Chapter 1: Kinnickinnic River Watershed Restoration Plan
Executive Summary

1.1 Introduction

The primary purpose of this Watershed Restoration Plan (WRP) is to identify specific actions that can be implemented between 2010 and 2015 to improve water quality within the Kinnickinnic River and its tributaries and present general recommendations for activity beyond 2015. These actions have been identified based upon a consideration of many factors, including overall effectiveness, scientific underpinning, regulatory considerations, and stakeholder goals.

This WRP describes the characteristics of the Kinnickinnic River and its watershed, focusing on those topics that are directly related to implementation (Figure 1-1). Information provided includes existing (Baseline Year 2000) and Year 2020 land uses, Baseline Year 2000 and Year 2020 water quality conditions, and the most significant sources of pollution. Water quality goals selected by the Southeastern Wisconsin Watersheds Trust, Inc. (SWWT), based upon scientific, regulatory, and stakeholder considerations, are also presented and explained, as are the load reductions that will be needed to meet those goals. The reductions are based upon projected loads for the Year 2020 and as such account for future growth.

This WRP is the culmination of historical and recent activity to protect and restore water quality within the greater Milwaukee region. Most significantly, it builds upon the Southeastern Wisconsin Regional Planning Commission (SEWRPC) Regional Water Quality Management Plan Update (RWQMPU) and Milwaukee Metropolitan Sewerage District (MMSD) 2020 Facilities Plan and incorporates the input from members of the SWWT and its associated Kinnickinnic River Watershed Action Team (WAT) and Science Committee.

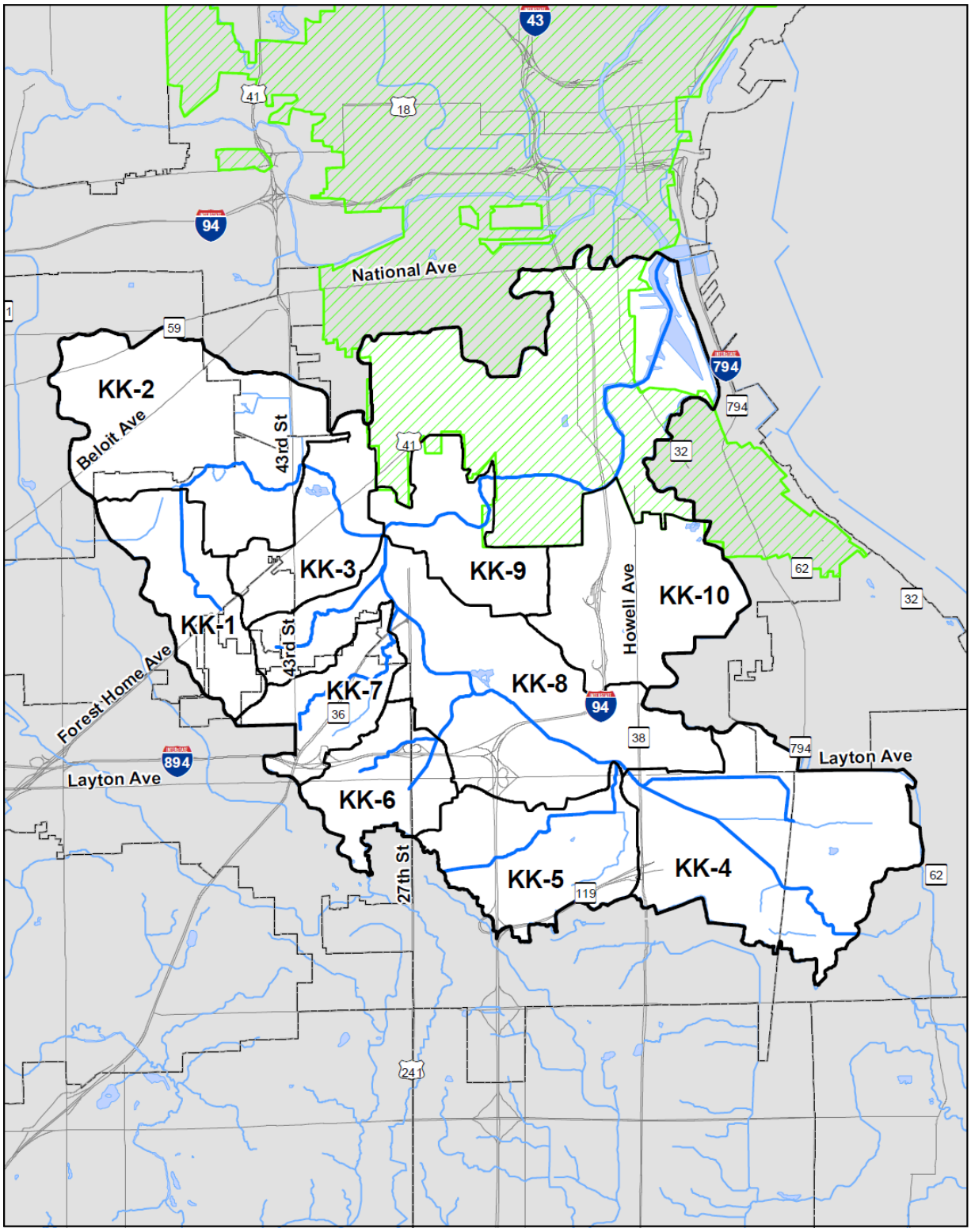
1.2 Key Elements of the Kinnickinnic River Watershed Restoration Plan

This WRP follows the Clean Water Act guidelines for developing effective watershed plans. As such, this WRP includes the U.S. Environmental Protection Agency's (USEPA) nine elements required to be addressed in watershed plans, described in the USEPA's *Handbook for Developing Watershed Plans to Restore and Protect our Waters.*[1] The USEPA's nine key elements are discussed below along with a reference to and a description of this WRP's chapters and appendices that most directly correspond to each key element.

1) Identification of causes and sources to be controlled

Chapter 4: *Characterize the Watershed* presents a detailed accounting of significant point and nonpoint sources (broken down by land use) within the Kinnickinnic River watershed. The chapter's maps, descriptions, and tables provide data on the Kinnickinnic River watershed's setting and pollutant loading as well as impacts to water quality and water quality standards.

[1] USEPA, *Handbook for Developing Watershed Plans to Restore and Protect our Waters*, http://www.epa.gov/owow/nps/watershed_handbook/pdf/ch02.pdf, EPA 841-B-08-002 (March 2008)



Preserving The Environment • Improving Water Quality

LEGEND

Assessment Point Boundaries

Combined Sewer Service Area

N

0 1,250 2,500 5,000

Feet

FIGURE 1-1
HABITAT ASSESSMENT POINT AREAS WITHIN THE KINNICKINNIC RIVER WATERSHED
KK WATERSHED RESTORATION PLAN

2) **Estimation of load reductions**

This key element is addressed in Chapter 6: *Estimate the Load Reductions and Other Benefits Expected from Management Measures*. Chapter 6 estimates the load reductions of the major components of the RWQMPU. The chapter also examines the effectiveness of planned management actions that are generally linked to specific land use classifications utilized in key element 1 described above. Chapter 6 also describes the management measures that will be needed to achieve load reductions and improve water quality in the Kinnickinnic River watershed. Chapter 4: *Characterize the Watershed* provides detailed estimates of future loads for the specific land use classifications within the watershed.

3) Description of nonpoint source pollution management measures

Chapter 5: *Identify Solutions and Develop Management Strategies to Achieve Goals* addresses this element. Chapter 5 presents management strategies to address both point and nonpoint sources. These strategies are grouped into three categories: existing regulatory strategies, management strategies currently being implemented, and management strategies recommended for implementation in the RWQMPU. In addition to bacteria and nutrients, Chapter 5 also presents management actions to improve habitat within the Kinnickinnic River watershed. Appendix 5A presents a discussion of road salt and includes management measures. Chapter 7: *Additional Management Strategies and Identification of Priority Actions* identifies additional actions that were not included in the RWQUMPU and prioritizes actions and identifies land uses and assessment point areas that should be targeted to meet the goals of this WRP. Note the Kinnickinnic River watershed assessment point areas are depicted on Figure 1-1. Appendices 4A, 4C and 4D of Chapter 4 present detailed data to support the prioritized actions discussed in Chapter 7. Appendix 4A presents SEWRPC's Memorandum Report 194, which includes an assessment of habitat conditions in the Kinnickinnic River watershed, Appendix 4C includes detailed factsheets for each assessment point (see element 5 below for description of the factsheets), and Appendix 4D presents specific data for each assessment point and ranks the assessment point areas by pollutant load. Appendix 7A includes a discussion of planning considerations for improved habitat and biodiversity.

4) Estimates of required technical and financial assistance

This element is addressed in Chapter 8: *Implementation Strategy* and Appendices 8A-C. Chapter 8 discusses funding sources and programs, critical participants, and data gaps. The chapter emphasizes the importance of addressing the data gaps to implement specific restoration activities. The chapter also addresses outstanding policy issues that need to be resolved prior to implementation. Appendices 5B and 5C present SWWT participants and selected responsibilities for elements of the RWQMPU.

5) Description of information/education program

This element is addressed in Chapter 3: *Building Partnerships*. Chapter 3 and Appendices 3A and 3B profile the SWWT and the WAT. The SWWT is ideally suited for outreach as it comprises a diverse suite of members and was formed to improve water quality within the greater Milwaukee watersheds (GMW). Appendix 4C contains factsheets, including maps, tables, and descriptions of the Baseline Year 2000 conditions of each assessment point area within the Kinnickinnic River watershed. The factsheets were developed to enhance the

public's understanding of and connection to the Kinnickinnic River watershed and will assist with implementation.

6) Implementation schedule

Chapter 7: *Additional Management Strategies and Identification of Priority Actions* addresses the schedule element. To enhance stakeholder understanding and the potential for improved water quality and habitat, this WRP distills future actions into priority action tables for each focus area. The chapter also presents a foundation action table that lists the predecessor actions that should be implemented to realize the full potential of subsequent actions. Chapter 7's tables suggest actions that should be implemented over the next five years to continue improving water quality within the Kinnickinnic River watershed. Chapter 8: *Implementation Strategy* also directly speaks to the schedule element. Chapter 8 presents an overview of this WRP's implementation process and includes timeframes for actions.

7) Description of interim, measureable milestones

This element is primarily concerned with measuring implementation. Measures of effectiveness and benefits to water quality are primarily addressed in element 8 below. This 'milestone' element is addressed primarily in Chapter 8: *Implementation Strategy.* Chapter 8 contains discussion of action plan steps and implementation measures that are required for actions, including actions that have been initiated and those that are planned. Chapter 7: *Additional Management Strategies and Identification of Priority Actions* also addresses this element. Chapter 7 presents a discussion of the watershed planning process and interim milestones, referred to as 'targets' in this WRP.

8) Description of criteria to determine whether load reductions are achieved

The criteria element is discussed in multiple chapters. Chapter 4: *Characterize the Watershed* utilizes projections of population and land use as well as management strategies to estimate future loads. Based on future loads, Chapter 6: *Estimate the Load Reductions and Other Benefits from Management Measures* estimates future water quality throughout the Kinnickinnic River watershed. In terms of habitat improvements, Chapter 3: *Building Partnerships* presents a comprehensive discussion of the stakeholders' criteria for improvements to habitat within the watershed. Chapter 8: *Implementation Strategy* incorporates discussions of criteria within the context of post implementation monitoring including adaptive management, success measurement, implementation and effectiveness monitoring as well as progress evaluation and recalibration

9) Monitoring component to evaluate effectiveness of implementation

The monitoring element is addressed in Chapter 8: *Implementation Strategy*. In addition to summarizing the status of all of the various water quality and habitat-based actions that have been recently completed, are underway, initiated or are planned or recommended, Chapter 8 of this WRP also includes discussions of post-implementation monitoring and progress evaluation and recalibration.

In summary, this WRP uses the watershed planning process found in the federal program guidance for Section 319 of the Clean Water Act and the specific recommended actions are based upon those recommended in the RWQMPU. This WRP is intended to be a flexible

document and as it is implemented, new information/data, technologies, and water quality measures may form the basis for future revisions.

1.3 Watershed Restoration Plan Development and Findings

1.3.1 Key Focus Areas Identified During the Watershed Restoration Plan Planning Process

Through the stakeholder input of the SWWT, three major focus areas emerged for this WRP: bacteria/public health, habitat, and nutrients/phosphorous. These focus areas reflect the linkage between water quality parameters and water usage in the Kinnickinnic River watershed.

a. Bacteria/Public Health

Fecal coliform bacteria are an indicator of pathogens, or microscopic organisms that can make people sick. The WAT and the Science Committee agreed that public health should be a top priority of this WRP. High levels of fecal coliform 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.

b. Habitat/Aesthetics

The WAT and Science Committee stressed that habitat issues include physical features as well as water quality components. Physical features, such as concrete-lined channels and restoration of watersheds with buffers are important, but the consensus was that this WRP should consider a wide range of habitat-based parameters. This WRP acknowledges that aesthetic improvement does not always relate directly to water quality or habitat improvement, but in many cases they are linked. The major habitat considerations are summarized below:

Manmade channels/concrete channels - The WAT and Science Committee suggested that concrete linings be removed and stream channels be naturalized. Other suggestions include removing streams from enclosed conduit (stream daylighting), erosion control, aesthetics 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 need to be considered.

In-stream conditions - The WAT and Science Committee made suggestions regarding improvements to in-stream conditions. Note that at the request of the SWWT Science Committee, SEWRPC staff assessed habitat conditions and provided recommendations to address habitat issues of concern from the perspective of both the land-based and in-stream-based conditions, and were distinguished as such. For a complete summary of biological and habitat conditions from year 2000 to 2009 as well as the recommended prioritization strategy and priority actions see Appendix 4A (SEWRPC MR-194). Examples of the habitat-based considerations include the following:

- Eliminate barriers to fish passage (add fish ladders)
- Reduce litter via programs (i.e., source control)
- Introduce environmentally-friendly sheet piling and bulkheads
- Reduce algae blooms

- Remove sediment island south of Lincoln Avenue (if not natural)
- Limit motor boat use upstream of Becher Street
- Increase diversity and complexity to the system

Riparian areas – The lands adjacent to the Kinnickinnic River stream banks protect and buffer the stream from pollutants. To maximize their protective benefits, the WAT suggested that riparian areas be kept vegetated and native vegetation should be managed to enhance biological diversity. Riparian areas should be expanded to a minimum of 120 feet and structures should be removed from riparian areas that are located within the floodplain. Other WAT suggestions for improving riparian areas along the Kinnickinnic River include the following:

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

In-stream and riparian areas:

- Restore native species and remove invasive species
- Use less road salt

c. Nutrients/Phosphorus

In-stream phosphorus concentrations vary 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.

1.3.2 Baseline Year 2000 Conditions

The characterization of the Baseline Year 2000 conditions within the Kinnickinnic River watershed was a crucial step in this WRP's planning process. A large amount of data was compiled for each of the 10 assessment point areas included in the watershed (see Chapter 4). A few important planning considerations emerged from the analysis of the baseline data:

- The watershed contains highly developed urban areas, which will be a critical consideration during implementation.
- Analysis of the baseline loading data revealed the importance of identifying unknown sources of fecal coliform bacteria within the watershed.
- The baseline characterization also highlighted the predominant role of nonpoint sources with respect to nutrient loading. However, the analysis also revealed the need to consider

non-contact cooling water and the role of phosphorus compounds in drinking water when identifying priority actions to curb nutrient loading.

- Habitat conditions vary among assessment point areas throughout the watershed. This WRP's identification of critical habitat impairments helps prioritize actions to improve habitat within the watershed.

1.3.3 Management Strategies to Achieve Goals

This WRP sought to identify management strategies that could be developed to reduce the loads in a cost effective manner to achieve the goals identified for the three focus areas. The approach to reduce pollutant loads in the Kinnickinnic River watershed is predicated on the assumption that the existing regulations for point and nonpoint sources of pollution will be implemented (see Table 5-1 in Chapter 5 for an accounting of existing regulations; examples include Point Source Control, Combined Sewer Overflow/Separate Sewer Overflow (CSO/SSO) Reduction Program, and Wis. Admin. Code Natural Resources (NR) 151 *Runoff Management (non-Ag only)*. In other words, the analysis assumes the recommended management strategies used to meet these regulations, identified in the 2020 Facilities Plan and SEWRPC's RWQMPU, are in place. These regulatory management strategies would then be the foundation on which new management strategies are added to achieve the desired goals.

This WRP partitions these management strategies, comprised of facilities, policies, operational improvements, and programs into three categories:

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

The existing regulatory management strategies identified in Table 5-1 as well as the management strategies in various stages of implementation generally address water quality. A number of strategies to improve habitat and further improve water quality are either in the process of being implemented (Table 5-2) or are yet to be implemented (Table 5-3).

1.3.4 Expected Benefits

Chapter 6 addresses the expected load reductions and improvements to habitat as well as estimates future impacts to water quality. Analysis of loading data estimates are summarized in the following bullets. These bullets present cumulative load reductions from the major components of the RWQMPU:

- Loads of total suspended solids (TSS) and biochemical oxygen demand (BOD) increase from Baseline Year 2000 to Planned 2020 Future with Planned Growth conditions whereas total phosphorus (TP) loads stay about the same and fecal coliform loads slightly decrease.
- Implementation of Wis. Admin. Code Natural Resources (NR) 151 *Runoff Management*, (non-Agriculture [Ag] only), as called for under the RWQMPU, results in an 11% decrease in TP loads, a 24% decrease in TSS loads, a 12% decrease in BOD loads, and a

13% decrease in fecal coliform loads, relative to planned 2020 future with planned growth conditions.

- Implementation of the Point Source Plan, recommended in the RWQMPU, results in additional load reductions of 7% for TP, 1% for TSS, 3% for BOD, and 21% for fecal coliform, relative to planned 2020 future with NR 151(non-Ag only) conditions.
- Implementation of the remaining measures in the recommended RWQMPU results in additional load reductions of 4% for TP and 29% for fecal coliform, relative to the planned 2020 future with point source plan (5-Year LOP). No additional load reductions are predicted for TSS or BOD.

The expected load reductions for the Kinnickinnic River watershed were estimated from the modeling that was completed in support of the 2020 FP, the RWQMPU, and this WRP. In some ways, these load reductions represent an upper estimate of the load reductions that could be achieved in the watershed because they are based on full implementation of a variety of management measures from the RWQMPU that were then incorporated into this WRP as actions. However, several management measures included in this WRP were not included in the model runs (e.g. the statewide ban on phosphorus in fertilizers). It is therefore possible that load reductions greater than those modeled for the RWQMPU could eventually be realized.

Despite significant projected load reductions, water quality modeling presented in Chapter 6 indicates that modeled year 2020 water quality assessments or scores generally show minor improvements or no change, although in some instances, water quality exhibits minor deterioration. Reduced loading does not necessarily directly translate to an improved water quality score because, in some cases, the baseline water quality is considerably degraded. This occurs because the scores are based on the percentage of time that compliance with standards is met. Reduced loading will improve water quality, but if compliance with water quality standard is still only met 70% of the time, the water quality will still be scored as poor.

1.3.5 Prioritization of Actions

The three focus areas determined by the SWWT's Science Committee included bacteria/public health, habitat and aesthetics, and nutrients/phosphorus. The technical team analyzed the potential benefits and developed a list of high priority actions specifically targeted toward the three focus areas. The recommended high priority actions are summarized in the following section, which includes excerpts from Table 7-5 *Foundation Actions*.

a. Public Health

The SWWT committees identified protection of human health as the most important water quality goal of this WRP. Reducing bacterial loads is a critical element because many locations in the Kinnickinnic River watershed frequently do not meet existing bacterial water quality criteria, which means there is a greater risk of getting sick when contacting the water. In addition to swift and comprehensive action to address significant sources of bacterial loading, this WRP endorses the enhancement of safe recreation within the Kinnickinnic River. Table 1-1 presents the Kinnickinnic River WRP's foundation actions to improve and address public health with respect to water quality in the Kinnickinnic River watershed. Foundation actions are a subset of the priority actions identified in Chapter 7. These actions are considered to be predecessor actions to be completed first in order to realize the full benefit of the other actions identified in this WRP.

TABLE 1-1

PUBLIC HEALTH TARGETS AND FOUNDATION ACTIONS

Watershed Targets to be Accomplished by 2015		Foundation Actions
1. Identify unknown sources of bacteria, and correct/remove/ disconnect them		1a. Conduct dry weather surveys to identify outfalls that have dry weather flows
		1b. Sample outfalls to determine which have human bacteria discharges (wet and dry weather samples)
		1c. Determine ownership/owner of outfalls that have dry weather flows and/or human bacteria
		1d. Initiate discussion with owner of outfall to begin determining corrective actions
		1e. Implement projects to correct/remove/disconnect unknown sources of bacteria
2. Increase recreational use of watershed and public access		2a. Identify recreational and body contact areas
		2b. Identify other areas suitable for recreation or body contact
		2c. Prioritize areas to restore for recreational use identified in Action 2b based on success of Action 1e.
3. Reduce bacteria sources from land-based activities		3a. Identify where public ownership of land can serve as a starting point to increase riparian buffers
		3b. Manage pet litter
		3c. Implement programs to discourage unacceptably high numbers of waterfowl from congregating near water features - identify areas and take action to discourage waterfowl feeding
		3d. Implement projects and programs to comply with MS4 permits and NR 151 TSS and runoff reduction requirements (reduced TSS expected to result in coincidental bacteria reduction)
		3d. Implement projects and programs to comply with MS4 permits and NR 151 TSS and runoff reduction requirements (reduced TSS expected to result in coincidental bacteria reduction)

The specific targets include the following:

Identify unknown sources of bacteria, including illicit connections

Item 1 on Table 1-1 indicates that this WRP prioritizes activities that will address illicit connections. This is important for two reasons: (1) significant water quality improvements are unlikely to occur until illicit connections are addressed, and (2) bacteria from illicit connections are recognized as a greater threat to human health than bacteria from other sources.

Note: this WRP recognizes that future indicators of waterborne bacteria and the related human health risk will likely be based upon more effective measures of human risk and not based on fecal coliform. However, focusing on illicit connections is required regardless of

what indicator is used in the future. The key point is that actions to address unknown sources of bacteria need to prioritize those that are associated with human sources of bacteria. See Section 7.2.1 in Chapter 7 for a discussion of alternative pathogen indicators.

This WRP focuses efforts on specific stream reaches, or segments, to investigate illicit connections based upon fecal coliform loadings from "unknown sources" determined during water quality model development. The analysis of the modeling data suggests that efforts focus on specific areas as noted in Chapter 7, Table 7-1.

Increase recreational use

In an effort to increase recreational use of the Kinnickinnic River watershed, this WRP seeks to identify recreational areas where body contact occurs as well as areas that have the potential for future recreational activity. There are gaps in the existing data sets and this WRP recommends collecting additional data. Once identified and with unknown sources of bacteria addressed, the areas with recreation potential would be prioritized and restored.

Reduce bacterial sources from land-based sources

This WRP recommends actions identified to address urban sources of fecal coliform bacteria, including pet waste and waterfowl, identifying opportunities to expand riparian buffers as well as projects to facilitate compliance with NR 151. See Chapter 7, Table 7-1.

b. Habitat and Aesthetics

Protecting and improving aquatic community health is also a critical goal of this WRP and encompasses a wide range of water resources issues such as improving habitat conditions, restoring natural flow and temperature regimes, removing trash, and addressing pollutants such as chlorides, sediment, and BOD. Note that removing trash and general consideration of aesthetics were a major concern for the Kinnickinnic WAT. This reflects the fact that most people use visual criteria to assess impairment. These criteria can be translated into technical standards which collectively are defined as habitat. Consequently the use of the phrase habitat and aesthetics addresses both citizen and water resources professional elements. Based upon a review of available data and consultations with local biological experts, Table 1-2 identifies specific foundation actions (land-based and in-stream-based) to improve and address habitat and aesthetics that are recommended by this WRP:

TABLE 1-2

HABITAT AND AESTHETICS TARGETS AND FOUNDATION ACTIONS

Watershed Targets		Foundation Actions
Land-based 1. Moderate flow regimes to decrease flashiness		1a. Implement stormwater management practices at the subwatershed level
		1b. Implement stormwater management practices at the neighborhood level
		1c. Maintain stormwater management practices at all levels
		1d. Restore floodplain connectivity with the stream system
2. Reduce water quality and quantity impacts using green infrastructure		2a. Implement green infrastructure to re-establish more natural hydrology, reduce runoff and improve water quality (continue and expand current efforts; e.g. Green Milwaukee and MMSD's green infrastructure plan)
3. Reduce water quality impacts from nonpoint runoff (focus on chlorides)		3a. Evaluate existing road salt reduction programs
		3b. Implement new pilot road salt reduction programs
		3c. Implement road salt reduction program education
Instream-based 1. Restore fish and aquatic organism passage from Lake Michigan to the headwaters and tributaries (i.e. Follow 3-Tiered Prioritization Strategy as outlined in Appendix 4A)		1a. Remove concrete within the lower reaches of the mainstem
		1b. Develop plans for removal of additional obstructions on the mainstem or tributaries and implement the plans
		1c. Develop detailed assessments to expand passage restoration efforts beyond the mainstem to the tributaries, prioritize them, and implement them

Moderate flow regimes to decrease flashiness

Flashiness is a measure of how rapidly flows increase and decrease due to wet weather and snow melt. Flashiness within the Kinnickinnic river watershed tends to be high due to a high degree of impervious surfaces as compared to the total land surface within the Kinnickinnic River watershed that inhibits infiltration of surface runoff into the ground. Stream flashiness is an impairment to habitat within the watershed. This WRP recommends actions to manage stormwater at various levels and restore connectivity to adjacent floodplains to moderate flashiness and improve habitat.

Reduce impacts through green infrastructure

The other land-based target to address habitat and aesthetics within the Kinnickinnic River watershed is focused on green infrastructure to address runoff quality and reduce runoff quantity. These actions are prioritized in Chapter 7, Table 7-2.

Reduce nonpoint water quality impacts (focus on chlorides)

This WRP's analysis of habitat impairments revealed the important role of chlorides in the Kinnickinnic River watershed. Consequently, this WRP focuses on chloride loading with respect to nonpoint source pollution impacts to habitat. This WRP recommends actions to evaluate existing road salt programs as well as actions to implement pilot programs and educational programs to reduce road salt application. Actions to address chloride loading are prioritized in Chapter 7, Table 7-2.

Restore fish passage throughout the watershed

Provision of fish and aquatic life passage includes the restoration and recreation of in-stream and riparian habitat. This habitat provides not only refuge for fish and aquatic life, but also comprises the feeding and breeding areas necessary for the survival of these organisms. This in-stream-based target depends upon the removal of concrete within the lower reaches of the mainstem. While restoration efforts are critical in the lower reaches, this WRP also recommends that fish passage restoration efforts are expanded to upstream tributaries. This WRP is also responsive to the need to restore connectivity with adjacent floodplains and the restoration of more natural hydrology by re-creating more meandering stream courses.

c. Nutrients

Phosphorus loading to Lake Michigan (and to a lesser extent within the Kinnickinnic River watershed) has also been identified as a priority issue to be addressed by this WRP, and the Wisconsin Department of Natural Resources (WDNR) is in the process of developing water quality standards for phosphorus. The most significant sources of phosphorus are believed to be from non-contact cooling water discharges and urban stormwater runoff. Table 1-3 presents the specific nutrient-related Foundation actions that are recommended by this WRP:

TABLE 1-3

NUTRIENTS TARGETS AND FOUNDATION ACTIONS

Watershed Targets		Foundation Actions
1. Reduce phosphorus loads from regulated discharges		1a. Continue adaptive implementation of overflow control program
		1b. Implement projects and programs to comply with MS4 permits and NR 151 TSS and runoff reduction requirements (reduced TSS expected to result in coincidental TP reduction)
		1d. Reduce phosphorus loads with State ban of phosphorus in commercial fertilizers
2. Reduce use of phosphorus compounds for control of lead and copper in drinking water systems		2a. Research development of alternatives to phosphorus compounds by public and private researchers in area universities and industries

Reduce phosphorus loads from regulated discharges

This WRP identified four priority actions to target phosphorus loading from regulated discharges, including combined sewer overflows and separate sewer overflows as well as discharges that are regulated through NR 151 and the MS4 permitting process. This WRP also emphasizes the benefits of Wisconsin's ban on phosphorus in commercial fertilizers and recommends that additional studies be conducted and the progress on the phosphorus reductions that result from the ban be reported.

Reduce use of phosphorus compounds in drinking water

Currently, phosphorus compounds are added to drinking water to control concentrations of copper and lead. In many residential drinking water systems, copper and lead leach from piping and can pose health concerns to the public, especially the very young. This WRP recommends research and development of alternatives to the use of phosphorus compounds in drinking water.

1.3.6 Other Pollutants

Technical Report No. 39 of the RWQMPU indicates that (polychlorinated biphenyls) PCBs have been detected within the mainstem of the Kinnickinnic River and that PCB concentrations generally increase from upstream to downstream. This WRP recognizes that PCBs and other pollutants, such as polyaromatic hydrocarbons (PAHs) nitrogen, copper, and pharmaceutical and personal care products (PPCPs), also affect water quality within the Kinnickinnic River watershed. Although this WRP does not identify or prioritize specific actions to address these other pollutants, several of the recommended actions identified to address the three focus areas would result in coincident loading reductions of the other pollutants. For example, the expansion of riparian buffers to improve habitat and increase phosphorus removal from stormwater would also simultaneously lead to some reductions in nitrogen loadings. More specific actions to address PCBs, PAHs, nitrogen, copper, and PPCPs will be identified when future updates of this WRP are developed.

1.3.7 Implementation and Monitoring

Chapter 8: *Implementation Strategy* is the final chapter of this WRP. This chapter addresses the implementation of the various actions identified in Chapter 7. This WRP stresses the importance of addressing funding issues and sources (see Appendix 8A) as well as post implementation monitoring. Follow-up monitoring recommendations are also included in this WRP because additional data will be needed to fulfill three primary objectives: (1) obtain additional data to address information gaps and uncertainty in the current analysis, (2) ensure that the identified management actions are undertaken, and (3) ensure that actions are having the desired effect. Implementation activities will then be adjusted based on this new information through the use of an adaptive management framework to be coordinated by the SWWT.

1.3.8 Policy Issues

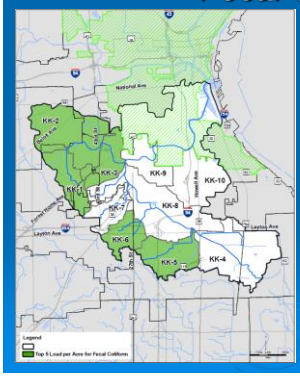
Policy issues need to be addressed as projects are considered for implementation. The following issues compose the initial list to be considered:

- Total maximum daily load (TMDL) development: Evaluation should include the timing of any TMDLs, leadership of the TMDLs in terms of regulatory agencies (WDNR/USEPA) versus "third party" (led by public agencies such as the MMSD) and the exact format of the TMDLs (i.e., which pollutants and which portions of the

watershed). An additional potential issue is the regulatory relationship between NR 151 and TMDLs, as noted in Chapter 2 of this WRP.

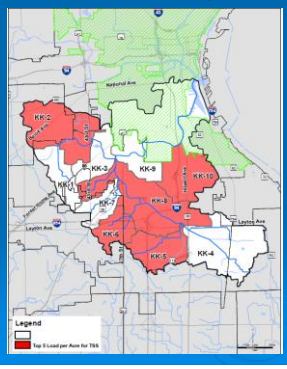
- Consideration of watershed permits: The issues to be addressed regarding this topic are summarized in the document *White Paper/Analysis for Watershed-based Permitting Primer* found in Appendix 8B.
- Water quality trading: The issues to be addressed regarding this topic are summarized in Appendix 8C.
- NR 151 implementation: The regulatory and financial issues regarding implementation of NR 151 may influence the effectiveness of this regulation on water quality and the implementation of this WRP.
- Alternatives to adding phosphorus compounds to drinking water: There are policy issues that should be addressed as this major source of phosphorous to the watershed is not currently the focus of any scientific or regulatory program.
- Alternative indicator to replace fecal coliform bacteria: The policy implications of building a local consensus for and support of new methods to assess water borne disease risk need to be addressed.

Location of Priority Areas
Fecal Coliform



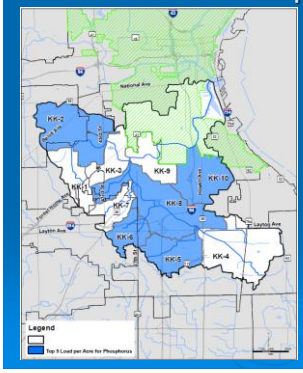
- Top 5 areas generating fecal coliform per acre of land
- Based on model

Location of Priority Areas
Total Suspended Solids (TSS)



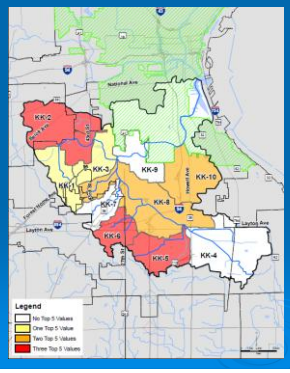
- Top 5 areas generating TSS per acre of land
- Based on model

Location of Priority Areas
Phosphorus



- Top 5 areas generating phosphorus per acre of land
- Based on model

Location of Priority Areas
Combined Results



- Indicates areas that WATs may want to focus on first
- "Hot spots"

7.2.5 Foundation Actions (Table 7-5)

Even after distilling the RWQMPU recommendations into the Priority Actions tables, the overall consensus among the SWWT committees was that there were still too many actions. Therefore, to provide further guidance on the next projects that should be implemented, the technical team developed a Foundation Actions table (Table 7-5). The actions chosen for the Foundation Actions table are considered to be the predecessor actions for all other recommended actions. The idea is that these actions must be completed before the full benefits of other actions can be realized and will be completed no matter what the final goals are for the watershed. For example, the full benefits of in-stream habitat improvements in the upstream reaches of the Kinnickinnic River watershed can never be fully realized until a better connection with Lake Michigan is created and fish passage through the concrete-lined channel section is provided in the lower reaches of the Kinnickinnic River.

As with the Priority Actions tables, the Foundation Actions table is meant to be used as a guide for future actions and can be modified as new information is obtained and as projects are implemented. Also, the table is not meant to exclude any recommendations from the RWQMPU.

Table 7-5: Foundation Actions
Kinnickinnic River Watershed

Watershed Targets to be Achieved by 2015	Actions
PUBLIC HEALTH/BACTERIA	
1. Identify unknown sources of bacteria, and correct/remove/disconnect unknown sources of bacteria (was high priority in the SEWRPC Regional Plan)	1a. Conduct dry weather surveys to identify outfalls that have dry weather flows
	1b. Sample outfalls to determine which have human bacteria discharges (wet and dry weather samples)
	1c. Determine ownership/owner of outfalls that have dry weather flows and/or human bacteria
	1d. Initiate discussion with owner of outfall to begin determining corrective actions
	1e. Implement projects to correct/remove/disconnect unknown sources of bacteria
2. Increase recreational use of watershed and public access (was not an action ranked in the SEWRPC Regional Plan)	2a. Identify recreational and body contact areas
	2b. Identify other areas suitable for recreation or body contact
	2c. Prioritize areas to restore for recreational use identified in Action 2b based on success of Action 1e.
3. Reduce bacteria sources from land-based activities (actions were ranked medium to high in the SEWRPC Regional Plan)	3a. Identify where public ownership of land can serve as a starting point to increase riparian buffers
	3b. Manage pet litter
	3c. Implement programs to discourage unacceptably high numbers of waterfowl from congregating near water features - identify areas and take action to discourage waterfowl feeding
	3d. Implement projects and programs to comply with MS4 permits and NR 151 TSS and runoff reduction requirements (reduced TSS expected to result in coincidental bacteria reduction)
	3e. Initiate municipal, county and SWWT education programs to educate public on sources of bacteria and actions they can implement to reduce loads to streams
HABITAT - LAND-BASED	
1. Moderate flow regimes to decrease flashiness	1a. Implement stormwater management practices at the subwatershed level
	1b. Implement stormwater management practices at the neighborhood level
	1c. Maintain stormwater management practices at all levels
	1d. Restore floodplain connectivity with the stream system
2. Reduce water quality and quantity impacts using green infrastructure	2a. Implement green infrastructure to re-establish more natural hydrology, reduce runoff and improve water quality (continue and expand current efforts; e.g. Green Milwaukee and MMSD's green infrastructure plan)
3. Reduce water quality impacts from nonpoint runoff (focus on chlorides)	3a. Evaluate existing road salt reduction programs
	3b. Implement new pilot road salt reduction programs
	3c. Implement road salt reduction program education
HABITAT - INSTREAM-BASED	
1. Restore fish and aquatic organism passage from Lake Michigan to the headwaters and tributaries (i.e. Follow 3-Tiered Prioritization Strategy as outlined in Appendix 4A)	1a. Remove concrete within the lower reaches of the mainstem
	1b. Develop plans for removal of additional obstructions on the mainstem or tributaries and implement the plans
	1c. Develop detailed assessments to expand passage restoration efforts beyond the mainstem to the tributaries, prioritize them, and implement them
PHOSPHORUS	
1. Reduce phosphorus loads from regulated discharges (actions were ranked low to high in the SEWRPC Regional Plan)	1a. Continue adaptive implementation of CSO and SSO overflow reduction program
	1b. Implement projects and programs to comply with MS4 permits and NR 151 TSS and runoff reduction requirements (reduced TSS expected to result in coincidental TP reduction)
	1c. Reduce phosphorus loads with State ban of phosphorus in commercial fertilizers
2. Reduce use of phosphorus compounds for control of lead and copper in drinking water systems	2a. Research development of alternatives to phosphorus compounds by public and private researchers in area universities and industries

This list is intended to highlight predecessor actions that need to be completed to realize the full potential of actions listed in Tables 7-1 thru 7-4 and the actions recommended by the RWQMPU.
The activities listed are suggestions to be implemented between 2010 and 2015 to move the watershed towards improved water quality and habitat.
Additional actions recommended by this WRP are presented in Chapters 5 and 6 and a complete list is included in Chapter 8. A complete list of actions recommended by the RWQMPU is presented in Chapter X of Planning Report No. 50. Additional habitat recommendations are included in SEWRPC's MR-194 in Appendix 4A.