

Chapter 5: Identify Solutions and Develop Management Strategies to Achieve Goals

5.1 Goals Identified in the Watershed Planning Effort

As discussed in Chapter 3, the Executive Steering Committee of the Southeastern Wisconsin Watersheds Trust, Inc. (SWWT) determined that the water quality goals from the Southeastern Wisconsin Regional Planning Commission's (SEWRPC) Regional Water Quality Management Plan Update (RWQMPU) should be used for the Watershed Restoration Plan (WRP). Through discussions at Watershed Action Team (WAT) and Science Committee meetings, focus areas were developed that reflect the linkage between water quality parameters and water usage.

Consistent with the focus areas for the WRP as identified in Chapter 3, the management strategies need to address the following critical areas:

1) Bacteria/Public Health

Fecal coliform bacteria are an indicator of pathogens, or microscopic organisms that can make people sick. The committees agreed that public health should be a top priority of the WRP. High levels of fecal coliforms are more of a concern during warm weather months because that is when people contact the water in the stream the most. One of the biggest concerns in the Kinnickinnic River watershed is the unknown or unidentified sources of fecal coliform and achieving reductions and compliance with water quality standards in warm weather months. A discussion of why fecal coliform was used in the analysis for the WRP, and the caveats that go with it, is provided in Section 7.2.1 of the WRP.

2) Habitat/Aesthetics

The committees stressed that habitat issues include not only physical features, but water quality components as well. As discussed in Chapter 3, this WRP acknowledges that aesthetic improvement does not always relate directly to water quality or habitat improvement, but in many cases they are linked. In addition, aesthetic improvement is strongly related to quality of life issues and environmental justice issues. See Chapter 3, Section 3.3 for additional discussion regarding these linkages.

The Science Committee identified physical features, such as concrete-lined channels and increased buffer widths as important considerations for habitat/aesthetics, but the consensus was that the WRP should also consider the following parameters:

- ◆ Chloride
- ◆ Total suspended solids (TSS)
- ◆ Sediment
- ◆ Dissolved oxygen (DO) /biochemical oxygen demand (BOD)
- ◆ Water temperature
- ◆ Trash - defined as pet litter, waterfowl impacts, and refuse – with the understanding that there is some overlap with other pollutants



- ◆ Flow/flood impacts

3) Nutrients/Phosphorus

In-stream phosphorus concentrations tend to be variable throughout the Kinnickinnic River watershed. While there do not appear to be many problems with algal growth within the watershed, phosphorus has been identified as an issue along the nearshore area of Lake Michigan.

The management strategies also consider nitrogen, copper, legacy pollutants such as polychlorinated biphenyls (PCBs), and emerging contaminants such as pharmaceuticals and personal care products (PPCPs). However, these pollutants are not a primary focus for the WRP and should be addressed in future studies.

The use of real-time data was stressed as an important implementation tool. The USGS and MMSD have installed monitoring facilities at select locations along the Kinnickinnic River. These facilities provide water quality, temperature, and flow data to resource managers on a real-time basis. The availability of real-time data facilitates an improved understanding of stream parameters under varied conditions. The USGS posts real-time monitoring data for Wisconsin at the following website:

<http://waterdata.usgs.gov/wi/nwis/current/?type=quality>

With regard to aesthetic and habitat improvements, the Kinnickinnic River Watershed Action Team (WAT) identified the issues and desired improvements summarized below, which are also listed in Chapter 3, Section 3.3.

1) Manmade channels/concrete channels

The WAT committee suggested that concrete linings be removed and stream channels be naturalized. The concrete removal and naturalization would make the river more attractive and appear less like a drainage ditch. See Chapter V of SEWRPC Technical Report No. 39 for locations of drop structures and concrete-lined channels in the Kinnickinnic River.¹ Other considerations included removing streams from enclosed conduit (stream daylighting) and reintroduction of stream meanders. Daylighting streams and reintroducing meanders would immediately improve habitat and aesthetics (vistas) and have the effect of drawing people to the river, but potential impacts to public safety and flooding also need to be considered.

2) In-stream conditions

The WAT committee made a number of suggestions regarding improvements to in-stream conditions. In general, these suggestions addressed habitat and in-stream physical conditions. The suggestions included the following:

- ◆ Eliminate barriers to fish passage (add fish ladders)
- ◆ Introduce environmentally-friendly sheet piling and bulkheads

¹ SEWRPC, *Water Quality Conditions and Sources of Pollution in the Greater Milwaukee Watersheds*, Technical Report No. 39, Chapter V, "Surface Water Quality Conditions and Sources of Pollution in the Kinnickinnic River Watershed" (November 2007)

- ◆ Reduce litter via programs (i.e., source control)
- ◆ Reduce algae blooms
- ◆ Remove the sediment island south of Lincoln Avenue (if not natural)
- ◆ Limit motor boat use upstream of Becher Street
- ◆ Increase diversity and complexity to the system

3) Riparian areas

Riparian areas are the lands that are adjacent to the Kinnickinnic River streambanks. Riparian areas protect and buffer the stream from pollutant loadings. To maximize their protective benefits, the WAT committee suggested that riparian areas be kept vegetated. The vegetation should be managed to enhance native biological diversity. The WAT committee also suggested riparian areas should be expanded to a minimum of 120 feet. Structures should also be removed from riparian areas that are also located within the floodplain. Other WAT committee suggestions involving riparian areas along the Kinnickinnic River included the following:

- ◆ Construct, treat, and restore wetlands
- ◆ Implement geese management and gull management, if applicable
- ◆ Implement mandates to address imperviousness with any new development and redevelopment
- ◆ Remove coal pile at the port or provide a buffer between the pile and the river (if possible)
- ◆ Improve public access to the river; mandate public access with any new development (indirect improvement through increased recreational use and awareness of the river)
- ◆ Create more trails along river

4) In-stream and riparian areas

For both in-stream and riparian areas, the WAT committee suggested that native species be restored and invasive species be removed. Also, efforts should be made to use less road salt within the watershed.

5) Desired uses

The WAT committee identified several desired uses for the Kinnickinnic River, including bird watching, kayaking and canoeing. The feasibility of these uses would be enhanced by clearly identifying access points along the river. Fishing, with the ability to consume fish, was also identified as a desired use. The WAT committee also indicated that simply living along the river would be desirable.

6) Overarching and vision

The WAT committee indicated that education and signage should play a prominent role in improving the Kinnickinnic River and the river's identity within the community. Educational programs and materials need to be available to both the general public and to



children. Signage needs to be improved to provide information on safety and historical aspects of the river. Physically, signage also needs to be sensitive to the existing environment. The committee also suggested that studies be conducted, a plan developed to both define and determine how to most effectively manage usage and density along the river. An entity should be appointed to manage usage. The WAT committee's vision is that the Kinnickinnic River becomes an integral part of the community that supports life and public health and that the community views the river as an asset.

These focus areas and goals were considered as the management strategies were developed for the Kinnickinnic River WRP. The framework to be used for these management strategies will be based upon the same theme as the RWQMPSU. Both the WRP and the RWQMPSU used categories of facilities, policies, operational improvements and programs. These strategies can interact with one another. For example, consider the construction of a new system or facility. A new system will require new operational procedures. These new operational procedures will be based upon policies and involve new programs. The categories are simply a way to characterize the management strategies as they are developed.

5.2 Management Strategies to Achieve Goals

The management strategies (FPOPs) must be identified and developed to reduce the loads in a cost effective manner to achieve the goals identified in Chapter 3. The approach to reduce pollutant loads in the Kinnickinnic River watershed is predicated on the assumption that the existing regulations for point and nonpoint sources of pollution will be implemented. In other words, the analysis assumes that the recommended management strategies used to meet these regulations, identified in the 2020 Facilities Plan (2020 FP) and SEWRPC's RWQMPSU, are in place. These management strategies would then be the foundation on which new management strategies are added to achieve the desired goals.

These management strategies (FPOPs) are grouped in the following three categories and discussed in subsequent sections in this chapter:

- 1) Existing regulatory management strategies (Table 5-1)
- 2) Other management strategies in various stages of implementation (Table 5-2)
- 3) Management strategies recommended for implementation by the RWQMPSU, but not yet implemented (Table 5-3)

These tables summarize the strategies identified in the RWQMPSU that could be used to achieve the goals identified for the Kinnickinnic River watershed. Each table corresponds to one of the three categories of management strategies identified above. The tables indicate which area (or areas) of focus each FPOP primarily addresses. The table also presents selected responsible parties and participants. For addition detail, see SWWT membership list and governmental management agency designations and selected responsibilities (Planning Report No.50 Tables 93-99) located in Appendices 5B and 5C.

5.3 Existing Regulatory Management Strategies to Achieve Goals

Pollutant loading in the Kinnickinnic River is a function of point sources and nonpoint sources. The management strategies (FPOPs) discussed in this chapter address pollutant loading from both types of sources. Table 5-1 summarizes the existing regulatory management strategies (FPOPs) to achieve goals. The table includes: the focus pollutant that the strategy addresses, the agencies responsible for implementation and compliance, and the status of the regulatory strategy as of October 2009.

**TABLE 5-1
SUMMARY OF EXISTING REGULATORY MANAGEMENT STRATEGIES (FPOPS) TO ACHIEVE GOALS**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, E. Coli, Pathogens)	Habitat/Aesthetics (Flow, TSS, CI, Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Point source control	X	X	X	WDNR, MMSD, and municipalities	Regulatory program underway
CSO/SSO reduction program	X	X	X	WDNR, MMSD, and municipalities	Regulatory program underway
WPDES stormwater permits (MS4)	X	X	X	WDNR and municipalities	Regulatory program underway
NR 151 <ul style="list-style-type: none"> • Vacuum street sweeping • Infiltration systems • Parking lot implementation of MCTTs • Vacuum sweeping parking lots • Wet detention basins 		X	X	WDNR and municipalities	Regulatory program underway
Phosphorus fertilizer ban			X	WDNR	Regulatory program underway
MMSD Chapter 13 revisions		X		MMSD and municipalities	Regulatory program underway with revision in progress
Transportation controls <ul style="list-style-type: none"> • TRANS 401 • NR 151 		X		WDNR, WisDOT, and WI Department of Commerce	Regulatory program underway <i>Continued...</i>



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	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, Cl ⁻ , Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Programs to detect and eliminate illicit discharges and control pathogens that are harmful to public health	X		X	Municipalities and NGOs with assistance from UWM GLWI and MMSD	Program needed for the KK watershed as is being implemented in the Menomonee River watershed
TMDL, EAP, watershed permitting and/or watershed trading	X	X	X	WDNR and USEPA	Could evolve from the WRP
Phosphorus water quality standard			X	WDNR	Regulation being drafted by WDNR

Notes:

Additional detail on all strategies can be found in the RWQMPU Planning Report No. 50, Chapters X and XI
 Cl⁻ = Chlorides
 CSO = Combined Sewer Overflow
 EAP = Environmental Accountability Project
 FC = Fecal coliform
 FPOP = Facilities, Policies, Operational Improvements, Programs
 GLWI = Great Lakes WATER Institute
 KK = Kinnickinnic River
 MCTT = Multi-chambered treatment train
 MS4 = Municipal Separate Storm Sewer
 NGO = Non-governmental organization

NR 151 = Wis. Admin. Code Natural Resources (NR) 151 *Runoff Management*
 SSO = Sanitary Sewer Overflow
 TMDL = Total Maximum Daily Load
 TRANS 401 = WisDOT CHAPTER TRANS 401: *Construction Site Erosion Control and Stormwater Management Procedures for Department Actions*
 TSS = Total suspended solids
 USEPA = U.S. Environmental Protection Agency
 UWM = University of Wisconsin-Milwaukee
 WDNR = Wisconsin Department of Natural Resources
 WisDOT = Wisconsin Department of Transportation
 WPDES = Wisconsin Pollutant Discharge Elimination System
 WRP = Watershed Restoration Plan



5.3.1 Details on the Existing Regulatory Management Strategies to Achieve Goals

The following sections summarize the various regulatory strategies listed in Table 5-1. Additional detail on regulatory strategies can be found in Chapter VI of SEWRPC's Planning Report No. 50.

5.3.2 Existing Point Source Control Regulations

Combined Sewer Overflow and Sanitary Sewer Overflow

Point source impacts on the Kinnickinnic River watershed have been studied and evaluated for many decades. The MMSD 2020 FP and the RWQMPSU reviewed the status of point source controls and found that they had progressed to the point that additional improvement in water quality needed to focus on nonpoint sources such as stormwater runoff. Still, the point source control plans are vitally important to watershed restoration.

The 2020 FP developed an approved plan to meet the regulatory requirements regarding MMSD's point sources (e.g., SSOs, CSOs, and water reclamation facility WRF] effluent). The 2020 FP concluded that, as a result of the substantial investment that has already been made to effectively reduce both SSOs and CSOs, the MMSD has reached a point of diminishing returns in terms of the additional water quality benefits that would result from further significant capital investment to further reduce sewer overflows. The MMSD, however, was required by the 2002 WDNR Stipulation to submit a *Wet Weather Control Plan* that meets its permit requirements and other requirements (discussed in Section 9.6.4 of Chapter 9 in the *2020 Facilities Plan Report*).

The 2020 planning process concluded that a 5-year level of protection (LOP) for SSO control under future 2020 population and land use conditions is consistent with state and federal requirements. It is important to note that the MMSD facilities are currently in compliance with point source pollution abatement measures required under state and federal laws. The new facilities recommended in the 2020 FP are to continue to achieve a 5-year LOP assuming the anticipated growth in population and land use.

The recommended facilities from the 2020 FP that directly address SSO and CSO control and are assumed to be implemented include the following:

- ◆ Implementation of a Wet Weather Peak Flow Management Program (WWPFMP)
- ◆ Pumping capacity from the Inline Storage System (ISS) to the Jones Island Water Reclamation Facility (JIWRF) of 180 million gallons per day
- ◆ Additional treatment capacity at the South Shore Water Reclamation Facility (SSWRF) of 150 MGD

The 2020 FP also assumed that SSOs from the municipalities would also achieve a 5-year LOP.

This overall plan for CSO and SSO control was approved by the WDNR and is the recommendation of the RWQMPSU.

Existing Wisconsin Pollutant Discharge Elimination System Permitted Industrial Discharges

There are 14 noncontact cooling water discharges in the Kinnickinnic River watershed. All of this noncontact cooling water is treated drinking water from municipal water supplies that is used for cooling at industrial facilities and does not come into direct contact with any raw material, product, byproduct, or waste. The water does contain phosphorus, in the form of phosphate, which is added in the water treatment process as a safety measure to prevent metal pipes from corroding and leaching metals such as lead into the drinking water. There are currently no other cost effective substitutes for phosphate. Therefore, the phosphorus load to the Kinnickinnic River from noncontact cooling water discharges is assumed to be a constant for planning purposes.

Also, other pollutant loads from industrial point sources represented in the water quality model are based on permitted discharge limits. No changes to these permitted limits were assumed to occur between the existing and the future water quality models. All discharge data have been updated based upon data available through 2008.

An additional industrial point source of note is General Mitchell International Airport, which discharges to Wilson Park Creek and is a permitted discharge with a specific stormwater permit. This permit allows the airport to discharge noncontact cooling water and stormwater that can contain contaminants common to airports, including deicing fluids.

5.3.3 Existing Nonpoint Source Regulatory Programs

Wis. Admin. Code Natural Resources 216 Stormwater Discharge Permits

The administrative rules for the state stormwater discharge permit program are set forth in Wis. Admin. Code Natural Resources (NR) 216 *Stormwater Discharge Permits*, which took effect on November 1, 1994. These rules were most recently repealed and replaced effective August 1, 2004. In general, the following entities are required to obtain discharge permits under NR 216:

- 1) An owner or operator of an MS4 serving an incorporated area with a population of 100,000 or more
- 2) An owner or operator of an MS4 notified by WDNR prior to August 1, 2004 that they must obtain a permit
- 3) An owner or operator of an MS4 located within an urbanized area as defined by the U.S. Bureau of the Census
- 4) An owner or operator of an MS4 serving a population of 10,000 or more in a municipality with a population density of 1,000 persons or more per square mile as determined by the U.S. Bureau of the Census
- 5) Industries identified in Section NR 216.21.18
- 6) Construction sites, except those associated with agricultural land uses, for those commercial buildings regulated by Wis. Admin. Code Commerce (Comm) 50 through 64 and WisDOT projects that are subject to the liaison cooperative agreement between the WDNR and WisDOT

Municipal Permits

On January 19, 2006, the WDNR issued a general stormwater discharge permit applicable to MS4s for areas that do not have individual permits and that are one of the following:

- 1) An urbanized area with a minimum population of 50,000 people as determined by the U.S. Bureau of the Census, or
- 2) A municipality with a population of 10,000 or more and a population density of 1,000 persons or more per square mile, or
- 3) An area that drains to an MS4 that is designated for permit coverage.

The general permit “specifies conditions under which stormwater may be discharged to waters of the state for the purpose of achieving water quality standards.” It establishes conditions for discharges to state-designated outstanding or exceptional resource waters. When an MS4 discharges to an impaired waterbody listed in Section 303(d) of the Clean Water Act (CWA), the following conditions must be met:

- 1) The permittee’s written stormwater management program must specifically identify control measures and practices that are to be applied in an attempt to reduce, with the goal of eliminating, the discharge of pollutants of concern that contribute to the impairment of the receiving water
- 2) The permittee may not initiate a new discharge of a pollutant of concern to an impaired waterbody or increase the discharge of such a pollutant to an impaired waterbody unless receiving water quality standards will be met or WDNR has approved a total maximum daily load (TMDL) for the impaired waterbody
- 3) For discharges to a waterbody for which a TMDL has been established, the permittee must determine if additional stormwater runoff controls are required to meet the TMDL wasteload allocation

The general stormwater discharge permit establishes requirements for the following:

- 1) Public education and outreach
- 2) Public involvement and participation
- 3) Illicit discharge detection and elimination
- 4) Construction site pollutant control
- 5) Post-construction stormwater management and a pollution prevention program

The construction site pollutant control requirements and the post-construction control requirements are based on the standards for new development, redevelopment, and transportation facilities as set forth in NR 151 and NR 216.

The following NR 216 municipalities are in the Kinnickinnic River watershed:

- 1) City of Milwaukee
- 2) City of Greenfield
- 3) City of West Allis



- 4) Village of West Milwaukee
- 5) City of Cudahy
- 6) City of St. Francis

Industrial Stormwater

Industrial stormwater discharges are permitted unless the industry certifies to WDNR that their facilities have no exposure of stormwater to industrial materials or activities that could contaminate it. By state code, this certification occurs every five years. An exclusion under the Intermodal Surface Transportation Efficiency Act (ISTEA) that postponed National Pollutant Discharge Elimination System (NPDES) permit application deadlines for most stormwater discharges associated with industrial activity at facilities that are owned or operated by small municipalities, including construction activity over five acres, was removed from the NR 216 regulation. All listed industrial facilities, whether municipally or privately-owned, will require permit coverage as per federal regulations.

There are 45 industrial facilities that have stormwater discharge permits in the Kinnickinnic River watershed.

Construction Site Stormwater Discharges

This provision was revised to lower the threshold for permit coverage from five acres to one acre of land disturbance. Areas less than one acre in size are also subject to regulation on a case-by-case basis if they are deemed to be a significant source of pollution to waters of the state. Municipalities may request and become authorized to provide state construction site permit coverage on behalf of WDNR.

Wis. Admin. Code Natural Resources 151 Runoff Management

Through 1997 Wisconsin Act 27, the State Legislature required the WDNR and the Department of Agriculture, Trade and Consumer Protection (DATCP) to develop performance standards for controlling nonpoint source pollution from agricultural and nonagricultural land and from transportation facilities. The performance standards are set forth in NR 151, which became effective on October 1, 2002, and was revised in July 2004. This regulation includes the following provisions:

- ◆ *Agricultural Performance Standards (not relevant for the Kinnickinnic River watershed due to the lack of agricultural operations)*
- ◆ *Nonagricultural (urban) Performance Standards*

The nonagricultural performance standards set forth in NR 151 encompass two major types of land management. The first includes standards for areas of new development and redevelopment and the second includes standards for developed urban areas. The performance standards address the following areas:

- Construction sites for new development and redevelopment
- Post construction phase for new development and redevelopment
- Developed urban areas
- Non-municipal property fertilizing



Chapter NR 151 standards require that municipalities with WPDES stormwater discharge permits reduce the amount of total suspended solids in stormwater runoff from areas of existing development that is in place as of October 2004 to the maximum extent practicable, according to the following standards:

- ◆ By March 10, 2008, the NR 151 standards called for a 20% reduction
- ◆ By October 1, 2013, the standards call for a 40% reduction

Also, permitted municipalities must implement 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 people or more per square mile that were not required to obtain municipal stormwater discharge permits must now implement those same three programs.

In addition, regardless of whether a municipality is required to have a stormwater discharge permit under NR 216, NR 151 requires that all construction sites that have one acre or more of land disturbance must achieve an 80% reduction in the sediment load generated by the site. With certain limited exceptions, those sites required to have construction erosion control permits must also have post-development stormwater management practices to reduce the total suspended solids load from the site by 80% for new development, 40% for redevelopment, and 40% for infill development occurring prior to October 1, 2012. After October 1, 2012, infill development will be required to achieve an 80% reduction. If it can be demonstrated that the solids reduction standard cannot be met for a specific site, total suspended solids must be controlled to the maximum extent practicable. Note that during the development of this WRP, participants' observations indicated that methods and installation are key factors that determine the effectiveness of erosion control measures at construction sites.

Section NR 151.12 requires infiltration of post-development runoff from areas developed on or after October 1, 2004, subject to specific exclusions and exemptions as set forth in Sections 151.12(5)(c)5 and 151.12(5)(c)6, respectively. In residential areas, either 90% of the annual predevelopment infiltration volume or 25% of the post-development runoff volume from a two-year recurrence interval 24-hour storm is required to be infiltrated. However, no more than 1% of the area of the project site is required to be used as effective infiltration area. In commercial, industrial and institutional areas, 60% of the annual predevelopment infiltration volume or 10% of the post-development runoff volume from a two-year recurrence interval 24-hour storm is required to be infiltrated. In this case, no more than 2% of the rooftop and parking lot areas are required to be used as effective infiltration area.

Section NR 151.12 also generally requires impervious area setbacks of 50 feet from streams, lakes, and wetlands. This setback distance is increased to 75 feet around NR 102-designated outstanding or exceptional resource waters or NR 103-designated wetlands of special natural resource interest. Reduced setbacks from less susceptible wetlands and drainage channels of not less than 10 feet may be allowed.



Transportation Facility Performance Standards

Transportation facility performance standards that are set forth in NR 151 and in Wis. Admin. Code Transportation (TRANS) 401 *Construction Site Erosion Control and Storm Water Management Procedures for Department Actions* cover the following areas:

- ◆ Construction sites
- ◆ Post-construction phase
- ◆ Developed urban areas

The standards of TRANS 401 are applicable to WisDOT projects.

All of the municipalities in the watershed are, or will be, required to meet NR 151 standards to the maximum extent practicable under the conditions of their WPDES municipal stormwater discharge permits issued pursuant to NR 216. By implementing controls to meet the standards of NR 151, municipalities will address the following:

- 1) Control of construction site erosion
- 2) Control of stormwater pollution from areas of existing and planned urban development, redevelopment, and infill
- 3) Infiltration of stormwater runoff from areas of new development

Urban best management practices that would be installed under this recommendation to control nonpoint source pollution from existing or new development could include the following:

- 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, and sedimentation/flotation devices
- 3) Maintenance practices such as vacuum sweeping of roads and parking lots

The benefits of full implementation of the urban standards set forth under NR 151 in reducing fecal coliform bacteria, total suspended solids, total nitrogen, total phosphorus, and heavy metals loads delivered to the streams of the study area and in reducing runoff volumes through infiltration practices were explicitly represented in the water quality modeling analyses conducted as part of the RWQMPSU and refined under the development of this WRP. They are reflected in the future condition water quality results presented in Chapter 4.

The projected future analysis includes load reductions from existing sources and from new sources. Chapter NR 151 “holds the line” with assumed growth in that the loads without NR 151 would grow. As directed by the Wisconsin Natural Resources Board resolution of May 22, 2002, in 2007, WDNR began amending NR 151 and related administrative rules to clarify language, modify grant criteria to reflect program priorities, and update certain provisions based on improved data. More information about NR 151 regulation revisions is available from the WDNR scope statement, which can be accessed at the following website:



<http://dnr.wi.gov/runoff/pdf/rules/nr151/ScopeStatement.pdf>. As of October 2009, the rule revision timeline had not been established.²

Phosphorus Fertilizer Ban

The state of Wisconsin enacted a ban on the sale of phosphorus-containing fertilizers that will take effect on April 1, 2010. It is expected that this ban will have a reduction on phosphorus loads to the Kinnickinnic River watershed due to the reduced application of fertilizers that contain phosphorus.

Total Maximum Daily Load or Environmental Accountability Project

The recommendations of this WRP may include the following regulatory actions as a next step in the process of improving water quality in the Kinnickinnic watershed:

- ◆ **TMDL:** This is an analysis that determines what levels of a given pollutant a waterbody can receive without the uses of that waterbody being impaired. The federal CWA requires that a TMDL be developed for each waterbody listed on the CWA Section 303(d) impaired waters list.³ As of the date of this WRP, the only stream reaches in the Kinnickinnic River watershed that are on that list are located in the estuary portion of the main stem of the river, downstream from the study area for this WRP. The estuary portion of the Kinnickinnic River is impaired by *E. coli*, polychlorinated biphenyls, phosphorus and unspecified metals. The Southeastern Wisconsin Watersheds Trust, Inc.'s Policy Committee is considering issues related to possible the addition of Kinnickinnic River watershed stream reaches to the impaired waters list. If any reaches were to be identified through that process, the WDNR would make the decision as to whether they should be added to the impaired waters list. Designation of additional reaches as impaired could facilitate future development of a TMDL. This WRP sets forth an integrated plan for improvement of water quality that can be pursued with or without establishment of TMDLs.

Phosphorus Water Quality Standard

The WDNR is in the process of adopting phosphorus water quality standards. When adopted, this new standard will require an examination of all sources of phosphorus in the Kinnickinnic River watershed to assess actions needed to meet the new water quality standard.

5.4 Other Management Strategies in Various Stages of Implementation

Table 5-2 summarizes all of the existing management strategies that are being implemented to some degree in the Kinnickinnic River watershed. The table identifies the focus area the strategy addresses, the agencies that are responsible for implementing the management strategy, and a comment on the status of the management strategy as of October 2009.

² WDNR, *NR 151 Rule Revision*, <http://www.dnr.wi.gov/runoff/rules/>, Revised January 27, 2010

³ WDNR, *2008 Methodology for Placing Waters on the Impaired Waters List*, <http://www.dnr.wi.gov/org/water/wm/wqs/303d/2008/2008methodology.htm> (last revised February 17, 2008)



**TABLE 5-2
OTHER MANAGEMENT STRATEGIES IN VARIOUS STAGES OF IMPLEMENTATION**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, Cl ⁻ , Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Stream channel dredging		X	X	USEPA and WDNR	Major project underway (downstream of KK River in estuary).
KK River flushing station	X	X		MMSD	Part of the MMSD 2020 Facilities Plan (downstream of KK River in estuary).
Develop according to approved land use plans		X		Milwaukee County, SEWRPC, and municipalities	In general, municipalities and Milwaukee County are following SEWRPC land use plans.
<i>Continued...</i>					



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Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, CI, Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Maintain and preserve environmentally significant lands <ul style="list-style-type: none"> • Ongoing programs • Greenseams • Ongoing planning efforts 		X	X	MMSD, SEWRPC, WDNR, and others such as land trusts	The potential future environmental corridor of the KK River watershed is preserved by the sewer extension process. The MMSD Greenseams Program will continue to look for opportunities in the KK River watershed. Other future actions under consideration by Milwaukee County and by the Kinnickinnic River Corridor Neighborhood Planning process.
<i>Continued...</i>					



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Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, CI, Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Expand riparian buffers	X	X	X	WisDOT, MMSD, and municipalities	I-94 North-South Freeway Project is evaluating various options (concentrating on the Villa Mann Creek area). The Kinnickinnic River Corridor Neighborhood Planning process is evaluating options. Milwaukee County is looking at the expansion of parkland/buffers. The River Revitalization Foundation may initiate a project in the KK River watershed.
Manage pet litter	X		X	Milwaukee County and municipalities	Program support through municipal ordinances.
Riparian litter and debris control	X	X		Milwaukee County, NGOs, and municipalities	Program support through municipal ordinances and citizen cleanup efforts.
<i>Continued...</i>					



**TABLE 5-2
OTHER MANAGEMENT STRATEGIES IN VARIOUS STAGES OF IMPLEMENTATION**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, CI, Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Research and implement projects on nonpoint pollution controls	X	X	X	MMSD, NGOs, and municipalities	The MMSD is continuing its stormwater demonstration grants.
Concrete channel renovation and rehabilitation (includes drop structures)		X		WisDOT, MMSD, and municipalities	The I-94 North-South Freeway Project is working with the MMSD on issues involving Villa Mann Creek. The MMSD will consider these aspects in future watershed channel rehabilitation projects. The Kinnickinnic River Corridor Neighborhood Planning process.
<i>Continued...</i>					



**TABLE 5-2
OTHER MANAGEMENT STRATEGIES IN VARIOUS STAGES OF IMPLEMENTATION**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, CI, Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Limit number of culverts, bridges, drop structures, and channelized stream segments and incorporate design measures to allow for passage of aquatic life		X		WisDOT, Milwaukee County, MMSD, and municipalities	The Kinnickinnic River Corridor Neighborhood Planning process is evaluating options with the MMSD to enhance the connectiveness of the KK River watershed. The I-94 North-South Freeway Project is working with the MMSD on issues involving Villa Mann Creek. The MMSD will consider these aspects in future watershed channel rehabilitation projects.
Remove abandoned bridges and culverts or reduce culvert length		X		MMSD and municipalities	The MMSD and municipalities working with WDNR and private owners to consider this type of action as development occurs.

Continued...



**TABLE 5-2
OTHER MANAGEMENT STRATEGIES IN VARIOUS STAGES OF IMPLEMENTATION**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, CI, Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
To the extent practicable, protect remaining natural stream channels including small tributaries and shoreland wetlands		X		Milwaukee County, MMSD, and municipalities	Milwaukee County, municipalities, and the MMSD are addressing this issue. See notes section at the end of this table for a reference to a recently-completed stream assessment report that addresses this strategy.
Restore, enhance, and rehabilitate stream channels to provide increased water quality and quantity of available fisheries habitat		X		WisDOT, Milwaukee County, MMSD, and municipalities	Various projects underway by the MMSD, WisDOT, and municipalities.
Monitor fish and macroinvertebrate populations		X		USGS, WDNR, and NGOs	Active programs supported by the MMSD. Potential for NGO effort with foundation and SWWT support.
Continue collection programs for household hazardous wastes and expand such programs to communities that currently do not have them		X		MMSD	The MMSD has program for the entire KK River watershed. <i>Continued...</i>



**TABLE 5-2
OTHER MANAGEMENT STRATEGIES IN VARIOUS STAGES OF IMPLEMENTATION**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, E. Coli, Pathogens)	Habitat/Aesthetics (Flow, TSS, CI, Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Continue and support of programs to reduce the spread of exotic invasive species, including public education programs		X		WDNR	Various efforts underway.
Continue and possibly expand current MMSD, WDNR, and USGS water quality monitoring programs, including Phases II and III of the MMSD corridor study	X	X	X	MMSD, WDNR, USGS, and NGOs	The MMSD conducts water quality monitoring and supports the Corridor Study. These are the key foundations of the watershed water quality monitoring effort. The NGOs with foundation support are another important element, concentrating on the detection of unknown fecal coliform sources.
Continue and possibly expand USGS stream gauging program		X		USGS	The MMSD and municipalities are supporting this effort.
Continue citizen-based water quality monitoring efforts	X	X	X	NGOs	The NGOs are leading this effort in cooperation with the SWWT with foundation support.
					<i>Continued...</i>



**TABLE 5-2
OTHER MANAGEMENT STRATEGIES IN VARIOUS STAGES OF IMPLEMENTATION**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, CI, Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Continue maintenance of MMSD conveyance system modeling tools	X	X	X	MMSD	The MMSD continues this effort, which is a key element in point source (CSO and SSO) control efforts.
Continue maintenance of watershed-wide riverine water quality models (LSPC)	X	X	X	MMSD and SEWRPC	The MMSD and SEWRPC continue support through the WRP.
Green Milwaukee	X	X	X	City of Milwaukee and MMSD	Projects underway and the MMSD is developing Green Infrastructure Plan.
Sediment Transport Study		X		MMSD	The MMSD conducting study to support flood management and rehabilitation activities.

Continued...



**TABLE 5-2
OTHER MANAGEMENT STRATEGIES IN VARIOUS STAGES OF IMPLEMENTATION**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, Cl ⁻ , Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Wilson Park Creek Flood Protection Project		X		MMSD	Project addresses risks associated with structures located in the floodplain.

Notes:

Additional detail on all strategies can be found in the RWQMPU Planning Report No. 50, Chapters X and XI
 Cl⁻ = Chlorides
 CSO = Combined Sewer Overflow
 FC = Fecal coliform
 FPOP = Facilities, Policies, Operational Improvements, Programs
 KK = Kinnickinnic River
 LSPC = Loading simulation program, a watershed modeling system that includes algorithms for simulating hydrology, sediment, and general water quality
 NGO = Non-governmental organization

SEWRPC = Southeastern Wisconsin Regional Planning Commission
 SSO = Sanitary Sewer Overflow
 SWWT = Southeastern Wisconsin Watershed Trust, Inc.
 TSS = Total suspended solids
 USEPA = U.S. Environmental Protection Agency
 USGS = U.S. Geological Survey
 WDNR = Wisconsin Department of Natural Resources
 WisDOT = Wisconsin Department of Transportation
 WRP = Watershed Restoration Plan



5.5 Management Strategies Recommended for Implementation in the Regional Water Quality Management Plan Update but Not Yet Implemented

Table 5-3 summarizes all of the management strategies that were recommended in the RWQMPU but are not actively being implemented in the Kinnickinnic River watershed. The table includes the focus area the strategy addresses, the responsible agencies for initiating the implementation of the management strategy, and a comment on the management strategy as of October 2009.

For additional detailed information, Chapters X and XI of the RWQMPU can be viewed at the following website:

http://www.sewrpc.org/publications/pr/pr-050_part-1_water_quality_plan_for_greater_mke_watersheds.pdf

**TABLE 5-3
MANAGEMENT STRATEGIES RECOMMENDED FOR IMPLEMENTATION IN THE
REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE BUT NOT YET IMPLEMENTED**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, Cl ⁻ , Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Bacteria ID program	X			NGOs and municipalities	Establish similar program currently underway in Menomonee River watershed.
Road salt reduction		X		WisDOT and municipalities	Consider implementation of innovative anti-icing and deicing programs to reduce the use of road salt as utilized by some Milwaukee area municipalities. See Road Salt Article in Appendix 5A)
Disconnect residential roof drains from sanitary and combined sewers and infiltrate roof runoff, including rain barrels and rain gardens		X		Municipalities	Establish similar program currently underway in Menomonee River watershed.
Restore wetlands, woodlands, and grasslands adjacent to the stream channels and establish riparian buffers		X		Milwaukee County, MMSD, and municipalities	Milwaukee County, the MMSD or land trusts may implement this strategy. <i>Continued...</i>



**TABLE 5-3
MANAGEMENT STRATEGIES RECOMMENDED FOR IMPLEMENTATION IN THE
REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE BUT NOT YET IMPLEMENTED**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, CI, Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Consider more intensive fisheries management measures where warranted		X		WDNR	As fish passage impediments are eliminated, the applicability of this program will be increased.
Implement programs to discourage unacceptably high numbers of waterfowl from congregating near water features	X	X		Milwaukee County and municipalities	Vegetated buffers discourage waterfowl congregation. Some actions already implemented.
Assess and evaluate the significance for public health and aquatic and terrestrial wildlife of the presence of PPCPs in surface waters	X			MMSD	The MMSD is working with various entities in researching this issue.
Implement collection programs for expired and unused household pharmaceuticals	X			MMSD	The MMSD's program provides sound implementation for this issue.
Establish long-term fisheries and macroinvertebrate monitoring stations		X		WDNR and USGS with support from MMSD	Program should be expanded as recommended in the 2020 FP and RWQMPU.

Continued...



**TABLE 5-3
MANAGEMENT STRATEGIES RECOMMENDED FOR IMPLEMENTATION IN THE
REGIONAL WATER QUALITY MANAGEMENT PLAN UPDATE BUT NOT YET IMPLEMENTED**

Management Strategy (FPOP)	Area of Focus Primarily Addressed			Responsible and/or Participating Organization	Comment
	Bacteria/Public Health (FC, <i>E. Coli</i> , Pathogens)	Habitat/Aesthetics (Flow, TSS, Cl ⁻ , Trash, Pet Litter, etc.)	Nutrients (Phosphorus)		
Establish long-term aquatic habitat monitoring stations		X		WDNR and USGS with support from MMSD	Program should be expanded as recommended in the 2020 FP and RWQMPU.
Monitor exotic and invasive species		X		WDNR	Various actions underway.
Follow recommendations of the regional water supply plan regarding maintenance of groundwater recharge and discharge areas		X		WisDOT, MMSD, and municipalities	Preservation of groundwater discharge zones in the watershed will preserve base flow to waterways.
Improve aesthetics		X		WisDOT, MMSD, NGOs, and municipalities	The Kinnickinnic River Corridor Neighborhood Planning process is evaluating this issue.

Notes:

Additional detail on all strategies can be found in the RWQMPU Planning Report No. 50, Chapters X and XI
 2020 FP = MMSD 2020 Facilities Plan
 Cl⁻ = Chlorides
 FC = Fecal coliform
 FPOP = Facilities, Policies, Operational Improvements and Programs

NGO = Non-governmental organization
 PPCPs - Pharmaceutical and personal care products
 RWQMPU = Regional Water Quality Management Plan Update
 TSS = Total suspended solids
 USGS = United States Geological Survey
 WDNR = Wisconsin Department of Natural Resources
 WisDOT = Wisconsin Department of Transportation



5.6 Summary

Tables 5-1, 5-2, and 5-3 give a summary of the management strategies (FPOPs) that are being implemented or available for implementation to improve bacteria (public health), habitat, and nutrient (phosphorus) loading in the Kinnickinnic River watershed.

These strategies will be evaluated in the next chapter in terms of their ability to reduce loads to the watershed. The strategies will be prioritized based upon their anticipated impact on improving water quality and habitat.