

Chapter II

RECOMMENDATIONS OF THE REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE FOR THE ROOT RIVER WATERSHED

The 2007 regional water quality management plan update for the greater Milwaukee watersheds (RWQMPU)¹ updated the initial regional water quality management plan² for six watersheds, including the Root River watershed. The RWQMPU addressed three major elements of the original regional water quality management plan: the land use element, the point source pollution abatement element, and the nonpoint source pollution abatement element. In addition, the updated plan included consideration of several issues that were not considered in the initial plan, including instream and riparian habitat conditions and groundwater management. The RWQMPU planning effort was conducted in conjunction and coordination with the development of the Milwaukee Metropolitan Sewerage District's (MMSD) 2020 facility plan.

The RWQMPU made numerous recommendations that are relevant to the Root River watershed. These recommendations fall into nine broad areas:

- Land Use,
- Point Source Pollution Abatement Measures,
- Nonpoint Source Pollution Abatement—Rural Control Measures,
- Nonpoint Source Pollution Abatement—Urban Control Measures,
- Instream Water Quality Management Measures,
- Inland Lake Water Quality Management Measures,

¹*SEWRPC Planning Report No. 50, A Regional Water Quality Management Plan Update for the Greater Milwaukee Watersheds, December 2007.*

²*SEWRPC Planning Report No. 30, A Regional Water Quality Management Plan for Southeastern Wisconsin: 2000, Volume One, Inventory Findings, September 1978; Volume Two, Alternative Plans, February 1979; Volume Three, Recommended Plan, June 1979.*

- Auxiliary Water Quality Management Measures,
- Groundwater Management Measures, and
- Recommended Water Use Objectives.

Table 2 summarizes the recommendations of the RWQMPPU as they relate to the Root River watershed. In addition, the table indicates which recommendations relate to each of the four focus areas of the watershed restoration plan: water quality conditions, recreational use and access, habitat conditions, and flooding.

SUMMARY OF RECOMMENDATIONS OF THE REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE

Land Use Element

The land use element of the regional water quality management plan update included both an inventory of existing development in year 2000 and the identification of planned year 2020 development. In addition, projections of buildout land use conditions were developed for municipalities located within the MMSD planning area.

Year 2020 and buildout population and land use estimates were initially developed by the SEWRPC staff and the communities served by the MMSD based on future land use information provided by those communities. Those initial year 2020 populations and land development assessments were used for sizing the conveyance components of MMSD's Metropolitan Interceptor System. Planned land use data and population forecasts from the SEWRPC 2020 regional land use plan³ were applied for communities in the study area that are not served by MMSD.

When data from the SEWRPC 2035 regional land use plan⁴ became available, 2020 land use and population estimates for the MMSD communities were revised using a 2020 stage of those data and the revised data were used to develop the wastewater treatment components called for under the recommended MMSD 2020 facilities plan which is incorporated in the regional plan. Similarly refined population estimates were used for the 2020 condition evaluation of all of the public sewage treatment plants in the study area. Revised 2020 industrial and commercial land use estimates were also applied for the development of revised nonpoint source pollution loads used in modeling the instream water quality conditions under revised future year 2020 and recommended water quality plan conditions.

The RWQMPPU makes several recommendations related to land use:

- That primary environmental corridors be preserved in essentially natural, open uses, forming an integrated system of open space lands. Under the RWQMPPU, development within the primary environmental corridors would be limited to essential transportation and utility facilities, compatible outdoor recreation facilities, and rural-density residential development⁵ in upland corridor areas not encompassing steep slopes. Several measures are in effect that help ensure the preservation of environmentally significant areas in the Root River watershed.

³*SEWRPC Planning Report No. 45, A Regional Land Use Plan for Southeastern Wisconsin: 2020, December 1997.*

⁴*SEWRPC Planning Report No. 48, A Regional Land Use Plan for Southeastern Wisconsin: 2035, June 2005.*

⁵*Rural density residential development consists of a maximum of one dwelling unit per five acres.*

Table 2

RELATIONSHIP OF RECOMMENDATIONS OF THE REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE TO FOCUS AREAS OF THE ROOT RIVER WATERSHED RESTORATION PLAN

Recommendation	Focus Area			
	Water Quality	Recreation	Habitat	Flooding
Land Use				
Develop according to approved local land use plans	--	X	X	X
Preserve primary environmental corridors in essentially open space uses	X	X	X	X
Consider preserving secondary environmental corridors and isolated natural resource areas in essentially open space uses	X	X	X	X
Preserve all identified natural areas and critical species habitat sites in public or public-interest ownership	--	X	X	X
Preserve, to the extent practicable, all farmland covered by Class I and Class II soils	--	--	--	--
Point Source Abatement Measures				
Refine sanitary sewer service areas	X	X	--	--
Continue operation and maintenance of MMSD, Racine, Union Grove, and Yorkville wastewater treatment plants	X	X	--	--
Abandon Yorkville wastewater treatment plant at the end of its useful life	X	X	--	--
Construct and maintain local sanitary sewer systems	X	X	--	--
Evaluate the need to reduce infiltration and inflow of clearwater into sanitary sewers	X	X	--	--
Implement Capacity, Management, Operations, and Maintenance (CMOM) programs	X	X	--	--
Continue operation and maintenance of Fonk's Mobile Home Park wastewater treatment plant	X	X	--	--
Construct two additions to the MMSD Metropolitan Interceptor System	X	X	--	--
Continue to regulate wastewater treatment plant and industrial discharges under the Wisconsin Pollutant Discharge Elimination System (WPDES) program.	X	X	--	--
Nonpoint Source Abatement-Rural Control Measures				
Implement practices to reduce soil loss from cropland to rates below the tolerable soil loss rate, "T"	X	--	X	--
Require agricultural operations with 35 or more combined animal units to provide six months of manure storage	X	X	--	--
Apply manure and supplemental nutrient to cropland in accordance with nutrient management plans	X	X	--	--
Consider increasing levels of cost-share funding for barnyard runoff best management practices (BMPs)	X	X	--	--
Increase crop and pasture riparian buffers to minimum 75-foot widths	X	X	X	X
Limit the number of stream crossings and configure crossings to minimize fragmentation	--	X	X	X

Table 2 (continued)

Recommendation	Focus Area			
	Water Quality	Recreation	Habitat	Flooding
Nonpoint Source Abatement-Rural Control Measures (continued)				
Convert marginally productive agricultural lands to wetland or prairie conditions	X	X	X	X
Restrict livestock access to streams	X	X	X	--
Take measures to ensure proper handling and treatment of milking-center wastewater	X	--	--	--
Implement county-enforced inspection and maintenance programs for private onsite wastewater treatment systems constructed after counties adopted private sewage system programs	X	X	--	--
Institute voluntary programs to inventory and inspect private onsite wastewater treatment systems constructed before counties adopted private sewage system programs	X	X	--	--
Nonpoint Source Abatement-Urban Control Measures				
Implement construction erosion control and urban nonpoint source pollution controls consistent with standards in NR 151	X	X	X	--
Implement programs to detect and eliminate illicit discharges and control pathogens that are harmful to human health	X	X	--	--
Conduct human health and ecological risk assessments to address pathogens in stormwater runoff	X	X	--	--
Implement chloride reduction programs	X	--	--	--
Implement fertilizer management programs	X	--	--	--
Implement pet litter management programs	X	X	--	
Implement beach and riparian litter and debris programs	X	X	X	--
Conduct targeted research on bacteria and pathogens and research on stormwater BMP techniques and programs	X	X	--	--
Instream Water Quality Management Measures				
Implement projects called for under the Milwaukee County stream assessment study	X	--	X	--
Prepare abandonment and riverine area restoration plans for dams	X	--	X	--
Limit the number of culverts, bridges, drop structures, and channelized stream segments and incorporate measures to allow for passage of aquatic organisms	--	--	X	X
Remove abandoned bridges and culverts	--	--	X	X
Protect remaining stream channels, including small tributaries and shoreland wetlands	X	--	X	--
Restore wetlands, woodlands, and grasslands adjacent to stream channels and establish minimum buffers 75 feet in width	X	X	X	X
Restore and enhance stream channels	X	--	X	--
Monitor fish and macroinvertebrate populations	X	--	X	--
Consider more intensive fisheries manipulation measures where warranted, based upon specific goals developed in detailed local-level planning	--	X	X	--

Table 2 (continued)

Recommendation	Focus Area			
	Water Quality	Recreation	Habitat	Flooding
Inland Lake Water Quality Measures				
Implement recommendations of Milwaukee County park pond and lagoon management plan	X	X	X	--
Conduct aquatic plant surveys in those lakes in which plant management activities are being conducted	--	--	X	--
Establish long-term monitoring stations in inland lakes	X	X	--	--
Auxiliary Water Quality Management Measures				
Implement waterfowl control programs, where necessary	X	X	--	--
Continue, support, and institute household hazardous waste collection programs	X	--	--	--
Continue, support, and institute collection programs for unused and expired medications	X	--	--	--
Conduct assessments and evaluations of the significance for human health and wildlife of the presence of pharmaceuticals and personal care products in surface waters	X	--	--	--
Continue and support programs to reduce the introduction and spread of exotic and invasive species	--	--	X	--
Document and monitor the occurrence and spread of exotic and invasive species	--	--	X	--
Continue and support current surface water quality monitoring programs	X	X	--	--
Extend long-term monitoring programs to areas outside of the MMSD service area	X	X	--	--
Establish long-term fisheries, macroinvertebrate, and habitat monitoring stations.	X	X	X	--
Continue efforts to facilitate consolidation of data from different monitoring programs	X	X	X	--
Continue and expand citizen-based monitoring efforts, with an emphasis on filling geographical data gaps	X	X	X	--
Maintain and update RWQMPU/MMSD 2020 Facility Plan water quality models	X	--	--	X
Groundwater Management Measures				
Maintain important groundwater recharge areas	X	--	X	X
Consider groundwater sustainability guidance from the regional water supply plan in evaluating the sustainability of proposed developments and local land use planning	X	--	X	--
Develop and implement utility-specific water conservation programs	X	--	X	--
Consider the potential impacts on groundwater quality of stormwater management facilities	X	--	--	--
Recommended Water Use Objectives				
Upgrade objectives for Hoods Creek, Tess Corners Creek, and Whitnall Park Creek to Fish and Aquatic Life	X	X	--	--
Upgrade objective for Ives Grove Ditch to Limited Forage Fish	X	X	--	--

Source: SEWRPC.

- That the preservation of secondary environmental corridors and isolated natural areas be encouraged and that counties and communities consider the preservation of these areas in the preparation of county and local land use plans.
- That all of the identified natural areas and critical species habitat sites designated for acquisition under the regional natural areas and critical species habitat plan (specified sites not in existing public or public-interest ownership) be preserved,⁶ and
- That, to the extent practicable, the most productive farmland, identified as farmland covered by agricultural capability Class I and Class II soils as classified by the U.S. Natural Resources Conservation Service be preserved.⁷

Point Source Pollution Abatement Plan Subelement

The RWQMPPU includes recommendations related to public wastewater treatment plants (WWTPs) and associated sewer service areas, private wastewater treatment plants, and other point sources of water pollution. The RWQMPPU reiterates the initial regional water quality management plan's recommendation that all sanitary sewer service areas be refined. Unrefined sewer service areas are the product of systems level planning and are normally generalized in nature. The refining process determines a precise sewer service area boundary that is consistent with local land use plans and development objectives. Reports documenting the refined sewer service area include detailed maps of environmentally significant lands within the sewer service area. The refining process is conducted by the community concerned, with the assistance of Regional Planning Commission staff. Following adoption by the designated management agency for the sewage treatment plant, local sewer service area plans are considered for adoption by the Regional Planning Commission as formal amendments to the regional water quality management plan. The Commission then forwards the plans to the WDNR for approval.

The RWQMPPU recommends that the MMSD, City of Racine, Village of Union Grove, and Yorkville Sewer Utility District No. 1 maintain and operate WWTPs. It recommends that the MMSD upgrade its WWTPs according to its 2007 facilities plan. The RWQMPPU evaluated facilities planning needs for WWTPs based upon a criterion that facilities planning should be initiated when average daily flow to a WWTP reaches 80 percent of the plant design capacity. Based upon the evaluations in the RWQMPPU, it is not anticipated that the Village of Union Grove will need to initiate facilities planning for its plant by 2020. A June 2007 sewer service area amendment was adopted that expands the sewer service area for the City of Racine and environs to include additional areas in the Villages of Caledonia and Mt. Pleasant. The RWQMPPU recommended that following adoption of this amendment, detailed facilities planning be undertaken to establish the new conveyance, pumping, and storage facilities needed to provide service to these areas. The RWQMPPU recommended that, when the Yorkville Sewer Utility District No. 1 wastewater treatment plant reaches the end of its useful life, the entire Yorkville sewer service area be connected to the sewerage system tributary served by the Racine wastewater treatment plant and the Yorkville treatment plant be abandoned. Based on population and sewage flow information available at the time, the RWQMPPU concluded that this would likely happen sometime after the year 2020.

⁶*SEWRPC Planning Report No. 42, A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin, September 1997; amended December 2010.*

⁷*The plan does envision that some Class I and Class II farmland that is located in the vicinity of existing urban service areas will be converted to urban use as a result of planned expansion of those urban service areas. This is a matter of balancing objectives for the preservation of productive farmland with objectives for the orderly and efficient provision of urban facilities and services. The plan also anticipates the development of lands beyond planned urban service areas that have been committed to low-density and suburban-density residential development through subdivision plats and certified surveys. This may be expected to result in the additional loss of Class I and Class II farmland.*

Within the service areas described, the RWQMPPU recommends that municipalities construct and maintain local sewer systems. In Milwaukee County, this recommendation applies to all of the municipalities that are wholly or partially located in the watershed, all of which are served by MMSD. In Racine County, this recommendation applies to the City of Racine; the Villages of Mt. Pleasant, Sturtevant, and Union Grove; the Caledonia East and West Utility Districts;⁸ the Mt. Pleasant Utility District No. 1; and the Yorkville Sewer Utility District No. 1. In Waukesha County, this recommendation applies to the Cities of Muskego and New Berlin, both of which are served by MMSD. Along with this recommendation, the plan calls for the municipalities operating local sewerage systems to evaluate the need to reduce clearwater infiltration and inflow into sewers and implement Capacity, Management, Operations, and Maintenance (CMOM) programs. CMOM is a program initiated by USEPA that provides a framework for municipalities to identify and incorporate widely accepted wastewater industry practices in order to better manage, operate, and maintain collections systems; investigate capacity constrained areas of the collection system; and respond to sanitary sewer overflow events. MMSD rules require that the communities within its service area implement CMOM programs. The RWQMPPU also recommends eliminating discharges from all points of sewerage flow relief in sewerage systems.

Within the Root River watershed, the RWQMPPU recommends continued operation of one privately owned wastewater treatment plant that serves Fonk's Mobile Home Park in the Town of Yorkville. It also recommends that this plant be upgraded and that the level of treatment be formulated as part of the Wisconsin Pollutant Discharge Elimination System (WPDES) permitting process.

In the Root River watershed, the RWQMPPU recommends constructing two additions to the MMSD Metropolitan Interceptor System: the Franklin-Muskego interceptor and the Ryan Creek interceptor.

The RWQMPPU recommends continued regulation of WWTP and industrial discharges to surface waters through the WPDES program, with effluent concentrations of pollutants being controlled to acceptable levels on a case-by-case basis through the operation of the WPDES.

Nonpoint Source Pollution Abatement Subelement

Recommended Rural Nonpoint Source Pollution Control Measures

The RWQMPPU includes recommendations for rural nonpoint source pollution control measures for the Root River watershed that are generally consistent with the land and water resource management plans for the counties within the watershed.⁹

The RWQMPPU calls for practices to reduce soil loss from cropland to be expanded to attain erosion rates less than or equal to "T," the maximum average annual rate of soil loss that can occur without significantly affecting crop productivity, by 2020. This could be accomplished through a combination of practices, including, but not limited to, expanded conservation tillage, grassed waterways, and riparian buffers. The applicable measures

⁸*The Caledonia West Utility District includes the Caddy Vista sewer service area, which is served by MMSD.*

⁹*SEWRPC Community Assistance Planning Report, No. 255, 2nd Edition, A Land and Water Resource Management Plan for Kenosha County: 2008-2012, October 2007; SEWRPC Community Assistance Planning Report No. 312, A Land and Water Resource Management Plan for Milwaukee County: 2012-2021, August 2011; SEWRPC Community Assistance Planning Report, No. 259, 2nd Edition, A Land and Water Resource Management Plan for Racine County: 2008-2012, October 2007; and Waukesha County Department of Parks and Land Use, Waukesha County Land and Water Resource Management Plan: 2006-2010, March 2006. (Note: the Waukesha County plan is currently being updated.)*

should be determined by the development of farm management plans which are consistent with the county land and water resource management plans.¹⁰

Because of the identified need to control fecal coliform bacteria from both urban and rural sources, the RWQMPU recommends that all livestock operations in the study area with 35 combined animal units or greater as defined in Chapter NR 243, “Animal Feeding Operations,” of the *Wisconsin Administrative Code*, provide six months of manure storage, enabling manure to be spread on fields twice annually during periods when the ground would not be frozen prior to spring planting and after summer and fall harvest.¹¹ Based on a review of the technical literature presented in the plan report, it was found that storing the manure for this period of time could reduce fecal coliform bacteria and *E. coli*. concentrations by about 90 percent.¹² It also recommends that manure and any supplemental nutrients be applied to cropland in accordance with a nutrient management plan consistent with the requirements of Sections ATCP 50.04, 50.48, and 50.50 and Section NR 151.07 of the *Wisconsin Administrative Code*. Finally, it recommends that nutrient management requirements for concentrated animal feeding operations in the study area be based on the WPDES permit conditions for those operations.

Chapters NR 151, “Runoff Management,” and ATCP 50, “Soil and Water Resource Management Program,” of the *Wisconsin Administrative Code* have certain provisions that relate to control of barnyard runoff, including those related to manure storage facilities, manure management, and clean water diversions. However, because existing operations are excluded from the requirements if cost-share funding is not available, and because of the limited amount of such funding that is available annually, many livestock operations are not compelled to comply with the provisions related to barnyard runoff. In order to attain a greater level of control of barnyard runoff, the RWQMPU recommends that consideration be given to increasing levels of cost-share funding to enable a higher level of implementation of the best management practices needed to meet the performance standards related to barnyard runoff.

Based on a review of the literature related to the effectiveness of riparian buffers in controlling nonpoint source pollution, the RWQMPU concludes that a minimum 75-foot riparian buffer width along each side of streams flowing through current crop and pasture land is optimal for the control of nonpoint source pollution. The plan update recommends that:

- In general, where existing riparian buffers adjacent to crop and pasture lands are less than 75 feet in width, they be expanded to a minimum of 75 feet,

¹⁰*The recommended rural nonpoint source pollution control measures in the RWQMPU were based upon, and incorporated, agricultural performance standards from Chapter NR 151, “Runoff Management,” of the Wisconsin Administrative Code that were in effect from 2004 through 2007 when the RWQMPU was being developed. NR 151 was revised in 2010, with revisions taking effect January 1, 2011. The current agricultural performance standards are described in Chapter III of this report.*

¹¹*Section NR 243.05 sets forth two methods for calculating animal units: one method based on “combined animal units” and one based on “individual animal units.” In determining the number of animals for which the manure storage recommendation of the regional water quality management plan applies, it is recommended that the method be applied that yields the lowest number of animals for a given category. For example, based on this approach, 35 animal units are equivalent to 25 milking cows; 35 steers; 87 55-pound pigs; and 1,050 to 4,375 chickens, depending on the type and whether the manure is liquid or nonliquid.*

¹²*SEWRPC Planning Report No. 50, op. cit.*

- The procedures for targeting buffers to locations where they would be most effective as developed under the Wisconsin Buffer Initiative be considered in the implementation of the riparian buffer recommendation made herein,¹³
- Opportunities to expand riparian buffers beyond the recommended 75-foot width be pursued along high-quality stream systems, including those designated as outstanding or exceptional resource waters of the State, trout streams, or other waterways that support and sustain the life cycles of economically important species such as salmon, walleye, and northern pike, and
- The number of stream crossings be limited and configured to minimize the fragmentation of stream-bank habitat.

Consistent with this, the RWQMPU identified specific sections of stream bank in the Root River watershed do be considered for establishment or expansion of riparian buffers. These recommendations are shown on Map 3.

The RWQMPU recommends that:

- A total of 10 percent of existing farmland and pasture be converted to either wetland or prairie conditions. The focus of this effort should be on marginally productive lands, which are defined as agricultural lands other than those highly productive lands designated as Class I and Class II lands by the U.S. Natural Resources Conservation Service. Consistent with this, the RWQMPU identified candidate areas to be given first consideration when identifying marginally productive lands to be converted to wetlands and prairies.¹⁴ Candidate areas that were identified in the Root River watershed are shown on Map 4. In the Root River watershed, the RWQMPU identified approximately 8,685 acres of candidate areas;
- Livestock access to streams be restricted through fences and other means;
- Measures be taken to ensure proper handling and treatment of milking center wastewater from dairy farms; and
- At a minimum, county-enforced inspection and maintenance programs be implemented for all new or replacement private onsite wastewater treatment systems (POWTS) constructed after the date on which the counties adopted private sewage system programs, that voluntary county programs be instituted to inventory and inspect POWTS that were constructed prior to the dates on which the counties adopted private sewage system programs, and that the WDNR and the counties in the study area work together to strengthen oversight and enforcement of regulations for disposal of septage and to increase funding to adequately staff and implement such programs.

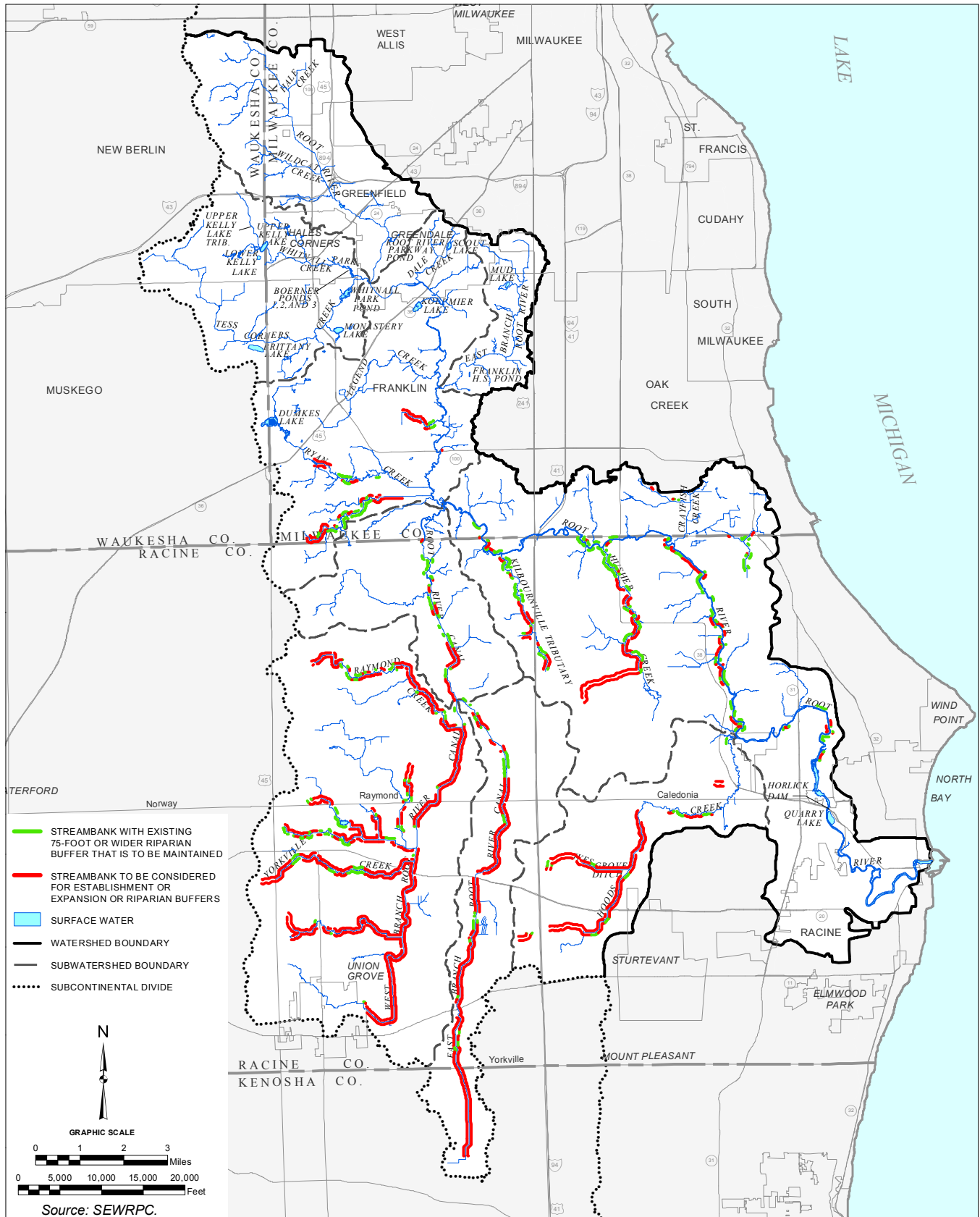
¹³*College of Agriculture & Life Sciences, University of Wisconsin-Madison, The Wisconsin Buffer Initiative, December 2005.*

¹⁴*The MMSD conservation and greenway connection plans program (Greenseams) provides for the purchase, from willing sellers, of natural wetlands to retain stormwater with the intention of reducing the risk of flooding, protecting riparian land from development, and providing increased public access. The MMSD facilities plan recommends that these programs continue and be integrated with the regional water quality management plan update recommendations regarding environmental corridors and conversion of cropland and pasture to wetland and prairie conditions.*

Within the Root River watershed, the Greenseams program only applies to areas within the MMSD service area. That area generally includes the Milwaukee and Waukesha County portions of the watershed and the Caddy Vista subdivision in the Village of Caledonia. The remainder of Racine County in the watershed and the Kenosha County portion of the watershed are not included.

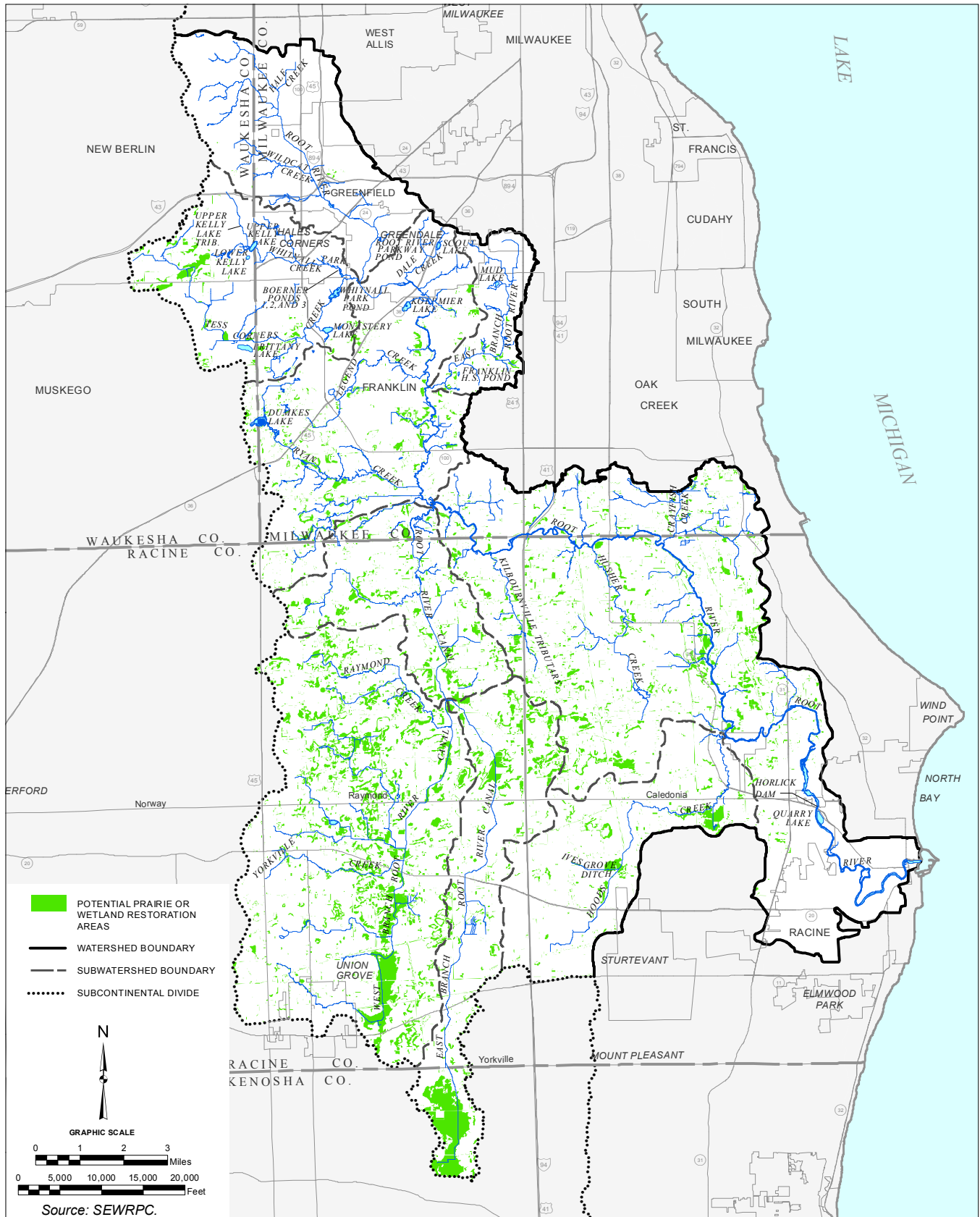
Map 3

STREAM REACHES IN THE ROOT RIVER FOR WHICH ESTABLISHMENT OR EXPANSION OF RIPARIAN BUFFERS ARE TO BE CONSIDERED



Map 4

POTENTIAL PRAIRIE OR WETLAND RESTORATION AREAS IDENTIFIED
IN THE REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE



Recommended Urban Nonpoint Source Pollution Control Measures

The RWQMPU recommends several best management practices to abate urban nonpoint source pollution. In some instances, the plan includes measures that go beyond what would be required to meet the performance standards of Chapter NR 151 of the *Wisconsin Administrative Code*.

The RWQMPU recommends that urban nonpoint source pollution controls be implemented that are consistent with the standards of Chapter NR 151.¹⁵ By implementing controls to meet these standards, municipalities will address control of construction site erosion; control of stormwater pollution from areas of existing and planned urban development, redevelopment, and infill; and infiltration of stormwater runoff from areas of new development. Urban best management practices that could be installed to control nonpoint source pollution from existing or new development could include such measures as 1) runoff infiltration/evapotranspiration and/or pollutant filtration devices such as grassed swales, infiltration basins, bioretention facilities, rain gardens, green roofs, and porous pavement; 2) stormwater treatment facilities, such as wet detention basins, constructed wetlands, sedimentation/flotation devices; and 3) maintenance practices such as vacuum sweeping of roads and parking lots.

In order to address fecal indicator bacteria and the risks posed to human health from the pathogens whose presence can be indicated by the presence of these indicators, the RWQMPU recommends enhanced urban illicit discharge control and/or innovative methods to identify and control possible pathogen sources in stormwater runoff from all urban areas in its study area, including the Root River watershed. To address the threats to human health and degradation of water quality resulting from human-specific pathogens and viruses entering stormwater systems, the plan recommends that each municipality in the study area implement a program consisting of:

- Enhanced storm sewer outfall monitoring to test for fecal coliform bacteria in dry- and wet-weather discharges,
- Molecular tests for presence or absence of human-specific strains of *Bacteroides*, an indicator of human fecal contamination, at outfalls where high fecal coliform counts are found in the initial dry-weather screenings,
- Additional dry-weather screening upstream of outfalls where human-specific strains of *Bacteroides* are found to be present, with the goal of isolating the source of the illicit discharge, and
- Elimination of illicit discharges that were detected through the program described in the preceding three steps.

It was anticipated that the program outlined above would also identify cases where illicit connections are not the primary source of bacteria, indicating that stormwater runoff is the main source. To adequately assess the appropriate way to deal with such bacteria sources (and the potentially associated pathogens), the RWQMPU recommends that human health and ecological risk assessments be conducted to address pathogens in stormwater runoff.

Water quality monitoring data set forth in the technical report that accompanied the RWQMPU indicated that chloride concentrations in the streams of the study area are increasing over time.¹⁶ The chloride is likely from

¹⁵*The recommended urban nonpoint source pollution control measures in the RWQMPU were based upon and incorporated nonagricultural performance standards from Chapter NR 151, "Runoff Management," of the Wisconsin Administrative Code that were in effect from 2004 through 2007 when the RWQMPU was being developed. NR 151 was revised in 2010, with revisions taking effect January 1, 2011. The current nonagricultural performance standards are described in Chapter III of this report.*

¹⁶*SEWRPC Technical Report No. 39, Water Quality Conditions and Sources of Pollution in the Greater Milwaukee Watersheds, November 2007.*

multiple sources, including sodium chloride and calcium chloride applied for ice and snow control on roads and parking lots, and discharges from water softener systems to either 1) POWTS which discharge to groundwater and, ultimately, to streams and lakes as baseflow, or 2) public wastewater treatment plants which discharge to surface waters. The RWQMPU makes several recommendations to reduce the amount of chlorides introduced into the environment. It recommends that the municipalities and counties in the study area continue to evaluate their practices regarding the application of chlorides for ice and snow control and strive to obtain optimal application rates to ensure public safety without applying more chlorides than necessary for that purpose. It also recommends that municipalities consider alternatives to current ice and snow control programs, such as applying a sand/salt mix to local roads and enhanced street sweeping in the spring of the year to remove accumulated sand. It recommends that education programs be implemented to provide information about 1) alternative ice and snow control measures in public and private parking lots and 2) optimal application rates in such areas. It recommends that education programs be implemented to provide information about alternative water softening media and the use of more efficient water softeners that regenerate water based upon the amount of water used and the quality of the water.

The RWQMPU recommends that the use of low- or no-phosphorus fertilizers be encouraged in areas tributary to inland lakes and ponds and that consideration be given to adopting low- or no-phosphorus fertilizer ordinances in those areas. It also recommends that information and education programs required under municipal WPDES stormwater discharge permits promote voluntary practices that optimize urban fertilizer application consistent with the requirements of WDNR Technical Standard No 1100, "Interim Turf Nutrient Management." One key provision of these standards calls for no application of fertilizer within 20 feet of a waterbody.

The RWQMPU recommends that:

- Existing litter and debris control programs along the urban streams of the study area be continued and that opportunities to expand such efforts be explored;
- All municipalities in the study area have pet litter control ordinance requirements and that these requirements be enforced; and
- Targeted research on bacteria and pathogens and research and implementation of stormwater BMP techniques and programs be supported. As part of this recommendation the plan also calls for support for research to develop and apply more direct methods of identifying sources of pathogens important to human health.

Instream Water Quality Measures Subelement

The RWQMPU recommends a number of instream water quality management measures that apply to the Root River watershed.

In 2004, Milwaukee County assessed the stability and fluvial geomorphic character of streams in the several watersheds within the County including the Root River watershed.¹⁷ This study report set forth and prioritized projects for concrete lining removal, channel rehabilitation, and fish passage improvement. The RWQMPU recommends that the projects called for under the Milwaukee County stream assessment study be implemented over time in a manner consistent with the need to provide flood protection and consistent with the stream rehabilitation recommendations of the regional plan update.

The RWQMPU recommends that abandonment and associated riverine area restoration plans be prepared as part of the design of new, or reconstructed, dams and prior to abandonment of existing dams. It also recommends that

¹⁷*Inter-Fluve, Inc., Milwaukee County Stream Assessment, prepared for Milwaukee County, September 24, 2004.*

any dam removals specifically include provisions to protect upstream reaches from erosion and downstream reaches from sedimentation by prohibiting excessive sediment transport from the impoundment during and after dam removal.

Culverts, bridges, drop structures, and channelized stream segments, fragment and limit connectivity within stream habitat and ecosystems. The RWQMPU recommends that, to the extent practicable, these stream crossings and management strategies be limited. It also recommends that where such crossings are required, they be designed to allow the passage of aquatic organisms in addition to the passage of water, especially under low flow conditions.

The RWQMPU made several recommendations regarding the protection and enhancement of fisheries. These are consistent with actions recommended by WDNR for habitat improvement of stream systems.¹⁸

The RWQMPU recommends that:

- To the extent practicable, protect remaining natural stream channels, including small tributaries and shoreland wetlands that provide habitat for the continued survival, growth, and reproduction of a sustainable fishery throughout the study area.
- Restore wetlands, woodlands, and grasslands adjacent to the stream channel and establish minimum buffers 75 feet in width to reduce pollutant loads entering the stream and protect water quality.
- Restore, enhance, and/or rehabilitate stream channels to provide increased quality and quantity of available fisheries habitat—through improvement of water quality, shelter/cover, food production, and spawning opportunities—using management measures that include, but are not limited to:
 - Minimizing the number of stream crossings and other obstructions to limit fragmentation of stream reaches.
 - Stabilizing stream banks to reduce erosion.
 - Limiting instream sedimentation and selectively removing excessive silt accumulations.
 - Reestablishing instream vegetation and bank cover to provide fish with shelter from predators, food, spawning areas, and protection from floods.
 - Realigning channelized reaches of streams and removing concrete lining to provide heterogeneity in depth (e.g., alternating riffle and pool habitat), velocity or flow regime, and bottom substrate composition.
 - As opportunities arise when roadways crossing streams are replaced or reconstructed, removing or retrofitting obstructions such as culverts, dams, and drop structures that limit the maintenance of healthy fish and macroinvertebrate populations.
- Monitoring fish and macroinvertebrate populations in order to evaluate the effectiveness of the water quality management program.

¹⁸*Wisconsin Department of Natural Resources, A Review of Fisheries Habitat Improvement Projects in Warmwater Streams with Recommendations for Wisconsin, Technical Bulletin No. 169, 1990.*

- Considering more intensive fisheries manipulation measures—in terms of removal of exotic carp species and/or stocking of gamefish or other native species—where warranted based upon specific goals and objectives established for each project site, reach, or subwatershed, based on detailed local level planning, throughout the study area.

The plan also recommends that the locations for carrying out the recommended stream restoration measures be developed with the guidance and direct involvement of the WDNR, based upon site-specific field evaluations.

Inland Lake Water Quality Measures Subelement

The Milwaukee County ponds and lagoons collectively include 68 small waterbodies primarily located within the Milwaukee County Park System. Several of these ponds and lagoons are located in the Root River watershed, including three garden ponds in Boerner Botanical Gardens, Mud Lake, three ponds in Oakwood Park, the Root River Parkway Pond, Scout Lake, and Whitnall Park Pond. In response to concerns about water quality and aesthetic conditions in and around these ponds, Milwaukee County developed a park pond and lagoon management plan.¹⁹ This study identified several problem issues related to the lakes, ponds, and lagoons, including shoreline erosion; the presence of nuisance algae and aquatic plants related to high nutrient loadings; elevated concentrations of fecal indicator bacteria, such as *E. coli*; litter; the presence of rough fish; and siltation. The plan made these three general recommendations for all park lakes, ponds, and lagoons:

- Identify and deploy alternative management strategies to mowing grass to short lengths directly adjacent to these waterbodies,
- Pursue grant funding for shoreline stabilization projects, and
- Continue water quality monitoring of these waterbodies in order to document conditions both before and after restoration projects.

The RWQMPSU recommends implementation of the recommendations of the Milwaukee County park pond and lagoon management plan.

Auxiliary Water Quality Management Subelement

The RWQMPSU made several auxiliary recommendations addressing several water quality issues.

The plan update recognizes that waterfowl, especially gulls, can be a significant source of fecal coliform bacteria in surface waters. It recommends that programs be implemented to discourage unacceptably high numbers of waterfowl from congregating near beaches and other water features. Measures that could be included in these programs include expanded use of informational signs regarding the negative aspects of feeding waterfowl, ordinances prohibiting the feeding of waterfowl, covered trash receptacles at beaches and water features, vegetative buffers along shorelines that discourage geese from congregating, and other, innovative measures, such as dogs trained to disperse waterfowl.

The RWQMPSU makes the following recommendations related to household hazardous and pharmaceutical wastes:

- That the existing collection programs for household hazardous wastes be continued and supported and that those communities not served by such programs consider developing and instituting such programs;

¹⁹*Milwaukee County Environmental Services, Milwaukee County Pond & Lagoon Management Plan, June 2005.*

- That assessments and evaluations be made of the significance for human health and for aquatic and terrestrial wildlife of the presence of pharmaceuticals and personal care products in surface waters; and
- That periodic collections of expired and unused prescription medications be conducted.

The RWQMPPU makes two recommendations regarding exotic and invasive species:

- That programs to reduce the introduction and spread of exotic and invasive species, including programs to educate the public, be supported and continued; and
- That the occurrence and spread of exotic and invasive species be monitored and documented.

The plan evaluated existing water quality monitoring and data collection programs and characterized gaps in the available data. It found that fewer data are available for areas outside the portion of the watershed served by the MMSD than are available within MMSD's service area. It also found that relatively few data were available from tributary streams. To address monitoring needs in the watershed, the RWQMPPU makes the following recommendations:

- That the surface water quality monitoring programs currently being conducted by the MMSD, WDNR, and USGS be supported and continued;
- That long-term monitoring programs be extended to areas outside of the MMSD service area (at the minimum monitoring should continue at the USGS sampling stations that were established or reinstated as part of the RWQMPPU);
- That long-term fisheries, macroinvertebrate, and habitat monitoring stations be established in streams, ideally at sites where water quality is also being monitored;
- That efforts to facilitate consolidation of data from various monitoring programs be continued;
- That long-term monitoring stations in inland lakes be established or continued;
- That aquatic plant surveys be made in those lakes in which plant management activities are being conducted; and
- That citizen-based monitoring efforts be continued and expanded, with an emphasis on filling geographical gaps in existing data.

Finally, the RWQMPPU recommends periodic maintenance and updating of the water quality models developed under the RWQMPPU/MMSD 2020 FP.

Groundwater Management Element

The RWQMPPU makes several recommendations regarding groundwater management. Three of these grew directly out of SEWRPC's regional water supply planning program which was in progress during the time that the RWQMPPU was being prepared.²⁰ As part of the regional water supply planning program, the most important

²⁰SEWRPC Planning Report No. 52, A Regional Water Supply Plan for Southeastern Wisconsin, December 2010.

groundwater areas within the Southeastern Wisconsin Region were identified.²¹ The RWQMPPU recommends that consideration be given to following the recommendations of the regional water supply plan regarding maintenance of these areas. Under the regional water supply planning process, groundwater sustainability analyses were made for six selected demonstration areas, representing a range of hydrogeologic conditions.²² These areas were analyzed to provide guidance on the density of individual household wells or shared common wells that could be installed without creating significant impacts on the shallow groundwater system. The RWQMPPU recommends that the groundwater sustainability guidance results developed in this study be considered by municipalities in evaluating proposed developments and in conducting local land use planning. The RWQMPPU recommends that water utilities develop and implement utility-specific water conservation programs.

The RWQMPPU also recommends that the design of stormwater management facilities that directly or indirectly involve infiltration of stormwater consider the potential impacts on groundwater quality, and that the provisions intended to protect groundwater quality in the WDNR's post-construction stormwater management technical standards be applied in the design of stormwater management facilities.

Recommended Water Use Objectives

Based on the analyses conducted for the RWQMPPU, the plan recommended that the WDNR consider upgrading the regulatory water use objectives of four streams in the Root River watershed. These regulatory water use objectives are part of the water quality standards promulgated by the State pursuant to the Federal Clean Water Act. They specify the appropriate water uses to be achieved by, and protected in, a waterbody. The designated water use objective of a waterbody is a factor in the determination of which water quality criteria apply to the waterbody. The RWQMPPU recommends that the water use objectives for Hoods Creek, Tess Corners Creek, and Whitnall Park Creek be upgraded from limited forage fish to fish and aquatic life. It also recommends that the water use objective for Ives Grove Ditch be upgraded from limited aquatic life to limited forage fish.

STATUS OF IMPLEMENTATION OF RECOMMENDATIONS OF THE RWQMPPU IN THE ROOT RIVER WATERSHED

The recommendations made in the RWQMPPU identify a series of management strategies designed to improve surface water quality conditions in the Root River watershed. As indicated above, these strategies include measures related to land use, point source pollution abatement, nonpoint source pollution abatement, instream and inland lake water quality management, groundwater management, and other issues. Efforts to implement the RWQMPPU have been ongoing for several years.

To formulate a restoration plan for the Root River watershed, it is important to assess the current status of implementation of the RWQMPPU. There are several reasons to do this. Assessing the status of implementation enables an evaluation of how much progress toward the goals of the RWQMPPU has been made since the plan was issued. Identifying areas in the watershed where projects implementing specific recommendations have been completed, are in process, or are planned can be useful for targeting locations for future projects. This identification can also indicate locations where recent efforts can be expanded or used as a basis for future actions. This can be especially important for the sorts of projects that act incrementally to produce reductions in pollutant loads to waterbodies, with resultant improvements in water quality. Alternatively, identification of areas where projects implementing specific recommendations have been completed, are in process, or are planned can

²¹*SEWRPC Technical Report No. 47, Groundwater Recharge in Southeastern Wisconsin Estimated by a GIS-Based Water-Balance Model, July 2008.*

²²*SEWRPC Technical Report No. 48, Shallow Groundwater Quantity Sustainability Analysis Demonstration for the Southeastern Wisconsin Region, November 2009.*

also indicate portions of the watershed that have not received sufficient attention in the implementation of the specific recommendations. Assessing the status of plan implementation can also point out those specific recommendations that may require more attention in implementation. Finally, assessing the status of implementation at this juncture makes it possible to apply the lessons learned from recent implementation efforts to the identification and prioritization of recommendations under this watershed restoration plan.

In the assessment of the status of implementation of the RWQMPU, the recommendations are grouped into three broad categories: recommendations that reflect, in whole or in part, existing regulatory requirements; recommendations that are in various stages of implementation; and recommendations that have not yet been implemented.

Existing Regulatory Management Strategies

Table 3 shows the implementation status of recommendations of the RWQMPU that reflect existing regulatory requirements. The table also indicates the relevant regulations in the *Wisconsin Administrative Code*, *Wisconsin Statutes*, and local ordinances. It is important to note that some of the recommendations listed on the table are only partially addressed by existing regulations. The following descriptions will note where this is the case.

Land Use Element

Develop According to Approved Land Use Plans

The RWQMPU was developed under the assumption that local communities will develop according to the recommendations given in approved local land use plans. This is partially addressed by existing regulatory requirements. In 1999, the Wisconsin Legislature enacted legislation that greatly expanded the scope and significance of comprehensive plans within the State. The legislation, often referred to as the State's "Smart Growth" law, provides a new framework for the development, adoption, and implementation of comprehensive plans by regional planning commissions and by county, city, village, and town units of government. The law is set forth in Section 66.1001 of the *Wisconsin Statutes*. This section of the *Statutes* also defines the elements that a comprehensive plan must contain. One of the required elements is a land use element that includes "a compilation of objectives, policies, goals, maps, and programs to guide future development and redevelopment of public and private property."

The law does not require the adoption of county and local comprehensive plans; however, Section 66.1001(3) of the *Statutes* requires that county and local general zoning ordinances; county, city, and village shoreland and floodplain zoning ordinances; county and local subdivision ordinances; and local official mapping ordinances enacted or amended on or after January 1, 2010, be consistent with the comprehensive plan adopted by the unit of government enacting or amending the ordinance.

With the exception of Milwaukee County, all of the counties, cities, villages, and towns that are wholly or partially located in the Root River watershed have either adopted independent comprehensive plans, adopted multi-jurisdictional county-local comprehensive plans as their local plans, or prepared local plans as part of a multi-jurisdictional county-local process adopted by the local government. Because all of the municipalities in Milwaukee County are incorporated as cities or villages, the County has not prepared a comprehensive plan.

Point Source Pollution Abatement Measures

Refining of Sanitary Sewer Service Areas

As previously described, the RWQMPU recommends that unrefined sanitary sewer service areas in the Root River watershed be refined. This has regulatory implications because Chapter NR 110, "Sewerage Systems," of the *Wisconsin Administrative Code*, requires that sanitary sewer extensions and sewerage system facility plans be in conformance with the approved areawide water quality management plan. Most of the sanitary sewer service areas within the Root River watershed have been refined. Areas served by MMSD in the Cities of Greenfield, Milwaukee, and West Allis, the Villages of Greendale and Hales Corners, and a portion of the Yorkville Sewer Utility District's service area have not been refined.

Table 3

SUMMARY OF EXISTING REGULATORY MANAGEMENT STRATEGIES IDENTIFIED IN THE REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE

Recommendation or Management Strategy	Focus Area Primarily Addressed				Responsible and Participating Organizations	Relevant Regulations
	Water Quality	Recreational Use and Access	Habitat Condition	Flooding		
Develop according to approved land use plans	--	X	X	X	Municipalities	66.1001 STATS ^a
Refine sanitary sewer service areas	X	X	--	--	Municipalities, SEWRPC, WDNR	NR 110 for public systems SPS 382 for private systems ^b
Continue operation and maintenance of MMSD, Racine, Union Grove, and Yorkville wastewater treatment plants	X	X	--	--	Municipalities, MMSD, WDNR	NR 208, NR 210, and WPDES permit conditions
Implement Capacity, Management, Operations, and Maintenance (CMOM) programs	X	X	--	--	MMSD, municipalities	Section 3.105 MMSD rules
Continue operation and maintenance of Fonk's Mobile Home Park wastewater treatment plant	X	X	--	--	Plant owner, WDNR	NR 208, NR 210, and WPDES permit conditions
Continue to regulate wastewater treatment plant and industrial discharges under the Wisconsin Pollutant Discharge Elimination System	X	X	--	--	Municipalities, MMSD, WDNR	Regulated through WPDES system (NR 200–299)
Apply manure and supplemental nutrient to cropland in accordance with nutrient management plans ^c	X	X	--	--	Agricultural operators, counties, DATCP, NRCS, WDNR	ATCP 50.04, ATCP 50.08, ATCP 50.48, ATCP 50.50, NR 151.07
Restrict livestock access to streams	X	X	X	--	Agricultural operators, counties, DATCP, WDNR	NR 151.08
Implement county-enforced inspection and maintenance programs for private onsite wastewater treatment systems constructed after counties adopt private sewage system programs	X	X	--	--	Counties, WDNR; Wisconsin Department of Safety and Professional Services; municipalities in Milwaukee County	SPS 383.255, SPS 383.54 Chapter 15 Kenosha County Municipal Code; Section 19, Racine County Code of Ordinances; Section 14-589 Waukesha County Ordinances; Section 190-28 Franklin Municipal Code;
Implement construction erosion control and urban nonpoint source pollution controls consistent with standards in NR 151	X	X	X	--	WDNR, counties municipalities	NR 151, NR 216

Table 3 (continued)

Recommendation or Management Strategy	Focus Area Primarily Addressed				Responsible and Participating Organizations	Relevant Regulations
	Water Quality	Recreational Use and Access	Habitat Condition	Flooding		
Implement fertilizer management programs ^d	X	--	--	--	Counties, WDNR	NR 151.13, NR 151.14, 94.643 STATS
Implement pet litter management programs	X	X	--	--	Counties, municipalities, UWEX	County and municipal ordinances ^e
Conduct aquatic plant surveys in those lakes in which plant management activities are being conducted	--	--	X	--	Counties, municipalities, lake associations	A common permit condition for aquatic plant management permits under NR 107 and NR 109
Continue and support programs to reduce the introduction and spread of exotic and invasive species	--	--	X	--	WDNR	Some aspects regulated under NR 40 and ATCP 21
Water Utilities develop and implement utility-specific conservation programs	X	--	X	--	Water utilities	Required for withdrawals from surface water and groundwater in Great Lakes Basin under NR 852
Consider the potential impacts on groundwater quality in the design of stormwater management facilities	X	--	--	--	WDNR, WisDOT, municipalities, counties	NR 151.12, NR 151.124, NR 151.24 NR 151.244, Trans 401.106

^aSection 66.1001(3) of the Wisconsin Statutes requires that county and local general zoning ordinances; county, city, and village shoreland and floodplain zoning ordinances; county and local subdivision ordinances; and local official mapping ordinances enacted or amended on or after January 1, 2010, be consistent with the comprehensive plan adopted by the unit of government enacting or amending the ordinance.

^bNR 110.08(4) and SPS 382 require that sewer service areas conform with areawide water quality management plans.

^cCompliance required in order to be eligible for cost-share funding.

^dIncludes the State ban on fertilizers containing phosphorus.

^eCounty ordinances apply to county parks and trails and apply to dogs in all counties, except in Milwaukee and Waukesha Counties, where they apply to any animal under a person's control. Municipal ordinances vary among jurisdictions.

Source: SEWRPC.

Since the completion of the RWQMPSU, a second-generation sewer service area plan has further refined the sanitary sewer service area for the City of Franklin, including portions of the Root River watershed.²³ In addition, amendments to the regional water quality management plan since approval of the RWQMPSU have resulted in further refinements to sanitary sewer service areas in the Root River watershed in the Cities of Muskego and New Berlin and the Villages of Caledonia, Mount Pleasant, and Union Grove. The existing sanitary sewer service areas in the Root River watershed are described in Chapter IV of this report.

Implement CMOM Programs

The RWQMPSU recommends that the municipalities operating local sewerage systems evaluate the need to reduce clearwater infiltration and inflow into sewers and implement CMOM programs that provide a framework for municipalities to identify and incorporate widely accepted wastewater industry practices in order to better manage, operate, and maintain collections systems; investigate capacity constrained areas of the collection system; and respond to sanitary sewer overflow events. Section 3.105 of MMSD's rules requires that the communities within its service area operating sewer systems tributary to MMSD's system establish and implement CMOM programs.

Continued Regulation of WWTP and Industrial Discharges through the WPDES Permit Program

The RWQMPSU recommends continued regulation of WWTP and industrial discharges to surface waters through the WPDES program, with effluent concentrations of pollutants being controlled to acceptable levels on a case-by-case basis through the operation of the WPDES program. Sections 283.31(1) and 283.33 of the *Wisconsin Statutes* require a permit for the legal discharge of any pollutant into the waters of the State, including groundwater. This State pollutant discharge permit system was established by the Wisconsin Legislature in direct response to the requirements of the Federal Clean Water Act. While the Federal law envisioned requiring a permit only for the discharge of pollutants into navigable waters, in Wisconsin permits are required for discharges from point sources of pollution to all surface waters of the State and, additionally, to land areas where pollutants may percolate, seep to, or be leached to groundwater.

Rules relating to the WPDES are set forth in Chapters NR 200 through 299 of the *Wisconsin Administrative Code*. The following types of discharges require permits under Chapter NR 200, "Application for Discharge Permits and Water Quality Standards Variances":

- The direct discharge of any pollutant to any surface water.
- The discharge of any pollutant, including cooling waters, to any surface water through any storm sewer system not discharging to publicly owned treatment works.
- The discharge of pollutants other than from agricultural uses for the purpose of disposal, treatment, or containment on land areas, including land disposal systems such as ridge and furrow, irrigation, and ponding systems.
- Discharge from an animal feeding operation where the operation causes the discharge of a significant amount of pollutants to waters of the State and the owner or operator of the operation does not implement remedial measures as required under a notice of discharge issued by the WDNR under Chapter NR 243, which deals with animal waste management.

Certain discharges are exempt from the permit system as set forth under Chapter NR 200, including discharges to publicly owned sewerage works, some discharges from vessels, discharges from properly functioning marine

²³*SEWRPC Community Assistance Planning Report No. 176, 2nd Edition, Sanitary Sewer Service Area for the City of Franklin, Milwaukee County, Wisconsin, June 2011.*

engines, and discharges of domestic sewage to septic tanks and drain fields. The latter are regulated under another chapter of the *Wisconsin Administrative Code*. Also exempted are the disposal of septic tank pumpage and other domestic waste, also regulated, under another chapter of the *Wisconsin Administrative Code*; the disposal of solid wastes, including wet or semi-liquid wastes, when disposed of at a site licensed pursuant to another chapter of the *Wisconsin Administrative Code*; and discharges from private alcohol production systems.

Discharges related to a variety of municipal and industrial activities may be permitted under the WPDES permit system. Particular facilities may be permitted either under an individual permit to the owner or operator of the facility or under a Statewide general permit.

Individual permits are issued to specific facilities that generate wastewater from unique types of activities, have complex mixtures of pollutants, or have physical-chemical treatment systems. Municipal and privately owned wastewater WWTPs are generally permitted under individual permits. Permit conditions for individual permits include effluent limitations for pollutants that are discharged and monitoring and reporting requirements. Individual permits include a compliance schedule which specifies the actions needed to be taken for the facility to remain in compliance with permit conditions and the dates by which these actions must be completed. Individual permits are issued for a five-year term. To maintain coverage beyond the end of the term, permittees must reapply at least 180 days prior to expiration of the permit.

Statewide general permits are used to cover groups of facilities that generate wastewater from relatively simple operations having similar types and amounts of pollutants. Coverage under a general permit is conferred by completing and submitting a request-for-coverage form to the appropriate WDNR regional office. Compliance with the limitations contained in a general permit must be attained at the time coverage is granted. As of March 2012, the State had issued 23 different WPDES general permits, covering a variety of activities and discharges. Examples of these include general permits for noncontact cooling water, swimming pool facilities, hydrostatic test water, and ballast water discharge. It is important to note that an individual facility may need to be covered under more than one general permit, depending on the different types of waste streams that the facility discharges. General permits contain effluent limitations for pollutants associated with the covered discharges. General permits also contain monitoring and reporting requirements. These permit conditions vary according to the category of general permit. For some general permits, the WDNR has developed standard discharge monitoring reporting forms.

Nonpoint Source Pollution Abatement—Rural Control Measures *Nutrient Management Plans and Nutrient Application*

Among the rural nonpoint source pollution abatement measures in the RWQMPSU was a recommendation that application of manure and supplemental nutrients to cropland be applied in accordance with approved nutrient management plans. Starting in 2005 for high-priority areas such as impaired or exceptional waters, and 2008 for all other areas, application of manure or other nutrients to croplands must be done in accordance with a nutrient management plan designed to meet State standards for limiting the entry of nutrients into groundwater or surface water resources. Requirements related to these plans are set forth in Section ATCP 50.04(3) of the *Wisconsin Administrative Code*. In general, for land that does not meet the NR 151 performance standards and that was cropped or enrolled in the U.S. Department of Agriculture Conservation Reserve or Conservation Reserve Enhancement Programs as of October 1, 2002, agricultural performance standards are only required to be met if cost-sharing funds are available. Existing cropland that met the standards as of October 1, 2002, must continue to meet the standards. New cropland must meet the standards, regardless of whether cost-share funds are available.

Restricting Livestock Access to Streams

The RWQMPSU recommends that livestock access to streams be restricted the use of fences and other means. This recommendation is partially implemented through existing regulations. NR 151 prohibits allowing livestock unlimited access to the waters of the State in locations where high concentrations of animals prevent the maintenance of adequate sod or self-sustaining vegetative cover. This rule includes a provision that the prohibition does not apply to properly designed, installed, and maintained livestock or farm equipment crossings.

It should be noted that access roads and cattle crossings, fencing to exclude livestock in order to protect erodible areas, and livestock water facilities designed to replace livestock access to streams or other natural drinking water sources are eligible for cost-share funding as agricultural best management practices.

Inspection and Maintenance Programs for Private Onsite Wastewater Treatment Systems (POWTS)

As previously described, the RWQMPSU recommends that, at a minimum, county-enforced inspection and maintenance programs be implemented for all new or replacement private onsite wastewater treatment systems (POWTS) constructed after the date on which the counties adopted private sewage system programs. It also recommends that voluntary county programs be instituted to inventory and inspect POWTS that were constructed prior to the dates on which the counties adopted private sewage system programs.

At the State level, the Wisconsin Department of Safety and Professional Services has established rules regulating POWTS set forth in Chapter SPS 383, "Private Onsite Wastewater Treatment Systems," of the *Wisconsin Administrative Code*. Much of the regulation is performed by counties and, in counties with population of 500,000 or more, in municipalities. SPS 383.255 requires counties with populations of less than 500,000 and municipalities located in counties with populations of 500,000 or more to develop and implement comprehensive maintenance programs for POWTS within their jurisdictions. These counties and municipalities are referred to as governmental units. These programs are to include:

- Conducting, completing, and maintaining an inventory of all POWTS located within the governmental unit's jurisdiction;
- A process that accepts and records inspection, evaluation, maintenance, and servicing reports submitted by owners of POWTS or their agents;
- A process that notifies owner of POWTS who are delinquent in meeting reporting requirements;
- A process that includes measures meant to ensure that required inspection, evaluation, maintenance, and servicing of POWTS are performed and reported; and
- Annual reporting to the Wisconsin Department of Safety and Professional Services.

The units of government are required to complete the inventory by October 1, 2013, and have the other elements of the programs in place by October 1, 2015.²⁴

For POWTSs installed or constructed on or after July 1, 2000, SPS 383.54 requires submission of a management plan to the governmental unit as part of a plan for installation, construction, or replacement of or addition to a POWTS. This management plan is to include servicing and maintenance requirements, including servicing frequency requirements of the components of the system. In addition to the frequency given in the management plan, servicing is required to occur when the combined volume of sludge and scum in an anaerobic treatment tank (septic tank) equals one-third of the tank's volume. The owner or the owner's agent is required to report to the governmental unit within 30 days of required inspections, evaluations, maintenance, or servicing.

²⁴As of March 2012, Section SPS 383.255 requires that the inventories be completed within three years of October 1, 2008 and the other elements be in place within five years of October 1, 2008; however, 2009 Wisconsin Act 392 requires that these deadlines be extended to the dates given in the text above. On August 15, 2011, the Wisconsin Department of Safety and Professional Services submitted proposed revisions to SPS 383 that would further extend these dates to the State Legislature for committee review. As of March 2012, the Legislature has taken no action on the proposed revisions.

For POWTSs existing prior to July 1, 2000, servicing is also required to occur when the combined volume of sludge and scum in an anaerobic treatment tank (septic tank) equals one-third of the tank's volume. In addition, those systems that utilize a treatment or dispersal component consisting, in part, of in situ soil are required to be visually inspected at least once every three years to determine whether wastewater or effluent is ponding on the surface of the ground. The owner or the owner's agent is required to report to the governmental unit within 30 days of required inspections, evaluations, maintenance, or servicing.

Kenosha, Racine, and Waukesha Counties and the City of Franklin in Milwaukee County have ordinances implementing POWTS management programs. With one exception, these programs require that inspection and servicing of systems be conducted on a three-year cycle. Waukesha County's program requires that inspection and servicing of systems be conducted on a two-year cycle. In each of these programs, the governmental unit provides notification to owners of POWTS that their systems are due for inspection and servicing.

Nonpoint Source Pollution Abatement—Urban Control Measures

Implementation of Construction Erosion Control and Urban Nonpoint

Source Pollution Controls Consistent with the Performance Standards in NR 151

As previously discussed, the RWQMPSU recommends that urban nonpoint source pollution controls be implemented consistent with the standards given in NR 151. The nonagricultural performance standards set forth in this chapter encompass two major types of land management. The first type includes standards for areas of new development and redevelopment. The second type includes standards for developed urban areas. The performance standards address the following areas:

- Construction sites for new development and redevelopment,
- Post-construction stormwater runoff for new development and redevelopment,
- Developed urban areas, and
- Nonmunicipal property fertilizing.

NR 151 requires counties and local units of government in urbanized areas, which are identified based on population density, to obtain a WPDES stormwater discharge permit as required under Chapter NR 216.02. As a result of these requirements, all four counties in which the Root River watershed is located have applied for and been issued these permits. In addition, all of the municipalities in Milwaukee and Waukesha County that are located in the Root River watershed and the City of Racine and the Villages of Caledonia, Mount Pleasant, and Sturtevant in Racine County have applied for and been issued these permits. These permit holders were required to reduce the amount of total suspended solids in stormwater runoff from areas of existing development that were in place as of October 2004 to the maximum extent practicable by 20 percent by March 10, 2008.

Permitted municipalities are also required to implement the following: 1) public information and education programs relative to specific aspects of nonpoint source pollution control; 2) municipal programs for collection and management of leaf and grass clippings; and 3) site-specific programs for application of lawn and garden fertilizers on municipally controlled properties with over five acres of pervious surface. Under the requirements of NR 151, by March 10, 2008, incorporated municipalities with average population densities of 1,000 persons or more per square mile that were not required to obtain municipal stormwater discharge permits were required to have implemented these same three programs.

In addition to the standards given in NR 151, units of government within the MMSD service area are required to comply with Chapter 13, "Surface Water and Storm Water Rules," of the MMSD rules. This Chapter requires governmental units in MMSD's service area to:

- Manage land use and activities in their jurisdictions to minimize debris and sediment from creating obstructions at outfalls or other structures in watercourses,
- Remove debris and sediment that obstructs stormwater outfalls or other drainage structures,
- Submit annual reports to the District that provide watershed, drainage, and development information,
- Establish which developments and redevelopments must comply with the peak runoff management requirements set forth in Section 13.11 of the MMSD rules, and
- Submit stormwater management plans for all eligible development and redevelopment projects.

In general, developments and redevelopments must provide stormwater management plans and comply with the runoff management requirements if they are in the District’s ultimate sewer service area (except for certain riparian areas immediately adjacent to Lake Michigan), and either call for an increase of one-half acre or more of new impervious area or for demolition or construction during redevelopment that disturbs an area larger than two acres. Communities in MMSD’s service area are required to have stormwater management ordinances that are consistent with Chapter 13 and to update the ordinances to include amendments to Chapter 13.

Fertilizer Management Programs

As previously discussed, the RWQMPPU recommends that the use of low- or no-phosphorus fertilizers be encouraged in areas tributary to inland lakes and ponds and that consideration be given to adopting low- or no-phosphorus fertilizer ordinances in those areas. It also recommends that information and education programs required under municipal WPDES stormwater discharge permits promote voluntary practices that optimize urban fertilizer application consistent with the requirements of WDNR Technical Standard No 1100, “Interim Turf Nutrient Management.”

Sections NR 151.13 and 151.14 of Chapter NR 151 of the *Wisconsin Administrative Code* set forth fertilizer performance standards for municipal and nonmunicipal properties with more than five acres of pervious surface where fertilizer is applied. These standards call for fertilizer application to be done “in accordance with site-specific nutrient application schedules based upon appropriate soil tests.” These standards are required to be followed in municipalities with WPDES stormwater discharge permits.

Section 94.643 of the *Wisconsin Statutes* which became effective on April 1, 2010, after completion of the RWQMPPU, places restrictions on the use, sale, and display of fertilizers containing phosphorus. This statute prohibits the application to turf of fertilizer that is labeled as containing phosphorus or available phosphate except for:

- Applying such fertilizer to establish grass, using seed or sod, during the growing season in which the person using the fertilizer began establishing the grass, or
- Applying fertilizer to an area where the soil is deficient in phosphorus as shown in a soil test performed by a laboratory no more than 36 months before the application.

The statute restricts the sale of fertilizers containing phosphorus to agricultural uses and the two uses described in the preceding paragraph. It also prohibits the display of fertilizers containing phosphorus.

Pet Litter Management

As previously discussed, the RWQMPPU recommends that all municipalities, including those in the Root River watershed, have pet litter control ordinance requirements and that these requirements be enforced. All four counties that contain portions of the Root River watershed have enacted ordinances regarding control of pet litter in County parks and trails. In general, these ordinances require that the owner, caretaker, or person in control of

an animal immediately remove pet litter when it is deposited, wrap it, and properly dispose of it. With the exception of Kenosha County, these counties' ordinances also require that anyone bringing an animal into a county park or trail also bring an item or device for removing pet litter. Kenosha and Racine Counties' ordinances apply specifically to dogs. Milwaukee and Waukesha Counties' ordinances apply to animals.

Most of the municipalities in the Root River watershed have pet litter management ordinances. Only three communities—the Towns of Paris, Raymond, and Yorkville—lack such ordinances. The requirements of these ordinances vary. Most require that the owner, caretaker, or person in control of an animal immediately remove and properly dispose of pet litter deposited by an animal under their control on any public property or private property other than that belonging to owner, caretaker, or person in control of the animal. A few of these ordinances apply only to public property or parks and trails. Most, although not all, of these ordinances require that, when an animal is off its owner's or caretaker's premises, the owner or caretaker have an item or device for removing pet litter in his or her possession. Which animals are covered by these ordinances also varies by jurisdiction. Seven municipalities have ordinances that apply to animals, seven municipalities have ordinances that apply specifically to dogs, and two municipalities have ordinances that apply specifically to dogs and cats.

It should be noted that the University of Wisconsin-Extension has developed educational materials related to pet waste management.²⁵

Inland Lake Water Quality Management Measures

Aquatic Plant Surveys for Lakes in Which Plant Management Activities Are Being Conducted

As previously described, the RWQMPPU recommends that aquatic plant surveys be conducted in those lakes in which plant management activities are being conducted. This recommendation is partially implemented under existing regulations. Aquatic plant management activities are regulated under two chapters of the *Wisconsin Administrative Code*. Chapter NR 107, "Aquatic Plant Management," regulates the application of chemical treatment for the management of aquatic plants. Chapter NR 109, "Aquatic Plants: Introduction, Manual Removal and Mechanical Control Regulations," regulates manual removal and mechanical control of aquatic plants. It also regulates the use of biological control agents. With some exceptions, a permit is required for most aquatic plant management activities.

Neither of these chapters specifically requires that an aquatic plant survey be conducted; however, they do require that the permit application include descriptive information of the plants or plant communities proposed to be managed. For chemical treatment, NR 107.04(2)(e) requires that the permit application include a description of the plant community causing the use impairment in the waterbody. Similarly, for manual removal and mechanical control of aquatic plants, NR 109.04(2)(f) requires that the permit application include a description of the aquatic plants to be controlled or removed. Under an additional provision of NR 109, the WDNR may require that an application for a permit for manual removal and mechanical control of aquatic plants include an aquatic plant management plan which describes how the aquatic plants will be introduced, controlled, removed, or disposed. The items that are required to be presented and discussed in such a plan are given in NR 109.09(2) and include a physical, chemical, and biological description of the waterbody. Under these provisions, the conduct of an aquatic plant survey has been a common permit condition for applications for permits to conduct aquatic plant management activities under NR 107 and NR 109.

Auxiliary Water Quality Management Measures

Exotic and Invasive Species Management

As described above, the RWQMPPU recommends that programs to reduce the introduction and spread of aquatic and terrestrial exotic and invasive species, including programs to educate the public, be supported and continued. Several State regulations address this recommendation.

²⁵University of Wisconsin-Extension, "Pet Waste and Water Quality," UWEX Publication GWQ006, 1999.

At the State level, rules regarding the identification, classification, and control of invasive species are set forth in Chapter NR 40, “Invasive Species Identification, Classification and Control,” of the *Wisconsin Administrative Code*. This chapter lays out several requirements.

First, NR 40 creates a comprehensive system with criteria to classify invasive species into two categories: prohibited species and restricted species. A prohibited species is one which the WDNR has determined is likely to survive and spread if introduced to the State, but which is not found in the State or that region of the State where the species is listed as prohibited, except for isolated individuals or small populations of terrestrial species or species that are isolated to a specific watershed in the State or Great Lakes. Prohibited species are those for which Statewide or regional eradication or containment may be feasible. A restricted species is one which the WDNR has determined is already established in the State or that region of the State where the species is listed as restricted and for which Statewide or regional eradication or containment may not be feasible. Both categories represent species that cause or have the potential to cause economic or environmental harm or harm to human health.²⁶ With some exceptions, NR 40 bans the transport, possession, transfer, and introduction of prohibited species. It also bans the transport, transfer, and introduction of restricted species. In addition, it bans the possession of restricted fish and crayfish species.

Second, NR 40 contains provisions enabling the WDNR to take action to control or eradicate invasive prohibited species that are present, but not yet established. With landowner permission or a judicial inspection warrant, the WDNR may inspect for, sample, and control prohibited species only. Persons found responsible for a prohibited species’ presence on property they own, control or manage may be ordered to carry out approved control measures. If a control order is not followed, and the WDNR takes control measures, the WDNR may seek cost-recovery. Control of restricted species is encouraged under NR 40, but not required.

Third, NR 40 requires that preventive measures be taken that address common pathways that may allow invasive species to spread. In general, the preventive measures are not species-specific. Examples of preventive measures include the requirement that aquatic plants and animals be removed from, and that water be drained from, any vehicle, boat, boat trailer, or boating and fishing equipment when such vehicle or equipment is removed from a waterbody or from the waterbody’s bank or shore. It should be noted that Section NR 19.055 of Chapter NR 19, “Miscellaneous Fur, Fish, Game and Outdoor Recreation,” of the *Wisconsin Administrative Code*, also requires that boats, boat trailers, boating equipment, and fishing equipment be immediately drained when they are removed from an inland or outlying waterbody or the waterbody’s bank or shore. This requirement extends to water in any bilge, ballast tank, bait bucket, live well, or other container.

Section NR 45.045 of Chapter NR 45, “Use of Department Properties,” of the *Wisconsin Administrative Code*, requires that any firewood brought into State parks or other State-managed lands be from Wisconsin, be from within 25 miles of the State-owned property, and be from outside any quarantine areas, unless the State-owned property is also within the quarantine area. (The Root River watershed is located entirely within quarantine areas for both gypsy moth and emerald ash borer.) As an alternative, firewood that is sold by Wisconsin certified firewood dealers has been treated to eliminate pests and diseases. This firewood may be brought onto State property. The Wisconsin Department of Agriculture, Trade & Consumer Protection (DATCP) has certification procedures for firewood dealers.

²⁶*In addition to the categories of invasive species regulated under NR 40, the WDNR maintains two lists of unregulated invasive species. The first consists of a caution list of species which are not found in the State that may have shown evidence of invasiveness in similar environments in other states and could potentially spread in Wisconsin. Additional information is needed to determine whether species on the caution list belong in another category. The second list consists of nonrestricted species which may have beneficial uses, but also may have adverse environmental, recreational, or economic impacts or cause harm to human health. Most of the nonrestricted species have already integrated into Wisconsin’s ecosystems and Statewide control or eradication is not practical or feasible.*

Management of several invasive species which are considered agricultural pests may also be addressed under the DATCP's authority to control pests on agricultural lands and agricultural business premises. These controls are set forth in Chapter ATCP 21, "Plant Inspection and Pest Control," of the *Wisconsin Administrative Code*. Under the rules in this chapter, DATCP may issue a quarantine order prohibiting the movement of any pest or any plant, pest host, or pest-harboring material which may transmit or harbor a pest. In addition, DATCP may issue a pest abatement order requiring the destruction or removal of pests, plants, pest hosts, or pest-harboring material within 10 days or the issuance of the order, if in DATCP's judgment such an order is necessary to prevent or control a hazard to plant or animal life in the State.

ATCP also contains measures specifically addressing particular pest species, most of which are considered either prohibited species or restricted species under NR 40. Examples of invasive species addressed under this authority include both Asian and European gypsy moth; pine shoot beetle; African and Africanized honeybees; hemlock woolly adelgid; emerald ash borer; Asian longhorned beetle; and *Phytophthora ramorum*, the fungus which causes sudden oak death. The details of measures set forth in ATCP 21 vary by pest species. In general, these rules prohibit anyone from:

- Importing the pest organism or materials that may harbor or transmit the pest organisms into the State from regulated, quarantined, or infested areas designated by the State or the U.S. Department of Agriculture, or
- Moving the pest organisms or materials that may harbor or transmit the pest organism from any from regulated, quarantined, or infested areas designated by the State or the U.S. Department of Agriculture, unless the material has been inspected and certified in written certification by a pest control officer from the State of origin as either
 - Originating from noninfested premises and having not been exposed to the pest organism,
 - Being free of the pest organism,
 - Having been effectively treated to destroy the pest organism, or
 - Having been produced, processed, stored, handled, or used under conditions which preclude effective transmission of the pest organism.

The materials subject to these prohibitions differ with the particular pest species.

At the local level, management of invasive species may be addressed through municipal ordinances. A few municipalities in the watershed have ordinances that specifically address invasive species. The Cities of Franklin and Greenfield have ordinances that define certain invasive plant species as noxious weeds and require that these species be controlled with other noxious weeds. Most of the municipalities in the watershed have noxious weed ordinances. While the content of these ordinances vary among the communities, they generally define certain plant species as noxious weeds and require their destruction or control. Some of these ordinances, such as those of the Cities of Milwaukee and Oak Creek, specifically relate to plant species that cause hay fever or skin rashes.

Groundwater Management Measures

Utility-Specific Water Conservation Programs

As previously noted, the RWQMPU recommends that water utilities develop and implement utility-specific water conservation programs. For water utilities withdrawing water from surface water or groundwater sources in the Great Lakes basin, including the Root River watershed, this recommendation is partially implemented through the requirements of Chapter NR 852, "Water Conservation and Water Use Efficiency," of the *Wisconsin Administrative Code*. This chapter requires mandatory water conservation programs for all new and increased withdrawals and diversions of water from sources in the Great Lakes basin after December 8, 2008. It does not require water conservation for existing facilities at their current level of water withdrawal.

The rule classifies new withdrawals and diversions into three tiers, based upon the daily average amount of water withdrawn, whether the new or increased withdrawal constitutes a diversion of water from the Great Lakes basin, and whether the new or increased withdrawal would result in an average water loss through consumptive use or diversion of more than 2,000,000 gallons per day. The measures that are required to be implemented vary by tier. For all new or increased withdrawals by utilities withdrawing an average of 100,000 gallons per day or more, the utility is required to develop a water conservation plan, conduct a water use audit, develop a leak detection and repair program, measure their sources of water, and educate their staff and customers about their water conservation activities. Utilities withdrawing more than an average of 1,000,000 gallons per day, seeking a new or increased diversion of Great Lakes water, or making withdrawals that result in an average water loss of more than 2,000,000 gallons per day are required to implement additional conservation and efficiency measures. Under the rule, conservation and efficiency measures that require retrofitting are optional.

Consider the Potential Impact on Groundwater Quality in the Design of Stormwater Management Facilities

As previously noted, the RWQMPPU recommends that the design of stormwater management facilities that directly or indirectly involve infiltration of stormwater consider the potential impacts on groundwater quality, and that the provisions in the WDNR's post-construction stormwater management technical standards that are intended to protect groundwater quality be applied in the design of stormwater management facilities. These recommendations are addressed by regulations contained in Chapters NR 151, "Runoff Management," and Trans 401, "Construction Site Erosion Control and Storm Water Management Procedures for Department Actions," of the *Wisconsin Administrative Code*. Chapter NR 151 sets forth post-construction performance standards for new development and redevelopment and infiltration performance standards for both nonagricultural (urban) areas and transportation facilities.²⁷ Trans 401 sets forth post-construction performance standards for those transportation facilities that are regulated by the Wisconsin Department of Transportation. These performance standards include several elements that are intended to protect groundwater quality:

- They prohibit the infiltration of runoff that originates from certain types of source areas that can be expected to contribute contaminants that could degrade groundwater quality. Examples of these source areas include fueling and vehicle maintenance areas, storage and loading areas from certain types of industrial facilities, and rooftops and parking areas of certain types of industrial facilities.
- They prohibit infiltration of runoff that originates from certain types of source areas in close proximity of features of the landscape or improvements to the landscape that can cause groundwater to be susceptible to contamination. Examples of these include prohibitions against infiltrating any runoff within 1,000 feet upgradient or 100 feet downgradient of karst features and infiltrating runoff from commercial, industrial, and institutional land uses or regional devices for residential development within 400 feet of a community water system well or 100 feet of a private well.
- They specify required soil characteristics and separation distances between the bottom of an infiltration system and the elevation of seasonal high groundwater or the top of bedrock. These specified soil characteristic and separation distances depend upon the source of the runoff.
- They prohibit infiltration of runoff in areas where contaminants of concern are present in the soil through which infiltration will occur.

²⁷The post-construction performance standard for new development and redevelopment in nonagricultural (urban) areas is set forth in NR 151.12. The infiltration performance standard for nonagricultural (urban) areas is set forth in NR 151.124. The post-construction performance standard for transportation facilities is set forth in NR 151.24. The infiltration performance standard for transportation facilities is set forth in NR 151.244.

- They require pretreatment prior to infiltration of runoff from parking lots and new road construction in commercial, industrial, and institutional areas.
- They require that infiltration systems shall, to the extent technically and economically feasible, minimize the level of pollutants infiltrating to groundwater and to maintain compliance with the preventive action limits for groundwater pollutants promulgated by the WDNR.²⁸

Other Management Strategies that Are in Various Stages of Implementation

Table 4 summarizes the recommendations of the RWQMPPU that have been or are being implemented to some degree in the Root River Watershed.

Land Use Element

Preserve Primary Environmental Corridors in Essentially Natural Open Space Uses

As previously noted the RWQMPPU recommends preserving primary environmental corridors in essentially open space uses. The current protection status of primary environmental corridors in the watershed is shown on Map 5. About 5,951 acres, or 94.7 percent, of the primary environmental corridors in the Root River watershed are protected, or substantially protected, through one or more of the following means:

- Public interest ownership, including publicly owned lands, privately held lands owned by conservancy organizations and other privately held lands that were in compatible outdoor recreational use, and surface water;
- Joint State-local floodplain and shoreland-wetland zoning;
- State administrative rules governing sanitary sewer extensions within planned sanitary sewer service areas; and
- Local land use regulations, including protection through local conservancy zoning and, in the case of Waukesha County, through its review of proposed land divisions.²⁹

Consider Preserving Secondary Environmental Corridors and Isolated Natural Resource Areas Essentially Natural Open Space Uses

The RWQMPPU encourages the preservation of secondary environmental corridors and isolated natural areas and recommends that counties and communities consider the preservation of these areas in the preparation of county and local land use plans. Some secondary environmental corridor sites and isolated natural resource areas in the Root River watershed are in protective ownership. Example of these sites include the Caledonia Wildlife Area and Ives Grove Woods in Racine County.

Preserve All Identified Natural Areas and Critical Species Habitat Sites in Public or Public Interest Ownership

The RWQMPPU recommends the preservation of all of the identified natural areas and critical species habitat sites. As called for under the regional natural areas and critical species habitat protection and management plan,³⁰ the

²⁸Preventive action limits are groundwater quality criteria. They are set forth in Chapter NR 140, "Groundwater Quality, of the Wisconsin Administrative Code.

²⁹Waukesha County utilizes its land division approval-objection authority to help ensure the preservation of environmental corridors. Waukesha County reviews all proposed subdivision plats and some, but not all, proposed certified survey maps in Waukesha County.

³⁰SEWRPC Planning Report No. 42, op. cit.

Table 4

MANAGEMENT STRATEGIES RECOMMENDED IN THE REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE THAT ARE IN VARIOUS STAGES OF IMPLEMENTATION

Recommendation or Management Strategy	Focus Area Primarily Addressed				Responsible and Participating Organizations ^a
	Water Quality	Recreational Use and Access	Habitat Condition	Flooding	
Land Use					
Preserve primary environmental corridors in essentially natural open space uses	X	X	X	X	Counties, municipalities
Consider preserving secondary environmental corridor and isolated natural areas in essentially natural open space uses	X	X	X	X	Counties, municipalities
Preserve all identified natural areas and critical species habitat sites in public or public interest ownership	X	X	X	X	Counties, municipalities
Preserve, to the extent practicable, all farmland covered by Class I and II soils	--	--	--	--	Counties, municipalities, DATCP
Develop according to approved land use plans	X	X	X	X	Counties, municipalities
Point Source Abatement Measures					
Refine sanitary sewer service areas	X	X	--	--	MMSD, municipalities
Construct and maintain local sanitary sewer systems	X	X	--	--	Municipalities
Construct two additions to the MMSD Metropolitan Interceptor System	X	X	--	--	MMSD
Nonpoint Source Abatement Measures-Rural Control Measures					
Implement practices to reduce soil loss from cropland to rates below the tolerable soil loss rate, "T"	X	--	X	--	Counties, DATCP, WDNR, NRCS
Require agricultural operations with 35 or more combined animal units to provide six months manure storage	X	X	--	--	Counties, DATCP, WDNR, USDA
Increase crop and pasture riparian buffers to a minimum width of 75 feet	X	X	X	X	Counties, Drainage districts, MMSD, DATCP, WDNR, USFSA, NRCS, Land trusts
Limit the number of stream crossings and configure crossings to minimize fragmentation	--	X	X	X	Counties, DATCP, WDNR, USDA
Convert marginally productive agricultural lands to wetland and prairie conditions	X	X	X	X	Counties, MMSD, WDNR, Land trusts
Take measures to ensure proper handling and treatment of milking-center wastewater	X	--	--	--	Counties, DATCP
Implement county-enforced inspection and maintenance programs for onsite wastewater treatment systems constructed after counties adopted private sewage system programs	X	X	--	--	Counties
Institute voluntary programs to inventory and inspect private onsite wastewater treatment systems constructed before counties adopted private sewage system programs	X	X	--	--	Counties, municipalities, WDSPP

Table 4 (continued)

Recommendation or Management Strategy	Focus Area Primarily Addressed				Responsible and Participating Organizations ^a
	Water Quality	Recreational Use and Access	Habitat Condition	Flooding	
Nonpoint Source Abatement-Urban Control Measures					
Implement programs to detect and eliminate discharges and control pathogens that are harmful to human health	X	X	--	--	Municipalities and WDNR
Implement chloride reduction programs	X	--	--	--	Counties, municipalities, WDNR, WisDOT
Implement fertilizer management programs	X	--	--	--	Counties, municipalities, WDNR, UWEX
Implement beach and riparian litter and debris control programs	X	X	X	--	Counties, municipalities, MMSD, UWEX
Instream Water Quality Management Measures					
Implement projects called for under the Milwaukee County stream assessment study	X	--	X	--	Milwaukee County
Limit the number of culverts, bridges, drop structures, and channelized stream segments and incorporate design measures to allow for passage of aquatic organism	--	X	X	X	Counties, municipalities, MMSD, WDNR, WisDOT
Remove abandoned bridges and culverts	--	--	X	X	Counties, municipalities, MMSD, WDNR, WisDOT
Protect remaining stream channels, including small tributaries and shoreland wetlands	X	--	X	--	Counties, municipalities, MMSD, WDNR, WisDOT
Restore wetlands, woodlands, and grasslands adjacent to stream channels and establish minimum buffers 75 feet in width	X	X	X	X	Counties, municipalities, MMSD, WDNR, WisDOT
Restore and enhance stream channels	X	--	X	--	Counties, municipalities, MMSD, WDNR, WisDOT
Monitor fish and macroinvertebrate populations	X	--	X	--	WDNR, MMSD
Consider more intensive fisheries manipulation measures where warranted based upon specific goals developed in detailed local level planning	--	X	X	--	WDNR
Inland Lake Water Quality Measures					
Implement recommendations of Milwaukee County park pond and lagoon management plan	X	X	X	--	Milwaukee County
Establish long-term monitoring stations in inland lakes	X	X	--	--	WDNR, UWEX
Auxiliary Water Quality Management Measures					
Continue, support, and institute household hazardous waste collection programs	X	--	--	--	Counties, MMSD, DATCP
Continue, support, and institute collection programs for unused and expired medications	X	--	--	--	Counties, MMSD
Continue and support programs to reduce the introduction and spread of exotic and invasive species	--	--	X	--	WDNR, UWEX

Table 4 (continued)

Recommendation or Management Strategy	Focus Area Primarily Addressed				Responsible and Participating Organizations ^a
	Water Quality	Recreational Use and Access	Habitat Condition	Flooding	
Auxiliary Water Quality Management Measures (continued)					
Document and monitor the occurrence and spread of exotic and invasive species	--	--	X	--	WDNR
Continue and support current surface water quality monitoring programs	X	X	--	--	MMSD, USGS, RHD, WDNR
Extend long-term monitoring programs to areas outside of the MMSD service area	X	X	--	--	USGS, RHD, WDNR
Establish long-term fisheries, macroinvertebrate, and habitat monitoring stations	X	X	X	--	WDNR, MMSD, USGS
Maintain and update RWQMPU/MMSD 2020 FP water quality models	X	--	--	X	MMSD, SEWRPC
Groundwater Management Measures					
Maintain important groundwater recharge areas	X	--	X	X	Counties, municipalities

^aAbbreviations for organizations are:

- DATCP = Wisconsin Department of Agriculture, Trade and Consumer Protection
- MMSD = Milwaukee Metropolitan Sewerage District
- NRCS = Natural Resources Conservation Service
- RHD = City of Racine Health Department
- SEWRPC = Southeastern Wisconsin Regional Planning Commission
- USDA = U.S. Department of Agriculture
- USFSA = U.S. Farm Services Agency
- USGS = U.S. Geological Survey
- UWEX = University of Wisconsin-Extension
- WDSPS = Wisconsin Department of Safety and Professional Services
- WDNR = Wisconsin Department of Natural Resources
- WisDOT = Wisconsin Department of Transportation

Source: SEWRPC.

RWQMPU recommends acquisition of those sites not in existing public or public-interest ownership. The identified natural areas and critical species habitat sites in the Root River watershed and their current and recommended protection status are shown on Map 6. The status of implementation of the RWQMPU recommendations for placing these sites in protective ownership is shown in Table 5. There are 43 natural areas and 28 critical species habitat sites that are wholly or partially located within the Root River watershed. The total area of these sites is 3,845 acres, with 3,686 acres located within the watershed. As of 2010, 2,213 acres were in protective ownership. The regional natural areas and critical species habitat protection and management plan, as amended, recommends that an additional 1,337 acres be acquired and placed in protective ownership.

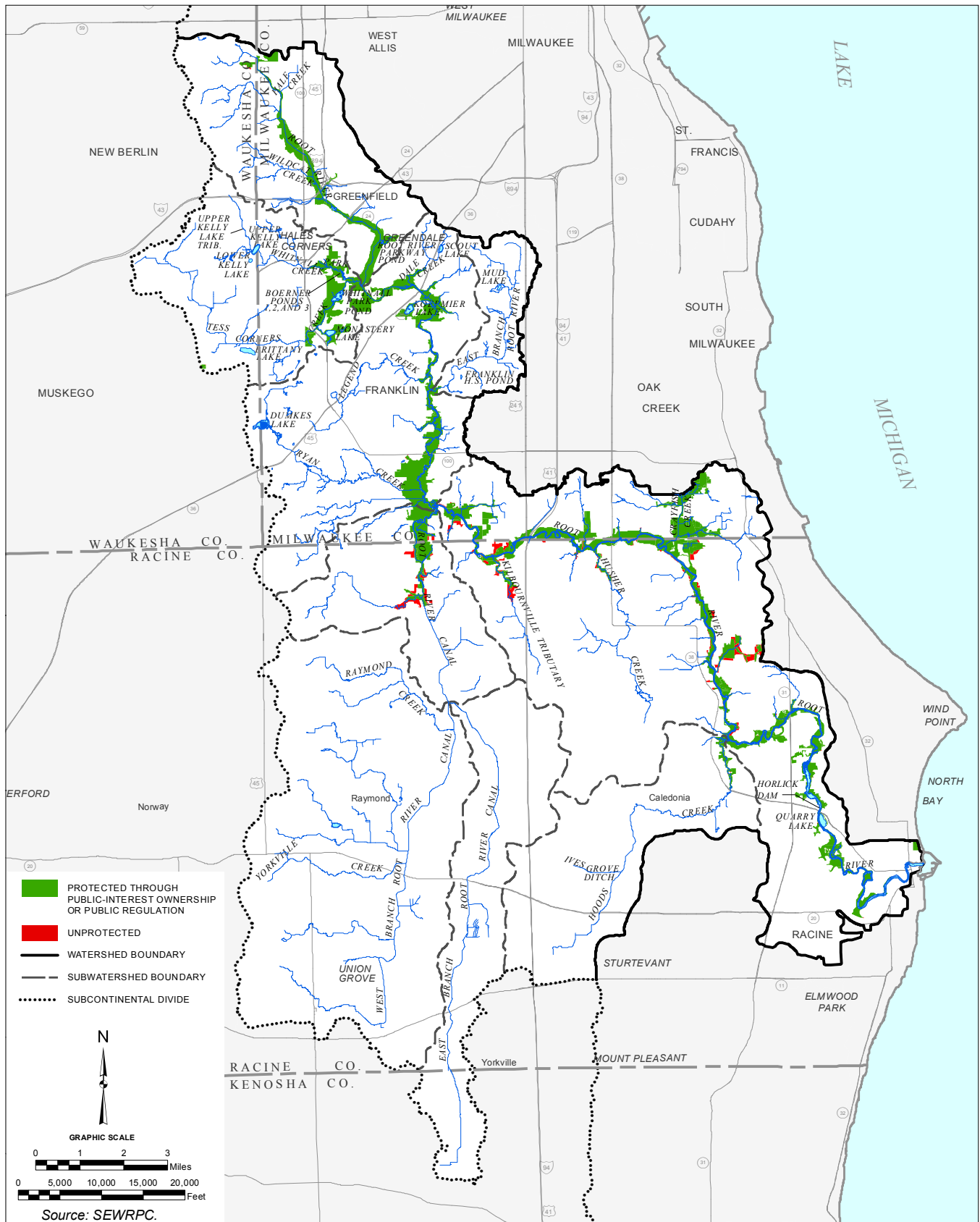
Point Source Pollution Abatement Measures

Construct and Maintain Local Sanitary Sewer Systems

As discussed previously, the RWQMPU recommends that all of the municipalities in Milwaukee County that are wholly or partially located in the watershed; the City of Racine, the Villages of Mt. Pleasant, Sturtevant, and Union Grove, the Caledonia East and West Utility Districts, the Mt. Pleasant Utility District No. 1, and the Yorkville Sewer Utility District No. 1 in Racine County; and the Cities of Muskego and New Berlin in Waukesha County, construct and maintain local sanitary sewer systems. These jurisdictions have all constructed such systems and perform maintenance on an ongoing basis.

Map 5

PROTECTION OF PRIMARY ENVIRONMENTAL CORRIDORS IN THE ROOT RIVER WATERSHED: 2000



Map 6

PROTECTION STATUS OF NATURAL AREAS AND CRITICAL SPECIES HABITAT SITES IN THE ROOT RIVER WATERSHED

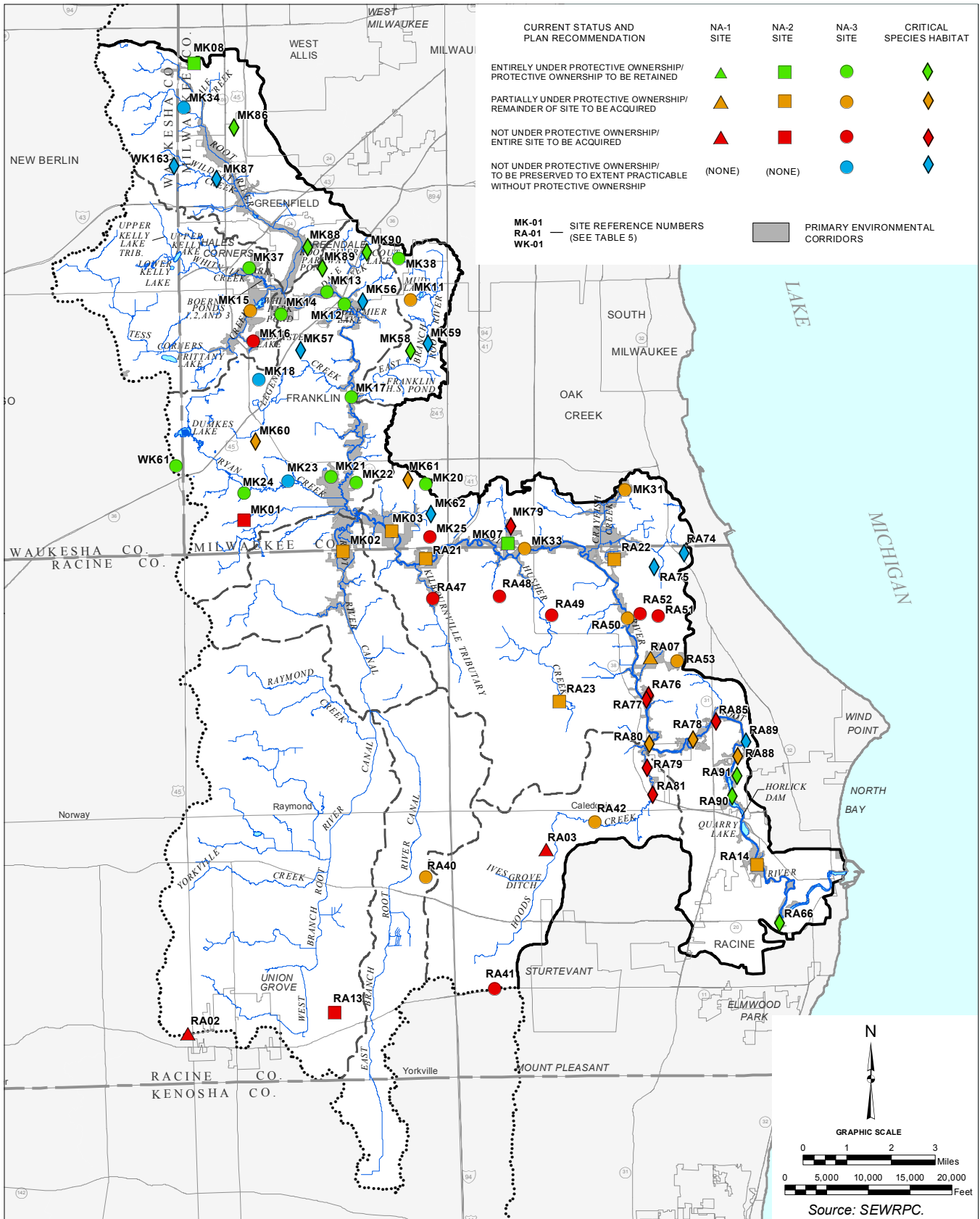


Table 5

**PROTECTION STATUS OF NATURAL AREAS AND CRITICAL
SPECIES HABITAT SITES IN THE ROOT RIVER WATERSHED: 2010**

Number on Map 6 ^a	Name	Class ^b	Area (acres)	Area in Watershed (acres)	Area in Protective Ownership (acres)	Area in Private Ownership (acres)	Area to Be Acquired (acres) ^c
MK-01	Adams Prairie	NA-2	37	37	0	37	37
MK-02	Root River Canal Woods	NA-2	315	315	111	204	168
MK-03	Root River Wet-Mesic Woods-West	NA-2	273	273	166	107	107
MK-07	Root River Wet-Mesic Woods-East	NA-2	52	52	52	--	--
MK-08	Greenfield Park Woods	NA-2	52	33	52	--	--
MK-11	Grobschmidt Park Wetlands and Upland Woods	NA-3	83	83	79	4	4
MK-12	Bike Trail Marsh	NA-3	3	3	3	--	--
MK-13	Root River Low and Upland Woods	NA-3	76	76	76	--	--
MK-14	Root River Parkway Woods	NA-3	64	64	64	--	--
MK-15	Whitnall Park Woods-South	NA-3	145	145	144	1	1
MK-16	Monastery Lake Wetlands	NA-3	48	48	0	48	48
MK-17	Root River Bike Trail Woods	NA-3	108	108	108	--	--
MK-18	Mission Hills Wetland	NA-3	38	38	0	38	0
MK-20	Fitzsimmons Road Woods	NA-3	39	26	39	--	--
MK-21	Root River Parkway Prairie	NA-3	51	51	51	--	--
MK-22	60th Street Woods	NA-3	11	11	11	--	--
MK-23	Ryan Creek Woods	NA-3	102	102	0	102	0
MK-24	Franklin Oak Woods and Oak Savanna	NA-3 ^d	79	79	79	--	--
MK-25	Elm Road Woods	NA-3	20	20	0	20	20
MK-31	Oak Creek Low Woods	NA-3	68	35	31	37	37
MK-33	Root River Riverine Forest	NA-3	331	331	330	1	1
MK-34	West Branch Root River Woods	NA-3	12	12	0	12	0
MK-37	Whitnall Park Woods-North	NA-3	82	82	82	--	--
MK-38	Grootemaat Woods	NA-3	20	20	20	--	--
MK-56	Russell Avenue Woods	CSH	9	9	0	9	0
MK-57	Loomis Road Woods	CSH	13	13	0	13	0
MK-58	Countryside Woods	CSH	26	26	26	--	--
MK-59	35th Street Woods	CSH	14	14	0	14	0
MK-60	Shooting Star Prairie and Shrubland ^e	CSH	18	18	15	3	3
MK-61	Oakwood Park Oak Woods	CSH	8	8	5	3	3
MK-62	Elm Road Woods-North	CSH	32	32	0	32	0

Table 5 (continued)

Number on Map 6 ^a	Name	Class ^b	Area (acres)	Area in Watershed (acres)	Area in Protective Ownership (acres)	Area in Private Ownership (acres)	Area to Be Acquired (acres) ^c
MK-79	PPG Woods	CSH	19	19	0	19	19
MK-86	Holt Park Woods	CSH	8	8	8	--	--
MK-87	Cold Spring Road Thicket	CSH	2	2	0	2	0
MK-88	Grange Avenue Woods	CSH	14	14	14	--	--
MK-89	Westway Woods	CSH	9	9	9	--	--
MK-90	Scout Lake Park Woods	CSH	43	43	43	--	--
RA-02	Kansasville Railroad Prairie	NA-1	28	6	0	0	6
RA-03	Franksville Railroad Prairie	NA-1	4	4	0	4	0
RA-07	Renak-Polak Maple-Beech Woods State Natural Area	NA-1 ^d	138	138	96	42	42
RA-13	Union Grove Railroad Prairie	NA-2	44	34	0	44	44
RA-14	Colonial Park Woods	NA-2	94	94	89	5	5
RA-21	County Line Riverine Woods	NA-2	141	141	41	100	100
RA-22	Hunts Woods	NA-2	36	36	5	31	31
RA-23	Caledonia Wildlife Area	NA-2	166	166	133	33	33
RA-40	Ives Grove Woods	NA-3	140	140	54	86	86
RA-41	Sylvania Railroad Prairie	NA-3	11	5	0	11	11
RA-42	Hoods Creek Woods	NA-3	72	72	9	63	63
RA-47	Kimmel Woods	NA-3	40	40	0	40	40
RA-48	Seven Mile Woods	NA-3	20	20	0	20	20
RA-49	Zirbes Woods	NA-3	13	13	0	13	13
RA-50	Caledonia Low Woods	NA-3	107	107	61	46	46
RA-51	Foley Road Woods-East	NA-3	24	24	0	24	24
RA-52	Foley Road Woods-West	NA-3	19	19	0	19	19
RA-53	Tabor Woods	NA-3	106	50	20	86	86
RA-66	Washington Park Woods	CSH	14	14	14	--	--
RA-74	WEPCo Woods	CSH	18	18	0	18	0
RA-75	Sherwood Property	CSH	4	4	0	4	0
RA-76	Forked Aster Site	CSH	18	18	0	18	18
RA-77	River Meadow Woods	CSH	14	14	0	14	14
RA-78	Caledonia Sanitary Sewer Right-of-Way	CSH	94	94	18	76	76
RA-79	Hoods Creek Swamp	CSH	13	13	0	13	13
RA-80	Root River Bluff	CSH	50	50	18	32	32
RA-81	STH 38/CTH K	CSH	4	4	0	4	4
RA-85	Four Mile Road Woods	CSH	31	31	0	31	31
RA-88	Caledonia Low Woods-South	CSH	30	30	20	10	10
RA-89	Root River Ravine Woods	CSH	5	5	0	5	0

Table 5 (continued)

Number on Map 6 ^a	Name	Class ^b	Area (acres)	Area in Watershed (acres)	Area in Protective Ownership (acres)	Area in Private Ownership (acres)	Area to Be Acquired (acres) ^c
RA-90	Root River Strip Woods	CSH	2	2	2	--	--
RA-91	River Bend Upland Woods	CSH	14	14	14	--	--
WK-61	Luther Parker Cemetery Prairie	NA-3	1	1	1	--	--
WK-163	Schkeryantz Woods	CSH	6	6	0	6	0
	Total	--	3,845	3,686	2,213	1,632	1,337

^aNumbers are those assigned in the county-level maps in the Amendment to SEWRPC Planning Report No. 42, Natural Areas and Critical Species Habitat Protection and Management Plan for the Southeastern Wisconsin Region, December 2010.

^bNA-1 sites are areas of Statewide significance. These areas contain excellent examples of nearly complete and relatively undisturbed plant and animal communities which are believed to closely resemble those present prior to European settlement.

NA-2 sites are areas of regional significance. These areas are so designated either because they show evidence of a limited amount of human disturbance or because they are of the highest quality but have less area than that required for the NA-1 ranking.

NA-3 sites are areas of local significance. While these areas are substantially altered by human activities, they may contain excellent wildlife habitat or provide refuge for native plant species which no longer exist in the surrounding region due to land use activities.

CSH sites are critical species habitat sites.

^cAs recommended in the 2010 amendment to the regional natural areas and critical species habitat protection plan.

^dThis site is also designated as a State natural area.

^eAlso known as Carity Prairie.

Source: SEWRPC.

Construct Two Additions to the MMSD Metropolitan Interceptor System

The RWQMPU recommended constructing two additions to the MMSD Metropolitan Interceptor System in the Root River watershed—a new Ryan Creek interceptor and a capacity upgrade to the Franklin-Muskego interceptor. As of February 2012, the design of the Ryan Creek interceptor was completed and a construction contract was awarded. The Ryan Creek interceptor was designed to eliminate the need to upgrade capacity of the Franklin-Muskego interceptor. Portions of the Metropolitan Interceptor System downstream from the Franklin-Muskego force main are being lined due to corrosion.

Nonpoint Source Pollution Abatement—Rural Control Measures

As previously noted, the RWQMPU makes several recommendations for controlling nonpoint source pollution in rural areas. These recommendations include:

- Implementing practices to reduce soil loss from cropland to attain erosion rates less than or equal to “T,” the maximum average annual rate of soil loss that can occur without significantly affecting crop productivity,
- Require livestock operations in the study area with 35 combined animal units or greater as defined in Chapter NR 243 to provide six months of manure storage,
- Establishing minimum 75-foot-wide riparian buffers along each side of streams flowing through current crop and pasture land,

- Limiting the numbers of stream crossing and configuring them to minimize fragmentation of stream habitat, and
- Taking measures to ensure proper handling and treatment of milking center wastewater.

The county land conservation offices in Kenosha, Milwaukee, Racine, and Waukesha Counties have been pursuing implementation of these recommendations by providing cost-share assistance and technical assistance to landowners to install practices that address soil erosion and agricultural nonpoint source pollution. Examples of practices that have been installed in the Root River watershed in recent years include grassed waterways, lined outlets, clean water diversions, gully stabilizations, and riparian buffers.

Convert Marginally Productive Agricultural Lands to Wetland and Prairie Conditions

As described previously, the RWQMPU recommends that a total of 10 percent of existing farmland and pasture be converted to either wetland or prairie conditions, with first consideration for conversion being given to marginally productive lands. There have been some efforts to implement this recommendation. In 2010, the Milwaukee County Department of Parks, Recreation and Culture (DPRC) converted two agricultural fields adjacent to Franklin State Natural Area to native prairie. This project was conducted in partnership with the Urban Ecology Center and the U.S. Forest Service. Funding for the project was provided by Root-Pike WIN. DPRC has also restored 19 acres of farmland within the Franklin State Natural Area to native prairie and is restoring 16 acres at this site to native savanna. Funding for this project was provided by Root-Pike WIN and the Milwaukee Area Land Trust. Through its Greenseams program, MMSD has acquired 357 acres in the Root River watershed, including over 150 acres in the headwaters of Ryan Creek and more than 80 acres adjacent to Crayfish Creek. Restoration activities to re-create a wooded wetland and native prairie are ongoing on the Crayfish Creek project site. In June 2012, the Racine County Land Division completed a project along the East Branch of the Root River Canal in the Town of Yorkville in which three acres of marginal farmland were converted to wetland.

Nonpoint Source Pollution Abatement—Urban Control Measures

Programs to Detect and Eliminate Discharges and Control Pathogens that Are Harmful to Human Life

As previously described, the RWQMPU recommends enhanced urban illicit discharge control and/or innovative methods to identify and control possible pathogen sources in stormwater runoff from all urban areas in its study area, including the Root River watershed. This recommendation is intended to address fecal coliform bacteria, the presence of which may indicate risks to human health from pathogens. As part of its sampling program, the Racine Health Department has been sampling stormwater outfalls that discharge into the Root River in the City of Racine.

Chloride Reduction Programs

The RWQMPU makes several recommendations to reduce the amount of chlorides introduced into the environment. These recommendations include:

- Evaluation of deicing practices by counties and municipalities to obtain optimal application rates to ensure public safety without applying more chlorides than necessary for that purpose;
- Consideration of alternatives to current ice and snow control programs;
- Implementation of education programs to provide information about alternative ice and snow control measures in public and private parking lots, optimal deicer application rates in such areas; and
- Implementation of education programs to provide information about alternative water softening media and the use of more efficient water softeners.

A number of efforts have been made to reduce the use of chlorides in deicing. In 2008 and 2009, Milwaukee County sponsored three winter maintenance workshops that focused on road salt use reduction for public works

employees and maintenance employees of public spaces such as schools and parking lots. In 2012, the impacts and management of road salt and prevention of pollution related to road salt were major topics presented at the annual stormwater municipal separate storm sewer system workshops sponsored by Waukesha County.

The City of Racine is purchasing a brine system for use in its deicing operations. It is initially intended to be used for ice control on arterial streets.

Fertilizer Management Programs

As described previously, the RWQMPSU recommends that information and education programs required under municipal WPDES stormwater discharge permits promote voluntary practices that optimize urban fertilizer application consistent with the requirements of WDNR Technical Standard No 1100, "Interim Turf Nutrient Management." Several programs provide information and education regarding fertilizer application and management to residents of the Root River watershed. Root-Pike WIN conducts the Keep Our Waters Clean program, an educational program providing information with the long-term goal of reducing polluted runoff and improving water quality in local waterways. This program is conducted under contract for the Southeast Wisconsin Clean Water Network, a group of 18 municipalities, including 9 in the Root River watershed. The WDNR and the University of Wisconsin-Extension also provide educational materials regarding urban fertilizer management.

Beach and Riparian Litter and Debris Control Programs

As previously noted, the RWQMPSU recommends that existing litter and debris control programs along the urban streams of the study area be continued and that opportunities to expand such efforts be explored. A number of agencies and entities have been conducting riparian litter and debris control activities in the Root River watershed.

The City of Racine Department of Parks, Recreation and Cultural Services, in conjunction with Leadership Racine, conducts an Adopt-A-River program for the reaches of the Root River in the City. Under this program, participating community organizations, associations, and agencies assume responsibility for litter control along the banks of the River that pass through City of Racine parks. Each participating organization agrees to pick up litter on its segment at least two times a year between April 1 and November 1. The City of Racine also conducts an Adopt-A-Beach program for Lake Michigan beaches.

Since 1999, the Badger Trails hiking organization has sponsored an annual hike along the Root River Trail in Greendale, Greenfield, and West Allis that includes litter pickup and removal.

Other organizations that have conducted or sponsored litter and debris control activities in the Root River watershed in recent years include S.C. Johnson Corporation, the Racine Marriott, the Sierra Club, Racine Lutheran High School Environmental Club, the YWCA of Racine Kids Nature Kamp, and the West Allis Central High School Conservation Club.

Instream Water Quality Management Measures

Implement Projects Called for Under the Milwaukee County Stream Assessment Study

The RWQMPSU recommends that the projects called for under the Milwaukee County stream assessment study be implemented over time in a manner consistent with the need to provide flood protection and consistent with the stream rehabilitation recommendations of the regional plan update. Milwaukee County has been pursuing funding to implement projects recommended by this assessment.

Culverts, Bridges, Drop Structures, and Channelized Stream

As discussed previously, the RWQMPSU makes several recommendations regarding culverts, bridges, drop structures, and channelized stream sections. It recommends limiting the installation of these features, removing them where possible, and retrofitting them to allow the passage of fish and other aquatic organisms. At least one recent project has addressed these recommendations. In 2010 and 2011, the Wisconsin Department of Transportation replaced and retrofitted culverts along Husher Creek at STH 38. This project incorporated features

to enhance fish and organism passage.³¹ The project included the removal of an abandoned and failing bridge and reconstruction of a more natural channel upstream from the culvert.

Protect Remaining Natural Stream Channels

The RWQMPPU recommends that to the extent practicable, remaining natural stream channels, including small tributaries and shoreland wetlands that provide habitat for the continued survival, growth, and reproduction of a sustainable fishery throughout the study area, be protected. No specific examples of implementation of this recommendation were identified within the Root River watershed.

Restore Wetlands, Woodlands, and Grasslands Adjacent to Stream Channels and Establish Minimum 75-Foot-Wide Buffers

As previously noted, the RWQMPPU recommends restoring wetlands, woodlands, and grasslands adjacent to stream channels and establishing buffers that are a minimum of 75 feet in width to reduce pollutant loads entering the stream and protect water quality. Some of the projects previously discussed in this chapter included restoration activities that address this recommendation. Examples of these projects include the Milwaukee County DPRC restoration activities at Franklin State Natural Area and MMSD activities related to its Greenseams project along Crayfish Creek. Other DPRC projects addressing this recommendation include planting a mixture of native hardwood trees on five acres adjacent to the Root River in Hales Corners in 2010 and removing brush from 12.5 acres of grassland adjacent to Mud Lake. In addition, the stream channel restoration project along a tributary to Upper Kelly Lake that is described in the next section includes the restoration of a riparian wetland. Finally, several agricultural runoff projects include installation of riparian buffers.

Restore and Enhance Stream Channels

The RWQMPPU recommends the restoration, enhancement, and/or rehabilitation of stream channels. Several recent projects have addressed these recommendations. The Racine County Land Conservation Division has provided cost-share and technical assistance to landowners for stream channel projects that address agricultural runoff. These projects, which include streambank protection and streambank sloping, were conducted on a number of streams in the watershed, including Caledonia Creek, Hoods Creek, the Root River, and the West Branch of the Root River Canal. In 2004, the City of New Berlin conducted streambank stabilization projects along a tributary to the Root River and a stream within the New Berlin Hills Golf Course. In 2004, the Town of Yorkville conducted a streambed stabilization project along an unnamed tributary to the West Branch of the Root River Canal. In 2004 and 2005, the Kelly Lakes Association and the City of New Berlin relocated and re-meandered a tributary to Upper Kelly Lake. This project included restoration of the wetland that the tributary flows through and reconnection of the stream to its floodplain. In 2008, the City of Racine conducted a streambank stabilization and restoration project along a section of the Root River between Colonial Park and Lincoln Park. In 2008, the Wisconsin Department of Transportation relocated and restored a section of the Kilbournville Tributary at the IH 94/CTH G interchange. This project also reconnected the stream to its floodplain and improved fish passage through this reach. In 2005, the City of Racine commissioned a study to evaluate the condition of storm sewer outfalls and streambanks and associated erosion and erosion potential along the Root River within the City.³² The City is currently updating this study.

Monitor Fish and Macroinvertebrate Populations

The RWQMPPU recommends that fish and macroinvertebrate populations be monitored to evaluate the effectiveness of the water quality management program. The WDNR conducts monitoring of these organisms in the Root River watershed. The most recent monitoring was conducted in 2011. In 2004 and 2007, fish and

³¹SEWRPC Staff Memorandum, "Data Analysis and Recommendations Related to the Proposed Restoration of Husher Creek, Tributary to the Root River in the Village of Caledonia, Racine County," December 28, 2011.

³²Earth Tech, Inc., Root River Outfall and Streambank Erosion Assessment, January 2005.

macroinvertebrate data were also collected at two sampling stations along the mainstem of the Root River in Milwaukee County as part of the MMSD Corridor Study.³³ In addition, Root-Pike WIN has funded a study of freshwater mussels in the Root River watershed. This study will examine the mainstem of the River and the canals for the presence and species of mussels. Field work for this study will be conducted in 2012.

Consider More Intensive Fisheries Manipulation Measures Where Warranted

Based Upon Specific Goals Developed in Detailed Local Level Planning

The RWQMPPU recommends that more intensive fisheries manipulation measures be considered where warranted based upon specific goals and objectives for particular fisheries. As part of its fisheries management programs, the WDNR considers the appropriate management measures for fisheries in the Root River watershed.

As part of its Southeast Region Urban Fishing Program, the WDNR annually stocks catchable-size rainbow trout in Franklin High School Pond, Quarry Lake, Schoetz Park Pond, and Scout Lake. In addition, the Hunger Task Force stocks several species of fish into Milwaukee County park ponds and lagoons.

Inland Lake Water Quality Management Measures

Implement Recommendations of Milwaukee County Park Pond and Lagoon Management Plan

The RWQMPPU recommends implementation of the recommendations of the Milwaukee County park pond and lagoon management plan. Milwaukee County has been pursuing funding to implement projects recommended under the plan.

Establish Long-Term Monitoring Stations in Inland Lakes

The RWQMPPU recommends that long-term monitoring stations be established in inland lakes. While several lakes and ponds in the Root River watershed have been sampled on single occasions, only four—Lower Kelly Lake, Quarry Lake, Scout Lake, and Upper Kelly Lake—have been sampled repeatedly. Two of these lakes have been sampled recently and continue to be sampled. Volunteers from the Wisconsin Citizen Lake Monitoring Network have monitored Secchi depth in Upper Kelly Lake at its deepest point since 1994. The City of Racine Health Department has sampled Quarry Lake for bacteria since at least 1990.

Auxiliary Water Quality Management Measures

Continue, Support, and Institute Household Hazardous Waste Collection Programs

The RWQMPPU recommends that the existing collection programs for household hazardous wastes be continued and supported and that those communities not served by such programs consider developing and instituting them. Most communities in the Root River watershed have provisions for collection of household hazardous wastes. Kenosha County sponsors an annual collection event for County residents outside of the City of Kenosha. In Milwaukee County, MMSD has three collection facilities that are open two to three days per week throughout the year. These sites serve all of Milwaukee County. In addition, the MMSD sponsors periodic mobile collection events for Milwaukee County residents. Five of these events are scheduled for 2012. In Racine County several communities conduct hazardous waste collection activities. The City of Racine and the Villages of Caledonia, Mount Pleasant, and Sturtevant jointly conduct monthly collection events between April and October for their residents.³⁴ The Village of Union Grove and the Town of Dover in conjunction with several other Racine County

³³*U.S. Geological Survey Scientific Investigations Report No. 2007-5084, Water-Quality Characteristics for Selected Sites within the Milwaukee Metropolitan Sewerage District Planning Area, Wisconsin: February 2004-September 2005, 2007; U.S. Geological Survey Scientific Investigations Report No. 2010-5166, Biological Water-Quality Assessment of Selected Streams within the Milwaukee Metropolitan Sewerage District Planning Area of Wisconsin: 2007, 2010.*

³⁴*The Villages of Elmwood Park, North Bay, and Wind Point, which are located outside of the Root River watershed, also participate in this program.*

municipalities that are not located in the Root River watershed conducted a collection event in April 2012. The Town of Norway has contracts with local waste disposal firms that allow residents to drop off household hazardous wastes at the firms' facilities on Saturdays. In the recent past, the Town of Raymond has made a similar arrangement with a local waste disposal firm. Waukesha County has established four drop-off sites for the collection of household hazardous wastes. In addition, the County schedules periodic special collection events.

Financial assistance is available from the State of Wisconsin to counties, municipalities, town sanitary districts, metropolitan sewerage districts, lake protection and rehabilitation districts, county utility districts, and regional planning commissions for household hazardous waste collection activities through the Wisconsin Clean Sweep program that is administered by the State Department of Agriculture, Trade and Consumer Protection.

Continue, Support, and Institute Collection Programs for Unused and Expired Medications

As indicated above, the RWQMPU recommends that periodic collections of expired and unused prescription medications be conducted. Three types of programs have been developed that are implementing this recommendation in the Root River watershed. First, several jurisdictions have held periodic collection events. In Milwaukee County, MMSD has periodically sponsored Countywide collection events. In Racine County, the City of Racine Health Department, the Central Racine County Health Department, and the Western Racine County Health Department conduct annual collection events in April and October. Communities located in the Root River watershed that have participated in these events include the City of Racine; the Villages of Caledonia, Mount Pleasant, Sturtevant, and Union Grove; and the Town of Dover. The Waukesha County Drug Free Communities Coalition coordinates an annual Countywide drug collection to dispose of unused and expired medications.

Second, several jurisdictions have established drop-off sites or drop boxes where residents may dispose of expired or unused medications. These sites are usually located at law enforcement offices. Kenosha County has established four sites that serve the entire County. In Milwaukee County, collection sites have been established at the police departments in the Cities of Franklin, Oak Creek, and West Allis, and the Village of Greendale. In addition, the City of Greenfield Health Department has established a collection site. These Milwaukee County sites serve their local residents. In Racine County, collection sites serving local residents have been established at the City of Racine and Village of Sturtevant police departments. In addition, the Town of Waterford Police Department has established a drop box for communities in the area.

Third, mail-back programs for disposal of expired or unwanted medications also serve residents of the watershed. In 2011 and 2012, three active mail-back programs served the Root River watershed residents. The University of Wisconsin-Extension's Get the Meds Out program provides free, prepaid mail-back envelopes to any interested pharmacy, clinic, health department, senior center, or police department within the 36 counties in the State of Wisconsin that are located in the Great Lakes basin. This program serves residents in all four of the Counties that contain portions of the Root River watershed. Participating facilities distribute the envelopes free-of-charge to their customers or clients upon request. Individuals who are unable to pick up an envelope may call to request one over the phone. This program is funded through a grant from the USEPA under the Great Lakes Restoration Initiative.

Nationally, Walgreens and CVS pharmacies also have established mail-back programs. Under these programs, individuals may purchase a mail-back envelope at a participating pharmacy for returning expired or unwanted medications. It is important to note that these two programs do not accept controlled substances.

As is the case for household hazardous waste collection, financial assistance from the State of Wisconsin is available to local units of government for expired and unused prescription medication collection activities through the Wisconsin Clean Sweep program that is administered by the State Department of Agriculture, Trade and Consumer Protection.

Continue and Support Programs to Reduce the Introduction and Spread of Exotic and Invasive Species

In addition to the regulatory approaches previously described, there are a number of ongoing efforts for reducing the introduction and spread of exotic and invasive species in the Root River watershed.

The Milwaukee County Department of Parks, Recreation and Culture (DPRC) conducts aquatic plant management activities in park ponds and lagoons for aquatic invasive plants such as Eurasian water milfoil. Management efforts are conducted on an as-needed basis. Similarly, the Kelly Lakes Association conducts aquatic plant management activities on Lower and Upper Kelly Lakes.

DPRC also conducts terrestrial invasive plant management and removal activities in parks and natural areas of the Milwaukee County Park System. The methods used depend on the particular invasive species and the biological community in which they are located. These methods include mowing, prescribed burns, hand removal, mechanical removal, and application of herbicides. Many of DPRC's activities in the management of invasive species are conducted in cooperation with partner groups. The Park People of Milwaukee County, an umbrella organization of park friends groups, park watch groups, and neighborhood associations concerned with specific parks of the Milwaukee County Park System, coordinates weed-out events in the Milwaukee County Park System. This coordination includes recruiting volunteers and providing onsite tools and training. Other recent partners include Americorps, the Student Conservation Association, the Boy Scouts and Girl Scouts, and service learning programs at local colleges and universities.

Several organizations in Racine County conduct or have conducted activities to remove invasive species. The Racine County Parks Department sponsors an Adopt-A-Park program. Invasive species removal is one of the activities that participating organizations pursue. Weed Out! Racine annually organizes and sponsors invasive plant removal activities in parks and natural area within the Root River watershed. In cooperation with the Village of Caledonia, the Hoy Audubon Society, the Sierra Club Southeast Gateway Group, and Weed Out! Racine have conducted invasive species removal at Nicholson Wildlife Area. The Kenosha/Racine Land Trust has conducted invasive species removal and management activities on conservancy land and conservation subdivisions. Groups from the University of Wisconsin-Parkside have conducted invasive species management activities in the Renak-Polak Woods and at the Root River Environmental Education Center. Similar activities have been conducted by organizations in Milwaukee County. The Greendale Environmental Group has conducted invasive species removal activities in the Dale Creek Parkway.

Document and Monitor the Occurrence and Spread of Exotic and Invasive Species

As noted previously, the RWQMPU recommended that the occurrence and spread of exotic and invasive species be documented and monitored. Several ongoing efforts have addressed this recommendation in recent years.

As part of its field activities, the WDNR documents occurrence of exotic and invasive species. In addition, in 2003 and 2004, the Department used satellite data to map the degree to which wetlands in the State are infested with reed canary grass.³⁵ Distributions of several invasive species are documented on the Department's surface water data viewer, an internet-based mapping utility.³⁶ The Department has also implemented an internet-based reporting system for citizens and other agencies to report occurrences of invasive species.³⁷

³⁵Wisconsin Department of Natural Resources, Mapping Wisconsin Wetlands Dominated by Reed Canary Grass, *Phalaris arundinacea* L.: A Landscape Level Assessment, Final Report to the U.S. Environmental Protection Agency, October 2008.

³⁶The surface water data viewer can be accessed at http://dnr.wi.gov/org/water/data_viewer.htm.

³⁷This can be accessed at <http://dnr.wi.gov/topic/Invasives/report.html>.

As part of its activities, the Milwaukee County DPRC has conducted natural resource inventories for natural areas management units within the Park System. These inventories include inventories of invasive species. Parks and natural areas within the Root River watershed that have been recently examined include Dale Creek Park, Franklin State Natural Area, Rainbow Airport Prairie, the Root River Parkway, Scout Lake Park, and Whitnall Park.

In 2011, volunteers under the direction of the Southeastern Wisconsin Invasive Species Consortium (SEWISC)—a coalition of local units of government; Federal, State, and local government agencies; businesses; land trusts; and nongovernmental organizations that promotes efficient and effective management of invasive species throughout Kenosha, Milwaukee, Ozaukee, Racine, Sheboygan, Walworth, Washington, and Waukesha Counties—conducted roadside surveys for the presence and population sizes of four invasive plant species: common teasel (*Dipsacus sylvestris*), cut-leaf teasel (*Dipsacus laciniatus*), giant reed grass (*Phragmites australis*), and Japanese knotweed (*Polygonum cuspidatum*). This survey covered all roads with lane markings within eight counties served by SEWISC. As part of this effort, surveys were also performed on areas in or near primary and secondary environmental corridors and isolated natural resource areas. SEWISC plans on conducting additional surveys for invasive plant species in the future.

Continue and Support Current Surface Water Quality Monitoring Programs

The RWQMPPU recommends that the surface water quality monitoring programs currently being conducted by the MMSD, WDNR, and USGS be supported and continued. While there have been some changes to sampling sites and sampling frequencies in response to budget considerations, these monitoring programs continue to operate in the Root River watershed. In addition, the City of Racine Health Department conducts water quality sampling, both within the City of Racine and at other locations in the watershed.

Extend Long-Term Monitoring Programs to Areas Outside of the MMSD Service Area

As discussed previously, the RWQMPPU recommends that long-term monitoring programs be extended to areas outside of the MMSD service area. Discussion of this recommendation in the plan noted that there were considerable data gaps, especially with respect to monitoring of tributary streams. Beginning in 2011, the City of Racine Health Department expanded its water quality monitoring program to several sampling sites in portions of the Root River watershed that have not been recently monitored. Two of the sites established are providing data from a 12-mile-long section of the River that has not previously been monitored. In addition, the Racine Health Department has established sampling stations on seven tributary streams. Monitoring continued through 2012.

Establish Long-Term Fisheries, Macroinvertebrate, and Habitat Monitoring Stations

As noted previously, the RWQMPPU recommends establishing long-term fisheries, macroinvertebrate, and habitat monitoring stations in streams—ideally at sites where water quality is also being monitored. As part of its 2011 monitoring efforts the WDNR monitored macroinvertebrate populations at the sample sites in the watershed that had been previously sampled as part of the final evaluation of the Root River Priority Watershed project in 1990.³⁸ In addition, the Racine Health Department coordinated its selection of water quality sampling sites in the watershed with WDNR staff in order to provide water quality data at some of the WDNR's fisheries and macroinvertebrate sampling sites.

Maintain and Update RWQMPPU/MMSD 2020 FP Water Quality Models

The RWQMPPU recommends periodic maintenance and updating of the water quality models developed under the RWQMPPU/MMSD 2020 FP. As part of its ongoing activities, SEWRPC has been maintaining and updating these models.

³⁸Wisconsin Department of Natural Resources, An Evaluation of Water Quality in the Root River Priority Watershed: Final Report, Publication WR-298-92, January 1992.

Groundwater Management Measures

Maintain Important Groundwater Recharge Areas

As previously discussed, the RWQMPU recommends that consideration be given to following the recommendations of the regional water supply plan regarding maintenance of groundwater recharge areas. The regional water supply plan recommended the preservation and protection of groundwater recharge areas having a high or very high recharge potential.³⁹ This plan went on to note that such protection may be largely achieved through the implementation of the adopted design year 2035 regional land use plan and supporting county comprehensive plans, since these plans recommend the preservation of environmental corridors, isolated natural resource areas, and prime and other agricultural areas that facilitate recharge. The plan estimated that, within the Southeastern Wisconsin Region, about 76 percent of the highly rated and very highly rated recharge areas may be expected to be preserved by inclusion in environmental corridors, isolated natural resource areas, and prime and other agricultural areas identified for preservation in the adopted regional land use plan.

Management Strategies Recommended by the RWQMPU that Are Not Yet Implemented

Some recommendations of the RWQMPU have not yet been implemented in the Root River watershed. These are summarized in Table 6.

³⁹*SEWRPC Planning Report No. 52, op. cit.*

Table 6

**MANAGEMENT STRATEGIES RECOMMENDED FOR IMPLEMENTATION IN THE
REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE BUT NOT YET IMPLEMENTED**

Recommendation or Management Strategy	Focus Area Primarily Addressed				Responsible and Participating Organizations ^a
	Water Quality	Recreational Use and Access	Habitat Condition	Flooding	
Abandon Yorkville sewage treatment plant at the end of its useful life	X	X	--	--	Yorkville Sewer Utility No. 1
Evaluate the need to reduce infiltration and inflow of clearwater into sanitary sewers	X	X	--	--	MMSD, municipalities
Consider increasing the levels of cost-share funding for barnyard runoff BMPs	X	X	--	--	Counties, USDA
Conduct targeted research on bacteria and pathogens and research on stormwater BMP techniques and programs	X	X	--	--	MMSD WDNR, RHD
Prepare abandonment and riverine restorations plans for dams	--	--	X	--	Racine County, WDNR
Conduct assessments and evaluations of the significance for human health and wildlife of the presence of pharmaceuticals and personal care products in surface waters	X	--	--	--	MMSD, USGS
Continue efforts to facilitate consolidation of data from different monitoring programs	X	X	X	--	MMSD, WDNR, UWEX, USGS, USEPA
Continue and expand citizen-based monitoring efforts, with an emphasis on filling geographical data gaps	X	X	X	--	UWEX, WDNR
Upgrade objectives for Hoods Creek, Tess Corners Creek, and Whitnall Park Creek to Fish and Aquatic Life	X	X	--	--	WDNR
Upgrade objective for Ives Grove Ditch to Limited Forage Fish	X	X	--	--	WDNR
Consider groundwater sustainability guidance from the regional water supply plan in evaluating the sustainability of proposed development and local land use planning	X	--	X	--	Counties, municipalities

^aAbbreviations for organizations are:

MMSD = Milwaukee Metropolitan Sewerage District
 RHD = City of Racine Health Department
 USDA = U.S. Department of Agriculture
 USEPA = U.S. Environmental Protection Agency
 USGS = U.S. Geological Survey
 UWEX = University of Wisconsin-Extension
 WDNR = Wisconsin Department of Natural Resources

Source: SEWRPC.