

Chapter 6 MANAGEMENT ALTERNATIVES

There are a variety of alternative actions or best management practices that can be used to address the impairments and sources of problems and achieve the goals established for protection and restoration of the Upper Subwatershed. Exhibit 21 identifies various alternative actions initially considered by the Upper Rouge River SWAG to do the following: (a) Protect Public Health (Health), (b) Reduce Excessive Flows (Flows), (c) Maintain and Enhance the River Ecosystem for Fish and Wildlife (Ecosystem), (d) Restore Aesthetically Appealing Conditions (Aesthetics), and (e) Minimize Upland Soil Erosion and Related Sedimentation (Erosion). In the exhibit, the actions that affect specific goals are highlighted and identified by the number 1 or 2: A “1” indicates the action has a direct effect on achieving the goal, and a “2” indicates the action has an indirect beneficial effect. A more detailed description of the actions summarized below is contained in Chapter 7: Action Plan.

The alternative actions were grouped into four broad categories, Urban Source Controls, Treatment/Controls Best Management Practices, Channel Maintenance/Restoration, and Public Education/Involvement. This matrix of alternative actions versus goals focuses attention on the need for coordinated actions between communities and agencies to achieve common objectives for the river. It also highlights how specific actions relate to each goal and where additional actions may need to be considered to achieve the long-term objectives.

The effectiveness, feasibility, and cost of actions designed to address long-term goals are unknown. However, in the short-term (i.e., over the next five years), a number of steps have already been initiated, or are planned, to implement activities that will assist in accomplishing the longer-term objectives. In addition, specific activities can be undertaken to fully evaluate the feasibility and cost effectiveness of those remedial actions for which information is currently lacking. The following paragraphs outline the factors considered in the establishment of the short-term objectives for the Upper Subwatershed.

6.1 Protect Public Health

Bacteria levels in some portions of the Upper Rouge River exceed the total-body and partial-body contact recreation Michigan water quality standards established to protect public health. The bacteria levels measured (i.e., *E. coli*) are used as an indicator for the presence of pathogenic microorganisms associated with human sanitary waste. The presence of high levels of *E. coli* in watercourses often indicates that untreated sanitary waste is entering the river.

Four primary sources of untreated sanitary waste have been identified in the Upper Subwatershed; (a) illicit connections/disposal of sanitary waste systems to separate storm sewers, (b) failing onsite disposal/treatment systems (OSDS or septic tank/drain field systems), (c) untreated overflows from CSOs, and (d) uncontrolled sanitary waste overflows from separate sanitary sewer systems (SSOs). High bacteria levels measured during dry weather periods tend to identify problems associated with illicit connections or illegal discharges to a separate storm water system, or the presence of failed individual OSDS. High bacteria levels that occur in the river only during wet weather periods following heavy rains or snowmelt are most likely due to CSO or SSO discharges.

The high bacteria levels measured in the river during dry weather conditions are usually related to site-specific problems that are relatively easy to correct once identified (e.g., ordering removal of an illicit connection coming from a home or business or requiring that an individual OSDS be repaired, or a connection made to a nearby sanitary sewer). Each community and agency within the Upper Subwatershed with responsibility for storm water drains and/or public buildings has already initiated illicit discharge detection and correction programs. These illicit connection inspections and corrective action programs will be completed within the next two years. Similarly, when individual failed septic systems are discovered, corrective actions to remedy the problems are coordinated with the county

EXHIBIT 21

Alternate Actions (Best Management Practices) Related to Goals

Goals/Alternative Actions	Health	Flow	Ecosystem	Aesthetics	Erosion
URBAN SOURCE CONTROLS					
<i>ILLICIT CONNECTION DETECTION/ELIMINATION</i>					
Staff Training	1		2	2	
Outfall Inspections/Testing/Enforcement	1		2	1	
Publicly Owned Facilities	1		2	1	
Discharges to Public Storm Drains	1		2	1	
<i>ILLEGAL DUMPING/SPILL CONTROLS</i>					
Local Ordinances/Enforcement	1		1	1	
Hot Line Reporting System	1	1	1	1	1
Household Hazardous Materials Management	1		1	2	
<i>LAND USE PLANNING AND MANAGEMENT</i>					
Storm Water Management for New Developments	2	1	1	2	1
Home Lawn and Garden Maintenance			1	2	2
Flood Plain Management		1	2	2	1
Soil and Sedimentation Controls			1	1	1
<i>PUBLIC FACILITIES MANAGEMENT</i>					
Storage/Loading/Unloading Operations Mgt.	2		1	2	
Outdoor Work Area Management	2		1	2	2
Vehicles and Equipment Management	2		1	2	
Pavement Cleaning			1	2	
Street Waste Transfer Facility			2	2	
Deicing Practices			1	2	
Golf Course/Recreation Area Management			1	2	2
<i>OSD INSPECTION/MAINTENANCE</i>					
Inspections at Time of Sale	1		2	2	
Sample Inspections	1		2	2	
Septage Disposal Reporting	1		2	2	
Regional Septage Disposal Facilities	1		2	2	
<i>SEWER SYSTEM OPERATION/ MAINTENANCE</i>					
Catch Basin Cleaning			1	2	
<i>SEWER SYSTEM OPERATION/ MAINTENANCE (Continued)</i>					
Sewer System Cleaning	1		2	1	
SSO Identification/Control	1	2	1	1	
TREATMENT/CONTROL BMPs					
<i>STORM WATER SYSTEM CONTROLS</i>					
System Master Planning/GIS	2	1	1	2	1
Wet Detention Ponds		1	1	2	1
Dry Extended Detention		1	1	2	1
Off-Channel Storm Water Retention		1	1	2	1
Constructed Wetlands		1	1	1	1
Relief of Flooded Basements	1	2		1	
Swales and Filter Strips		2	1	1	1
Storm System Media Filters			1	1	1
Storm Water Infiltration		1	1	2	1
Sediment Ponds		1	1	1	1
<i>SANITARY SYSTEM CONTROLS</i>					
Oil and Grease Trap Devices	2		1	1	
In-Line Sewer Treatment Devices	2		1		
CSO Retention/Treatment Facilities	1	1	1	1	2
CHANNEL MAINTENANCE/RESTORATION					
Outlet Stabilization		2	1	1	1
Engineered Streambank Measures		2	2	1	1
Bioengineered Streambank Measures		2	1	1	1
Biotechnical Streambank Measures		2	1	1	1
Habitat Restoration		2	1	1	1
Flow Obstruction Prevention/Removal		1	2	1	1
PUBLIC EDUCATION/INVOLVEMENT					
Subwatershed Video	2		2	2	2
Direct Mailings to Homes	2		2	2	2
Events					
Rouge Clean-Up			2	1	
Presentations (Frog Survey, etc.)			1	2	
Rouge Education Project	2	2	1	1	2
Rouge Friendly Business Program	2	2	1	1	2
Storm Drain Stenciling	2		1	1	2
River Signage	2	2	2	1	2
Brochures (Residential Car Washing, etc.)	2	2	1	1	2
Cable Broadcasts	2	2	2	1	2
Public Service Radio Announcements	2	2	2	1	2
Web Sites	2	2	2	2	2
Violation Reporting and Tracking System	2		1	1	1

SOURCE: Rouge Project Office, 2000.

¹Action has direct beneficial effect.

²Action has indirect beneficial effect.

health agencies. Communities within Wayne County are discovering failed septic systems as part of the new county ordinance that requires inspection of septic systems prior to the sale of property.

High bacteria levels associated with wet weather flows such as CSOs, SSOs, or widespread septic system failures are difficult to remediate. Not only is the cost of addressing CSOs, SSOs, and widespread septic tank failures often high, but arriving at the most cost-effective solution requires time-consuming engineering studies, analysis of alternatives, and investigation of the potential impacts on the river and/or other elements of the sanitary sewer system. Replacing, upgrading, or adding capacity to an existing sanitary sewer system to address CSOs, SSOs, and widespread septic system failures is a complex task.

CSOs

Information collected in the first phase of the Rouge River CSO demonstration project and the MDEQ evaluation of the performance of the CSO basins already constructed on the Rouge River is currently being used by Redford Township and its consultants to evaluate alternatives for addressing the remaining uncontrolled CSO discharges. The schedule for design, construction, and operation of the facilities required to control the remaining CSOs in the Upper Subwatershed will be resolved under the terms of the MDEQ-issued discharge permit, which may allow for extension of the current 2005 scheduled completion date, if warranted under certain identified conditions.

SSOs

SSOs have received focused attention over the last year from both the MDEQ and the U.S. EPA. The U.S. EPA has adopted draft guidelines for defining and addressing SSOs under the Clean Water Act, and the MDEQ has begun to aggressively enforce the new SSO reporting requirements through two new state laws passed in the summer of 2000. Much of the discussion at the state and federal level on SSOs has focused on determining when, if ever, limited SSOs can be allowed. Under extreme wet weather events, separate sanitary sewer systems may overflow untreated waste since many of these separate systems were originally designed to include the transport of some storm water (e.g., basement footing drains).

Defining the design capacity standards that must be met with existing separate sanitary systems will determine how much additional construction may be required and its cost. Current contract limitations on the volume of wastewater that can be discharged into the City of Detroit sanitary system for transport and eventual treatment also will have to be evaluated in the context of resolving SSO capacity problems. Some progress in addressing SSO problems within the Upper Subwatershed has occurred recently, and more is expected over the next five years. The results of current research and project planning in areas where SSOs have been identified will determine the types and cost of required remedial measures.

In August of 2000, the Sanitary Sewer Overflow Task Force, chaired by the southeast Michigan Council of Governments (SEMCOG), published a report entitled *Implementing Sanitary Sewer Overflow Corrections: An Action Strategy*. The task force assembled to prepare this report included a majority of the Rouge River watershed communities and agencies that have responsibility for addressing existing SSO problems. The report lays out a process for implementing the SSO strategy developed by the MDEQ. It has been submitted to the MDEQ as the basis for moving forward in resolving the complex SSO issues.

Widespread Replacement of Failed Septic Systems

Replacing a large number of failed septic systems with sanitary sewers in the Upper Subwatershed will require a major capital investment in new infrastructure. In addition, the capacity of existing lateral and interceptor sanitary sewers that would receive additional volumes of waste must be evaluated. Finally, if the new sewers are to be connected to the Detroit Water and Sewer Department system,

current contract limitations on the sewage flow to that system must be considered. Mechanisms for funding new sewers to homes currently served by septic systems vary between municipalities. In some cases, existing legal requirements mandate that individual homeowners pay the full cost of providing sanitary sewer service. Engineering, legal, and funding issues make it unlikely that major new sanitary sewer services will be provided to existing developed areas within the next five years in the Upper Subwatershed, beyond those already planned and funded.

6.2 Reduce Excessive Flows

While the natural gradient of the Upper Rouge River would support a wide range of aquatic organisms, the highly fluctuating flows and accompanying bank erosion, sedimentation, and bottom scouring limits the abundance and species of organisms that can survive in the river. The natural hydraulics (river flow conditions) of the Upper Subwatershed have been significantly altered. Historically, in subwatershed areas with permeable soils, rainwater and snowmelt were allowed to percolate into the groundwater before being slowly discharged to the river. In areas where soils were impermeable, large wetlands, once common in the watershed, captured and retained storm water and snowmelt, slowly releasing water to the river. Now, many of the permeable surfaces in the subwatershed have been covered with homes, businesses, industries, parking lots, driveways, and roadways. Former wetland areas have been filled. Thus, more storm water is transported directly and quickly to the river, causing more frequent and larger floods and faster river flow velocities.

Nearly 75 percent of the Upper Subwatershed is comprised of land uses that include significant impervious surfaces. The percentage of impervious surface area in the subwatershed is expected to increase over the next 25 years. The information collected indicates that the flood flows in the river are increasing in volume and frequency, despite efforts over the last 25 years by most local governments to require onsite detention of storm water when new developments occur. The design and maintenance of previously constructed storm water detention facilities and/or the types of developments regulated under storm water detention ordinances have been inadequate to prevent an increase in the frequency of flood events.

In addition to damage caused by high river flows to fish and aquatic habitat, damage occurs to public and private property due to flooding and bank erosion. Increased attention to the design and maintenance of storm water detention facilities and to the types of development or redevelopment that are regulated will be required to prevent future increases in the frequency of flood flows. Retrofitting and maintenance of previously constructed storm water control facilities and/or new regional storm water detention basins will be required to reduce the frequency and volume of storm-related flood flows that now occur in the Upper Subwatershed.

Property owners adjacent to the river are expressing increased concerns over the frequency of floods and/or the loss of property due to bank erosion. Some areas adjacent to the Upper Rouge River have experienced increased flooding problems following heavy rain events. High water severely limits the use of golf courses and public recreation areas developed in the downstream portions of the Upper Rouge River. These areas now flood on a more frequent basis than they did in the past.

Over 90 people attended a public meeting held by the Upper SWAG in the summer of 2000, and a majority expressed concerns over flooding and bank erosion on the Bell Branch and Tarabusi Creek of the Upper Rouge River. Landowner complaints over flooding and bank erosion issues in Redford Township, Livonia, and Farmington Hills have become more frequent in recent years.

Striking a balance between property owners' concerns and maintaining adequate aquatic habitat often can be a difficult task when managing woody debris in a water body. While property owners point to fallen trees and other river obstruction debris as a major factor in flooding of property and bank erosion, woody debris in a water body provides valuable habitat for fish and other aquatic organisms.

For undeveloped land within the subwatershed, a number of options are available to reduce flows from impervious surfaces (e.g., onsite retention/detention, regional detention, groundwater infiltration basins, open space development requirements, etc.). Wayne County has recently adopted a new storm water management ordinance for all new construction that requires a permit from the county. This new ordinance is intended to reduce the volume of storm water runoff during significant storm events through onsite storm water detention or through the application of other best management practices.

Retrofitting storm water controls in developed areas is much more difficult since land available to store storm water is limited. However, emerging technologies are available to provide in-line treatment and temporary storage. Increasing the maintenance of existing retention facilities (e.g., more frequent removal of accumulated sediments) in developed areas may provide an opportunity to improve existing flow conditions. Many existing storm water detention facilities were constructed when the land first was developed. The maintenance of these facilities was often left with the property owners within a subdivision, if it was considered at all. A funding mechanism is needed to assure that the existing retention facilities are managed so that their original capacity to mitigate the damage of excessive storm water flows is maintained. The City of Farmington Hills is currently exploring financing options to address maintenance of existing, under-utilized storm water detention facilities.

A pilot project is under way in the City of Livonia (on the Bell Branch) to determine the feasibility, potential effectiveness, and cost of constructing an off-channel flood detention basin on existing public property. The results of this study should provide key information on the efficacy of constructing off-channel flood retention facilities elsewhere in the Upper Subwatershed. The storm detention facility under consideration in Livonia will consider water quality enhancement features as part of the overall design. In addition, Redford Township is considering additional storm water storage for the Bell Branch at the county-owned Bell Creek Park.

6.3 Protect and Restore River Ecosystem for Fish and Wildlife

Fisheries studies that have compared the Upper Rouge River to similar river segments in southern Michigan indicate that current stream temperatures, river gradients, and water quality should support a wider range of species and higher abundance of pollution-intolerant fish populations than now exist in the river. The primary problem related to fisheries is the highly variable flows.

Specific actions to protect and enhance water quality, preserve existing structural habitat for fish and fish food organisms, and sustain water temperatures within the preferred range are important objectives. Similarly, water-dependent wildlife populations can be protected and enhanced if appropriate steps are taken to preserve and restore essential wildlife habitat both within the river and in adjacent riparian corridors. Fish and wildlife habitat enhancement should be considered in conjunction with other public or private development projects within the subwatershed.

Reducing the quantity of hazardous waste and lawn and garden chemicals that reach the river through careless disposal, storage, or use can help protect the water quality of the river. Public education programs that are under way within the Upper Subwatershed will help address these potential sources of pollution from individual residences. Elimination of illicit connections, control of CSOs and SSOs, and remediation of failed OSDs in the Upper Rouge River also can help achieve Michigan water quality standards.

6.4 Restore and Maintain Aesthetically Appealing Conditions

The majority of the public's current primary connection to the river relates to uses of adjacent lands for recreation. Odors and unsightly trash and debris impair and discourage these recreation uses. Riparian homeowners also suffer the consequences of poor aesthetic conditions on the river. While many of the short-term objectives previously discussed will improve the aesthetics of the river (e.g., control of SSOs and CSOs), trash and litter dumped directly or washed from streets and adjacent lands into the

river are major sources of impairment to the river. Log jams and other obstructions in the river that create aquatic habitat also collect the floating and partially submerged materials washed into the river, focusing attention on the amount of debris.

7. RECREATIONAL USE OF THE ROUGE RIVER



Picnicking in a public park along the Rouge River

Annual river cleanups sponsored by Friends of the Rouge in cooperation with local governments, businesses, and volunteers have removed literally tons of trash, discarded appliances, tires, and other waste from sections of the Upper Rouge River over the last several years. A secondary benefit of the annual cleanup is the public awareness it generates about how litter and individual actions affect the river. However, the long-term success of keeping the river free of discarded waste materials is dependent upon education and getting the public involved in activities that create a sense of ownership and stewardship.

8. REMOVING TRASH AND ACCUMULATED DEBRIS FROM THE ROUGE RIVER



Rouge Rescue, sponsored by Friends of the Rouge

6.5 Minimize Upland Soil Erosion and Related Sedimentation

Urbanization has increased the rate at which soils are eroded and deposited as sediment in the Upper Rouge River. In addition to stream bank erosion caused by excessive flows, human activity on the upland areas exposes sand and silt that eventually can wash into the river. When land is disturbed during construction activities and the vegetation is removed, even light precipitation can quickly erode exposed soils and wash them into nearby drains or sewers. Street surfaces, driveways, and parking lots can accumulate silt and sand that is also washed directly into the river through storm drainage systems.

These sources of sediments can impair the effectiveness of enclosed storm drainage systems to transport storm water runoff and seriously affect the survival and abundance of fish, benthic organisms, and other aquatic animals and plants found in the river. Soil erosion and sedimentation controls at construction sites can minimize the transport of exposed soils until vegetative cover has been reestablished. Regular cleaning of streets and maintenance of storm water catch basins can reduce the amount of sediments reaching the river. The construction of grassy swales to filter storm water from paved surfaces can also reduce sediment loadings.