

Section 6

Management Alternatives

There are a variety of alternative actions or best management practices that can be used to address the impairments and the sources of problems to achieve the goals established for protection and restoration of the Middle 3 Subwatershed. The Matrix titled Middle 3 Subwatershed Actions to Achieve Goals, identifies various alternative actions initially considered by the Middle 3 Rouge River Subwatershed Advisory Group. There are seven identified categories of best management practices (BMP): 1) Reduce Peak Flows, 2) Reduce Sediment Loads, 3) Reduce Sanitary Wastewater Pollution, 4) Preserve/Increase Habitat, 5) Enhance Recreation Activities, 6) Reduce Chemical Pollutants and 7) Educate the Public. The actions related to specific goals and BMP categories are identified for each community, Wayne County and MDOT by letters and a number "1" or "2". For example, G19 indicates the action that Garden City has proposed for reducing pollutant loading in storm water. This action also falls into the BMP categories of reducing peak flows. A more detailed description of the actions included in the broad categories summarized below is contained in Chapter 7 Action Plan.

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.

6.1 Analysis of Factors Considered in Short-Term Goals

In some cases 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 goals for the Middle 3 Subwatershed.

6.1.1 Reduce Sanitary Wastewater Pollution

Bacteria levels in some portions of the Middle 3 Rouge River exceed full-body and partial body contact recreation water quality standards intended 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 water courses indicates that untreated human waste is entering the river.

Four primary sources of untreated human waste have been identified in the Middle 3 Subwatershed; 1) illicit connections/disposal of sanitary waste systems to separate storm sewers, 2) failing on-site disposal/treatment systems (septic systems or OSDS), 3) untreated overflows from combined sewers (CSOs), and 4) uncontrolled sanitary

waste overflows from separate sanitary sewer systems (SSOs). High bacteria levels measured during dry weather periods tend to identify upstream 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 upstream CSO or SSO discharges.

The high bacteria levels measured in the river during dry weather conditions are usually related to site specific problems that can be relatively easily corrected 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 connected to a nearby sanitary sewer). Each community and agency within the Middle 3 Rouge with responsibility for storm water drains and/or public buildings have already initiated illicit discharge detection and correction programs targeted to remove sanitary waste illegally discharging into separate storm drains. These illicit connection inspection and corrective action programs will be completed within the next two years. Similarly, when individual failed septic systems are discovered, corrective action to remedy the problem is coordinated with the county 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 only associated with wet weather flows such as CSOs, SSOs, or widespread septic system failures are more difficult to remediate. Not only is the cost often high to address CSOs, SSOs, or widespread septic tank failures, 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 or widespread septic system failures is a complex and generally costly task.

6.1.1.1 CSOs

The first steps of the phased demonstration program to address combined sewer overflows in the entire Rouge River system is nearing completion. The CSO projects completed in the Middle Rouge subwatershed under Phase I in the Rouge River watershed, include a new CSO detention and treatment facility in Dearborn Heights and the separation of combined sewers in the cities of Livonia, Garden City, and Westland. The remaining CSOs in the Middle 3 Rouge River are located in Dearborn Heights. Information collected in the first phase of the Rouge River CSO demonstration project including MDEQ evaluations of performance of the CSO basins constructed in the Rouge River, is currently being used by Dearborn Heights 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 Middle 3 Subwatershed will be resolved under the terms of the MDEQ issued discharge permit which may allow for extension of the 2005 date if warranted under certain identified conditions.

6.1.1.2 SSOs

SSOs have received 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 contained in 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 water due to flows exceeding the system capacity caused by infiltration and inflow (see discussion in Section 5.4). Many of these currently separated 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 at what 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 will also have to be evaluated in the context of resolving SSO capacity problems in the collecting sewer lines operated by cities, townships and county agencies. While some progress has occurred recently and more is expected over the next five years in addressing SSO problems within the Middle 3 Subwatershed, the ultimate resolution of SSOs in the Rouge River watershed is not likely to occur within the next five years.

6.1.1.3 Identify and Eliminate Failing OSDS

With the passage of the Wayne County ordinance requiring the evaluation of OSDS at the time of sale of property, there is in place a mechanism to review OSDS. The ordinance, which went into effect in January 2000, has been successful in identifying and correcting failing OSDS.

Westland has begun extending sanitary sewers to areas of the city that have OSDS. This will provide a long-term solution for wastewater from those Westland buildings now served by OSDS.

All communities are implementing illicit detection elimination plans. As failing OSDS are found, through this process or in response to a complaint, the community will cooperate with the Wayne County Environmental Health Section for follow up and correction.

Livonia has a policy of requiring regular inspection of OSDS in areas where sanitary sewers are available. This annual inspection checks on the operation of OSDS, and if the OSDS is failing, the premise is required to connect to the sanitary sewer.

6.1.2 Reduce Peak Flows

The increased volume and in-stream velocity of river flows following rainstorm and snowmelt events within the Middle 3 Subwatershed associated with urbanization, have created a number of problems. In addition to damage to private and public property due to bank erosion and flooding, the increase in flows has limited the available habitat for fish, wildlife and bottom dwelling fish food organisms.

Increased frequency and volume of flood flows in the Middle 3 Rouge River Subwatershed is primarily due to increases in pavement or structures that impede the infiltration of precipitation into the ground and cause rapid surface runoff to storm drains discharging to the river. Wetlands in the subwatershed that formally retained water from storm events have been largely eliminated over the last 100 years, adding to the problem of excessive river flows. It is important that remaining wetlands and flood plain areas within the Middle 3 Subwatershed be protected from development to preserve the water storage capacity and protect other valuable functions these areas provide. Figure 16 identifies the wetlands in the Middle 3 Subwatershed that should be protected.

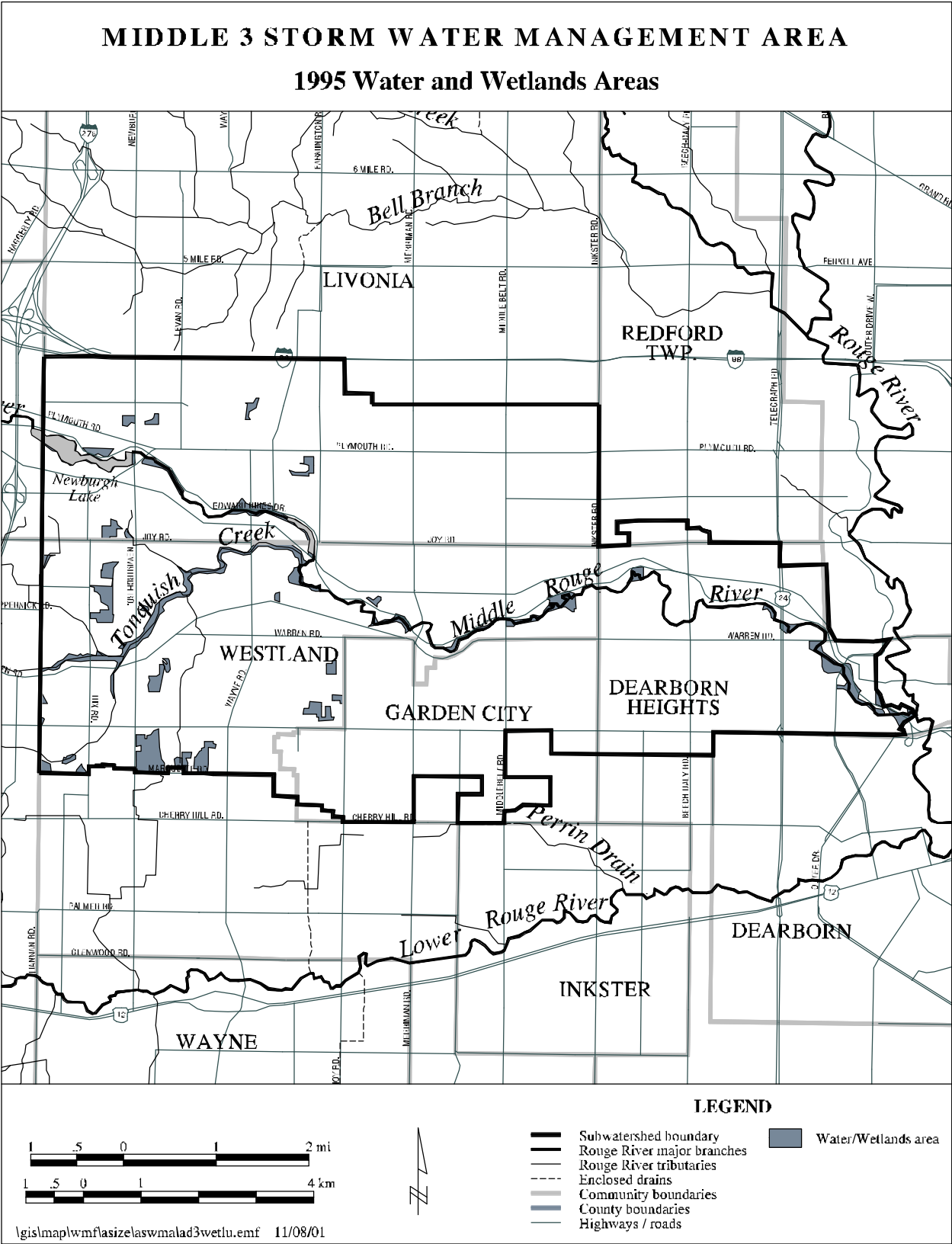
For undeveloped land within the subwatershed a number of options are available to reduce flows from impermeable surfaces (e.g. on-site retention/detention, regional detention, groundwater infiltration basins, open space development requirements, etc.).

Wayne County has recently adopted a new storm water management ordinance for all new construction that otherwise require a permit from the county. This new ordinance is intended to reduce the volume of storm water runoff during significant storm events.

Retrofitting storm water controls in the already developed areas are much more problematic since land available to store storm water is limited. Increasing the maintenance of existing retention facilities (e.g., more frequent removal of accumulated sediments) in the already developed areas may provide a limited opportunity to improve existing flow conditions. Many existing storm water retention facilities were constructed at the time the area was first developed. The cost of maintaining these facilities was 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 maintained and that their original capacity to ameliorate storm water flows is restored.

The disconnection of downspouts from discharging directly to storm sewers or combined sewers has been undertaken by all the communities. This will reduce the peak flows in the river and help in other ways to improve the environment.

Figure 16



6.1.3 Preserve/Increase Habitat

Fisheries studies that have compared the Middle 3 Rouge River to similar river segments in southern Michigan indicate that current stream temperatures, river gradient, and water quality, with minor exceptions, should support a wider diversity of species and higher abundance of pollution intolerant fish populations than now exists in the river. The habitat that fish need includes suitable water quality, passage routes, spawning grounds, feeding and resting sites, and shelter from predators and adverse conditions. The primary problem related to fisheries is the highly variable flows. The frequency, volume and velocity of current flows within the Middle 3 Rouge exceed the maximum allowable values to sustain viable populations of many species.

Reducing existing high flow conditions will be difficult, as was previously discussed. None-the-less, 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. Anticipated actions include preserving and enhancing existing wetlands, wetland mitigation banking, constructing wetlands and restoration of habitats. 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. Opportunities for fish and wildlife habitat enhancements will be considered by Wayne County 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 underway and planned within the Middle 3 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 septic systems in the Middle 3 Rouge can help achieve restoration of dissolved oxygen levels to meet state water quality standards intended to protect aquatic organisms. Planting trees along the river will also help reduce the water temperature, stabilize stream banks and will provide habitat for wildlife.

6.1.4 Enhance Recreational Activities

The majority of the public's current primary connection to the river relates to uses of land adjacent to the river for recreation and water activities on Newburgh and Nankin Lakes (boating, fishing, triathlon events, picnicing, birding, etc.). Odors and unsightly trash and debris impair and discourage these recreation uses. Property owners riparian to the river also suffer the consequences of poor aesthetic conditions on the river. While many of the short-term goals previously discussed will improve the aesthetics of the river (e.g., log jam removal, stream bank stabilization), trash and litter dumped directly or washed from streets and adjacent lands into the river is

major source of impairment to the river. Log jams and other obstructions in the river collect the floating and partially submerged materials washed into the river focusing attention on amount of debris.

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 Middle 3 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 maintaining the river free of discarded waste materials is through education and public involvement in activities that create a sense of ownership and stewardship.

6.1.5 Reduce Sediment Loads

Urbanization has increased the rate that soils are eroded and deposited as sediment in the Middle 3 Rouge River. In addition to stream bank erosion caused by excessive flows, human activity on the upland areas generates sand and silt that eventually can wash into the river. When land is disturbed during construction activities and the vegetation 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 also is washed directly into the river through storm drainage systems.

These sources of sediments can impair the effectiveness of storm sewers to transport storm water runoff and also seriously affect the survival and abundance of fish, fish food 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. The 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, detention/retention ponds, media filters on storm sewers can also reduce sediment loadings.

6.1.6 Reduce Chemical Pollutants

PCBs, a persistent chemical that had been discharged upstream of Newburgh Lake, have caused a fish eating advisory to be placed on the Middle Rouge River. With the removal of the sediments in Newburgh Lake the PCB contamination has been eliminated. Mercury remains a problem and also is mentioned in the fish eating advisory.

Algae on Newburgh Lake turns the lake green after rain events in the warmer months. Nankin Lake also experiences algae problems. Excessive nutrients, especially phosphorous, contributes to the algae problems. The major source of phosphorous and other nutrients in stormwater runoff has been reported in other watersheds from fertilizer applications. SEMCOG has prepared a report on Managing

Fertilizer to Protect Our Water Resources. Educational efforts and an ordinance that supports environmentally friendly lawn applications should remind people of what they can do to reduce runoff of chemicals to surface water.



Algae on Newburgh Lake

The programs referred to in 6.1.1 to reduce sanitary wastewater pollution will also reduce chemical pollutants. Collection of household hazardous waste will help reduce chemical pollution, as will installation of oil and grease traps on storm drains from parking areas. The Rouge Friendly Business Program also offers great pollution prevention ideas that are cost effective.

6.1.7 Educate the Public

Communities are committed to education of the public to fulfill part of the requirements of the community storm water permit. The Public Participation Plan being implemented by the communities in the Middle 3 subwatershed continually brings messages about what the public and businesses can do to restore and improve the river. A variety of methods will be used to reach the public. These include direct mailings, storm drain stenciling, river signage, public displays radio and television spots, community meetings, newsletters, advertisements, presentations and videos.