were suitable for swimming and boating based on state water quality standards for bacteria.



Goal: Improve water quality, water quantity and biological monitoring in the subwatershed to measure progress

Dissolved oxygen in the river is important to the survival of fish and other aquatic life. Insufficient dissolved oxygen limits ecosystem diversity and can result in fish kills and produce foul odors from the decomposition of organic materials. Michigan water quality standards require a minimum of 5.0 mg/L of dissolved oxygen to support warm water fish populations.

The figure shows the percent of the time dissolved oxygen concentrations met the State standard at Haggerty Road (US10), indicating that conditions have been protective of warm water fish populations nearly 100 percent of the time since monitoring began in 2002, which was funded by the **ARC.**



The largest concentrations of wood frogs and spring peepers were in Maybury State Park in the **City of Northville** and the wetlands south of the **City of Walled Lake** in the 2005 Frog and Toad Survey sponsored by Friends of the Rouge (FOTR).



Since 2001, FOTR has expanded its volunteer benthic macroinvertebrate monitoring program to include 19 sites in the Middle 1 that are sampled on a rotating basis three times a year. Johnson Creek in **Salem Township** and the **City of Northville** still has a diverse assemblage of sensitive macroinvertebrates such as stoneflies, caddisflies and mayflies.

Goal: Increase public understanding of their role in protecting water quality

Plymouth Township initiated an innovative approach to storm water education by creating neighborhood-specific presentations that include images and techniques unique to each neighborhood, while addressing unilateral actions that can be taken by homeowners to reduce non-point source pollution entering the Rouge River.



Canton Township developed a detention pond maintenance video that provides background on storm water management as well as step-by-step information on what type of maintenance is necessary to keep detention ponds functioning properly.



Northville Township and **Wayne County** supported and facilitated the Johnson Creek Protection Group.

The **City of Wixom** conducted a commercial lawn maintenance workshop.

Ours to Protect road signs have been installed at numerous Middle 1 subwatershed tributary crossings by **communities, Wayne County** and **Oakland County.**



Plymouth Township created an interpretive and education system along Tonquish Creek.

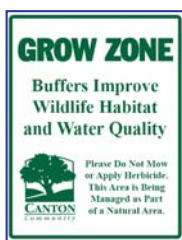
Northville Township created several seasonal displays for use in its public library; disseminated educational brochures and promoted storm water-related articles in local newspapers and on its website.

Goal: Integrate storm water management in planning and land use approval process



The Johnson Creek Protection Group is afforded the opportunity in **Middle 1 communities** to provide comments on project site plans that may affect Johnson Creek.

Canton Township implemented a Detention Basin Landscaping Ordinance that details specific native plant requirements, including wetland plants and riparian buffer vegetation, for any new or retrofitted detention basins within the community.



The **Wayne County** Storm Water Ordinance was adopted in 2000 to help minimize flooding problems, streambank erosion and other impacts to natural resources down stream of development projects. The ordinance requires that management measures be implemented as part of development projects to reduce peak river flows and remove pollution from storm water runoff. To date, storm water management measures have been implemented as part of over 3,000 development projects in the county under this program.



Goal: Establish financial and institutional arrangements for the fulfillment of the management plan

The **City of Northville, Northville Township** and the **City of Livonia** joined forces to host a biannual Household Hazardous Waste (HHW) Day free to all of their residents. By collaborating on this effort, each community saves costs while offering residents two collection events each year instead of one.

The **City of Plymouth** and **Plymouth Township** have combined efforts to offer a HHW collection program to their residents. As a result, participation rates nearly doubled as did the volume of wastes that were collected and disposed of properly.

The **Middle 1 communities** participate in the Southeast Michigan Partners for Clean Water which produced and widely distributed materials on "Seven Simple Steps to Clean Water," which discusses proper fertilizer use, car washing techniques, pet waste disposal and other river-friendly behaviors.



The **ARC** was founded in 2003 to enable Rouge River Watershed communities to lead watershed management activities into the future. In 2005, thanks to efforts spearheaded by the ARC and supported by other watershed entities, government officials and environmental organizations, legislation was signed by Michigan's governor to institutionalize watershed alliances such as the ARC. The ARC conducts water quality monitoring, sponsors workshops on detention pond maintenance and septic systems maintenance and promotes river-friendly activities.

Goal: Enforce action plans and increase accountability for storm water management

The majority of **Middle 1 communities** and the counties require inspections and certification of constructed Best Management Practices (BMP) such as detention basins. This ensures that these BMPs are functioning properly for the property owners following construction activities.



The **City of Novi** hosted a "Keeping it Clean" workshop for municipal maintenance staff which provided an overview of the good housekeeping requirements outlined in the federal Phase II Storm Water Regulations and how individual actions can protect our water resources. This training was designed to ensure that municipalities properly manage their own garages and storage yards in order to minimize storm water runoff impacts to local waterways. The workshop was presented by the Southeast Michigan Council of Governments (SEMCOG) and the Southeast Partners for Clean Water, and was funded in part by the Rouge River National Wet Weather Demonstration Project.



Keeping it Clean
Municipal operations for clean water



Rouge River Subwatershed

The Middle 1 Rouge River Subwatershed covers approximately 80.6 square miles or 51,586 acres in Oakland, Washtenaw and Wayne counties. The Middle 1 Subwatershed is nearly 50 percent developed and impervious surfaces make up nearly 20 percent of the land. The Middle 1 Subwatershed contains many tributaries including the Johnson Creek, Tonquish Creek, Willow Creek, Bishop Creek, Meadowbrook Lake, Phoenix Lake, Wilcox Lake and Newburgh Lake.

As part of the subwatershed management planning process, long term goals and short term objectives were established in the 2001 Middle 1 Rouge River Subwatershed Management Plan. The long term goals of the Middle 1 Rouge River Subwatershed management plan are, in order of importance:

1. Reduce flow variability.
2. Reduce nutrient loading, especially with regard to all impoundments of the Middle Rouge River, upstream of and including Newburgh Lake.
3. Reduce soil erosion and sedimentation.
4. Protect and mitigate the loss of natural features.
5. Increase opportunities for passive and active recreational uses.
6. Improve water quality, water quantity and biological monitoring in the subwatershed to measure progress.
7. Increase public understanding of their role in protecting water quality.
8. Integrate storm water management in planning and land use approval process.
9. Establish financial and institutional arrangements for the fulfillment of the management plan.
10. Enforce action plans and increase accountability for storm water management.

The subwatershed management planning process and subwatershed projects that fulfilled Subwatershed Advisory Group goals couldn't have been completed without partnerships between the communities, the counties, non-profit organizations, stewardship groups, citizens, local schools, colleges and universities.



Every August the **City of Walled Lake** sponsors a Market Day downtown by the lake with vendors selling arts, crafts, and baked goods. The City of Walled Lake Department of Public Works sponsors a booth with a variety of public education materials.



Wayne County initiated its Grow Zone Strategy along the Middle Rouge River within Hines Park to increase infiltration, reduce flooding impacts and restore habitat.



The **City of Northville** created passive recreation opportunities at the three-acre Ford Park development, which is located next to Mill Race Historical Village.



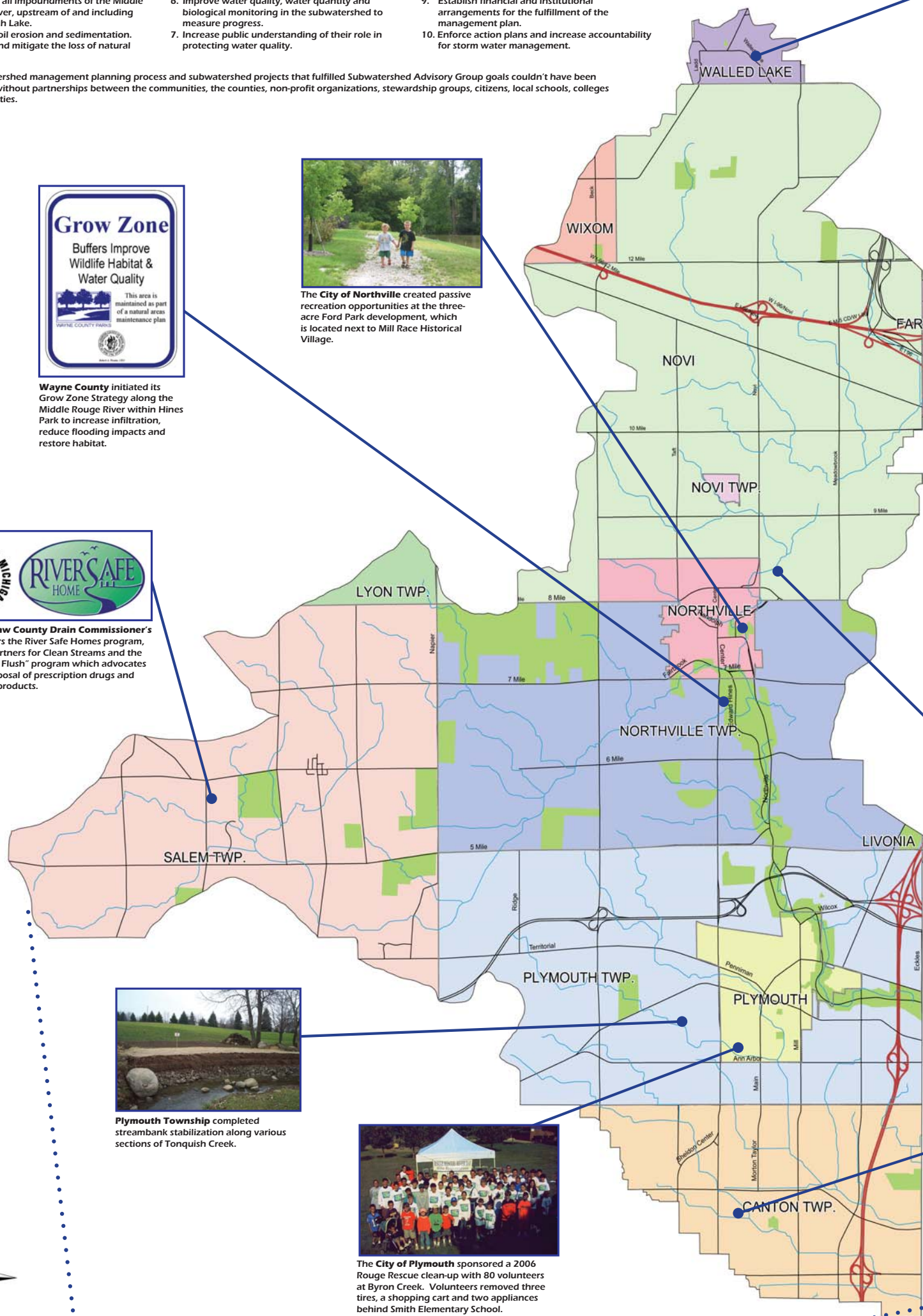
The **Washtenaw County Drain Commissioner's Office** sponsors the River Safe Homes program, Community Partners for Clean Streams and the "Don't Rush to Flush" program which advocates the proper disposal of prescription drugs and personal care products.



The **City of Farmington Hills** remediated an old landfill by creating the Farmington Hills Golf Club featuring an extended wet detention pond that filters runoff prior to discharging to a wetland.



The **City of Novi** received Rouge Project funding to conduct a streambank stabilization project using bioengineering upstream of the Northville Mill Pond.



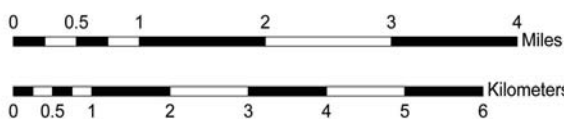
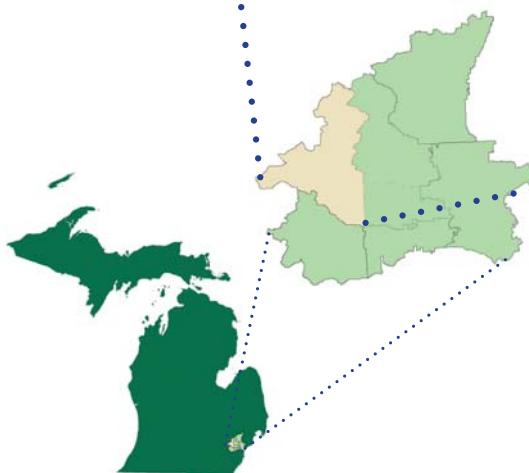
Plymouth Township completed streambank stabilization along various sections of Tonquish Creek.



The **City of Plymouth** sponsored a 2006 Rouge Rescue clean-up with 80 volunteers at Byron Creek. Volunteers removed three tires, a shopping cart and two appliances behind Smith Elementary School.



Canton Township was an active place for Western Chorus Frogs during the 2005 Frog and Toad Survey, sponsored by Friends of the Rouge. These small frogs were heard in 24 of 26 (92%) of surveyed blocks.



Land Use Category	Percentage of Total Drainage Area
Forest/rural open	22%
Urban open	4%
Agricultural	16%
Medium density residential	30%
High density residential	3%
Commercial	6%
Industrial	7%
Highways	3%
Water/wetlands	9%

Demographics

Size: 80.6 square miles
 Population (2000): 94,412
 Miles of stream: 150
 Jurisdictions: Oakland, Washtenaw and Wayne counties and 13 communities

Some photos provided by: Rouge River National Wet Weather Demonstration Project, Wayne County Department of Environment, City of Walled Lake, Northville Township, Farmington Hills, Friends of the Rouge, Washtenaw County Drain Commissioner's Office, Southeast Michigan Council of Governments (SEMCOG) and Environmental Consulting & Technology, Inc.

Legend

- Rouge River & Tributaries
- Lake
- Highway
- County Road
- Recreation Area

Communities

- CANTON TWP.
- FARMINGTON HILLS
- LIVONIA
- LYON TWP.
- NORTHVILLE
- NORTHVILLE TWP.
- NOVI
- NOVI TWP.
- PLYMOUTH
- PLYMOUTH TWP.
- SALEM TWP.
- WALLED LAKE
- WIXOM