

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 Watershed Trust (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 focus areas for the Kinnickinnic River watershed restoration plans (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 for 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 sources of fecal coliform.

2) Habitat

The committees stressed that habitat issues do not only include physical features but water quality components as well. The physical features, such as concrete-lined channels, and restoration of watersheds with buffers are important, but the consensus was that the WRP should also consider the following parameters:

- ◆ Chloride
- ◆ Total suspended solids (TSS)
- ◆ Sediment
- ◆ Dissolved oxygen/biochemical oxygen demand (BOD)
- ◆ Temperature
- ◆ Trash
 - pet waste
 - Impacts to and from waterfowl (deteriorate water quality, but also negatively impact birds)
- ◆ 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.

4) Real-Time Data

The USGS and the 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 United States Geological Service (USGS) posts real-time monitoring data for Wisconsin at <http://waterdata.usgs.gov/wi/nwis/current/?type=quality>.

The management strategies will also consider nitrogen, copper, and historical pollutants such as polychlorinated biphenyls (PCBs). These pollutants are not a primary focus for the WRP and will be addressed in future studies. With regard to aesthetic and habitat improvements, the Kinnickinnic River Watershed Action Team (WAT) committee identified the following focus areas:

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 examples of drop structures and concrete-lined channels in the Kinnickinnic River¹. Another suggestion focused on removing streams from enclosed conduit (stream daylighting). While daylighting streams and introducing meanders would immediately improve habitat along the stream, 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 along the Kinnickinnic River. In general, these suggestions addressed habitat and in-stream physical conditions. The suggestions included:

- ◆ Eliminate barriers for fish passage (add fish ladders)
- ◆ Introduce environmentally-friendly sheet piling and bulkheads
- ◆ Reduce litter via programs (i.e. source control)
- ◆ Reduce algae blooms
- ◆ Remove the sediment island south of Lincoln Street (if not natural)
- ◆ Limit motor boat use upstream of Becher Street
- ◆ Increase diversity and complexity to the system

¹ Southeastern Wisconsin Regional Planning Commission, Regional Water Quality Report No. 39, Chapter V, *Surface Water Quality Conditions and Sources of Pollution for the Kinnickinnic River Watershed*, accessed online October 2009, http://www.sewrpc.org/waterqualityplan/pdfs/tr-039_chapter-05.pdf.

3) Riparian areas

Riparian areas are the lands that are adjacent to the Kinnickinnic River streambanks. The Riparian area protects and buffers the stream. To maximize the protective benefits of the riparian areas, the WAT committee suggested that riparian areas be kept vegetated. The vegetation should be managed to enhance native biological diversity. Also, these 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 suggestions involving riparian areas along the Kinnickinnic River include:

- ◆ Construct and restore wetlands
- ◆ Implement geese and gull management within the watershed
- ◆ 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

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. Examples of desired uses include 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 watercourse would benefit the river.

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 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 to both define and most-effectively manage usage and density along the river. The Kinnickinnic River is an integral part of the community that supports life and public health. Communities need to view the river as an asset.

All of these focus areas and goals need to be considered as the management strategies are developed for the Kinnickinnic River WRP. The framework to be used for these management

strategies will be based upon the same theme as the Regional Water Quality Management Plan Update (RWQMPU) – that being the use of the categories of “FPOPs” or:

- ◆ **Facilities** – strategies and management strategies that involve building something (an example is the removal of the concrete lining within a watershed)
- ◆ **Policies** - strategies and management strategies that change or modify policies, regulations, ordinances or other similar measures (Example: Wisconsin Pollutant Discharge Elimination System (WPDES), municipal separate storm sewer system (MS4) permitting regulation)
- ◆ **Operational Improvements** - strategies and management strategies that involve new actions or operating procedures (Example: Maintenance measures taken in the Kinnickinnic River channel)
- ◆ **Program** - strategies and management strategies that involve initiating or continuing a program (Example: rain barrel / rain garden programs)

Note that these strategies 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 (FPOPs) to Achieve Goals

The management strategies 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 with the assumption that the existing regulations for point and nonpoint sources of pollution will be implemented. In other words, the analysis assumes the recommended management strategies used to meet these regulations, identified in the 2020 Facilities Plan (2020 FP) and the Southeastern Wisconsin Regional Planning Commission’s (SEWRPC) RWQMPU 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 RWQMPU, but not yet implemented (Table 5-3)

These tables summarize the strategies identified in the RWQMPU 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.

5.1 Existing Regulatory Management Strategies (FPOPS) To Achieve Goals

Pollutant loading in the Kinnickinnic River is a function of point sources and nonpoint sources. The management strategies discussed in this chapter address pollution 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.

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

Management Strategy (FPOP) as detailed in the RWQMPU	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, 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 • Conservation tillage • 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

Notes:
 Additional detail on all strategies can be found in the RWQMPU Planning Report No. 50, Chapters 10 & 11
 FPOP = Facilities, Policies, Operational Improvements, Programs
 CSO/SSO = Combined Sewer Overflow / Sanitary Sewer Overflow
 WPDES = Wisconsin Pollutant Discharge Elimination System
 MS4 = Municipal Separate Storm Sewer
 NR151 = Chapter NR 151, *Runoff Management*, Wisconsin Administrative Code
 MCTT = Multi-chambered treatment train
 TSS = total suspended solids; CI- = chlorides; FC = fecal coliform
 WDNR = Wisconsin Department of Natural Resources



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

Management Strategy (FPOP) as detailed in the RWQMPSU	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)		
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
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
TMDL, EAP, watershed permitting and/or watershed Trading	X	X	X	WDNR, USEPA	Could evolve from the WRP
Phosphorus water quality standard			X	WDNR	Regulation being drafted by WDNR

Notes:

TRANS 401 = CHAPTER TRANS 401: Construction Site Erosion Control and Stormwater Management Procedures for Department Actions

TMDL = Total Maximum Daily Load

EAP = Environmental Accountability Project

NGO = Non-governmental organization

GLWI = Great Lakes WATER Institute

KK = Kinnickinnic River

USEPA = US Environmental Protection Agency

WRP = Watershed restoration plan



5.2.1 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 the RWQMPPU at: http://www.sewrpc.org/publications/pr/pr-050_part-1_water_quality_plan_for_greater_mke_watersheds.pdf,

5.2.2 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 recent MMSD 2020 FP and the RWQMPPU 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, sources of stormwater runoff. Still, the point source control plans are vitally important to watershed restoration.

The recently-approved MMSD 2020 FP developed an approved plan to meet the regulatory requirements regarding MMSD's point sources (e.g., sanitary sewer overflows (SSOs), combined sewer overflows (CSOs) and water reclamation facility 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, 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, is 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 determined to be 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:

- ◆ Implementation of a Wet Weather Peak Flow Management Program (WWPFMP)
- ◆ Pumping capacity from the Inline Storage System (ISS) to 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 Wisconsin Department of Natural Resources (WDNR) and is the recommendation of the RWQMPPU.

Existing Wisconsin Pollution 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 materials, products, byproducts, or wastes. 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 dischargers, 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 are 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 which can contain contaminants common to airports, including deicing fluids.

5.2.3 Existing Nonpoint Sources Regulatory Programs

Chapter NR 216, Stormwater Discharge Permits, Wisconsin Administrative Code (NR 216)

The administrative rules for the state stormwater discharge permit program are set forth in NR 216, 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 a MS4 serving an incorporated area with a population of 100,000 or more
- 2) An owner or operator of a MS4 notified by WDNR prior to August 1, 2004, that they must obtain a permit
- 3) An owner or operator of a MS4 located within an urbanized area as defined by the U.S. Bureau of the Census
- 4) An owner or operator of a 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, those for commercial buildings regulated by Chapters Commerce (Comm) 50 through 64 of the *Wisconsin Administrative Code*, and Wisconsin Department of Transportation 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 municipal separate storm sewer systems for areas that do not have individual permits and that are either:

- 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 a 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 a 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:

- 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 Chapters 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 storm water 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 storm water 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 storm water discharge permits in the Kinnickinnic River watershed.

Construction Site Storm Water 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

Chapter NR 151, Runoff Management, Wisconsin Administrative Code

Through the 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 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:

- 1) Construction sites for new development and redevelopment
- 2) Post construction phase for new development and redevelopment
- 3) Developed urban areas
- 4) Non-municipal property fertilizing

Chapter NR 151 requires 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.

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 Chapter NR 102-designated Outstanding or Exceptional Resource Waters or Chapter 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 Chapter TRANS 401, “Construction Site Erosion Control and Storm Water Management Procedures for Department Actions,” of the *Wisconsin Administrative Code* cover the following areas:

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

The standards of TRANS 401 are applicable to Wisconsin Department of Transportation 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, 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 and are reflected in the future condition water quality results presented in Chapter 4.

Note that the projected future analysis includes load reductions from existing sources and from new sources. 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 rule revisions is available from the WDNR scope statement which can be accessed at <http://dnr.wi.gov/runoff/pdf/rules/nr151/ScopeStatement.pdf> . As of October 2009, the rule revision timeline had not been established².

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 Plan

The recommendations of this WRP may include the following regulatory actions as a next step in the process of improving water quality in the KK 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 list³. 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 Policy Committee is considering issues related to possible 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.
- ◆ EAP: An Environmental Accountability Plan (EAP) is an alternative to a TMDL. This is a plan for action that will result in a significant reduction or overall elimination of the pollutant loading that is contributing to the impairment for which a waterbody is listed. It is expected that implementation of this plan of action would result in the waterbody meeting standards. Acceptable EAPs must meet a minimum of nine required elements prescribed for water quality-based plans in federal program guidance for Section 319 of the CWA. Wisconsin currently has six projects that may have an EAP prepared to address specific pollutants and impairments instead of a TMDL. Implementation of an

² Wisconsin Department of Natural Resources. *NR 151 Rule Revision*, <http://dnr.wi.gov/runoff/rules/nr151/rulerevision.htm>, accessed online October 2009.

³ Wisconsin Department of Natural Resources, *2008 Methodology for Placing Waters on the Impaired Waters List*, <http://dnr.wi.gov/org/water/wm/wqs/303d/2008/2008methodology.htm>, accessed online October 2009.



EAP may not be possible as the KK watershed is not listed as impaired. This WRP was developed based on the nine required elements of Section 319 of the CWA, including:

1. Identification of causes and sources to be controlled
2. Estimation of load reductions
3. Description of nonpoint source pollution management measures
4. Estimates of required technical and financial assistance
5. Description of information/education program
6. Implementation schedule
7. Description of interim, measureable milestones
8. Description of criteria to determine whether load reductions are achieved
9. Monitoring component to evaluate effectiveness of implementation

Implementation of this plan would be expected to significantly improve compliance with the fecal coliform bacteria standard in the estuary portion of the Kinnickinnic River, which is listed as an impaired water based in part on existing fecal coliform levels. Thus, implementation of an EAP could be considered as a plan implementation tool.

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.

5.3 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.

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, Cl-, Trash, Pet Litter,	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		Municipalities, Milwaukee County and SEWRPC	In general, municipalities and Milwaukee County are following SEWRPC land use plans.
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 watershed is preserved by the sewer extension process. The MMSD Greenseams Program will continue to look for opportunities in the KK watershed. Other future actions under consideration by Milwaukee County and by the Kinnickinnic River Corridor Neighborhood Planning Process.

Notes:

Additional detail on all strategies can be found in the RWQMPU Planning Report No. 50, Chapters 10 & 11
 FPOP = Facilities, Policies, Operational Improvements, Programs
 NGO = Non-governmental organization
 TSS = total suspended solids; Cl- = chlorides; FC = fecal coliform
 KK = Kinnickinnic River
 USEPA = United States Environmental Protection Agency
 WDNR = Wisconsin Department of Natural Resources
 SEWRPC = Southeastern Wisconsin Regional Planning Commission



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,	Nutrients (Phosphorus)		
Expand riparian buffers	X	X	X	WisDOT, Municipalities and MMSD	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 watershed.
Manage pet litter	X		X	Milwaukee County and Municipalities	Program support through municipal ordinances.
Riparian litter and debris control	X	X		Milwaukee County, Municipalities, and NGOs	Program support through municipal ordinances and citizen clean up efforts.
Research and implementation projects on nonpoint pollution controls	X	X	X	MMSD, Municipalities and NGOs	MMSD is continuing its stormwater demonstration grants.

Notes:
 NGO = Non-governmental organization
 WisDOT = Wisconsin Department of Transportation



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,	Nutrients (Phosphorus)		
Concrete channel renovation and rehabilitation (includes drop structures)		X		WisDOT, Municipalities and MMSD	The I-94 North-South Freeway Project is working with MMSD on issues involving Villa Mann Creek. MMSD will consider these aspects in future watershed channel rehabilitation projects. The Kinnickinnic River Corridor Neighborhood Planning Process.
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, Municipalities and MMSD	The Kinnickinnic River Corridor Neighborhood Planning Process is evaluating options with MMSD to enhance the connectiveness of the KK watershed. The I-94 North-South Freeway Project is working with MMSD on issues involving Villa Mann Creek. MMSD will consider these aspects in future watershed channel rehabilitation projects.
Remove abandoned bridges and culverts or reduce culvert length		X		Municipalities and MMSD	MMSD and municipalities working with WDNR and private owners consider this type of action as development occurs.

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,	Nutrients (Phosphorus)		
To the extent practicable, protect remaining natural stream channels including small tributaries and shoreland wetlands		X		Milwaukee County, Municipalities and MMSD	Milwaukee County, municipalities, and MMSD are addressing this issue. The recommendations of a recent stream assessment should be consulted.
Restore, enhance, and rehabilitate stream channels to provide increased water quality and quantity of available fisheries habitat		X		WisDOT, Milwaukee County, Municipalities and MMSD	Various projects underway by MMSD, WisDOT, and municipalities.
Monitor fish and macroinvertebrate populations		X		USGS, WDNR, and NGOs	Active programs supported by MMSD. Potential for NGO effort with foundation and SWWT support.

Notes:
 SWWT = Southeastern Wisconsin Watershed Trust
 USGS = United States Geological Survey



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,	Nutrients (Phosphorus)		
Continue collection programs for household hazardous wastes and expand such programs to communities that currently do not have them		X		MMSD	MMSD has program for the entire KK watershed.
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, NGOs	MMSD conducts water quality monitoring and supports the Corridor Study. These are the key foundations of the watershed water quality monitoring effort. NGOs with foundation support are another important element, concentrating on the detection of unknown FC sources.
Continue and possibly expand USGS stream gauging program		X		USGS	MMSD and municipalities are supporting this effort.
Notes: FC = Fecal coliform					



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,	Nutrients (Phosphorus)		
Continue citizen-based water quality monitoring efforts	X	X	X	NGOs	NGOs are leading this effort in cooperation with the SWWT with foundation support.
Continue maintenance of MMSD conveyance system modeling tools	X	X	X	MMSD	MMSD continues this effort, which is a key element in point source (CSO & SSO) control efforts.
Continue maintenance of watershed-wide riverine water quality models (LSPC)	X	X	X	MMSD and SEWRPC	MMSD and SEWRPC continue this support through the WRP Plan.

Notes:

CSO = Combined Sewer Overflow

SSO = Sanitary Sewer Overflow

LSPC = Loading simulation program, a watershed modeling system that includes algorithms for simulating hydrology, sediment, and general water quality on land

WRP = Watershed restoration plan



5.4 Management Strategies Recommended for Implementation in the RWQMPU 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 (Chapters 10 and 11) of the RWQMPU can be viewed at http://www.sewrpc.org/publications/pr/pr-050_part-1_water_quality_plan_for_greater_mke_watersheds.pdf.

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TABLE 5-3: MANAGEMENT STRATEGIES RECOMMENDED FOR IMPLEMENTATION IN THE RWQMPU BUT NOT YET IMPLEMENTED

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, Cl-, Trash, Pet litter,	Nutrients (Phosphorus)		
Bacteria ID program	X			Municipalities and NGOs	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.
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.

Notes:
 Additional detail on all strategies can be found in the RWQMPU Planning Report No. 50, Chapters 10 & 11
 FPOP = Facilities, Policies, Operational Improvements and Programs
 RWQMPU = Regional Water Quality Management Plan Update
 WisDOT = Wisconsin Department of Transportation
 NGO – Non-governmental organization
 TSS = total suspended solids; Cl- = chlorides; FC = fecal coliform



TABLE 5-3: MANAGEMENT STRATEGIES RECOMMENDED FOR IMPLEMENTATION IN THE RWQMPU BUT NOT YET IMPLEMENTED

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,	Nutrients (Phosphorus)		
Restore wetlands, woodlands, and grasslands adjacent to the stream channels and establish riparian buffers		X		Milwaukee County, MMSD and Municipalities	Milwaukee County, MMSD or land trusts may implement this strategy
Consider more intensive fisheries manipulation 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.

Notes;
WDNR = Wisconsin Department of Natural Resources



TABLE 5-3: MANAGEMENT STRATEGIES RECOMMENDED FOR IMPLEMENTATION IN THE RWQMPU BUT NOT YET IMPLEMENTED

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,	Nutrients (Phosphorus)		
Conduct assessments and evaluations on the significance for public health and aquatic and terrestrial wildlife of the presence of pharmaceuticals and personal care products in surface waters	X			MMSD	MMSD is working with various entities in researching in this issue.
Implement collection programs for expired and unused household pharmaceuticals	X			MMSD	MMSD's new program provides a 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.
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.

Notes:
 USGS = United States Geological Survey
 2020 FP = MMSD 2020 Facilities Plan



TABLE 5-3: MANAGEMENT STRATEGIES RECOMMENDED FOR IMPLEMENTATION IN THE RWQMPU BUT NOT YET IMPLEMENTED

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,	Nutrients (Phosphorus)		
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, Municipalities and MMSD	Preservation of groundwater discharge zones in the watershed will preserve base flow to waterways.
Improve aesthetics		X		WisDOT, Municipalities, MMSD and NGOs.	The Kinnickinnic River Corridor Neighborhood Planning Process is evaluating this issue.

5.5 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 load reductions, ease of implementation and estimated costs of each strategy.

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