

CHAPTER 7: ADDITIONAL MANAGEMENT STRATEGIES AND IDENTIFICATION OF PRIORITY ACTIONS

7.1 Additional Management Strategies

The recommended management strategies from the Southeastern Wisconsin Regional Planning Commission's (SEWRPC) Regional Water Quality Management Plan Update (RWQMUPU) were used as the basis for the recommendations of this Watershed Restoration Plan (WRP). Chapter 6 presents the RWQMUPU's management strategies and estimates the pollutant load reductions from the major components of the RWQMUPU. During the development of this WRP, the project team and the Southeastern Wisconsin Watersheds Trust, Inc. (SWWT) committees enhanced or expanded some of the RWQMUPU's management strategies, changed the priority for some of the strategies, and developed some new management strategies. These additional or modified management strategies are presented in the following section. As Chapter 6 identified each management measure's assigned priority from Tables 93-99 within the RWQMUPU, the following section also identifies the priority, determined during the development of this WRP, for each additional management strategy. The additional strategies are partitioned into three subsections: committed programs, strategies that are in various stages of implementation, and strategies that are not yet implemented.

7.1.1 Committed Programs

Transportation controls

(high priority)

The Wis. Admin. Code Transportation (Trans) 401 rule requires BMPs "...to be employed to avoid or minimize soil, sediment and pollutant movement, or to manage runoff, onto or off a project site or selected site, including the avoidance or minimization of discharges to off-site areas, public sewer inlets and waters of the state." The rule requires new transportation facilities to reduce the TSS loads by 80% and requires highway reconstruction and non-highway redevelopment to reduce TSS loads by 40%. It also requires the peak discharge to be maintained to that of the predevelopment, 2-year 24-hour design event.

There are also several transportation projects underway within the Kinnickinnic River watershed. For example, the South 6th Street bridge is to be replaced and the concrete channel from the bridge downstream to I-94 is to be reconstructed to stabilize the channel side slopes. The Wisconsin Department of Transportation (WisDOT) is also considering lowering and reconstructing the channel between I-894 and Bolivar Avenue and extending the I-894 enclosure of the Villa Mann Creek Tributary. The MMSD is also considering plans for replacement and partial removal of the culvert enclosure along the tributary to Villa Mann Creek east of 27th Street. Each of these projects has the potential to improve the habitat within the watershed. NR 151 also contains performance standards for major transportation facilities that cause or may cause polluted runoff. The standards apply to a wide range of facilities, including roadways, airports and railroads.

Phosphorus fertilizer ban*(medium priority)*

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 result in reduced phosphorus loads to the Kinnickinnic River watershed due to the reduced application of fertilizers containing phosphorus. Because the bill to ban phosphorus fertilizer had not been finalized at the time the water quality model was prepared, the expected load reductions from the ban were not modeled during the development of this plan; however, phosphorus loads from residential grass are estimated to decrease by approximately 20% based on studies in communities that have implemented similar bans.¹ The state of Wisconsin ban will likely result in a similar reduction.

Phosphorus water quality standard*(medium priority)*

It was not possible to quantify the expected load reductions resulting from a statewide phosphorus water quality standard as the process was ongoing during the development of this WRP. However, yearly average phosphorus concentrations at many of the assessment points in the Kinnickinnic River watershed are already less than 0.1 mg/L and the statewide ban on phosphorus fertilizers is expected to result in additional decreases (see previous discussion on the phosphorus fertilizer ban).

Delisting of Beneficial Use Impairments within the Area of Concern*(high priority)*

The Milwaukee Estuary Area of Concern (AOC) includes the Kinnickinnic River downstream of Chase Avenue (STH 38). Of the 14 beneficial uses, 11 are impaired within the Milwaukee Estuary AOC (referred to as beneficial use impairments [BUI]) including the following:

- ◆ Restrictions on fish and wildlife consumption
- ◆ Eutrophication or undesirable algae
- ◆ Degradation of fish and wildlife populations
- ◆ Beach closings
- ◆ Fish tumors or other deformities
- ◆ Degradation of aesthetics
- ◆ Bird or animal deformities or reproduction problems
- ◆ Degradation of benthos
- ◆ Degradation of phytoplankton and zooplankton populations
- ◆ Restriction on dredging activities
- ◆ Loss of fish and wildlife habitat

The Milwaukee River Basin Partnership, WDNR, and other stakeholders have implemented projects to address the BUIs within the Milwaukee Estuary AOC. However, more work is needed

¹ Lehman, J.T., D. W. Bell, and K. E. McDonald, "Reduced river phosphorus following implementation of a lawn fertilizer ordinance," *Lake and Reservoir Management* (in press)

to achieve delisting, including additional studies and the development of a comprehensive delisting strategy that is based on public input.

The RWQMPU's strategies and the WRP's Priority and Foundation Actions are consistent with the overall goal of delisting BUIs within the AOC. This WRP distills the RWQMPU's strategies into specific sets of actions that are designed to target public health, habitat, and phosphorus loading within the Kinnickinnic River. Implementation of this WRP will directly contribute to delisting the BUIs presented below.

Table 7-4 presents the WRP's Priority Actions that will specifically target the following BUIs by reducing point and nonpoint source loading of nutrients and sediment. *Note: the following descriptions were obtained from the WDNR's Delisting Targets for the Milwaukee Estuary Area of Concern.*²

- ◆ **Eutrophication or undesirable algae** – This BUI is caused by excessive nutrient loading and low dissolved oxygen concentrations which enrich aquatic environments and support excessive algal growth.
- ◆ **Degradation of aesthetics** – This BUI is caused by unnatural physical properties that interfere with designated uses of the waterway, such as litter.
- ◆ **Degradation of benthos** – This BUI can be caused by excessive sediment loading.
- ◆ **Degradation of phytoplankton and zooplankton populations** – This BUI can be caused by a number of factors including excessive nutrient loading from point and nonpoint sources and sedimentation.

Table 7-1 presents the WRP's Priority Actions that will reduce the beach closing BUI within the Milwaukee Estuary AOC.

- ◆ **Beach closings** – This BUI is caused by point and nonpoint pollution that leads to elevated *E. coli* concentrations.

The WRP's Priority Actions that are geared toward land-based habitat and instream-based habitat will directly target the fish and wildlife-related BUIs below. The Priority Actions are listed on Tables 7-2 and 7-3.

- ◆ **Loss of fish and wildlife habitat** – This BUI results from wetland loss, flashiness, channel obstructions and concrete lining.
- ◆ **Degradation of fish and wildlife populations** – This BUI is caused by multiple factors including the loss of fish and wildlife habitat and the presence of invasive species.

Implementation of the RWQMPU will address toxic substances and work toward delisting the three remaining BUIs within the Milwaukee Estuary AOC: fish tumors or other deformities, restriction on dredging activities, and bird or animal deformities or reproduction problems.

7.1.2 Additional Management Strategies in Various Stages of Implementation

Green Milwaukee (high priority)

² WDNR, *Delisting Targets for the Milwaukee Estuary Area of Concern*, March 2008



The city of Milwaukee is promoting building “green,” which can have a positive impact on water quality within the Kinnickinnic River watershed. For example, a green roof installed on the city owned building at 809 North Broadway will prevent about 10,500 gallons of water from going into the sewer system. The Milwaukee Metropolitan Sewerage District (MMSD) is developing a Green Infrastructure Plan to enhance and further their focus on sustainability and the use of green infrastructure to store, convey, and use rainwater in more natural ways. Other municipalities are also promoting green development, such as encouraging more low impact development (LID) and greater use of green infrastructure. The use of LID and green infrastructure on new or re-developments can result in significant reductions in runoff and pollutant loadings compared to traditional construction.

Total Maximum Daily Load or Environmental Accountability Project
(discussed in Regional Water Quality Management Plan Update but not recommended)
(medium priority)

A total maximum daily load (TMDL) is an analysis that shows how much pollution a waterbody can receive and still meet water quality standards. An Environmental Accountability Project (EAP) is an alternative to a TMDL that provides recommendations for significantly reducing the pollutant loading that is contributing to an impairment of a waterbody. Because both of these efforts would result in additional study of the Kinnickinnic River watershed, it is not possible to quantify the expected load reductions or other benefits at this time from these potential studies. The MMSD submitted a Great Lakes Restoration Initiative grant application to conduct a 3rd Party TMDL in the Kinnickinnic River watershed in 2010. At the time this WRP was written, the grants had not been awarded.

Kinnickinnic River Watershed Sediment Transport Study
(medium priority)

As this WRP is being written, the MMSD is conducting a sediment transport study to provide a supplementary planning tool for appropriate flood management, stabilization, and rehabilitation activities within the Kinnickinnic River watershed. The project scope consists of survey field work, computer modeling, and field geomorphology assessment of the Kinnickinnic River and tributaries within the District’s jurisdiction. Potential benefits to be realized from this project include reduced streambank erosion (resulting in lower sediment loads) and improved habitat conditions. The study is scheduled to be completed in 2010.

Wilson Park Creek flood protection project
(low priority)

The MMSD is conducting a flood protection project within the Wilson Park Creek subwatershed to protect residences and businesses in the city of Milwaukee from flooding up to the 1% probability flood event. The scope consists of performing the planning phase necessary to identify flooding areas within the District’s jurisdiction. It will include input by a stakeholder group and construction cost estimating during the alternative analysis phase of the project. Construction costs will be further refined during the preliminary engineering phase to occur at a later date. Approximately 120 structures have initially been identified in the floodplain. Potential benefits to be realized from this project include reduced flashiness and better habitat conditions.

7.1.3 Additional Management Strategies Recommended for Implementation, But Not Yet Implemented

Improve aesthetics (high priority)

Stakeholders have identified improved aesthetics as one of their most important goals for the watershed. Actions that would improve aesthetics and promote stewardship of the watershed include restoring areas for recreational use, improved public access, implementing green infrastructure and removing concrete-lined channels. Efforts to beautify the stream corridor will therefore need to be a critical aspect of implementing this WRP.

7.2 Identification of Priority Actions

The identification of Priority Actions builds upon the analyses of the SEWRPC's RWQMPU and the MMSD's 2020 Facilities Plan (2020 FP), both of which identified numerous management measures that would result in meeting watershed goals.

The SWWT Science Committee determined three areas of highest concern, called focus areas. These include bacteria/public health, habitat and aesthetics, and nutrients/phosphorus (see Chapters 3 and 5). The technical team then identified a list of Priority Actions for each of the three focus areas, based on the high priority recommendations identified in the RWQMPU.

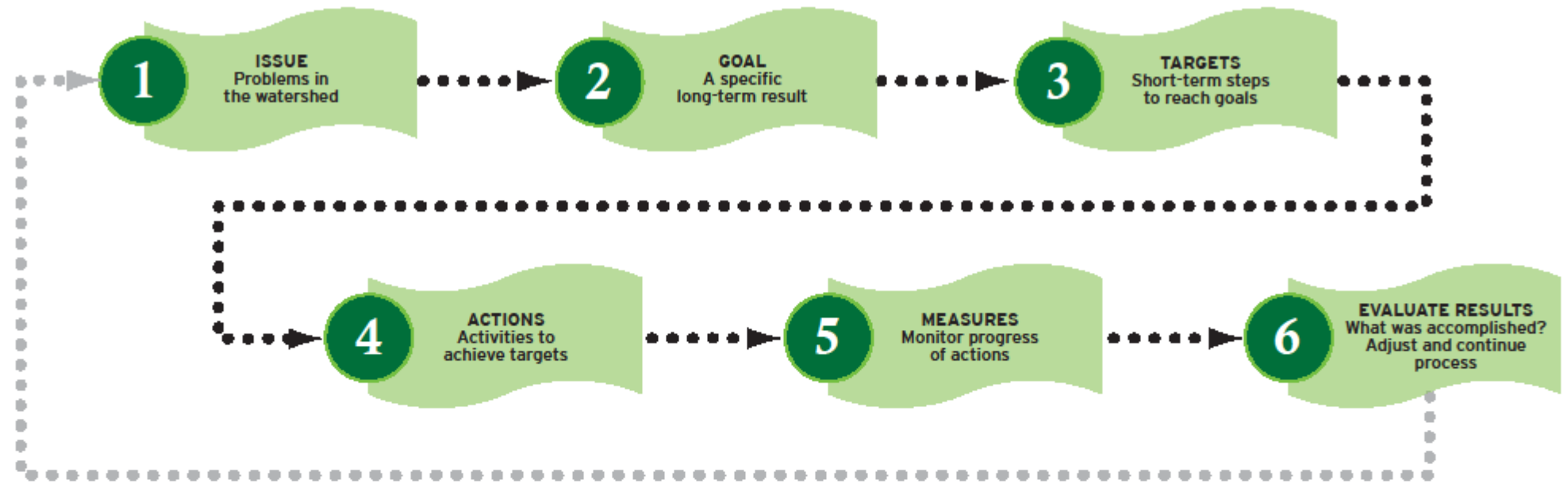
Based on input from the Watershed Action Team (WAT), Policy Committee, and the Science Committee, the technical team compiled the list of actions into a "priority actions matrix" as a reference document. The matrix includes four tables: one for public health/bacteria (Table 7-1), two for habitat – one for land-based measures (Table 7-2), one for in-stream based measures (Table 7-3), and one for nutrients/phosphorus (Table 7-4).

The tables suggest actions that should be implemented over the next five years to continue improving water quality and habitat in the Kinnickinnic River watershed and are meant to be used as a guide for future actions by the SWWT and its committees; they are not meant to exclude any recommendations from the RWQMPU. Additional actions identified in the RWQMPU can be found in Chapters 5 and 6 of this WRP and in Chapter X of SEWRPC's RWQMPU Planning Report No. 50.

The information in Tables 7-1 through 7-4 may change over time and as other projects are implemented. The information should be verified during the preparation of more detailed work plans as the next steps of implementation are completed. All of the recommendations in the RWQMPU contribute to improving water quality and habitat within the Kinnickinnic River watershed and achieving the overall goals of the RWQMPU. Although some recommendations are not included in the Priority Actions tables, this does not mean they should not be carried forward or implemented as opportunities arise. The high Priority Actions are merely identified to guide the implementation process based on the knowledge and data available as of March 2010.

Figure 7-1 summarizes the process to determine actions needed and briefly describes the components of the tables. The components of the tables are explained in more detail in the following text.

Process to Determine Actions Needed



How to Read the Priority Actions Table

1 ISSUES are problems in the watershed

2 GOALS are specific long-term results intended to help move towards improved regional water quality

3 TARGETS are short-term goals or steps needed to reach long-term goals

4 ACTIONS activities or projects needed to achieve the targets and address the issues

5 MEASURES are used to monitor the progress of an action or set of actions towards achieving a specific target

7 PRIMARY LAND USE THE ACTION ADDRESSES shows where the actions would be applied

8 RESPONSIBLE AND/OR PARTICIPATING ORGANIZATION identifies organizations that could lead the action and/or participate in implementation

9 RELATIVE COST is an approximation of an action's cost

10 GEOGRAPHIC CONCENTRATION OF ACTION AND RELATIVE PRIORITY provides general locations and prioritization of where actions should be implemented

11 POTENTIAL CONTRIBUTION TOWARD ACHIEVING WATERSHED TARGET AND GOAL provides an estimate of how much progress towards achieving the target or goal is attributed to the action

TABLE 1
Implement in Period: 2010 to 2015

PRIORITY ACTIONS MATRIX
Kinnickinnic River Watershed

Focus Area: Public Health/Bacteria
Issue: Risk of getting sick if you swim or otherwise contact the water
Goal: Greater water-based recreational opportunities
SEWRPC Regional Plan Goal: Pollutant: 1 reduction for fecal coliform bacteria for entire watershed by year 2020 = 52% or 2,600 trillion cells
What Will Meeting this Goal Accomplish: Significant reduction in total fecal coliform; reduced risk of getting sick; minimal improvement to meet 2009 water quality standards

Watershed Targets to be Accomplished by 2015	Actions	Measure ^a	Primary Land Use the Action Addresses ^a					Responsible and/or Participating Organization	Relative Cost	Geographic Concentration of Action and Relative Priority ^a											Potential Contribution Toward Achieving Watershed Target & Goal	
			High Density Residential Low Density Residential	Commercial	Industrial & Institutional	Outdoor Recreation, Wetlands, Woodlands, and Open Space	Transportation			NR-1	NR-2	NR-3	NR-4	NR-5	NR-6	NR-7	NR-8	NR-9	NR-10	NR-11		
1. Identify unknown sources of bacteria, and	14. Do dry weather surveys to identify outfalls that have dry weather flows	14. Number of sites surveyed							Municipalities and NGOs with assistance from LWRF, OLWR and WMSO	High	NR-1	NR-2	NR-3	NR-4	NR-5	NR-6	NR-7	NR-8	NR-9	NR-10	NR-11	High
15. Sample outfalls to determine which have human bacteria discharges (wet and dry weather)	15. % of outfalls sampled	15. % of outfalls sampled							Municipalities and NGOs with assistance from LWRF, OLWR and WMSO	High	NR-1	NR-2	NR-3	NR-4	NR-5	NR-6	NR-7	NR-8	NR-9	NR-10	NR-11	High



FIGURE 7-1
PRIORITY ACTIONS DEVELOPMENT
AND PRESENTATION
Kinnickinnic River watershed

- 1) **Issues – Problems in the watershed.** The purpose of this WRP is to address water quality and habitat issues within the Kinnickinnic River watershed. The following three issues are addressed by the Priority Actions:
- a. Reduce the risk of getting sick if you swim in or otherwise contact the water (too many bacteria and pathogens in the water)
 - b. Reduce the impact of development on habitat and aesthetics, including the following:
 - i. Address human-induced runoff from the land surface to the stream system (reduced buffer widths, pollution, and increased erosion)
 - ii. Address stream flashiness (rapid increase and decrease in flows; impacts to runoff peak rate and volume)
 - iii. Address the impacts of human influences on in-stream fishery habitat, water quality and aesthetics (obstructions to fish and aquatic life passage, including concrete-lined channels and low-gradient dams; pollution; vegetation; and trash)
 - c. Reduce the nutrient impacts on the watershed and discharge of nutrients, specifically phosphorus, from the watershed to Lake Michigan (excessive algae and *Cladophora* growth)

Issues can be linked to physical factors, chemical factors, or both. Often, there are multiple factors that contribute to an issue. Physical factors that contribute to issues include dams, flow velocity (the speed at which water flows in a stream), and concrete-lined channels. These changes have important implications for stream ecology. For example, changes to flow velocity and sediment transport can directly disrupt the channel bottom conditions that organisms depend on to find food and shelter (benthic substrate) and disrupts their overall life cycle. Chemical factors include high concentrations of bacteria that can indicate the presence of organisms that make people sick or high concentrations of chlorides that are lethal to fish.

- 2) **Goals – A specific long-term result intended to be achieved that will help move towards improved regional water quality.** Achieving goals will solve or work towards solving issues within the watershed. Goals can be quantitative or qualitative or both. Most quantitative goals also have a corresponding qualitative goal. An example of a quantitative goal is to reduce the total fecal coliform bacteria load to the Kinnickinnic River watershed by 52%. An example of a corresponding qualitative goal is to increase water-based recreational opportunities by reducing the risk of people getting sick when they recreate in the river.

The baseline goals for this plan were defined in the RWQMPU and confirmed as the baseline goals, or starting point, for this WRP by the SWWT Executive Steering Council. The baseline goals related to water quality improvements were established by the RWQMPU in an attempt to meet the applicable fishable/swimmable water quality use objectives and the associated water quality standards or guidelines. The baseline habitat improvement goals for the WRP were also based on the RWQMPU and were subsequently expanded by SEWRPC's Memorandum Report No. 194 (Appendix 4A).

As the WRP is implemented, the goals can be adapted and modified at any time by the SWWT to adjust for new water quality standards or new information.

- 3) **Targets – Short-term goals or steps required to reach the long-term goals.** In order to break down the long-term goals into more manageable pieces, targets were established. Establishing targets helps determine the specific steps needed to achieve a goal and facilitates the development of measures to track progress. The targets were developed from the management measures selected from above or from Chapter 6. An example of a target is to expand riparian buffer widths to a minimum of 75 feet.
- 4) **Actions – Activities or projects needed to achieve the targets and address, or start addressing, the issues.** Actions can include data gathering, research, or actually removing a concrete-lined channel. The actions included in Tables 7-1 through 7-4 were identified as those that can make the most positive impact on habitat and water quality (focusing on fecal coliform bacteria and phosphorus reduction) in the Kinnickinnic River watershed. They are not the only actions that can or should be taken. Implementing these actions should move water quality and habitat improvement towards meeting the targets and achieving the goals. An action, or a group of actions, was developed for each of the management measures that were selected to more clearly define activities needed to implement the management measures.
- 5) **Measures – A way to monitor progress of an action or set of actions towards achieving a specific target.** Measures can be used to determine if the actions are being implemented and whether or not they are improving water quality or habitat. Examples of measures include: increased number of days that one can recreate in a stream, miles of buffers established, length of concrete channel removed, fish population diversity, and concentrations of pollutants. The progress for some actions, such as the length of concrete removed, can be determined as soon as they are implemented. However, it may take several years or even decades to be able to measure progress towards achieving certain water quality or habitat improvements.
- 6) **Evaluate Results – Determine what was accomplished by the actions, make adjustments, and continue process.** An evaluation of the measures will show if the actions should be continued, used elsewhere, modified, or discontinued.
- 7) **Primary Land Use the Action Addresses – Appropriate area(s) where the actions would be applied.** Some actions are land use-specific and are best suited to be applied to certain land uses, such as pet litter management in residential and parkland areas. This column provides guidance on where the actions would be most effective at improving water quality. A bullet in the column indicates the primary land use type(s) that the action addresses. Most of the actions that address habitat improvement can be applied regardless of the land use type. Therefore, this column was not included in Tables 7-2 and 7-3.
- 8) **Responsible and/or Participating Organization – Organization(s) that will lead the action and/or participate in the implementation of the activity.** One organization will need to lead each activity to establish an ultimate decision maker and determine who will be accountable for implementing the action. When appropriate, other organizations can be identified as team members to help develop and implement the activity. The

organizations listed are proposed to lead or participate in the implementation of the action. The lead organization should be determined by a process established by the SWWT.

- 9) **Relative Cost – Approximation of an action’s cost.** The relative cost is provided to give the reader a sense of how expensive an action might be to implement throughout the watershed. There are many variables that impact the cost of an activity, including the level of implementation or the size of the project, whether land needs to be purchased, the location and condition of the land, and many other factors. Therefore, the information provided in the tables should be used as a guide only. For purposes of the tables, the following categories are defined as a total watershed cost for the action:

- ◆ **Low** = cost less than or equal to \$500,000
- ◆ **Medium** = more than \$500,000 but less than \$2,000,000
- ◆ **High** = cost greater than or equal to \$2,000,000

- 10) **Geographic Concentration of Action and Relative Priority – Location and prioritization of where actions should be implemented.** For each assessment point area or location within the watershed, a priority for each action was assigned based on information available to the technical team and SEWRPC, and engineering judgment. The priority for each action is presented by assessment point area on Tables 7-1 through 7-4. The information included model results, such as pollutant load per acre and percentage of unknown fecal bacteria attributed to the assessment point area, land use, whether there was an associated project underway, or where the action fit within the tiered approach developed by the Habitat Subcommittee that focuses on reconnecting waterways to Lake Michigan (described in Appendix 4A of Chapter 4). The data used for the priority assignments are provided in the footnotes of the tables. These priorities are provided as a guide and can be modified by the WAT as the implementation process moves forward and as new information is gathered and analyzed.

- 11) **Potential Contribution toward Achieving Watershed Target and Goal – How much progress towards achieving the target or goal can be attributed to the action.** Each action identified has the potential to contribute towards improved water quality and/or habitat in the watershed. Some actions have the potential to make a bigger impact than others. Some actions directly impact water quality, such as reducing bacterial sources. Others have an indirect impact, such as expanding a water quality monitoring program.

During the development of the 2020 FP and the RWQMPSU, some of the actions that directly impact water quality were assigned specific pollutant load reductions and some were not. There are several reasons why some actions were not assigned specific reductions. One reason is the impact from the action is highly variable depending on the site where it is applied. Another reason is the action relates to monitoring or data collection, which will be used to fill data gaps and assist with decision making, and therefore indirectly impacts water quality or habitat improvement. This information is provided as a guide and can be modified by the WAT as the implementation process moves forward and as new information is gathered and analyzed.

What will achieving the identified goals accomplish? Achieving the goals will significantly reduce the quantity (load) and concentrations of pollutants in the streams and improve habitat in the watershed. However, all water quality standards as they exist in 2009 are not anticipated to be met under all circumstances – even if all recommendations from the RWQMPSU are implemented and the goals are met. It is important to point out that the actions identified in Tables 7-1 through 7-4 are only a subset of the RWQMPSU recommendations. Information regarding anticipated water quality improvements based on full implementation of the RWQMPSU is provided in Chapters 4 and 6 and discussed briefly below.

Fecal Coliform

Implementation of all actions identified in the RWQMPSU recommended plan will result in significant improvement in fecal coliform concentrations in general even though anticipated water quality conditions for about half assessment point areas fall short of meeting water quality standards. However, this reduction and the focus on removing human sources of bacteria would reduce the risk of getting sick from contacting the water. For the Kinnickinnic River watershed, the anticipated overall load reduction is 52%. This will increase compliance with the geometric mean standard during the swimming season (May – September) by 21 days in the lower reach of the mainstem. This reduction will allow progress towards any future bacterial standard that may use a different measure than fecal coliform bacteria.

Habitat

Achieving the habitat goals of meeting the fishable and swimmable standards will improve water quality and hydrology to the point where the watershed can sustain a natural fishery and support a full range of recreational uses such as fishing, kayaking, bird watching, and any other recreational activity that would be enhanced by improved water quality and aquatic / riparian habitat. Although progress can be made, intense urbanization coupled with relatively low flows and extensive channel modification will make the achievement of fishable and swimmable goals extremely difficult in most areas of the Kinnickinnic River watershed. However, greater progress can likely be made toward the fishable and swimmable goals in the downstream portion of the watershed because of its association with the estuary and the Great Lakes system. In terms of fishable goals, research indicates that close proximity and a connection to the estuary and Lake Michigan will tend to support a more diverse fish assemblage. See Appendix 4A for more information on the interactions among fish passage, fish diversity and the Great Lakes system. The types of fish and aquatic life that will be present depend on many factors that will be influenced by the decisions made throughout the implementation of this WRP. The Kinnickinnic River watershed assessment point areas are identified in Figure 7-2. Appendix 7A includes a discussion of planning considerations for improved habitat and biodiversity.

Phosphorus

Implementing the actions to address phosphorus will result in a significant reduction in nutrient loading within the watershed. This will directly reduce the occurrence of algae and the loading of nutrients to the Milwaukee Estuary and Lake Michigan. The

impending water quality standard scheduled to take effect in 2010 is anticipated to be met on a yearly average in about half of the assessment point areas following implementation of these activities. An additional action that should be researched and evaluated is finding an alternative to adding phosphorus compounds to drinking water. The actions noted are anticipated to bring most of the assessment point areas into compliance with the impending standard of 0.075 mg/L on a yearly average basis.

7.2.1 Priority Actions to Address Public Health/Bacteria (Table 7-1)

The presence of fecal coliform bacteria is an indicator of potential pathogens that can make people sick. High levels of fecal coliforms (and the pathogens they may indicate) are a threat to the health of anyone who comes in contact with the water. The biggest risk to public health occurs when human fecal coliforms are present. Higher concentrations of fecal coliforms are normally found in streams during and after storms. Sources include the following:

- ◆ Unknown sanitary sewer cross-connections to storm sewers (unknown because the exact reasons are unknown for the wide-spread and in some cases, very high levels of bacteria found in storm sewers), combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), and failing septic systems
- ◆ Runoff impacted with droppings from pets, seagulls, geese and other wildlife

The WRP modeled fecal coliform bacteria as an indicator of waterborne bacteria and related public health risks. Fecal coliform was used because it is consistent with Wisconsin's standard for in-stream conditions (see Wis. Admin. Code Natural Resources [NR] 102 *Water Quality Standards for Wisconsin Surface Waters*). Also, most of the available bacteria/public health data collected from waterways within the Kinnickinnic River watershed are based on fecal coliform bacteria. One of the major drawbacks of relying on fecal coliform as an indicator of human sewage is that fecal coliform bacteria are found in most warm-blooded animals.³ The presence of fecal coliform bacteria itself neither provides any information on the source of the bacteria nor the origin of the bacteria; the presence of fecal coliform bacteria does not specifically indicate human sewage. One of this WRP's Foundation Targets is to identify unknown sources of bacteria as well as to disconnect these sources. Considering the limitations identified above, this WRP acknowledges that that future indicators of waterborne bacteria and the related public health risk will likely be based upon more effective measures of human risk and not based on fecal coliform bacteria.

It is important to note that while the indicator organism will likely change, this WRP's focus on identifying and disconnecting illicit connections is still relevant. Illicit connections cause human sewage contamination and present a direct risk to human health. An effective indicator organism should be directly linked to illicit connections and not indicate the presence of waste from other sources like waterfowl and pet litter. Human-specific strains of *Bacteroides*, with a specific human genetic marker, have enabled researchers to differentiate between human and non-human sources of sewage.⁴ Researchers at the University of Wisconsin-Milwaukee (UWM), in collaboration with MMSD and the Milwaukee Riverkeepers, have used the *Bacteroides* genetic

³ Bower, P.A., Scopel, C.O., Jensen, E.T., Depas, M.M. & McLellan, S.L. 2005. Detection of genetic markers of fecal indicator bacteria in Lake Michigan and determination of their relationship to *Escherichia coli* densities using standard microbiological methods. *Appl. Environ. Microbiol.* 71(12): 8305-8313

⁴ Ibid



marker to investigate sewage in stormwater outfalls. In some cases, specialized dye testing was used to confirm the results; *Bacteroides* has shown promise as an effective and specific indicator of human sewage. This WRP supports additional research to further refine *Bacteroides* use as an indicator of human sewage contamination and the use of the latest technologies to detect human sources. The WRP also supports an expanded monitoring program for *Bacteroides* throughout the watershed to ensure a baseline is established and future evaluations can occur.

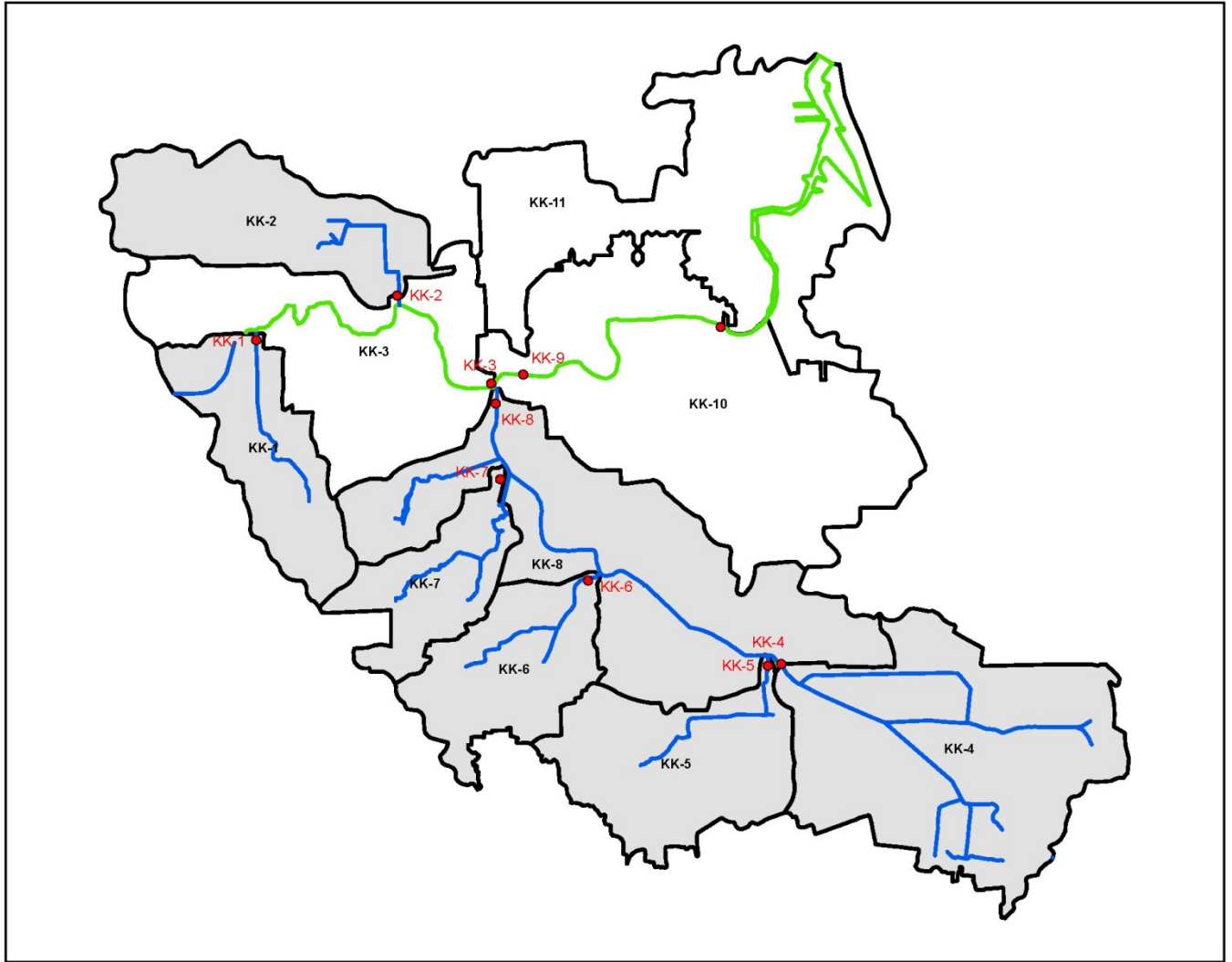


FIGURE 7-2
HABITAT ASSESSMENT POINT AREAS
WITHIN THE KINNICINNIC RIVER
WATERSHED
KK WATERSHED RESTORATION PLAN

Table 7-1 presents the identified actions and associated information to address public health/bacteria. Implementing these actions will result in significant improvement in fecal coliform concentrations, thereby reducing the risk of getting sick when contacting the water during recreational activities. However, water quality standards as of 2009 are not anticipated to be met in about half of the assessment point areas - even if all of the activities recommended in the RWQMPU were implemented and the RWQMPU goals were met. The actions identified in Table 7-1 are only a subset of the RWQMPU recommendations. Therefore, implementing only the actions in Table 7-1 will likely not reach the goals. In order to reach the water quality standards as of 2009 in all areas of the watershed every day of the year, the amount of fecal coliform entering the streams would need to be reduced by over 90%.

**Table 7-1: Priority Actions to Address Public Health/Bacteria
Kinnickinnic River Watershed**

Focus Area: Public Health/Bacteria

Implementation Period: 2010 to 2015

Issue: Risk of getting sick if you swim in or otherwise contact the water

Goal: Greater water-based recreational opportunities

SEWRPC Regional Plan Goal: Pollutant load reduction of fecal coliform bacteria for entire watershed by year 2020 = 52%

What Will Meeting this Goal Accomplish?: Significant reduction in total fecal coliform; reduced risk of getting sick; minimal improvement to meeting 2009 water quality standards

Watershed Targets to be Achieved by 2015	Actions	Measures ^A	Primary Land Use the Action Addresses ^B						Responsible and/or Participating Organization ^C	Relative Cost ^D (for implementation of the action in the entire watershed; unit costs shown if available)	Geographic Concentration of Action and Relative Priority ^E											Potential Contribution ^F Toward Achieving Watershed Target & Goal			
			Agriculture	Low Density Residential	High Density Residential	Commercial	Institutional & Governmental	Outdoor Recreation, Wetlands, Woodlands, and Open Space			Transportation	Manufacturing & Industrial	KK-1	KK-2	KK-3	KK-4	KK-5	KK-6	KK-7	KK-8	KK-9		KK-10	KK-11	
																									Lyons Park Creek
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	1a. Number of stream miles surveyed		●	●	●	●			●	Municipalities and NGOs with assistance from UWM GLWI and MMSD	Low	BR	BR	BR	DR	ARU	BR	CR	BR	CR	BR		8% reduction in total watershed loads by 2015; 16% reduction in total watershed loads by 2020	
	1b. Sample outfalls to determine which have human bacteria discharges (wet and dry weather samples)	1b. % of outfalls sampled		●	●	●	●			●	Municipalities and NGOs with assistance from UWM GLWI and MMSD	Medium	BR	BR	BR	DR	ARU	BR	CR	BR	CR	BR			
	1c. Determine ownership/owner of outfalls that have dry weather flows and/or human bacteria	1c. % of owners identified		●	●	●	●			●	Municipalities and NGOs with assistance from UWM GLWI and MMSD	Low	BR	BR	BR	DR	AR	BR	CR	BR	CR	BR			
	1d. Initiate discussion w/ owner of outfall to begin determining corrective actions	1d. % of owners with whom discussions have been initiated		●	●	●	●			●	Municipalities and NGOs with assistance from UWM GLWI and MMSD	Low	BR	BR	BR	DR	AR	BR	CR	BR	CR	BR			
	1e. Implement projects to correct/remove/disconnect unknown sources of bacteria	1e. % of sources corrected		●	●	●	●			●	Municipalities and NGOs with assistance from UWM GLWI and MMSD	High (Programs to detect and eliminate illicit connections \$2000)	BR	BR	BR	DR	AR	BR	CR	BR	CR	BR			
2. Increase recreational use of watershed (was not an action ranked in the SEWRPC Regional Plan)	2a. Identify recreational and body contact areas	2a. Stream miles of watershed surveyed		●	●	●	●	●	●	●	SWWT	Low	A (priorities can be set after survey data is obtained)											Fill data gaps - use results to revise priorities on geographic concentration of Target 1 as data is developed	
	2b. Identify other areas suitable for recreation or body contact	2b. Stream miles suitable for recreation/body contact		●	●	●	●	●	●	●	SWWT	Low	A (priorities can be set after survey data is obtained)												
	2c. Prioritize areas to restore for recreational use identified in Action 2b based on success of Action 1e.	2c. Stream miles restored for public access, recreational use or body contact		●	●	●	●	●	●	●	SWWT	Low	TBD												
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	3a. Number of stream miles with 75 feet-wide buffers or greater					●	●			Milwaukee County, Municipalities, NGOs and SWWT	Low (Riparian Buffer \$940/acre (Cap.) \$210/acre (O&M))	B (priorities can be set after survey data is obtained)											Site-specific	
	3b. Manage pet litter	3b. Number of municipalities with strengthened pet litter programs		●	●			●			Milwaukee County, Municipalities, NGOs and SWWT	Low	B (priorities can be set after survey data is obtained)											2% reduction in total watershed loads	
	3c. Implement programs to discourage unacceptably high numbers of waterfowl from congregating near water features - identify areas and take action to discourage waterfowl feeding	3c. Number of areas documented, and successful implementation of programs to eliminate feeding or other food sources for waterfowl		●	●	●	●	●	●	●	●	Milwaukee County, Municipalities, NGOs and SWWT	Low (Discourage Waterfowl \$189/acre (O&M))	B (priorities can be set after survey data is obtained)											Site-specific
	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. Required reports and estimates of TSS reductions that will have some benefit for bacteria		●	●	●	●			●	●	WDNR and Municipalities	High (Parking Lot Sweeping \$3,400/acre (O&M) Street Sweeping \$2,500/curb mile (Cap.) \$60/curb mile (O&M))	B	B	B	D	A	B	C	B	C	B		13% reduction in total watershed loads by 2020
	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	3e. Number of documented, successful education programs implemented		●	●	●	●	●	●	●	●	Milwaukee County, Municipalities, NGOs and SWWT	Low	B											Not measurable

Watershed Targets to be Achieved by 2015	Actions	Measures ^A	Primary Land Use the Action Addresses ^B							Responsible and/or Participating Organization ^C	Relative Cost ^D (for implementation of the action in the entire watershed; unit costs shown if available)	Geographic Concentration of Action and Relative Priority ^E											Potential Contribution ^F Toward Achieving Watershed Target & Goal	
			Agriculture	Low Density Residential	High Density Residential	Commercial	Institutional & Governmental	Outdoor Recreation, Wetlands, Woodlands, and Open Space	Transportation			Manufacturing & Industrial	KK-1	KK-2	KK-3	KK-4	KK-5	KK-6	KK-7	KK-8	KK-9	KK-10		KK-11
													Lyons Park Creek	South 43rd St. Ditch	Kinnickinnic River-Upper	Wilson Park Creek-Upper	Holmes Avenue Creek	Willa Mann Creek	Cherokee Park Creek	Wilson Park Creek-Lower	Kinnickinnic River-Middle	Kinnickinnic River-Middle		Kinnickinnic River-Lower
4. Continue overall water quality monitoring to assess progress towards targets and goals (was high priority in the SEWRPC Regional Plan)	4a. Continue MMSD water quality monitoring program and expand it to include biotic sampling	4a. Continue existing level of water quality samples and parameters tested for if justified after annual review	Not Applicable							MMSD, WDNR, USGS, NGO's	Low	A											Fill data gaps	
	4b. Continue involvement of USGS in MMSD Corridor Study	4b. Maintain existing funding level for continued USGS involvement								USGS	Low	A												
	4c. Coordinate WDNR sampling and monitoring programs with MMSD and USGS and integrate NGO sampling efforts (such as the efforts detailed in Target 1)	4c. Overall data collection program is integrated through the USGS corridor study or other means. SWWT serves as a vehicle to coordinate and prioritize data collection efforts.								MMSD, SEWRPC, WDNR, USGS and NGO's	Low	A												
5. Continue to achieve the 5 year LOP and continued compliance with SSO and CSO regulations; strive to reduce overflow frequency and volume (SSO was high priority in the SEWRPC Regional Plan and CSO was medium priority)	5a. Continue adaptive implementation of overflow control program	5a. Annual volume and frequency of CSO and SSO		●	●	●	●	●	●	●	WDNR, MMSD, and Municipalities	High	AR											18% reduction in total watershed loads by 2020
6. Improved water quality in the Kinnickinnic River Estuary (was medium priority in the SEWRPC Regional Plan)	6a. Renovate KK River Flushing Station to enable the facility to continue to function	6a. Fecal coliform water quality data	Not Applicable							MMSD	Medium	Not Applicable											B	Reduces concentration only
		6b. Progress toward achieving existing water quality standards																						
7. Development of better human health risk assessment to address pathogens in stormwater (was high priority in the SEWRPC Regional Plan)	7a. Research development of better indicator test than fecal coliform to assess risks of disease and determination of human sources (was high priority in the SEWRPC Regional Plan)	7a. Progress on the GLWI work on bacteriodes and other test parameters and development of human health water quality standards by WDNR and USEPA	Not Applicable							UWM GLWI, Marquette University, MMSD, Municipalities and NGOs	Medium	A											Fill data gaps	

Footnotes:

- A. The ultimate measure is whether bacteria loads to the streams are being reduced.
 - B. Land use types are discussed in Chapter 4 of this WRP. Additional details on land use types can be found in Chapters 1 and 2 of SEWRPC's Technical Report No. 39.
 - C. Organizations listed are understood to lead or participate with the implementation of the action. For greater detail, see the SWWT membership list in Appendix 5B and SEWRPC's Planning Report No. 50, Tables 93-99, in Appendix 5C.
 - D. Cost data are provided for guidance only and are based on costs developed for SEWRPC's Regional Planning Report No. 50, Appendix R. Cap. = Capital/construction cost; O&M = Operations and Maintenance
 - E. Relative priority for Target 1 is based on the percentage of unknown sources estimated by the water quality model developed under the RWQMPU and verified with updated data for the WRP.
 - F. Target 1: Approximately 60% of the urban nonpoint source fecal coliform loads from the subwatersheds were determined to be from unknown sources. Considering the potential challenges associated with this work, the Regional Plan recommended 33% of these unknown sources be eliminated by 2020. Reducing 33% of these sources would reduce the total fecal coliform load by 16%. If half of this load is reduced by 2015, approximately 8% of the load would be reduced. Target 5: Goal from MMSD's 2020 Facilities Plan is 5-year LOP for SSO's
 - G. This assessment point area is associated with the Kinnickinnic River within the estuary. While not included within the pollutant loading and water quality analysis for the WRP, this area is incorporated in the habitat assessment conducted for the Kinnickinnic River watershed
- 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.

LEGEND

- A = Highest Priority
- B = Next Highest Priority
- C = Moderate Priority
- D = Lowest Priority
- R = Required by Law
- U = Underway
- Foundation Action

7.2.2 Priority Actions to Address Land-based Habitat (Table 7-2)

During the development of this WRP, the Science Committee formed a Habitat Subcommittee to address habitat issues. The SEWRPC staff, with input and assistance from others on the Habitat Subcommittee, developed Table 7-2, which identifies Priority Actions to address land-based habitat issues resulting from human influences on runoff from the land surface. The targets identified to address the issues are related to riparian corridors, hydrology, water quality and quantity, and improved monitoring within the 10 assessment point areas within the Kinnickinnic River watershed.⁵ See Appendix 4A of Chapter 4 for additional information.

⁵ SEWRPC Memorandum Report No. 194, Stream Habitat Conditions and Biological Assessment of the Kinnickinnic and Menomonee River Watersheds: 2000-2009, January 2010.



7.2.3 Priority Actions to Address In-stream-based Habitat (Table 7-3)

The Habitat Subcommittee also developed Table 7-3, which identifies Priority Actions to address in-stream-based habitat issues resulting from human influences on in-stream fishery habitat and water quality. The targets identified to address the issues are related to aquatic organism passage, aquatic habitat, aquatic organisms, and improved monitoring, recreation, and aesthetics.⁶ See Appendix 4A of Chapter 4 for additional information.

⁶ Ibid.



Table 7-3: Priority Actions to Address Instream-based Measures

Kinnickinnic River Watershed

Focus Area: Habitat- Instream Based Measures

Implementation Period: 2010 to 2015

Issue: Mitigating the human influences on instream fishery habitat and water quality.

Goal: Habitat improvement through reduction of instream based detrimental influences throughout the stream system.

SEWRPC Regional Plan Goal: Achievement of the fishable and swimmable standards.

What Will Meeting this Goal Accomplish?: Improvement of water quality and habitat to sustain a natural fishery and support a full range of recreational uses.

Habitat Dimension	Watershed Targets	Actions	Measures ^A	Responsible and/or Participating Organization ^B	Relative Cost ^C (for implementation of the action in the entire watershed; unit costs shown if available)	Tributary Reaches & Subwatersheds ^D							Mainstem Reaches & Subwatersheds ^D		
						KK-4	KK-8	KK-5	KK-6	KK-7	KK-1	KK-2	KK-3	KK-10 (includes KK-9)	KK-11 ^E
Aquatic Organism Passage	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	1a. Stream miles of concrete removed, number of native species present (see Appendix 4A for biological indicators)	Municipalities SWWT, NGOs with WDNR and MMSD	High (\$2,000 - \$4,200/linear foot (Cap.))		B	B	B	B	B	B	A	A	A
		1b. Develop plans for removal of additional obstructions on the mainstem or tributaries and implement the plans	1b. S Number of structures (e.g., drop structures and bridges) removed or retrofitted, number of native species present (see Appendix 4A for biological indicators)	Municipalities SWWT, NGOs with WDNR and MMSD	Medium-High		B	B	B	B	B	B	A	A	A
		1c. Develop detailed assessments to expand passage restoration efforts beyond the mainstem to the tributaries, prioritize them, and implement them	1c. Stream miles of concrete removed, number of drop structures eliminated, miles of enclosed channel daylighted or retrofitted, number of bridge crossings retrofitted, and channel restored, number of Tributary miles connected to mainstem, number of native species present (see Appendix 4A for biological indicators)	Municipalities SWWT, NGOs with WDNR and MMSD	Medium-High (Dam Abandonment and Restoration Plan \$25,000/dam (Cap.) for drop structure removal)		B	B	B	B	B	B	A	A	A
Aquatic Habitat	2. Restore fish and aquatic organism habitat from Lake Michigan to the headwaters and tributaries (i.e. Follow 3-Tiered Prioritization Strategy as outlined in Appendix 4A)	2a. Protect and expand existing highest quality remaining fishery and aquatic habitat (see Appendix 4A) (includes reducing flow velocities and addressing localized sediment issues)	2a. Stream miles of habitat protected	Municipalities SWWT, NGOs with WDNR and MMSD	Low		B	B	B	B	B	B	A	A	A
		2b. Provide instream habitat treatments including pool and riffle structure, substrates, vegetation or Cuyahoga habitat underwater baskets	2b. Stream miles of habitat created or improved, number of native species present (see Appendix 4A for biological indicators)	Municipalities SWWT, NGOs with WDNR and MMSD	Medium - High		B	B	B	B	B	B	A	A	A
		2c. Restore connectivity with floodplain and recreate a more natural meandering stream (to be undertaken simultaneously with 2a) to provide for the life history of fish and aquatic organisms (rearing, feeding, breeding, and refuge areas)	2c. Number of miles connected and functional as fish and aquatic organism habitat, number of native species present (see Appendix 4A for biological indicators)	Municipalities SWWT, NGOs with WDNR and MMSD	High		B	B	B	B	B	B	A	A	A
		2d. Protect excessively eroding streambanks or streambeds, especially where structures such as bridge abutments and buildings are threatened	2d. Miles of streambanks and streambeds stabilized; reduction in flow velocity	Municipalities SWWT, NGOs with WDNR and MMSD	Medium - High		A								
		2d. Maintain water quality conditions conducive to a successful and sustainable fishery	2d. Thermal regime, oxygen concentrations, turbidity, chlorides, etc.	Municipalities SWWT, NGOs with WDNR and MMSD	Medium		B	B	B	B	B	B	A	A	A

Habitat Dimension	Watershed Targets	Actions	Measures ^A	Responsible and/or Participating Organization ^B	Relative Cost ^C (for implementation of the action in the entire watershed; unit costs shown if available)	Tributary Reaches & Subwatersheds ^D								Mainstem Reaches & Subwatersheds ^D	
						KK-4	KK-8	KK-5	KK-6	KK-7	KK-1	KK-2	KK-3	KK-10 (includes KK-9)	KK-11 ^E
						Wilson Park Creek-Upper	Wilson Park Creek-Lower	Holmes Avenue Creek	Villa Mann Creek	Cherokee Park Creek	Lyons Park Creek	South 43rd Ditch	Kinnickinnic River-Upper	Kinnickinnic River-Middle	Kinnickinnic River-Lower
Aquatic Organisms	3. Restore a sustainable fishery and aquatic community	3a. Protect and expand remaining or existing highest quality aquatic communities (fisheries, macroinvertebrates, mussels) (see Appendix 4A)	3a. Number, type, and life stages of native species observed (see Appendix 4A for biological indicators)	Municipalities SWWT, NGOs with WDNR and MMSD	Low		B	B	B	B	B	B	A	A	A
		3b. Reintroduce native species	3b. Number, type, and life stages of native species observed (see Appendix 4A for biological indicators)	SWWT, NGOs with WDNR and MMSD	Low		B	B	B	B	B	B	A	A	A
		3c. Develop and implement plans for control and removal of non-native and invasive species	3c. Area cleared or tons removed of non-native and invasive species	Municipalities SWWT, NGOs with WDNR and MMSD	Low-Medium		B	B	B	B	B	B	A	A	A
Monitoring and Information	4. Continue monitoring and informational programming	4a. Continue and expand monitoring efforts and inventory maintenance for fish passage, habitat, aquatic organisms, and water quality (especially metals and polycyclic aromatic hydrocarbons (PAHs))	4a. Number of stations established and conditions documented and shared with stakeholders	Municipalities SWWT, NGOs Universities, USGS, SEWRPC, WDNR and MMSD	Low-Medium	B	B	B	B	B	B	B	A	A	A
		4b. Develop new monitoring sites in cooperation with citizen and other monitoring programs and share the knowledge with stakeholders	4b. Number of stations established and numbers of informational programs delivered	Municipalities SWWT, NGOs Universities, USGS, SEWRPC, WDNR and MMSD	Low	B	B	B	B	B	B	B	A	A	A
Recreation	5. Improve recreational opportunities (also see MR-194 in Appendix 4A)	5a. Inventory and maintain existing recreational opportunities	5a. Number of facilities maintained, public access sites	County, NGO's, municipalities, WDNR, local stakeholders	Low		B	B	B	B	B	B	A	A	A
		5b. Develop new and safe recreation opportunities such as linking water and land-based trail systems	5b. Numbers of signs installed to identify unsafe navigational hazards, number of navigational hazards removed or retrofitted, number of new public access sites or facilities created, number of informational signs installed; miles of trails established	County, NGO's, municipalities, WDNR, local stakeholders	Low		B	B	B	B	B	B	A	A	A
		5c. Maintain appropriate water quality conditions and create safe flow conditions conducive to full contact recreation	5c. Number of safe recreation days, number of areas identified as safe for recreation, number of safe exits constructed in confined channels	MMSD, WDNR, NGO's, municipalities, local stakeholders	Medium		B	B	B	B	B	B	A	A	A
Aesthetics	6. Continue removal of trash	6a. Identify source locations and continue and expand trash and debris collection and disposal	6a. Source locations identified, improvement of trash accumulation points in the watershed, and tons of debris identified, collected, and disposed of	Municipalities SWWT, NGOs with WDNR and MMSD	Low-Medium (Skimmer Boat \$1,000,000 for new boat \$150,000 (O&M)); Individual NGO clean up efforts \$35,000/yr/NGO		B	B	B	B	B	B	A	A	A

Footnotes: it is important to note that these instream actions and measures will require permits from the WDNR, municipalities, and/or County.

A. The ultimate measure is whether habitat is improving.

B. Organizations listed are understood to lead or participate with the implementation of the action. For greater detail, see the SWWT membership list in Appendix 5B and SEWRPC's Planning Report No. 50, Tables 93-99, in Appendix 5C.

C. Cost data based on costs developed for SEWRPC's Regional Planning Report No. 50, Appendix R. Cap. = Capital/construction cost; O&M = Operations and Maintenance, cost for concrete removal is based on average of recent MMSD project costs.

D. Relative priority based on 3-tiered approach, described in Appendix 4A, which emphasizes the mainstem, then tributaries, then high quality areas.

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.

LEGEND
A = Highest Priority
B = Next Highest Priority
R = Required by Law
Foundation Action

7.2.4 Priority Actions to Address Nutrients/Phosphorus (Table 7-4)

Excess phosphorus can lead to an increase in weed growth, which results in aesthetic impacts and can reduce dissolved oxygen concentrations at night, which is harmful to fish. When the weeds die, they can produce noxious odors and also reduce the dissolved oxygen concentrations in the water. Potential sources of phosphorus include the following:

- ◆ Non-contact cooling water and any other discharge of treated drinking water (phosphorus compounds) including, lawn watering, car washing and other outdoor activities that utilize and discharge finished municipal water
- ◆ Fertilizers
- ◆ Sanitary sewer overflows
- ◆ Eroding soil (phosphorus is naturally occurring nutrient that clings to soil particles)
- ◆ Private onsite wastewater treatment systems
- ◆ Manure spreading

Table 7-4 presents the identified actions and associated information to address nutrients/phosphorus. As noted above in Section 7.1, implementing these actions will result in significant reduction in nutrient pollution of the watershed and may bring most assessment point areas in line with the impending water quality standard.

Table 7-4: Priority Actions to Address Nutrients/Phosphorus

Kinnickinnic River Watershed

Focus Area: Nutrients - Phosphorus

Implementation Period: 2010 to 2015

Issue: Nutrient impacts on the watershed and discharge of nutrients from the watershed to Lake Michigan

Goal: Reduction of nutrient loads and impacts on water quality such as algae and *Cladophora*

SEWRPC Regional Plan Goal: Pollutant load reduction of phosphorus of entire watershed by year 2020 = 20% or 2,600 pounds per year reduction

What Will Meeting this Goal Accomplish?: Significant reduction in nutrient pollution of the watershed including algae reduction and reduction of nutrient discharges to the Milwaukee Estuary and Lake Michigan

Watershed Targets	Actions	Measures ^A	Primary Land Use the Action Addresses ^B							Responsible and/or Participating Organization ^C	Relative Cost ^D (for implementation of the action in the entire watershed; unit costs shown if available)	Geographic Concentration of Action and Relative Priority ^E											Potential Contribution Toward Achieving Watershed Target & Goal	
			Agriculture	Low Density Residential	High Density Residential	Commercial	Institutional & Governmental	Outdoor Recreation, Wetlands, Woodlands, and Open Space	Transportation			Manufacturing & Industrial	KK-1	KK-2	KK-3	KK-4	KK-5	KK-6	KK-7	KK-8	KK-9	KK-10		KK-11
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	1a. Annual volume and frequency of CSO and SSO	●	●	●	●		●	●	WDNR, MMSD, and Municipalities	High	AR											6% reduction in total watershed loads	
	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)	1b. Required reports and estimates of phosphorus reductions associated with TSS reduction	●	●	●	●		●	●	WDNR and Municipalities	Medium-High (Parking Lot Sweeping \$3,400/acre (O&M) Street Sweeping \$2,500/curb mile (Cap.) \$60/curb mile (O&M) Stormwater Treatment \$32,500/acre (Cap.) \$3,200/acre (O&M))	RD	RB	RD	RD	RA	RB	RD	RC	RD	RC	11% reduction in total watershed loads by 2020		
	1c. Reduce phosphorus loads with State ban of phosphorus in commercial fertilizers	1c. Required reports and estimates of phosphorus reductions	●	●	●	●		●	●	WDNR and Municipalities	Low	D	B	D	D	A	B	D	C	D	C	Estimated 8% reduction in total watershed loads based on literature		
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	2a. Progress on public and private research in the Milwaukee area on development of better technology	Not Applicable							UWM WQI, MMSD, Municipalities, Industries, Milwaukee 7, and NGOs	Medium	A											11% reduction in total watershed loads (if phosphorus from all industrial point sources eliminated) Alternative to phosphorus compounds would have regional, national and global impacts	
3. Reduce phosphorus sources from land-based activities (buffers not recommended in KK watershed in the SEWRPC Regional Plan)	3a. Identify where public ownership of land can serve as a starting point to increase riparian buffers	3a. Number of stream miles with 75 feet-wide buffers or greater where public ownership exists	Not Applicable							Milwaukee County, Municipalities, NGOs, SWWT	Low (Riparian Corridors \$944/acre (Cap.) \$210/acre (O&M))	B											8% reduction in total watershed loads by 2020	
4. Continue overall water quality monitoring to assess progress towards targets and goals (was high priority in the SEWRPC Regional Plan)	4a. Continue MMSD water quality monitoring program and expand it to include biotic sampling	4a. Continue existing level of water quality samples and parameters tested for if justified after annual review	Not Applicable							MMSD, WDNR, USGS, NGO's	Low	A											Fill data gaps	
	4b. Continue involvement of USGS in MMSD Corridor Study	4b. Maintain existing funding level for continued USGS involvement	Not Applicable							USGS	Low	A												
	4c. Coordinate WDNR sampling and monitoring programs with MMSD and USGS and integrate NGO sampling efforts (such as the efforts detailed in Target 1)	4c. Overall data collection program is integrated through the USGS corridor study or other means. SWWT serves as a vehicle to coordinate and prioritize data collection efforts.	Not Applicable							MMSD, WDNR, USGS, NGO's	Low	A												
5. Improved water quality in the Kinnickinnic River Estuary (was medium priority in the SEWRPC Regional Plan)	5a. Renovate KK River Flushing Station to enable the facility to continue to function and maintain dissolved oxygen concentrations	5a. Phosphorus water quality data 5b. Progress toward achieving existing phosphorus water quality standards	Not Applicable							MMSD	Medium	Not Applicable											B Reduces concentration only	

Footnotes:

A. The ultimate measure is whether habitat is improving.

B. Land use types are discussed in Chapter 4 of the WRP. Additional details on land use types can be found in Chapters 1 and 2 of SEWRPC's Technical Report No. 39.

C. Organizations listed are understood to lead or participate with the implementation of the action. For greater detail, see the SWWT membership list in Appendix 5B and SEWRPC's Planning Report No. 50, Tables 93-99, in Appendix 5C.

D. Cost data are provided for guidance only and are based on costs developed for SEWRPC's Regional Planning Report No. 50, Appendix R. Cap. = Capital/construction cost; O&M = Operations and Maintenance

E. Relative priority for Actions 1b and 1c are based on the total nonpoint load per acre

F. This assessment point area is associated with the Kinnickinnic River within the estuary. While not included within the pollutant loading and water quality modeling, this area is incorporated

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.

LEGEND
A = Highest Priority
B = Next Highest Priority
C = Moderate Priority
D = Lowest Priority
R = Required by Law
Foundation Action

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.

7.3 Comments Received on Priority Actions Tables

Watershed Action Team meetings and Science Committee meetings were held in fall 2009 to discuss ongoing development of the WRP for the Kinnickinnic River watershed. Comments were solicited from participants at the meeting and through the postal service, e-mail, and e-forum in regards to the draft Priority Actions tables, which were called the draft Summary Matrix tables at the time. The following sections are intended to outline the comments that were submitted during the development of the Priority Actions tables (indicated in *italics*) and discuss how the comments were addressed or why they were not addressed in the tables.

1) Metals and PAHs

Metals and polyaromatic hydrocarbons (PAHs) are not specifically addressed in the plans and these two parameters are important impairments for fish and wildlife.

While metals and PAHs are not identified for special attention in the WRP, they are expected to be reduced through implementation of the Wis. Admin. Code NR 151 *Runoff Management* requirements. In addition, it is expected that metals and PAHs will be reduced as a result of other actions identified in the Priority Actions tables that reduce stormwater runoff. Because metals and PAHs have not been a specific focus area, nor on the parameter list based on the Science and Policy Committees, and Executive Steering Council discussions, they have not been modeled during this study. Some modeled parameters can be an indicator (such as turbidity) or surrogate (such as total suspended solids [TSS]) of these pollutants, but additional data on these pollutants have not been collected as part of this study. Specific reductions of these pollutants can be measured and investigated in future studies.

Note that hazardous materials assessments should be considered during planning and design of channel renovation and rehabilitation projects; some concrete channels overlay contaminated soils.

It was suggested that the matrix include a monitoring recommendation to specifically address TSS or PAHs/heavy metals. By collecting the relevant data, future plans will have the data needed to address these important pollutants as well. This will facilitate future iterations of the plan to address this better data. Another commenter asked whether polychlorinated biphenyls (PCBs) should also be considered and whether additional monitoring should be added to the recommendations.

Awareness and education efforts related to automobile practices and use of transportation-related chemicals such as antifreeze, motor oil, and fuel could be included and would also benefit from future monitoring data.

These comments were addressed by adding metals and PAHs specifically in the monitoring and information section of Table 7-3. There are also recommendations in the RWQMPSU to maintain and expand monitoring programs. As the implementation process moves forward, additional data gaps will be identified and specific monitoring projects can be conducted to gather the appropriate data.

2) Buffers

There are multiple benefits of buffers and other actions/facilities. Perhaps these are actions that should be focused on first. These projects may be the most likely projects to receive funding.



The use of buffers is recommended in many of the recommended actions. The inclusion of habitat improvements related to land based activities is included in the Foundation Actions table (Table 7-5) and buffers are an element of this action.

3) Activity Champions

The SWWT could select one organization to champion each activity and verify if all other participating organizations were identified in the matrix. There was a desire to have the tables clearly indicate who will do what and how individuals and organizations can help.

Another suggestion was to organize the Summary Matrix tables by implementation group (business/industry, households, etc.). Large institutional stakeholders are responsible for most of the actions on the tables, and it leaves off actions for smaller or individual stakeholders.

The “Responsible and/or Participating Organization” column was included in the tables to indicate which organizations might lead and/or participate in the activities. It will be the responsibility of SWWT to determine which SWWT organizations should be involved and what the roles and responsibilities for SWWT should be for each action. Also, the process of implementing new actions is discussed in Chapter 8. This process includes the designation of a lead organization for any new action.

4) Table Organization

The Summary Matrix (Priority Actions table) and the Foundation Actions table, in particular, could end up causing actions that are not listed to be overlooked and this is not beneficial. It was agreed that the plan will have to label the summaries with disclaimers warning that specific actions are part of an overall plan.

The text and the Foundation Action table were revised to address the concern that WRP readers might only focus on actions listed in the Foundation Actions table. The concern was addressed by clarifying these ‘foundation’ actions are simply predecessor actions that are required to realize the full benefit of other actions intended to improve water quality or habitat within the watershed. Note also that the actions included in the Priority Actions tables are suggestions to be implemented between 2010 and 2015. These actions are a distillation of the recommended actions presented in the RWQMPU, found in Chapter X of Planning Report No. 50 and discussed in Chapters 5 and 6 of this WRP.

One suggestion was that the foundation elements be highlighted within the four focus area tables rather than called out separately in an additional table.

The Foundation Actions were highlighted in the Priority Actions tables.

The importance of the Foundation Actions table (Table 7-5) to serve as a roadmap for the next five years was highlighted, and it was suggested to refine the table now.

There was also a suggestion to combine or connect the cost and benefit columns to serve as an additional measure.

This task was determined to be appropriate for the next level of planning and was not done as part of the WRP.

Another suggestion was to reorganize the tables in the matrix to detail conditions and possible actions for specific sections of each of the 10 major tributaries or sections (assessment point

areas) of the Kinnickinnic River. This would be an additional table for each sub-watershed that identifies conditions and possible actions for specific sections of each of the 10 major sections of the Kinnickinnic River and the feasibility of each action. Actions might include the reduction or elimination of adverse impacts or possible improvements to the existing condition. Simplified headings such as these could be used:

- ◆ *What's there*
 - *Current condition of the watershed and water quality*
 - *Specific areas/conditions/issues of concern (e.g., fecal coliform)*
 - *Factors/uses/condition (parking lots, factories, concrete channels, etc) affecting areas/issues of concern*
- ◆ *Why do we care*
- ◆ *What can be done*
 - *Possible actions to reduce or eliminate adverse impact (remove barrier, implement best management practices)*
 - *Actions to improve existing condition (widen buffer, create recreation access)*
- ◆ *Feasibility of action (cost, politics, efficacy)*

This information can then be combined with other Kinnickinnic tributary tables to show connection to other sub-watershed actions, cost effective coordination, implementation, maintenance, and monitoring.

The consensus of the SWWT committees was to leave the tables organized the way they are. This allows the reader to view multiple assessment point areas at one time. Much of the information discussed above is included in the WRP chapters. Additional information is contained in the RWQMPSU. Some of the more detailed information mentioned above will be gathered in the next phase of implementation when more detailed work plans are developed to conduct specific projects. The more detailed data gathering is beyond the scope of the WRP.

Another suggestion indicated that it would be helpful to use photos, words, and images to shape the vision and illustrate the goals to relate these efforts to how they will impact people's day-to-day lives. Additionally, a narrative, photos, and art would help to paint a vision for people of what the stream might look like when targets/goals accomplished and would help get buy in.

The plan contains maps that depict streams within various contexts, including underground and channelized streams and those that flow within naturalized channels. Maps that indicate the locations of point sources, excessive erosion, as well as other conditions are also included. Most of the maps are provided in Chapter 4 and Appendix 4A.

5) Early Actions

The SWWT should identify and prioritize projects in the watershed that will be able to provide a quick success. Implementing these projects first will maintain and build the momentum of the Kinnickinnic River WAT.

These actions can be determined from Tables 7-1 through 7-5 from Chapter 7, or the overall action lists in Chapter 8.



6) Phosphorus

The SWWT Policy Committee should look into alternatives to adding phosphorus compounds to drinking water. It was suggested the plan include other treatment and water re-use alternatives instead of chemical solutions for dealing with a reduction in the use of phosphorus compounds for the control of lead and copper in drinking water systems.

This is a Foundation Action. It is important to note that the programs and processes that are utilized by water utilities are in response to regulatory requirements and successfully address a significant public health issue.

7) Prioritization Process

Priority is a complex concept involving both an assessment of conditions and values related to those conditions.

The initial versions of Tables 7-1 through 7-4 (Priority Actions tables) describe the greatest need in terms of the technical analysis and current conditions and were revised based on input from the WAT. These initial priority designations can guide the WAT and SWWT as they move forward with implementation. The SWWT committees or chairs have the ability to add the value component and adjust the prioritization accordingly. For example, intervention may be more feasible in some places because of varying factors, opportunities, and synergies creating a context for increasing or decreasing the level of priority for each item. Priorities may be revised over time by the WAT.

Another suggestion indicated that it would be beneficial to generate a list that optimizes available resources, leverages additional resources, and includes an analysis of visibility of potential projects. Additionally, the prioritization of projects as opportunities arise should also be considered.

This action should be discussed by the WAT in the next phase of implementation as discussed in Chapter 8.

Comments also suggested a wider index for prioritization than just A or B. This could increase clarity of priorities (such as using A, B, C, and D) that could differ across the watershed. One comment suggested changing the word “priority” that appears in Column 7.

The prioritization was expanded in Table 7-1 and 7-4 to include A through D. The prioritization in Tables 7-2 and 7-3 remains limited to A and B due to the relatively high prioritization attributed to habitat-based actions. After discussion with the Science Committee, the consensus was to keep the word priority in the “Geographic Concentration of Action and Relative Priority” column as it indicates a preference for where actions should be implemented first. The prioritization can be revised in the future by the WAT.

8) Other Comments by Focus Area

Comments included changes to watershed targets including the refinement of associated actions, measures, and prioritization. Specific comments are summarized below for each focus area and are described based on their position in the matrix (action, measure, and priority).

1) Public Health/Bacteria

Action



- ◆ *The current measures (bacteria) are not the best measure because it doesn't highlight the importance of human waste. Clearly, identifying where human waste is entering our waterways is a high priority.*

Text added in Section 7.2.1 that discusses the issues with using fecal coliform bacteria as an indicator organism and provides recommendations for future actions regarding the identification of unknown sources.

- ◆ *The 52% goal is doing everything in the regional plan; it is possible doing everything on the table still may not get to that number to reach the SEWRPC goal.*

This statement is correct.

Measure

- ◆ *Non-governmental organizations are already doing some of these initiatives. In KK-5, the non-governmental organizations have already found seven outfalls that need to be further investigated between 6th and 27th streets.*

No response required.

Priority

- ◆ *There are sections where it makes sense for the WAT to work on prioritizing. For example, locations where people are using the resource.*

Correct. No response required.

- ◆ *Knowing how many persons are affected in each sub-watershed may help to prioritize areas in the target for increased recreational use.*

This can probably be determined with available information, but it was not done as part of this WRP. It is recommended that this analysis be completed as part of the implementation phase if deemed necessary.

2) *Habitat*

Action

- ◆ *One comment indicated that habitat is an area where best management practices could cumulatively have an impact.*

Correct. No response required.

- ◆ *Salt levels are important and inadvertently missed on the tables. Add salt (chlorides) to habitat land based measures and to the Foundation Actions table.*

Road salt (chloride) reduction has been added to the Chapter 7 Tables.

- ◆ *KK-11 closest to the estuary is the location in the watershed with the most chance for high quality aquatic life with instream enhancements. Until the concrete comes out upstream, it doesn't make sense to spend money on fish passage.*

Concrete removal is a key component for improving fish passage.

- ◆ *KK-4 should be changed so it will be monitored for water quality. It is the airport location, so for instream habitat it is not a priority, but still should be monitored for water quality (edit Table 3 of the matrix).*

Added.

- ◆ *It is difficult in the spreadsheet on habitat to prioritize certain actions in certain areas.*

Agree. The priorities may need to be modified in the implementation phase.

- ◆ *Some instream work should happen in the lower Kinnickinnic (estuary Area of Concern), but otherwise passage and other in-stream work should not be too much of a focus in the Kinnickinnic River watershed until a significant amount of concrete removal occurs. The MMSD's Underwood Creek project's accomplishments are instructive here.*

Concrete removal is a Foundation Action and is a key component for improving fish passage.

Measure

- ◆ *Rain barrels, green roofs, and rain gardens could be added to the table. It may not be realistic to show land purchases as a measure in urbanized areas. The Kinnickinnic Summary Matrix table ought to bump up in importance disconnecting downspouts, rain barrels, rain gardens, etc. above buying land to expand riparian buffers.*

Reducing flashiness, by implementing green infrastructure and other stormwater management practices such as the ones mentioned, is a Foundation Action. Although listed as a high priority, it is acknowledged that purchasing buffers along the KK will be challenging due to the degree of development.

9) Other Miscellaneous Comments

- ◆ *Monitoring -- The focus on monitoring needs could vary by assessment area, depending on water quality, habitat conditions, and land use.*

Agree. This should be considered when developing the monitoring plans during the implementation phase.

- ◆ *The WAT needs to think about how to leverage efforts.*

Agree. This action should be discussed by the WAT in the next phase of implementation.

- ◆ *The blue lines on the map need to be confirmed.*

The maps are based off of data from SEWRPC and are not easily updated. Revisions to the maps can be made, if necessary, as part of an appropriate action during implementation.

10) Goals

Another comment suggested that there be a measure of success on the overall goal to show how well actions are accomplishing a goal. Another comment indicated that the region has a well-established framework for measuring water quality, including the MMSD H2OInfo tool, which is considered valuable.

Monitoring is a recommended action included in the WRP. Data should be reviewed and analyzed, as discussed in Chapter 8, to monitor progress. The MMSD's H2OInfo tool will be a valuable monitoring tool.

Implementation plans should include a monitoring component.

Monitoring is a recommended action included in the WRP.

11) Funding

Obtaining future funding and investment would be facilitated by developing a specific plan. The use of mapping to identify problem areas would also improve chances for future funding.

The appendices in Chapter 4 contain numerous maps. Additional map files can be obtained through SEWRPC and MMSD.