

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) suggested that the water quality goals from the Southeastern Wisconsin Regional Planning Commission's (SEWRPC) Regional Water Quality Management Plan Update (RWQMPS) 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 Menomonee 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 Menomonee 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 United States Geological Survey (USGS) and the MMSD have installed monitoring facilities at select locations along the Menomonee 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 <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 of the WRP and will be addressed in future studies.

With regard to aesthetic and habitat improvements, the Menomonee River Watershed Action Team (WAT) committee identified the focus areas summarized below. See Chapter 3, Section 3.3 for detailed information.

1) Manmade channels/concrete channels

The WAT committee suggested that concrete linings be removed and stream channels be naturalized. The following reaches were noted as candidates for concrete removal/stream naturalization: Underwood Creek, Honey Creek (downstream of 84th Street and upstream of McCarty Park) and the Menomonee River. See the Underwood Creek Baseline Water Quality Report for examples of drop structures and concrete-lined channels¹. The removal of concrete and stream naturalization would also serve to remove barriers to fish passage. Note: the concrete lining at Miller Park is a good example of an impediment to fish passage. Other considerations include removing streams from enclosed conduit (stream daylighting) and re-introduction of stream meanders. 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. In general, these suggestions addressed habitat, water quality and in-stream physical conditions. Habitat-based suggestions included:

- ◆ Remove barriers to fish passage (fish ladders are okay)
- ◆ Increase pools and riffles
- ◆ Reduce unnatural solids in streambed and improve clarity of water

¹ Milwaukee Metropolitan Sewerage District, Underwood Creek Baseline Water Quality Report (2003-2005), accessed online October 2009, <http://v3.mmsd.com/AssetsClient/Documents/08-266%20UC%20web.pdf>

- ◆ Investigate use of seawalls/fish condos
- ◆ Plant wild rice in the lower reaches of the Menomonee River
- ◆ Restore original meanders upstream of 115th Street
- ◆ Decrease flashiness and thermal discharges

Other suggestions, such as reducing nutrient and chloride loads, eliminating fecal coliforms and increasing dissolved oxygen concentrations address water quality within the Menomonee River. Suggestions to address physical characteristics of the river include litter reduction programs and a focus on improved water clarity and color.

3) Riparian areas

Riparian areas are the lands that are adjacent to the Menomonee River streambanks. Riparian areas protect and buffer the stream from pollutants. To maximize their protective benefits, the WAT committee suggested that riparian areas be kept vegetated. The vegetation should be managed to enhance biological diversity. Also riparian areas should be expanded to a minimum of 75 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 Menomonee River include:

- Construct and restore wetlands
- Reduce or eliminate nutrient inputs from manure spreading in rural areas
- Improve public access to river
- Remove invasive species
- Clean up Superfund sites such as Little Menomonee River

4) Desired uses

The WAT committee identified several desired uses for the Menomonee River, including swimming and riverwalks with public access at 25th Street and points downstream along the Menomonee River. Fishing at Petit Point, 12th Street and Bruce Street was also identified as a desired use along with kayaking and canoeing along the river.

5) Overarching and Vision

Communities and resource managers need to frame the river as a community asset. Communities need to create an identity for the river and communities need to identify with the river. In terms of vision, communities should focus on green infrastructure and provide education and opportunities for their citizens to live sustainably.

These focus areas need to be considered as the management strategies are developed for the Menomonee River WRP. The framework to be used for these management strategies will be based upon the same theme as the RWQMPU – that being the use of the categories of “FPOPs” or:



- ◆ **Facilities** – strategies and management strategies that involve building something (an example would be 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 Menomonee River channel)
- ◆ **Programs** - 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 Menomonee 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 the recommended management strategies used to meet these regulations, identified in the 2020 Facilities Plan (2020 FP) and SEWRPC's RWQMPS 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 RWQMPS, but not yet implemented (Table 5-3)

These tables summarize the strategies identified in the RWQMPS that could be used to achieve the goals identified for the Menomonee 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.

5.3 Existing Regulatory Management Strategies to Achieve Goals

Pollutant loading in the Menomonee 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)	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, 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 • Conservation tillage • Infiltration systems • Parking lot implementation of multi-chambered treatment trains (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
 WDNR = Wisconsin Department of Natural Resources
 CSO/SSO = Combined Sewer Overflow / Sanitary Sewer Overflow
 WPDES = Wisconsin Pollutant Discharge Elimination System
 NR 151 = Chapter NR 151 *Runoff Management*, Wisconsin Administrative code
 MS4 = Municipal Separate Storm Sewer System
 TSS = total suspended solids; Cl- = chlorides; FC = fecal coliform
 Additional detail on all strategies can be found in the RWQMPU Planning Report No. 50, Chapters 10 & 11



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	Bacteria/Public Health (FC, E Coli, Pathogens)	Habitat/Aesthetics (Flow, TSS, Cl ⁻ , 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 underway in Wauwatosa
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
 USEPA = US Environmental Protection Agency
 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 the RWQMPPU at:

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

5.3.2 Existing Point Source Control Regulations

Combined Sewer Overflow (CSO) and Sanitary Sewer Overflow (SSO)

Point source impacts on the Menomonee River watershed have been studied and evaluated for many decades. The recent 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., 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, 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 the following:

- 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 (WPDES) Permitted Industrial Discharges

There are 54 noncontact cooling water discharges in the Menomonee 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 water. There are currently no other cost effective substitutes for phosphate. Therefore, the phosphorus load to the Menomonee 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 has been updated based upon data available through 2008.

5.3.3 Nonpoint Sources - Committed 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 50 through 64 of the *Wisconsin Administrative Code*, and Wisconsin Department of Transportation (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 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 NR 151 and NR 216.

The following NR 216 municipalities are in the Menomonee River Watershed:

- 1) Town of Germantown
- 2) Village of Germantown
- 3) City of Mequon
- 4) Village of Menomonee Falls
- 5) Town of Richfield



- 6) Town of Lisbon
- 7) City of Brookfield
- 8) Village of Butler
- 9) City of Milwaukee
- 10) City of Wauwatosa
- 11) Town of Brookfield
- 12) Village of Elm Grove
- 13) City of New Berlin
- 14) City of West Allis
- 15) City of Greenfield
- 16) Village of Greendale

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 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 175 permitted industrial facilities that have storm water discharge permits in the Menomonee 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

Chapter NR 151 Runoff Management, Wisconsin Administrative Code (NR 151)

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*



Agricultural performance standards cover the following areas:

- Cropland sheet, rill, and wind erosion control
- Manure storage
- Stormwater runoff
- Nutrient management

The following manure management prohibitions are set forth in Section NR 151.08.

All livestock producers shall comply with the following:

- ◆ Shall have no overflow of manure storage facilities
- ◆ Shall have no unconfined manure pile in a water quality management area
- ◆ Shall have no direct runoff from a feedlot or stored manure into the waters of the state
- ◆ May not allow unlimited access by livestock to waters of the state in a location where high concentrations of animals prevent the maintenance of adequate sod or self-sustaining vegetative cover

For existing land that does not meet the NR 151 standards and that was cropped or enrolled in the U.S. Department of Agriculture Conservation Reserve or Conservation Reserve Enhancement Programs as of October 1, 2002, agricultural performance standards are only required to be met if cost-sharing funds are available or if the best management practices and other corrective measures needed to meet the performance standards do not involve eligible costs. Existing cropland that met the standards as of October 1, 2002 must continue to meet the standards. New cropland must meet the standards, regardless of whether cost-share funds are available.

For existing livestock facilities that do not meet the NR 151 standards or prohibitions, the performance standards or prohibitions are only required to be met if cost-sharing funds are available or if the best management practices and other corrective measures needed to meet the performance standards or prohibitions do not involve eligible costs. Existing livestock facilities that met the standards as of October 1, 2002 must continue to meet the standards. New livestock facilities must meet the standards, regardless of whether cost-share funds are available.

- ◆ *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

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 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, 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.

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 Menomonee 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 Menomonee River 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 Menomonee River watershed that are on that list are located along the Little Menomonee River and in the estuary portion of the main stem of the River. As a result, a TMDL may not be the best approach to watershed restoration.

The Little Menomonee River is listed due to creosote contamination in the sediment. The pollutants in the estuary portion include E. coli, polychlorinated biphenyls, phosphorus, and unspecified metals. The estuary portion is located downstream from the study area for this WRP. The Southeastern Wisconsin Watersheds Trust Policy Committee is considering issues related to possible addition of other Menomonee 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 would be a plan for action that would 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 EAP may not be possible for the entire Menomonee River watershed as the only reach listed as impaired as of July, 2009 is the Little Menomonee

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.



due to creosote-contaminated sediment. 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

The WRP provides suitable documentation that could allow for a successful EAP. Implementation of this plan would be expected to slightly improve compliance with the fecal coliform bacteria standard in the estuary portion of the Menomonee River, which is listed as an impaired water based in part on existing fecal coliform levels. However, additional bacteria reduction strategies would be required in order to achieve a significant reduction of the loading. Thus, implementation of an EAP could be considered as a plan implementation tool if additional bacteria reduction strategies are included.

Phosphorus Water Quality Standard

The WDNR is in the process of adopting phosphorus water quality standards. This new standard, when adopted, will require an examination of all sources of phosphorus in the Menomonee 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 Menomonee 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)		
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.
Bacteria ID program	X			Municipalities, MMSD, Great Lakes WATER Institute and NGOs	Program currently underway in the Menomonee River watershed to identify human sources from storm sewer discharge.
Disconnect residential roof drains from sanitary and combined sewers and infiltrate roof runoff, including: <ul style="list-style-type: none"> • Rain barrels • Rain gardens 		X		Milwaukee County, MMSD and Municipalities	Program currently underway in Menomonee River watershed.
Road salt reduction		X		WisDOT and Municipalities	Implementation of innovative anti-icing and deicing programs to reduce the use of road salt as used by some Milwaukee Area municipalities.

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
 SEWRPC = Southeastern Wisconsin Regional Planning Commission
 WisDOT = Wisconsin Department of Natural Resources
 TSS = total suspended solids; Cl- = chlorides; 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)		
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 primary environmental corridor of the Menomonee River watershed is preserved by the sewer extension process. The MMSD Greenseams Program will continue to look for opportunities in the Menomonee River watershed.
Preserve highly productive agricultural land	X	X	X	Ozaukee County Land Conservation	Program underway in Ozaukee County.
Reduce soil erosion from cropland		X	X	Counties, DATCP, WDNR and NRCS	Program underway.
Provide six months of manure storage for livestock operations	X		X	Counties, DATCP, WDNR, and USDA	Expand number of operations with six month storage capacity.
Prepare and/or implement nutrient management plans	X		X	Counties, DATCP, WDNR, and USDA	Program underway; need to increase focus on implementation.

Notes:
 DATCP = Department of Agriculture, Trade and Consumer Protection
 NRCS = Natural Resources Conservation Service
 USDA = United States Department of Agriculture
 WDNR = Wisconsin Department of Natural Resources



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)		
Control barnyard runoff	X	X	X	Counties, DATCP, WDNR, and USDA	Program underway; need to expand implementation.
Expand riparian buffers	X	X	X	Counties, DATCP, Farm Services Agency, WDNR, Land Trusts and NGOs	Milwaukee County is looking at the expansion of parkland/buffers. The River Revitalization Foundation has initiated or identified numerous projects in the Menomonee River watershed.
Convert marginal cropland and pasture to wetlands and prairies	X	X	X	Counties, WDNR, USDA, and Land Trusts	Program underway; need to expand implementation.
Restrict livestock access to streams	X	X	X	Counties, DATCP and WDNR	Program underway; need to expand implementation.
Manage milking center wastewater	X		X	Counties and WDNR	Program underway; need to expand implementation.
Expand oversight and maintenance of POTWs	X		X	Counties, Municipalities and Department of Commerce	Program underway; need to expand implementation.
Notes: POTW = Private onsite wastewater treatment system					
Manage pet litter	X		X	Milwaukee County and	Program support through municipal



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)		
				Municipalities	ordinances.
Riparian litter and debris control	X	X		Counties, 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.
Concrete channel renovation and rehabilitation (includes drop structures)		X		Municipalities and MMSD	MMSD is rehabilitating Underwood Creek and is working to obtain funding to rehabilitate the Menomonee River mainstem in Valley Park. MMSD will consider these aspects in future watershed channel rehabilitation projects.

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)		
Limit number of culverts, bridges, drop structures, and channelized stream segments and incorporate design measures to allow for passage of aquatic life		X		WisDOT, Counties, Municipalities and MMSD	MMSD is rehabilitating Underwood Creek and is working to obtain funding to rehabilitate the Menomonee River mainstem in Valley Park. MMSD will consider these aspects in future watershed channel rehabilitation projects.
Dam abandonment and restoration plans		X		Waukesha County, Menomonee Falls and MMSD	Menomonee Falls dam.
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.
Manage contaminated sediment sites		X		WDNR	Superfund site clean up on Little Menomonee River.
To the extent practicable, protect remaining natural stream channels including small tributaries and shoreland wetlands		X		Counties, Municipalities and MMSD	Milwaukee County, municipalities, and MMSD are addressing this issue. The recommendations of a recent stream assessment ² should be consulted.



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)		
Restore wetlands, woodlands, and grasslands adjacent to the stream channels and establish riparian buffers		X		Counties, Municipalities, MMSD, Land Trusts and NGOs	The River Revitalization Foundation has initiated or identified numerous projects in the Menomonee River watershed.
Restore, enhance, and rehabilitate stream channels to provide increased water quality and quantity of available fisheries habitat		X		WisDOT, Milwaukee County, Municipalities and MMSD	Projects have been completed or initiated on Underwood Creek in Elm Grove and Wauwatosa, and on the Menomonee River mainstem along Valley Park.
Monitor fish and macroinvertebrate populations		X		USGS, WDNR, and NGOs	Active programs supported by MMSD. Potential for NGO effort with foundation and SWWT support.
Implement programs to discourage unacceptably high numbers of waterfowl from congregating near water features	X	X		Counties and Municipalities	Vegetated buffers discourage waterfowl congregation. Some actions already implemented.
Notes: SWWT = Southeastern Wisconsin Watershed Trust USGS = United State 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 majority of the Menomonee River 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 fecal coliform sources.
Continue and possibly expand USGS stream gauging program		X		USGS	MMSD and municipalities are supporting this effort.
Continue citizen-based water quality monitoring efforts	X	X	X	NGOs	NGOs are leading this effort in cooperation with the SWWT with Foundation Support.



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)		
Monitor exotic and invasive species		X		WDNR	Various actions underway.
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.

Notes:

CSO = Combined Sewer Overflow

SSO = Sanitary Sewer Overflow

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

WRP = Watershed restoration plan



5.5 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 Menomonee 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 of the RWQMPU and 11) 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)		
Consider more intensive fisheries management measures where warranted		X		WDNR	As fish passage impediments are eliminated, the applicability of this program will be increased.
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 the developing research on this issue.
Implement collection programs for expired and unused household pharmaceuticals	X			MMSD	MMSD's new program provides a sound implementation for this issue.
<p>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 TSS = total suspended solids; Cl- = chlorides; FC = fecal coliform WDNR = Wisconsin Department of Natural Resources</p>					



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)		
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.
Establish long-term water quality monitoring programs for areas outside of MMSD service area	X	X	X	WDNR and USGS with support from MMSD	Program should be expanded as recommended in the 2020 FP and RWQMPU.
Follow recommendations of the regional water supply plan regarding maintenance of groundwater recharge areas		X		WisDOT, Municipalities and MMSD	Preservation of groundwater discharge zones in the watershed will preserve base flow to waterways.

Notes:
 USGS = United States Geological Survey
 2020 FP = MMSD 2020 Facilities Plan
 RWQMPU = Regional Water Quality Management Plan Update
 WisDOT = 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, Cl ⁻ , Trash, Pet litter,	Nutrients (Phosphorus)		
Utilize groundwater sustainability guidance results in evaluating the sustainability of proposed developments and in the conduct of local land use planning		X		WisDOT, Municipalities and MMSD	Sustaining groundwater in the watershed will preserve base flow to waterways.
Improve Aesthetics		X		WisDOT, Municipalities, MMSD and NGOs	Establish a program to improve aesthetics in selected areas throughout the watershed.

Notes:
 NGO = Non-Governmental Organization



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 Menomonee 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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